PROVINCE OF BRITISH COLUMBIA

FOURTEENTH ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

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1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

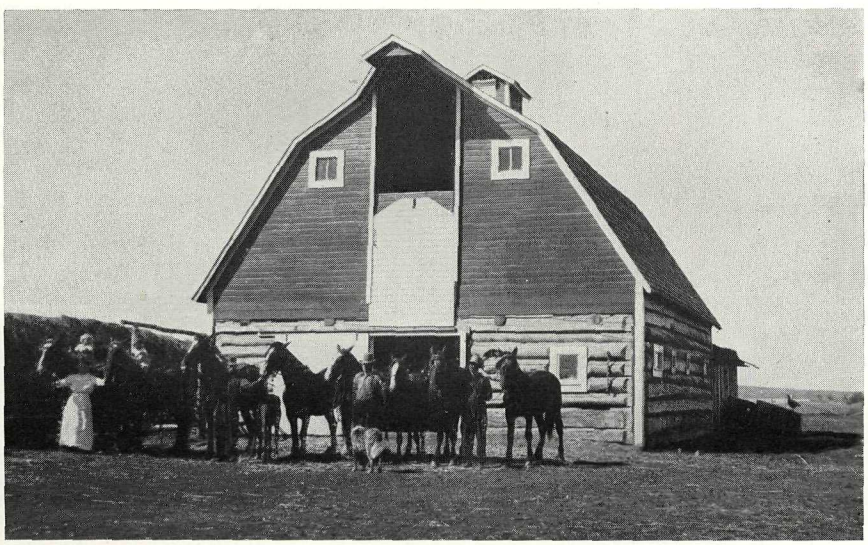
I have the honour to submit for your consideration herewith the Annual Report of the Department of Agriculture for the year 1919.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., March 9th, 1920.



Horses and barn. J. Taylor, Rolla, Peace River, B.C.

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BRITISH COLUMBIA DEPARTMENT OF AGRICULTURE.

BRANCHES AND CHIEF STAFF MEMBERS, YEAR 1919.

Minister of Agriculture:
Hon. E. D. BARROW, M.P.P.

Deputy Minister:
Dr. D. WARNOCK, V.S., O.B.E.

Departmental Secretary:
WM. J. BONAVIA.

Statistician:
G. H. STEWART.

Horticultural Branch:

B. HOY, B.S.A., Assistant Horticulturist and Inspector of Fruit Pests (Vernon).
E. W. WHITE, B.S.A., Assistant Horticulturist and Inspector of Fruit Pests (Victoria).
E. C. HUNT, B.S., Assistant Horticulturist and Inspector of Fruit Pests (Nelson).
W. H. ROBERTSON, B.S.A., Assistant Horticulturist and Inspector of Fruit Pests (Victoria).
W. T. HUNTER, B.S.A., District Field Inspector (Penticton).
J. TAIT, District Field Inspector (Summerland).
H. H. EVANS, District Field Inspector (Vernon).
C. R. BARLOW, District Field Inspector (Salmon Arm).
C. B. TWIGG, B.S.A., District Agriculturist and Inspector (Creston).
G. L. FOULKES, Secretary.

Imported Fruit and Nursery Stock Inspection Branch:

W. H. LYNE, Chief Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vanc.).
D. GAVET, Assistant Inspector of Imported Fruit and Nursery Stock, Rice, etc., (Vanc.).
W. J. GRAHAM, Assistant Inspector of Imported Fruit and Nursery Stock, Rice, etc., (Vancouver).
H. F. OLDS, Assistant Inspector of Imported Fruit, Vegetables, Rice, etc., (Vancouver).
M. L. BIRD, Assistant Inspector of Imported Fruit, Vegetables, Rice, etc. (Vancouver).

Plant Pathology and Entomology Branch:

J. W. EASTHAM, B.Sc., Plant Pathologist (Vancouver).
M. H. RUHMANN, Assistant Plant Pathologist (Vernon).
E. W. BUCKELL, Field Assistant (Vernon).

Markets Branch:

R. C. ABBOTT, Coast Markets Commissioner and Inspector in Charge of Exports (Vancr.).
H. GUTTERIDGE, Assistant Potato Inspector (Vancouver).
J. A. GRANT, Prairie Fruit Markets Commissioner (Calgary).

Live Stock Branch:

W. T. MCDONALD, M.S.A., Live Stock Commissioner (Victoria).
J. R. TERRY, Chief Instructor in Poultry-raising (Victoria).
H. E. UPTON, District Instructor in Poultry-raising (New Westminster).
W. NEWTON, Soil and Crop Instructor (on special leave of absence).
G. C. HAY, B.S.A., District Agriculturist (Kamloops).
DR. A. KNIGHT, V.S., Chief Veterinary Inspector (Victoria).
DR. S. A. K. WHITE, V.S., Assistant Veterinary Inspector.
DR. W. W. ALTON, V.S., Assistant Veterinary Inspector.

Live Stock Branch—Continued.

DR. B. R. ILSLEY, V.S., Assistant Veterinary Inspector.
DR. D. B. MCKAY, Assistant Veterinary Inspector.
DR. W. T. BROOKS, Assistant Veterinary Inspector.
DR. M. SPARROW, Assistant Veterinary Inspector.
DR. J. D. MCDONALD, Assistant Veterinary Inspector.
R. J. FERRIS, Silo Demonstrator.
W. H. STROYAN, Poultry Caretaker.
GEO. PILMER, Brand Recorder.
R. CAHILTY, Brand Inspector.
J. W. MCKINLEY, Foreman, 105-Mile Experimental Station.
C. PHELPS, Foreman, Quilchena Experimental Station.

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T. A. F. WIANCKO, Dairy Instructor and Inspector.
E. RIVE, Milk-tester.
J. B. WATSON, Milk-tester.

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F. D. TODD (Victoria).
L. HARRIS (Vernon).
W. H. TURNBULL (Lower Mainland).
A. W. FINLAY (Lower Mainland).
A. KEIR (Lower Mainland).

Publications Branch:

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Household Science Branch:

MISS OLIVE HAYES, Provincial Instructor and Demonstrator.

General:

A. H. SHOTBOLT, General Assistant.
D. E. MACKERETH, Carpenter.

Accountant's Branch:

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R. E. MITCHELL, Assistant Accountant.
C. P. L. PEARSON, Assistant Accountant.

Clerical:

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R. MURRAY.
A. J. HOURSTON.
D. JOHNSON.
E. A. BOXALL.
E. DRUMMOND.
V. J. F. BABINGTON.
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N. EVANS.
G. HAWES.
M. G. BURNYEAT.
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V. M. BRAKES.
M. LANDER.
A. P. WOODWARD.
K. MCRAE.
M. WALSH.
L. LEES.
F. M. LAWSON.

Women's Institutes:

MRS. V. S. MACLACHLAN, Secretary.

Ploughing in the month of February in the Lower Fraser Valley.

Cutting oats on Lulu Island, New Westminster District.

REPORT OF THE DEPARTMENT OF AGRICULTURE.

REPORT OF THE DEPUTY MINISTER OF AGRICULTURE.

D. WARNOCK, V.S., O.B.E.

Hon. E. D. Barrow,
Minister of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith the report of the Department of Agriculture for the year 1919.

AGRICULTURAL CONDITIONS.

Following a mild winter, the spring of 1919 opened rather late and cool. The condition of the soil for early seeding was good, and ample rainfall induced a strong vegetation, which up till the end of June gave every indication of a heavy yield of hay and grain. Later, however, the precipitation was much below normal, resulting in very poor hay-crops in many areas of the Province, particularly in the Southern Interior. On Vancouver Island and the Lower Mainland the yield of hay was satisfactory. Grain-crops, too, suffered to some extent from drought, but were harvested in excellent condition and the quality of grain was good. In Central British Columbia crops were heavy, but the early advent of winter interfered with threshing operations and some of this work remains to be done in the spring. In spite of dry weather conditions, potatoes yielded a fair crop, but in the early fall met a slow demand at comparatively low prices. Later in the season, owing to the losses sustained by growers in the Prairie Provinces through the early onset of below-zero weather, there was a strong demand for British Columbia potatoes in Prairie markets and prices rapidly advanced. Southern buyers, too, have taken large quantities, with the result that the available supply of potatoes in the Province is much short of requirements and prices are extremely high.

ASSISTANCE TO STOCK-OWNERS IN DROUGHT-AFFECTED AREAS.

Towards late summer representations were made to the Department by stock-owners at a number of points in the Southern Interior to the effect that owing to prolonged drought there was a serious shortage of winter feed, and unless some relief could be afforded in procuring supplies of fodder from outside sources many owners would be compelled to sacrifice their stock. The situation was at once investigated by W. T. McDonald, Live Stock Commissioner, and his report confirmed the representations made by stock-owners.

At that time negotiations were in progress between the Provincial Governments of Alberta and Saskatchewan, the Federal Government and railway companies, for the purpose of formulating a plan to render assistance to stock-owners in the drought-stricken areas of the Prairie Provinces, and your Department made application to have British Columbia included, which was agreed to. Early in October winter set in with unprecedented severity on the Prairies; the situation became very alarming, as cattle had to be hand-fed much earlier than usual or had been anticipated, and local hay-supplies were rapidly being consumed. It was evident that the inadequate supplies of fodder on hand would not last long and it would be necessary to ship large quantities of hay into Alberta from Eastern points. Realizing that if severe winter conditions continued in the Prairie Provinces there would be little hay available from that source for the use of British Columbia stock-owners, your Department recommended that an independent policy of assistance to stock-owners be adopted to facilitate the procuring of hay, and this was authorized by the Government about the end of October. The policy in operation permits properly accredited stock-owners who met with crop-failures through drought to purchase fodder wherever they can procure it, the Government refunding one-third the amount of transportation charges on validation of the freight bills in the Department. Printed application forms furnished by the Department must be filled in by the applicant, stating the number of cattle, sheep, and work-horses owned by him, signed before a Commissioner for Oaths, countersigned by the local bank manager or clerk of the municipality, and returned to the Department with the receipted freight bills before a refund can be made. Many stock-owners who experienced crop-failure (some for the second time in two years) have availed themselves of the assistance offered,

and have been enabled to carry over the winter much valuable stock which, had help been denied, they would have been compelled to sacrifice.

LIVE STOCK.

Cattle.—Owing to the extreme drought conditions which prevailed in Southern Alberta last summer thousands of cattle from the ranching districts south of Calgary were thrown on the market, and farmers and stockmen of this Province availed themselves of the opportunity to purchase desirable stockers at greatly reduced prices. In addition to cattle purchased, many herds were shipped into Central British Columbia over the Grand Trunk Pacific Railway by Alberta stockmen, and much of the surplus fodder harvested in the recently settled areas has been fed to these cattle. Considerably more than 100 car-loads of cattle were shipped into Central British Columbia last autumn via Edmonton, and, in addition, many herds were driven into the Peace River country. The Department is in receipt of numerous inquiries from Prairie stockmen regarding suitable grazing areas in this Province, and there is every indication of a substantial increase in the number of cattle in the Province in the near future.

Prairie breeders of pure-bred stock, too, are becoming impressed with the advantages offered in British Columbia, and a number are investigating with a view to transferring a portion of their herds to this Province. The show and sale of bulls, principally of beef type, organized by the British Columbia Stock-breeders' Association, and held at Kamloops on March 25th last, was a great success. Alberta breeders exhibited a number of pure-bred Shorthorn and Hereford bulls and heifers which captured many prizes and sold at satisfactory prices, while the event proved an excellent advertising medium for the Province, as evidenced by the fact that a few months later some prominent Alberta owners had secured locations in the Okanagan Valley and had transferred some of their best breeding stock for the purpose of establishing registered herds. Provincial stockmen are beginning to realize the importance of good blood, and last fall a car-load of registered Aberdeen-Angus bulls and heifers was purchased in Manitoba by the Land Settlement Board and resold to ranchers in the Aspen Grove District. With more pure-bred herds in the Province and better facilities afforded for the purchase of registered sires, it is hoped that the scrub bull will be eliminated to a great extent, and the Department is preparing to conduct an educational campaign along this line.

Horses.—In spite of the great development of motor-traction, good heavy draught horses still command high prices and can be raised at a profit to the breeder. At the moment there is a decided reaction in favour of horse-traction, which is partly explained by the increased cost of motor-tractors as well as steadily advancing cost of maintenance and operation. Wideawake horse-breeders in the Western Provinces are already restocking their farms and ranches with mares and stallions of the best heavy draught type that money can buy, and are confident that the future of the industry is bright. Several Alberta and Saskatchewan owners of studs of heavy horses are looking for land suitable for horse-breeding purposes, with the intention of moving to British Columbia if desirable locations can be secured at reasonable prices. The small nondescript horse is now, practically speaking, valueless, and the breeding of such ought to be discouraged in every possible way, so that valuable grazing areas may be conserved for more profitable live stock.

Sheep.—Owing to drought conditions of the past season in the sheep-grazing areas south of the International Boundary, as well as in the Provinces to the east, numerous inquiries have been received from flockmasters concerning facilities offered in this Province. Several large owners from outside points have visited the Southern Interior, Vancouver Island, and the Central Interior investigating range conditions, and there are indications that the number of sheep in the Province will be materially increased during the coming year. Last summer some thousands of sheep were brought into the East Kootenay District from Alberta, but were shipped out again when winter set in.

Hogs.—In spite of the high cost of feed-grain and the attempt of the Board of Commerce Commission to fix the price of bacon, there has been an increase in the number of hogs in the Province, although at one time many breeders and feeders in face of discouraging conditions threatened to go out of business. With the Canadian Wheat Board endeavouring to increase the price of feed-grain on one hand, and the Board of Commerce forcing lower prices for hog products on the other, feeders for a time could see little profit in the business and many curtailed operations. In October last the Canadian Wheat Board ordered an extra charge of 10 cents per

bushel, approximately $3.35 per ton, on all feed-wheat shipped into British Columbia, which was a serious handicap to hog-feeders, poultrymen, and other buyers of low-grade wheat. On learning of this impost your Department at once took the matter up with the Wheat Board at Winnipeg, protesting what appeared to be discrimination against the live-stock interests of this Province, and after a week of negotiation the Chairman of the Board cancelled the order.

Goats.—This industry has made much progress during the past year, and it is estimated that there are now 3,500 milch goats in the Province, these providing much of the supply of dairy products in many homes. The many interesting exhibits of milch goats seen at the Victoria Home Products, Vancouver, and New Westminster Exhibitions last fall attracted much attention, and bulletins on goat-keeping issued by the Department are in much demand.

Poultry.—Poultry-raising has developed in a remarkable degree notwithstanding the high price of feed during the past year. Returned soldiers seem to favour this industry and many are investing in poultry-farms under assistance from the Soldiers' Settlement Board, although the high cost of feed will necessitate careful management if poultry-keeping is to be made a success. The report of J. R. Terry, Chief Poultry Instructor (attached hereto), includes a comparative table showing the increased cost of feed from 1913 to 1919. Poultry-breeders are taking much interest in the Egg-laying Contests now conducted in the Province, and valuable lessons are learned. Under present conditions, only by skilful management and rigorous "culling-out" of unproductive birds can the business be made profitable. The two poultry experts of the staff are extremely busy owing to the many calls for advice, and additional instructors are urgently required.

VETERINARY INSPECTION AND HEALTH OF ANIMALS.

On the whole, the general health of animals in the Province is excellent. During the year the officers of the Veterinary staff visited 2,068 premises and subjected 14,400 cattle to the tuberculin test, of which 573 reacted, and of the latter 445 were at once slaughtered, the remainder being held for retest. The percentage of reactors is comparatively low, and the health of British Columbia dairy stock will compare favourably with that of the stock of any other Province in the Dominion. All classes of live stock have been very free from outbreaks of contagious disease, and it is to be hoped that the contagion of cattle-mange has not been introduced through the many importations of range cattle from Alberta. However, every precaution was taken; all importations were carefully examined by Federal Veterinary Inspectors before being allowed to leave Alberta, while cattle from suspected ranges were dipped twice at intervals of ten days before shipment was permitted. But for these restrictions and risk of bad effects from dipping late in the season many more cattle would have been purchased in Alberta by British Columbia stockmen. It is hoped that other Provinces will, in the near future, co-operate with British Columbia in the endeavour to stamp out bovine tuberculosis, as new importations are a constant menace. The "accredited herd" plan for pure-bred dairy cattle now being established by the Federal Department of Agriculture is a step in the right direction, but Dominion-wide compulsory application of the test to all dairy cattle under supervision of the Federal Health of Animals Branch is, in my opinion, the only satisfactory method of combating tuberculosis. Recently, Provincial Veterinary Inspectors have been called upon to apply the test to dairy cattle about to be purchased by the Soldiers' Settlement Board, and, as the calls are generally urgent, the regular work of inspection is interfered with to some extent. Two additional Inspectors were appointed during the year, but others are required for the Central Interior districts.

DAIRYING.

This important industry has had to cope with some adverse circumstances, such as reduced yields of hay, root, and corn crops and high prices of mill-feeds. Subsequent to the removal by the United States of the embargo against the importation of Canadian wheat much of that grain has crossed the International Boundary, and as a consequence there is a shortage of by-products and prices have advanced. Prices of dairy products have been satisfactory to producers and there has been a large export trade. The industry is developing and there is a growing demand for good dairy stock. Last fall buyers from Central British Columbia visited the older districts of the Lower Mainland and made extensive purchases of dairy cattle for shipment north, but found difficulty in procuring enough to meet their requirements. Steps are

being taken by the Department to establish two creameries in Central British Columbia next spring. Henry Rive on his return from overseas service in July last was appointed Dairy Commissioner, and under his direction new Cow-testing Associations are being formed. Much valuable information is derived from systematic cow-testing, and through records revealed owners are enabled to eliminate unprofitable animals. Much improvement in the quality of British Columbia butter has been noted, due to improved methods and greater care in butter-making.

HORTICULTURE.

Fruit-growers have had a very successful year, although they had to contend with adverse circumstances, such as the acute sugar shortage, box shortage, and other disabilities. From early summer sugar was difficult to procure in quantity sufficient to meet domestic requirements and there was little available for fruit-preserving purposes. In the early season growers themselves much underestimated the prospective fruit yield, and this error was responsible in a measure for the inadequacy of the box-supply in the late packing season. The box shortage, inadequate temporary storage facilities, and difficulty in procuring sufficient cars to transport the enormous apple-crop, all contributed towards late picking and indirectly caused considerable loss to growers. On October 10th and 11th a cold wave of unprecedented severity at that time of year struck the Okanagan Valley and ruined apples to the extent of thousands of boxes which were yet on the trees. From the experience of last year it would appear as if owners of large apple-orchards would be wise in providing more adequate temporary storage warehouses on their premises to meet emergencies which are likely to be costly. In April, 1919, Jas. A. Grant, Prairie Markets Commissioner, visited a number of the larger cities in the British Isles for the purpose of studying market conditions. As a direct result a number of leading wholesale fruit merchants visited British Columbia during the picking season and purchased freely, besides arranging to handle quantities of British Columbia fruit on commission on terms satisfactory to growers. During the season many car-loads of apples were exported to Great Britain, New Zealand, and other countries at remunerative prices, while the Prairie markets derived a large proportion of their supply from this Province. Last summer Superintendent Denison, of the Dominion Meteorological Service, visited the fruit-growing districts of the Southern Interior, collecting data with a view to formulating a plan for establishing frost-warning stations, which, it is thought, will be of great value in forecasting summer frosts sufficiently in advance to enable fruit-growers to take precautions towards guarding against damage. Mr. Denison is now endeavouring to perfect a plan in conjunction with Dominion and United States meteorological authorities.

FIELD-WORK.

During 1919 officers of the Horticultural Branch have been exceedingly busy and have accomplished much valuable work in the control and eradication of fruit pests and diseases. In the Okanagan Valley Ben Hoy and his staff carried out a very energetic campaign from the beginning of May till the end of November against the ravages of codling-moth, which is perhaps the most dangerous pest in that district. Approximately 223 acres of moth-infested orchards were dealt with under the supervision of Field Inspector H. H. Evans and good progress is reported.

In August last W. H. Robertson returned from overseas service, and on September 1st, although barely convalescent from the effects of a severe wound sustained in France, he returned to duty, taking charge of the Lower Mainland, relieving E. W. White of that area and enabling the latter to devote more attention to field and experimental work on Vancouver Island, where he has been investigating methods of rehabilitating strawberry-soils badly infested with strawberry-root weevil. The voluminous reports appended hereto by members of the Horticultural staff contain much interesting information.

HOUSEHOLD SCIENCE BRANCH.

This Branch was established in January, 1919, with Miss Olive E. Hayes as Provincial Instructor of Household Science. During the year many short course and lecture demonstrations in connection with Women's Institutes were held in various districts of the Province and were much appreciated. Exhibits demonstrating relative values of foods were displayed at New Westminster Exhibition and Victoria Home Products Fair under direction of Miss Hayes, and these attracted much attention. These demonstrations are very popular, and managers are already asking for displays at exhibitions to be held during 1920.

LAND SETTLEMENT.

Many new settlers have secured locations along the Grand Trunk Pacific Railway in Central British Columbia, and many more will follow. These consist largely of pioneer farmers from the Prairie Provinces who have sold their farms at good prices owing to the increased demand for farm lands, and are attracted by the cheap and fertile lands of the Central Interior. The majority of these settlers are possessed of capital, understand the management of Prairie lands, and will make good. They are the class of settler the Province needs and will greatly assist in increasing agricultural production.

In 1919 the Province was visited by several eminent agricultural authorities from the United Kingdom, including Sir John Keen, Bart., and Christopher Turnor, Esq., the latter following up the work begun by Sir Rider Haggard. Mr. Turnor farms a large acreage in England and was Chairman of one of the Agricultural Committees in connection with the Greater Production Campaign in Britain during the war. Sir John Keen is prominent in agricultural circles in Ireland and is considered to be one of the leading authorities. Both gentlemen spent considerable time in the Province, visited many districts, investigating potentialities from an agricultural standpoint, and were much impressed with the opportunities offered for the settlement of British ex-service men.

THE AGRICULTURAL JOURNAL.

The *Journal* is becoming more and more appreciated and its circulation is now 8,500 monthly. It is well known beyond the boundaries of the Province and complimentary references by correspondents are not infrequent.

SCARCITY OF AGRICULTURAL EXPERTS.

Much difficulty is met with in securing the services of properly qualified agricultural experts. During the war many students of agriculture enlisted and graduating classes have been small in numbers for several years. Technical men possessing practical experience are much sought after, both in Canada and the United States, and the supply is not nearly equal to the demand. Soldier settlement organizations in all Provinces, from Ontario West to the Pacific, are strong competitors with Departments of Agriculture for the services of good fieldmen, and there is likely to be a scarcity for some time.

Appended hereto are the reports of heads of branches and staff officials outlining in detail their respective activities.

Respectfully submitted.

D. WARNOCK,
Deputy Minister.

REPORT OF SECRETARY FOR THE DEPARTMENT OF AGRICULTURE.

WM. J. BONAVIA.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my report on the general work of the Department for the year ending December 31st, 1919.

STAFF.

The Estimates for the fiscal year ending 31st March, 1920, provided for fifty-two permanent officials of all ranks, being an increase of four over those for the preceding year. No appointments, however, were made for the office of Provincial Horticulturist or Agricultural Organizer. The year has again been marked by a considerable number of appointments to the staff, but fewer resignations than in 1918; the actual figures being twenty-four and five respectively.

APPOINTMENTS.

Date.	Name.	Appointment.	Remarks.
Jan. 1	Miss O. E. Hayes ...	Demonstrator, Domestic Science ...	
„ 24	Miss L. Lees	Stenographer	
Feb. 14	Miss M. Walsh	„	
March 4	G. H. Stewart	Clerk	Reinstated on return from overseas.
„ 17	T. M. Anderson	Acting District Field Inspector (Kelowna)	
„ 24	Miss M. Lauder	Stenographer (Kamloops)	
April 1	Dr. D. W. Warnock ..	Deputy Minister	
„ 4	F. J. Fleury	Clerk	Reinstated on return from overseas.
May 1	Miss E. W. Drummond	Stenographer	
June 6	Miss G. Lindsay	„	
„ 6	Miss V. Brakes	„	
„ 25	Jas. J. Mowat	Clerk (Vernon) (part time).	
July 2	E. A. Raines	Messenger	
„ 7	H. A. Brown	Veterinary Inspector	[overseas.
„ 14	H. Rive	Dairy Commissioner	Reinstated on return from
„ 16	L. Francis	Clerk	Ditto.
Aug. 4	J. C. McDonald	Provincial Veterinary Inspector	
Sept. 1	A. S. Rankin	Supervisor, Cow-testing (Dewdney).	[overseas.
„ 1	W. H. Robertson	Assistant Horticulturist	Reinstated on return from
„ 1	G. L. Foulkes	Clerk	Ditto.
„ 12	M. L. Bird	Assistant Inspector of Fruit Pests ..	„
Oct. 20	D. Johnson	Clerk	„
Dec. 1	C. B. Twigg	District Agriculturist and Field Inspector (Creston)	
	Miss A. P. Woodward	Stenographer (Duncan) (part time)	

Resignations.—The following resignations took place; G. H. Thornbery, Cow-tester, Courtenay, being granted leave of absence from October 31st, 1919:—

Date.	Name.	Appointment.	Remarks.
July 19	E. W. Hogan	Soil and Crop Instructor (Victoria)	Gone to Mexico.
„ 31	K. W. Munson	District Field Inspector (Chilliwack)	Taken up fruit-farming.
Aug. 2	H. A. Brown	Veterinary Inspector	
Oct. 22	L. Francis	Clerk	Gone to England.
„ 31	G. H. Thornbery	Cow-tester	Granted leave of absence.
Nov. 30	F. J. Fleury	„	Taken up farming.

Temporary Appointments.—A total of 130 temporary appointments were made during the year, as against seventy-five in 1918; twenty-two appointments being made under the provisions of the "Agricultural Instruction Act."

Provincial Estimates—		
Inspectors, Brands	1	
„ Imported Fruit	20	
„ Nursery Stock at Vancouver	5	
„ District Field Inspectors, Control of Fruit Pests, etc.	42	
Judges, Fall Fair Associations	24	
Women's Institute Lecturers, etc.	2	
Departmental exhibits	7	
Temporary clerical and stenographic work	7	
	—	108
"Agricultural Instruction Act"—		
District Agriculturist	1	
Assistant Horticulturist	1	
District Fruit Inspectors	2	
Foremen at Dry Farms	2	
Silo Demonstrator and Editor of *Agricultural Journal*	1	
Caretaker, Egg-laying Contest	1	
Supervisors, Cow-testing Associations	3	
Testers	4	
Assistant Plant Pathologist	1	
Assistant Entomologist	1	
Stenographers	4	
Messenger	1	
	—	22
Total		130

CORRESPONDENCE.

A total of 9,755 letters were received in this office, as against 8,390 in 1918, and 7,547 dispatched. A considerable increase was noted in the correspondence relating to Agricultural and Co-operative Associations. The correspondence for this section shows an increase of 31 per cent. over that of the previous year.

Appendix No. 1 shows the whole correspondence received and sent out from the Department at Victoria.

Circular Letters.—The total number of circular letters sent out during the year was 39,675, this being almost a 50-per-cent. increase over the figures for the previous year. For convenience these circulars have been grouped as per attached list:—

Agricultural Associations	425
Dairy Division	3,530
Farmers' Institutes	7,210
Goat-breeders' Association	6,480
Horticultural Branch	600
Miscellaneous	9,715
Poultry Branch	4,125
Stock-breeders' Association	655
Statistics Branch	1,745
Soil and Crop Division	150
Women's Institutes	5,040
Total	39,675

PUBLICATIONS.

There was a considerable increase in the issue of new publications and reprints during the year, there being an exceptional demand from persons both in the Province and intending settlers from other parts of the Dominion and the United States. The monthly publication of the Department, the *Agricultural Journal*, is also now well established as the leading farm journal for the Province; the total number of copies for the year being 84,700, the average monthly

circulation being 7,058 copies, or an increase of 16 per cent. over the circulation in 1918. The new publications issued were as follows:—

Date.	Name.	Description.	No.
1918.			
Dec. 9	Bulletin No. 23 and Maps ..	Handbook of British Columbia	5,000
1919.			
Jan. 7	Dept. Circ. No. 22	City and Suburban Food Production, 1918	1,000
,, 16	Insect Notes	For Year 1918	300
,, 21	Circ. No. 51	Orchard Cover-crops	1,000
Feb. 15	Farmers' Institute Report ..	District A Conference	250
,, 25	Circ. No. 20	Instructions *re* keeping Records of Farm Products	200
,, 25	Bulletin No. 81	Boys' and Girls' Competition, 1919	1,500
March 8	Agric. Dept. Circ. No. 23 ...	Honey Production in 1918	2,000
,, 18	Circ. Nos. 24, 25, and 26 ...	Household Science Branch, *re* Food for Children	3,000
,, 29	Bulletin No. 82	Agricultural Statistics for 1918	1,000
,, 31	Report	Department of Agriculture, 1918	1,000
April 15	Bulletin No. 27 (4th Ed.) ..	The Climate of British Columbia	5,000
,, 26	Circ. Bulletin No. 23	Peas and Oats for Silage	4,000
,, 28	Farmers' Institute Report ..	Also Meeting with Agricultural Committee	500
May 22	Agric. Dept. Circ. No. 28 ...	Fruit: Selection and Preparation of Plate Exhibits	1,000
,, 22	Agric. Dept. Circ. No. 27 ...	Fruit: Standards of Perfection	1,000
June 2	Booklets	The Co-operative Farmers' Institute of B.C.	2,500
,, 12	Agric. Dept. Circ. No. 29 ...	Hints to Exhibitors at Fall Fairs; Box Fruits, etc.	500
,, 13	Report	Agricultural Fairs Associations, 1918	500
,, 14	Bulletin No. 83	Preservation of Food, etc.	20,000
July 22	Bulletin No. 30 (4th Ed.) ..	Guide to Bee-keeping	4,000
Aug. 1	Farmers' Institute Report ..	Agricultural Conference held at Smithers	500
,, 7	Bulletin No. 1	Handbook of B.C. for Toronto Exhibition	3,000
,, 8	Circ. Bull. No. 4 (2nd Ed.)	Management of Turkeys	1,500
,, 12	Handbook of B.C.	1919 Edition	2,000
,, 13	Hort. Circ. No. 53	Selection of Orchard Sites, etc.	2,500
,, 13	Circ. Bulletin No. 24	Poultry-culling Demonstrations and Appliances ...	2,000
Sept. 5	Leaflets	*Re* Fire-blight	1,000
,, 8	Hort. Circ. No. 31 (2nd Ed.)	Peach-twig Borer	2,500
,, 8	Hort. Circ. No. 36 (2nd Ed.)	Onion-thrips	2,500
,, 9	Agric. Dept. Circ. No. 30 ..	Milk, the Protective Food	4,000
,, 26	Circ. No. 30	Milk, the Protective Food	3,000
,, 27	Circ. Bull. No. 19 (2nd Ed.)	Poultry Rations, etc	5,000
Oct. 1	Bulletin No. 39 (3rd Ed.) ..	Natural and Artificial Brooding and Incubating ..	5,000
,, 14	Circ. Bull. No. 11 (3rd Ed.)	Poultry-keeping on a City Lot	7,500
,, 20	Bulletin No. 26 (6th Ed.) ..	Practical Poultry-raising	10,000
Nov. 24	Circ. No. 14	Community Breeding	500
Dec. 12	Bulletin No. 71 (2nd Ed.) ..	Butter-making on the Farm	5,000
,, 15	Hort. Circ. No. 54	Loganberry Culture	10,000
,, 24	Hort. Circ. No. 59	Rose Culture	2,000

Bulletins and Circulars dispatched during the Year.—The grand total of all publications sent out from the Department through the mails or personally delivered to callers was 144,605, as against 50,000 in 1918. This big increase was partly due to the number of publications distributed at the Toronto National Exhibition, and also at the Provincial Exhibition, which was again held at New Westminster.

FINANCIAL.

The appropriations for this Department for the fiscal year ending March 31st, 1920, amounted to $271,334. It was found necessary, however, to supplement certain votes at the close of the year by special warrants, as follows:—

Inspection and Fumigation of Imported Fruit and Nursery Stock	$ 3,500
Agricultural Fairs, etc.	3,000
Women's Institutes, etc.	3,500
Departmental exhibits	1,500
Total	$11,500

To do this must be added the sum of $7,786, being the total additional moneys required in connection with the payments of bonuses and increases of salaries to officials based upon the

regrading under the "Civil Service Act," making the grand total of appropriations for the Department $290,620, as against $243,320.10 for the previous fiscal year, or a total increase of 16.2 per cent.

The gross receipts of the Department for the calendar year amounted to the sum of $116,471.97, the strictly revenue receipts being $41,419.85; the latter being a considerable decrease as compared with 1918 owing to the closing-down of the Frondeg Farm. (*See* Appendix No. 2 for comparison of sums voted for the Department.)

"*Agricultural Instruction Act, 1919-20.*"—The following payments were received during the year from Ottawa:—

January 23rd, 1919, balance due from 1917-18	$ 5,250 00
May 14th, 1919, second portion of 1918-19 grant	34,599 53
November 20th, 1919, advance on account 1919-20 agreement	10,000 00
Total	$49,849 53
Credit balances, January 1st, 1919	15,233 39
Miscellaneous refunds during 1919	8,175 88
Overdraft at close of 1919	6,337 21
Total	$79,596 01

The expenditure under the various sections of the "Instruction Act" were as per attached statement:—

Quarter ending March 31st, 1919	$21,091 23
" June 30th, 1919	28,080 62
" September 30th, 1919	15,270 40
" December 31st, 1919	15,153 76
Total	$79,596 01

It will be noted that the total, $79,596.01, exceeds the expenditure during 1918 by $11,046.49. This has resulted in our commencing the year 1920 with an overdraft of $6,337.21. The total number of cheques drawn on the special account at the Canadian Bank of Commerce was 1,272.

Seed-grain Refunds.—The matter of refunds has engaged the attention of the Department throughout the year, and in the fall a letter was addressed to every person whose name was recorded as receiving seed-grain either in 1915, 1917, or 1918. The results with regard to the 1918 distribution have been very satisfactory. This is largely due to a lien upon the property of persons to whom seed was supplied having been registered. Where there is no security, as in 1915 and 1917, the requests from the Department have met with practically no response, and stricter measures will have to be devised if the sums outstanding at the close of the year are not to be bad debts.

The following figures show the total seed-grain refunds during the calendar year:—

Seed-grain distribution, 1915	$ 294 73
" " 1917	281 53
" " 1918	10,755 67
Total	$11,331 93

Amounts on account of seed-grain outstanding at the end of 1919, so far as departmental records show, are as follows:—

Promissory note, not including interest, 1915	$ 5,660 30
" " 1917	2,909 49
" " 1918	10,422 45

BRITISH COLUMBIA STUDENTS.

Reports from the Bursar of the Ontario Agricultural College at Guelph showed that four British Columbia students who had enlisted for overseas service during the war had now returned to complete their courses. There is also a considerable increase noted in the number of young ladies taking the Teachers' Course in Home Economics, there being four entries at O.A.C., four at the University of Toronto, and one at the Manitoba College.

The following were the students to whom grants were paid:—

Ontario Agricultural College, Guelph.—Miss C. E. Maxwell, 702 Fourth Avenue, New Westminster, Home Economics, Second-year Course, Junior Normal; Miss B. S. Dickinson, Duncan,

Home Economics, Second-year Course, Senior Normal; Miss M. Grant, 1100 Sixth Avenue West, Vancouver, Home Economics, Second-year Course, Senior Associate; Miss G. Rebbick, care Mrs. Mahon, 1001 Seaton Street, Vancouver, Home Economics, Second-year Course, Senior Associate; H. R. L. Davis (returned soldier), Langley, Agriculture, Second-year Course; A. Fulton (returned soldier), Lumby, Agriculture, Third-year Course; J. C. Roger (returned soldier), Summerland, Agriculture, Fourth-year Course; E. C. Hessel (returned soldier), Vernon, Agriculture, Fourth-year Course.

University of Toronto.—Miss K. Drew, New Westminster, Home Economics, Second-year Course; Miss M. E. Gilley, New Westminster, Home Economics, Third-year Course; Miss M. E. Graham, Milner, Teachers' Course; Miss B. Beddie, 207 Burris Street, Hamilton, Ont., Teachers' Course.

Manitoba College.—Miss G. Hallwright, 916 Tolmie Avenue, Victoria, Home Economics, final year.

BEE-INSPECTION WORK.

An interesting feature of the past year was the enactment of the "Foul Brood Bees Act Amendment Act," which contains several new points, the chief ones being that no bee-keeper should keep any bees except in a frame hive; that within certain specified districts of the Province orders might be made by the Hon. the Minister of Agriculture prohibiting the movement of bees without inspection and certificate; that equitable compensation might be paid after the destruction of any diseased bees or appurtenances have been ordered by an Inspector; that an annual registration fee of $1.50 for the first six hives up to a maximum fee of $5 should be paid by each bee-keeper; and that specified standard labels should be used for British Columbia honey. The amendments to the Act were very largely due to the representations made by the British Columbia Bee-keepers' Association, and necessitated the appointment of a larger number of Inspectors than in previous years, the following appointments being made:—

W. J. Sheppard, Chief Inspector, Nelson—Kootenays.

F. D. Todd, Inspector, Victoria—Vancouver Island, Gulf Islands, Howe Sound.

L. Harris, Inspector, Vernon—Okanagan.

W. H. Turnbull, Inspector, Sullivan Station—Matsqui, Langley, Surrey, Delta, Richmond, Pitt River to Mission.

A. W. Finlay, Inspector, Huntingdon—Chilliwack, Sumas, Dewdney, Kent, Mission to Agassiz.

A. Keir, Inspector, North Lonsdale—Vancouver, North Vancouver, South Vancouver, Point Grey, Burnaby, Coquitlam.

The expenses of administration during the year amounted to $8,708.96, and compensation paid out up to the close of the year was $115.25. The total receipts from bee-registration fees up to the end of December amounted to $2,146.16, but as these moneys were collected under the authority of a Provincial Act they were credited to Provincial revenue, and some arrangement should be made whereby these fees should be credited to the section of the "Instruction Act" from which the expenditures on account of inspection-work are made.

FARMERS' INSTITUTES.

The year 1919 closed with the net number of Farmers' Institutes at 159. Whilst there were several new incorporations, these were offset by the cancelling of the charters of six of the older institutes where the membership had so dwindled, due to various causes, that the business of the institute could no longer be carried on. The new incorporations were as follows: (1) Dunster Farmers' Institute, March 11th; (2) Princeton District Farmers' Institute, April 3rd; (3) Smithers Farmers' Institute, May 10th; (4) Chase District Farmers' Institute, July 14th; (5) Campbell and Robins Range Farmers' Institute, August 13th; (6) Newlands Farmers' Institute, September 20th.

The institutes closed down are: West Kootenay Farmers' Institute, July 9th; Fern Ridge Farmers' Institute, December 1st; Chilko Farmers' Institute, December 8th; St. Elmo Farmers' Institute, December 18th; Canford Farmers' Institute, December 26th; Trapp Lake Farmers' Institute, December 26th.

There are also a few institutes in outlying sections which have not yet recovered their normal membership, but which may be expected to resume a fresh period of activity during the coming year. The total membership recorded for 1919 was 6,290, as against 6,072 in the previous

year. The increase is small but satisfactory, and shows that the period of stagnation during the later years of the war is now over. The institutes with the largest membership are as follows:—

Creston	239
Cowichan	163
Spallumcheen	146
Delta	138
Islands	132
Shirley and District	130
Victoria	117
Northern Okanagan	94
Nechako	92
Surrey	91
Kelowna	90

Advisory Board.—The arrangement brought to a successful conclusion in 1918, whereby various institutes in the Province were grouped into nine districts, who nominated members to the Board, was continued. The nominations, which were subsequently approved by the Honourable the Minister, were as follows:—

District.	Area.	Member.
A	Vancouver Island, Gulf Islands, and Bella Coola ...	C. E. Whitney Griffiths, Metchosin.
B	Bulkley Valley, Skeena and Nass Valleys	M. F. Nourse, Burns Lake.
C	Prince George, including district from Endako to McBride	J. D. Charleson, Vanderhoof.
D	Kamloops, North Thompson Valley, Nicola Valley, and district between St. Elmo and Revelstoke	Wm. Harrison, Pritchard.
E	Langley and all institutes on south and north sides of Fraser to Chilliwack and Howe Sound	Jas. Bailey, Sardis.
F	Grand Forks, Arrow and Slocan Lakes, and Boundary Districts	A. H. Smith, Nakusp.
G	Kelowna, including Okanagan Valley from Mara to Kaleden, also Salmon River Valley.	L. E. Taylor, Kelowna.
H	Robson, Kootenay Lake, and Kootenay River Institutes	A. D. Clyde, Robson.
I	Cranbrook, South-east Kootenay, and Columbia Valley	A. B. Smith, Cranbrook.

Two important meetings of the Board were held—Victoria, February 19th to 22nd, and Smithers, June 23rd and 24th. The meetings of the Board at Victoria were especially interesting. In addition to the large number of resolutions which were discussed, important statements were made by the Hon. the Minister of Agriculture as affecting the policy of the Department and the agricultural industry, and meetings of a committee of the Board were held with the Agricultural Committee of the Legislative Assembly, who passed their approval upon the final resolutions put through at the Board's meeting.

H. W. M. Rolston, of the Soldier Settlement Board and representative of the G.W.V.A., was appointed a member by the Board to sit with them in all their discussions.

The invitation of A. M. Manson, M.P.P., for the Board to hold their next session in the central portion of the Province was accepted, and arrangements made for the next meeting to be at Smithers.

Smithers Conference.—The Advisory Board, in view of important matters to be discussed, sent out invitations to the Presidents of the following associations: British Columbia Fruitgrowers' Association; British Columbia Poultrymen's Association; British Columbia Dairymen's Association; British Columbia Stock-breeders' Association; Vernon Fruit Union; United Farmers of British Columbia. The Hon. Mr. Barrow, R. R. Walker, of the Land Settlement Board, and the writer also took part in the Conference.

After passing upon a number of resolutions from institutes the main business of the Conference was proceeded with—namely, the framing of resolutions and the taking of preliminary action with regard to: (*a*) The union of Farmers' Institutes and the United Farmers of British Columbia, and (*b*) the organization of an Agricultural Council or Central Executive body to represent the whole body of agriculturists in the Province. These resolutions having been carried

unanimously, committees were appointed to do the preliminary work and ascertain the feelings of the different organizations in the Province and report fully to the next Conference to be held at the capital in 1920, when it is hoped that definite action will be possible along the lines indicated.

Following the meeting at Smithers, the Board and other delegates inspected the Bulkley Valley, Nechako Valley, Burns Lake, and Francois Lake Districts. A large area of agricultural land was carefully looked over and reliable data obtained on possibilities for settlers in the great areas awaiting development. The members of the party returned to their homes impressed with the potentialities of the districts visited, and appreciative of the many courtesies received from transportation companies, Farmers' Institutes, and other bodies, as well as from individual settlers.

Fairs held by Farmers' Institutes.—The following fairs were organized by institutes during the year: McBride, September 5th; Denman Island, September 25th and 26th; Metchosin, October 2nd and 3rd; Rolla (Peace River). Judges were supplied by the Department to the first three points, and the reports indicate that the events were entirely successful.

Stumping-powder.—Early in the year powder companies were able to announce a small reduction to the record price of $10.25 per case which had prevailed at the close of the previous year. By March the price had dropped to $8.67½, by September to $8.42, and at the close of the year stood at $8.14. Strong representations are being made by the Department from time to time to obtain a reduction in powder in view of the paramount importance of this article to the new settlers who are now taking up land, and it is hoped that early in the New Year a reduction of $1 per case will at least be possible owing to the withdrawal of charges for guarding, storing, and handling the departmental stocks which were imposed as war measures. The total number of cases of powder supplied was 7,356, of which the Canadian Explosives Company supplied 4,555 and the Giant Powder Company 2,801.

No itineraries were arranged for short courses or lectures, but a number of individual visits were made by the officials to attend institute meetings by special request, where demonstrations and addresses were given.

The total expenditure of Farmers' Institutes for the calendar year amounted to $9,783.47, being practically the same as in the previous year. The average cost of an institute to the Department worked out at $61.53. (For full details of the cost of administering Farmers' Institutes *see* Appendix No. 3.)

WOMEN'S INSTITUTES.

The year just closed has seen a steady progress made in the Women's Institute movement. Seven new institutes were incorporated, as against two in the preceding year, making the total number now in existence seventy. The new incorporations were as follows:—

Date.	Name.	Headquarters.
May 12	Langley-Triangle	Milner.
June 10	Bonnington and South Slocan	South Slocan.
Oct. 31	Denman Island	Denman Island.
„ 31	South Vancouver	South Vancouver.
Nov. 10	Strawberry Vale	Strawberry Vale (Saanich District).
„ 24	Mount Lehman	Mount Lehman.
Sept. 10	Armstrong	Armstrong.

These new institutes all start off with a membership well over the minimum of twenty-five required for incorporation, and from communications in the Department at the close of the year several more will be organized in the near future. The total membership of Women's Institutes at the close of the year was 2,753, as against 2,428 in the previous year. This is almost identical with the membership for 1917. The ten institutes having the largest membership were as follows:—

Kelowna	139
Cranbrook	128
Cowichan	110
Kaslo	88

Agassiz	74
Summerland	71
Shawnigan Lake and Cobble Hill	64
Central Park	64
Vernon	61
Peachland	60

Conferences were again held at four points: (1) Abbotsford, October 14th to 16th; (2) Nakusp, October 20th to 22nd; (3) Salmon Arm, October 24th and 25th; (4) Victoria, October 28th and 29th.

No Advisory Board meeting was held subsequent to the Victoria Conference, the Board being temporarily suspended owing to irregularities in its constitution. The Institute year was also marked by the lamented death of the Chairman of the Advisory Board, Mrs. A. Blackwood-Wileman, Duncan, V.I., who was seized with a fatal illness on her way home from the Convention of Federated Women's Institutes held at Toronto in November, and succumbed at Calgary. Mrs. V. S. MacLachlan, for some time Secretary to the Advisory Board, was appointed Secretary to Women's Institutes on July 1st, 1919. The total expenditure on Women's Institutes for the calendar year was $11,013.55, as against $4,826.75 in 1918. This very large increase over the cost in 1918 was occasioned by the establishment of the Household Science Branch and also the increased expenditure of the Advisory Board.

Flower-shows.—Thirty-six institutes held flower-shows or exhibitions of women's work during the year, as against thirty-one in the previous year. The Department supplied the usual five book prizes and also assisted by the small grant of 25 cents *per capita*. A number of these institute shows are now established on a sound basis and run in a thoroughly businesslike way; a good prize-list being prepared, and these shows generally coincide with some other local social event. (For full details of the cost of administering Women's Institutes *see* Appendix No. 4.)

AGRICULTURAL FAIRS.

During the past year two new Fair Associations were incorporated: July 7th, West Vancouver Agricultural and Horticultural Association; July 17th, Bulkley Valley Agricultural and Industrial Association. The total number of existing associations at the close of the year was sixty-nine. The number of exhibitions and fairs held totalled fifty-five, as against forty-one the previous year. This big increase was due to the revival of many of the smaller associations which had been dormant during the war period. No convention of Provincial associations was held during the year, so that arrangements for the various fair dates were made by correspondence; certain dates having been fixed for the important events, such as Vancouver, New Westminster, Duncan, Kamloops, etc., the smaller associations were notified and suitable dates selected.

Five circuits were again arranged for: Circuit 1, Vancouver Island and Gulf Islands; Circuit 2, Lower Fraser Valley; Circuit 3, Okanagan and Kamloops District; Circuit 4, East and West Kootenays and Boundary; Circuit 5, Central British Columbia and Peace River.

Judges.—As in former years, live stock, horticultural, and seed judges were supplied free of all cost to associations who applied for same. Owing to the staff of this Department not being up to full strength the services of a number of experts were requisitioned, as follows:—

Horticultural and Field Crops: M. S. Middleton, Vernon; P. W. Anketell Jones, Chemainus; J. B. Partington, Head Gardener, Parliament Buildings; Professor Barss, University of British Columbia; Professor L. Stevenson, Superintendent, Dominion Experimental Farm, Sidney; P. E. French, Vernon; S. H. Hopkins, Duncan; P. James and A. McMeans.

Live Stock: A. B. Smith, Cranbrook; H. E. Waby, Enderby; J. A. Turner, Victoria; H. Webb, Sardis; Professor H. N. King, University of British Columbia; A. P. McGorman, Kelowna; G. B. Bolster, Nanaimo; Dr. Derby, Vancouver; P. Moore, Colony Farm, Essondale; W. McIntyre, Chilliwack; G. S. Harris, Moresby Island; E. Buss, Victoria; N. Grimmer, Pender Island; S. H. Hopkins, Duncan.

Poultry: H. E. Waby, Enderby; E. A. Orr, Chilliwack; H. D. Reid, Victoria; W. M. Higgs, Sooke; W. Stonehouse, Vancouver; A. B. Smith, Cranbrook; E. B. Cale, Vancouver.

Dairy Products: F. H. A. Norton, Victoria.

Home Economics: Mrs. M. Carter, Victoria; Mrs. A. Blackwood-Wileman, Duncan.

Judges' reports showed that, whilst high quality in horticultural products was in evidence at most points, the number of entries were much less than in past years, a matter to be regretted, but probably due largely to the difficulty of farmers finding time to spare in preparing exhibits during the busy season, and also to some extent to the lack of the smaller associations giving sufficient publicity to their annual event and taking strong and active measures to arouse the interest of the community.

Grants.—The appropriation voted for the fiscal year ending March 31st, 1920, amounted to $35,000, being more than double the vote for the previous year, which was $16,000. This increase was due to provision being necessary for substantial grants to the Vancouver Exhibition and the Provincial Exhibition at New Westminster, which was revived after a lapse of five years. The total sum awarded in grants was $28,135, full details of which appear in Appendix No. 5.

The outstanding feature of the fair year was the splendid exhibitions at Vancouver and New Westminster. The live-stock exhibits at Vancouver were record-breaking, both as to number of entries and quality of stock exhibited, whilst at New Westminster the horticultural and field-crop exhibits, both from individuals and districts, were the outstanding features. The latter association deserves praise for the splendid way in which it has commenced operations again; the amount of work to be done in replanning grounds and rebuilding was of a formidable character and the successful result reflects the greatest credit on all parties concerned.

CO-OPERATIVE ASSOCIATIONS.

The past year has been marked throughout the Province by a co-operative movement affecting various phases of the agricultural industry. This is evidenced by the increased prosperity of the existing associations already incorporated with share capital under the "Agricultural Act," including fruit-growers, live stock, creameries, and miscellaneous co-operative associations, and also by the number of new associations incorporated by the Department, as follows:—

Name.	Date of Incorporation.	Share Capital.
Revelstoke United Farmers' Co-operative Association	March 6th	$ 5,000
Vancouver Island Milk Producers' Association	April 10th	100,000
Nanoose District Co-operative Association	May 8th	25,000
Princeton Co-operative Association	October 6th	20,000
Fraser Valley North Langley Co-operative Association	November 26th	10,000
Fraser Valley Agassiz Co-operative Association	„ 26th	25,000
Fraser Valley Matsqui Co-operative Association	„ 26th	10,000
Fraser Valley Surrey Farmer Co-operative Association	„ 26th	25,000
Fraser Valley Huntingdon Feed and Produce Association	„ 26th	20,000
Fraser Valley Delta Co-operative Association	„ 26th	250,000
Fraser Valley Richmond Producers' Association	„ 26th	15,000
Fraser Valley Farmers' Feed Association	„ 26th	50,000
Total		$555,000

All of which is respectfully submitted.

WM. J. BONAVIA,
Secretary.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, VANCOUVER ISLAND AND LOWER MAINLAND DISTRICTS.

E. W. WHITE, B.S.A.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for Vancouver Island and the Lower Mainland District for the year 1919.

STAFF.

The Horticultural Branch has been without the supervision of a Provincial Horticulturist during the entire year of 1919, no one having been appointed to that position since the resignation of M. S. Middleton in November, 1918.

In April, 1919, Ben Hoy, Assistant Horticulturist at Vernon, was placed in charge of all the work in the Interior of the Province, and your assistant was left in charge of the office at Victoria and the work in the Coast sections.

On July 1st, 1919, K. W. Munson, District Field Inspector for the Lower Mainland, severed his connection with the Department to enter commercial work. No successor was appointed, due to the fact that several former members of the staff were expected back from overseas service.

On September 1st, 1919, W. H. Robertson, who was Assistant Horticulturist for Vancouver Island and the Lower Mainland before going overseas in January, 1916, returned to duty. He immediately assisted with the work in the Victoria office and took over the field-work on the Lower Mainland.

ORCHARD-RENOVATION WORK IN THE FRASER VALLEY.

This work, which occupied a great deal of time in the spring of 1918 following the very severe ice-storm of the previous winter, was continued in the spring of 1919. Pruning demonstrations were given in a number of orchards which of necessity had to be omitted in 1918. Considerable grafting-work was also done throughout the district.

SMALL-FRUIT PLOTS, CHILLIWACK.

The same arrangements as were made in 1918 with K. W. Munson were continued in 1919 in reference to the small-fruit plot at Chilliwack, which was under the direction of the Horticultural Branch from 1912 to 1916. This plot consists of 2 acres Evergreen and ½ acre Snyder blackberries, ¾ acre Cuthbert raspberries, and ½ acre loganberries. As in 1918, this plot, despite the high rental of $112.50 per acre which was paid, again was a decided financial success.

Due to the increasing interest being shown in small fruits, Mr. Munson made arrangements with A. H. Ingrams, of Fairfield Island, Chilliwack, to conduct tests with different varieties of strawberries, different methods of growing, and cost of production.

These two plots afforded places where a great deal of valuable information was distributed cheerfully and gratuitously to a great many intending settlers, both returned soldiers and others, and the plots did a great deal to encourage small-fruit planting in the district.

DEMONSTRATION STRAWBERRY-PLOT, GORDON HEAD.

This plot was established in March, 1919, for two main purposes: First, in order to demonstrate the possibility of building up and improving an impoverished strawberry-soil badly infested with the strawberry-root weevil (*Otiorhynchus ovatus* Linn.) and other strawberry-insects by the adoption of a regular system of crop-rotation, of proper and modern methods of culture, and of the recommended control measures for the said strawberry-root weevil; and, second, for the purpose of making further investigations into the life-history of the said weevil and the testing-out of different types of weevil barriers. The lease is for a period of six years. Supervision of the plot was placed with the Horticultural Branch and the representative of the Dominion Entomological Branch.

Considerable time was spent in selecting a suitable piece of land, and the plot was finally located on the farm of G. A. Vantreight, Gordon Head. It consists of approximately 6⅓ acres and is oblong in shape, measuring 810 feet long and 342 feet wide.

In selecting the plot it was endeavoured to secure the worst weevil-infested patch in the district, and it may be said that in the spring of 1918 approximately 4 acres out of the 6 were in strawberries which were to bear the second crop. By May it was seen that approximately 1 acre was so badly infested with weevil that it would be useless to leave it, so that it was ploughed up and planted to potatoes. From the 3 acres which were left only about 75-100 crates of strawberries were harvested. The other 2 acres making up the 6 were in clover-sod.

The plot was divided into six lots of approximately 1⅙ acres, measuring 342 feet long and 135 feet wide. A six-year rotation about as follows was decided upon: 1919, plant to strawberries; 1920, first crop; 1921, second crop, remove plants in September, prepare land and seed to fall wheat and clover; 1922, harvest crop of fall wheat; 1923, harvest crop of clover, in fall manure and plough; 1924, plant potatoes; and in 1925 the land should be in shape to plant back to strawberries. This means that on a 6-acre unit there would never be more than 2 acres in bearing strawberries—1 acre first crop and 1 acre second crop—1 acre would be in young plants, 1 acre in wheat, 1 acre in clover, and 1 acre in potatoes.

In taking over the plot in March, 1919, we found the land in the following condition: Approximately 1 acre, Lot 1, was in clover; 1 acre, Lot 2, had been ploughed in the fall of 1918 and was ready for potatoes; 2 acres, Lots 3 and 4, were in fall wheat; and 2 acres, Lots 5 and 6, were in fall oats.

In order to start operations it was decided to plant 1 acre in the spring of 1919. Lot 4 was selected as the most suitable lot on which to plant. This was the piece of land on which the strawberries were a failure in the spring of 1918 and which had been ploughed up in May and planted to potatoes. In the fall it was seeded to fall wheat. In the spring we manured on the fall wheat with approximately 32 tons of cow manure; the land was ploughed and prepared for strawberries and planted on April 29th and 30th. A weevil barrier made of boards 1 inch thick and 12 inches wide was built around the entire acre. The top 2 inches of the board was covered with tree tanglefoot.

Lot 1 was left in clover-hay; Lot 2 was manured with approximately 32 tons of cow manure and planted to potatoes on June 19th, which was too late, but circumstances prevented earlier planting; Lot 3, in fall wheat, was seeded to red and alsike clover; Lots 5 and 6 were in fall oats and the crop was harvested.

It is too early to predict what success or failure may attend the plot, but this preliminary and general report is made in order to give an idea of the work which is being attempted. A complete and detailed report will be published at the conclusion of the six-year lease and interim reports will be published from time to time.

EXPERIMENTAL SPRAYING.

Tanner Bros.' Orchard, Keating.—The work which was conducted in this orchard in 1916, 1917, and 1918 for the control of anthracnose on a block of thirty-six trees, consisting of three plots of nine trees each and a check-plot of nine trees, was really completed on May 29th, 1919, when J. W. Eastham, Provincial Plant Pathologist, made the final counts for new infection.

As reported in previous reports, these trees were twenty years old when taken over in 1916 and were so badly diseased with anthracnose that there was practically no new wood in them and nothing remained but the main trunk and branches.

The final inspection for new infection in May, 1919, gave the following result:—

Plot 1, which had just received an early spray the first week in September, while the fruit was on the tree, of 3-4-40 Bordeaux, only showed thirteen new infections; three trees were absolutely free of the disease, three trees showed one infection each, two trees showed three infections each, and one tree showed four infections.

Plot 2, which received the early weak spray at the same time as Plot 1, and also a 6-6-40 Bordeaux spray about the end of October after the fruit was harvested, only showed six new infections; five trees were absolutely clean, two trees showed one infection each, and two trees showed two infections each.

Plot 3, which received only the late spray of 6-6-40 Bordeaux at the same time as Plot 2, showed 130 infections; the lowest number of infections were seven on one tree and the highest were twenty-nine on another tree.

Plot 4, in which the trees were unsprayed, showed anywhere from 50 to 100 new infections per tree.

The results show that even a weak Bordeaux, applied early, will control the disease almost entirely. The cost of the early spray over three years only averaged 14.19 cents per tree.

In reference to the production of fruit, it might be said that the variety, being Baldwin, had formed a biennial system of bearing; the years 1914, 1916, and 1918, being the off-years, will not be taken into consideration. In 1915, however, the crop averaged about a box and a half per tree; in 1917, after two years of spraying, it averaged five boxes per tree; and in 1919, after four years of spraying, the crop averaged nine boxes per tree, and this from trees which in 1916 were considered total wrecks and almost valueless. A detailed summary of the work appeared in the September issue of the *Agricultural Journal*.

Stewart Bros.' Orchard, Keating.—In the fall of 1919 a block of 1 acre of fifteen-year-old Kings consisting of forty-five trees was taken over in order to conduct further tests in the control of anthracnose and to test out different sprays. The block was divided into five plots: No. 1 was sprayed in September, while the fruit was on the tree, with 3-4-40 Bordeaux; No. 2 was sprayed at the same time with Burgundy mixture, practically a colourless mixture made from the following formula: 1 lb. copper sulphate or bluestone, 1½ lb. sal soda, and 40 gallons water. If this proves efficient it will be very beneficial, because it may be applied at any time and leaves no deposit on the fruit. No. 3 was sprayed in October, after the fruit was picked, with 3-4-40 Bordeaux; No. 4 was sprayed at the same time with 6-6-40 Bordeaux; and No. 5 was sprayed at the same time with lime-sulphur 1-9. A check-tree was left in each plot. It was intended to test out the prepared Bordeaux paste, but none could be secured at the time. This test will be made in 1920.

HORTICULTURAL CONDITIONS.

The Department made no grants towards these competitions in 1919, but your assistant was called upon to judge two garden competitions which were the outgrowth of the competitions formerly encouraged by the Department.

Ward IV. Saanich cottage-garden competition, having eleven entries, was judged on August 4th and August 29th; Ward VII. Saanich cottage-garden competition, having twenty-four entries, was judged on July 7th and August 28th.

FALL FAIRS.

The following fall fairs were attended in the capacity of judge of fruit and vegetables: Kamloops, assisted by C. R. Barlow; Armstrong, assisted by H. H. Evans and P. E. French; Creston, assisted by Ben Hoy; and the last fair judged was at New Denver. The Provincial Exhibition at New Westminster was visited on the last day. The garden vegetables at the North and South Saanich Fair were also judged. A detailed report has been submitted.

In addition, your assistant judged at the annual flower-show of the Hatzic Women's Institute on June 12th, at the annual show of the Ward II. Saanich Cottage Garden Association on August 30th, and at the annual show of the Ward IV. Saanich Cottage Garden Association on September 10th.

INSPECTION OF NURSERIES.

This work was carried out according to the regulations in so far as it was possible. Inspections were made in the spring at shipping-time, during the summer, and again in the fall at digging-time.

Nurserymen were practically sold out of all available stocks in the spring of 1919, and at the present time are faced with a severe shortage and are unable to meet the demands of the 1920 shipping season. This condition exists in practically all parts of Canada and the United States; prices for stock are consequently very high.

INSECT PESTS AND DISEASES.

Systematic orchard-inspection work has been almost impossible, due to the shortage of help, but a great many inspections were made on specific requests.

Pear-thrips.—No experimental work was conducted on this pest during the season. It was still serious in some orchards, but where the trees were thoroughly sprayed with the recommended sprays serious damage did not result. So far this pest is confined to Vancouver Island and the Gulf Islands and has not yet been reported from the Lower Mainland.

Strawberry-root Weevil.—This insect again caused severe damage in some plantations, but growers are beginning to adopt the recommended methods of control, with good results. As noted above, extensive studies with this pest have been started on the demonstration strawberry-plot at Gordon Head, the life-history work all being done by W. Downes, of the Dominion Entomological Branch.

Crown-borer.—This pest is beginning to cause considerable trouble in loganberry and raspberry plantations, but it is not thought that it will ever become very serious.

Codling-moth.—This insect has been known to exist in the Victoria District since 1909. Extensive work was carried on up to 1915. When the pear-thrip struck the district, codling-moth work was of necessity dropped, and consequently no systematic work was carried on during 1916, 1917, 1918, and 1919. However, during the past season the pest has again been reported a number of times, and it will be necessary to undertake work along this line in 1920.

In September a codling-moth infestation was also reported from North Bend. This was investigated and the report confirmed. Work will need to be undertaken in this district also.

Another slight infestation of codling-moth was reported from New Westminster. This was investigated by W. H. Lyne and confirmed. Some form of control measure will need to be installed.

Tent-caterpillars.—This pest was again very prevalent in Victoria and Vancouver Cities and adjacent municipalities. However, it was principally troublesome in waste places. In well-sprayed and well-cared-for orchards the tent-caterpillar did insignificant damage, and this will always be the case. It is a pest of neglected and waste places.

Anthracnose.—This disease was again very destructive in some orchards. Experimental spraying has proved that it can be almost absolutely controlled, and it is now up to the orchardists themselves.

Apple and Pear Scab.—This disease on both fruits was troublesome in some orchards, but did not cause serious financial loss.

Other pests and diseases were of about normal severity and did not cause undue damage where proper remedial measures were adopted.

FRUIT AND VEGETABLE PRODUCTION.

The strawberry-growers of the southern end of Vancouver Island had a very successful season. Climatic conditions were very favourable and the picking season lasted from June 4th to July 22nd. Fifteen car-loads, totalling 11,500 crates, were shipped to Prairie points, and approximately 3,350 crates were marketed in Victoria. In addition to the crate shipments, approximately 400 tons of jam-berries were sent to the jam-factories. The strawberry-crop brought in about $185,000 of new money into the district in 1919.

Tree-fruits were a good average crop, and Olivet cherries especially brought good returns. Vegetable-crops were up to normal, but the very severe weather early in December destroyed a large quantity of semi-hardy vegetables which usually will remain in the ground all winter.

On the Lower Mainland the small-fruit growers had a successful season and the industry is increasing in importance very rapidly. The total value of small-fruit production on the Lower Mainland alone in 1919 almost equalled the total value for the whole Province in 1918.

The plantings in loganberries are increasing every year and there appears to be a bright future for this berry in the Coast districts. Tree-fruits were an average crop, but showed considerable increase over 1918.

Vegetable production is on the increase, but there is room for considerable development along this line, especially among the white growers.

SOLDIER SETTLEMENT.

Due to the activities of the Soldier Settlement Board and allied bodies, a large number of returned men have been settled on farms on Vancouver Island and the Lower Mainland. The majority of these are on small acreage. A number are more or less inexperienced and they have naturally come to the Department of Agriculture for advice, despite the fact that the Soldier Settlement Board has a large number of field supervisors at work. Help has always been given whenever possible, but the demand has been so constant that time was the limiting factor as to the amount of assistance which could be rendered.

DEMONSTRATIONS AND GENERAL WORK.

Demonstrations in various branches of horticultural work and personal calls to growers take up a great deal of time during the year. This work has been especially heavy this year, due to the fact that, besides the soldier settlers, there have been a large number of settlers from the Prairie Provinces and the Old Country.

There is not much to show for this work at the end of each year, but it is extremely valuable and cannot be omitted. It is always appreciated.

VISIT TO WASHINGTON, IDAHO, AND OREGON.

During the first two weeks of August your assistant was privileged to attend the second annual meeting of the Western Horticulturists, held jointly at the Washington State College, Pullman, and the University of Idaho, Moscow. Representatives were present from the States of Washington, Idaho, Oregon, Montana, Utah, and the Province of British Columbia. Very excellent meetings were held and an excellent field-day was spent at the orchard tract of Lewiston, Idaho. This meeting will be held in Vernon, B.C., in August, 1920. The trip was made by auto and en route the orchard district adjacent to Spokane was visited. On the return journey the fruit districts of Walla Walla, Kennewick, Yakima, Hood River, and Puyallup were visited and very valuable information obtained relative to the industry.

MEETINGS, PRESS ARTICLES, AND DEPARTMENT PUBLICATIONS.

During the year several meetings were addressed on different subjects; two of the more important being one on "Small Fruits" before the annual meeting of the British Columbia Fruit-growers' Association at Penticton in January, and the other on "Winter Injury to Fruit-trees West of the Cascades" before the annual meeting of the Western Washington Horticultural Association at Everett in February.

Various articles were prepared during the year for the Department's *Agricultural Journal* and for the agricultural press in general.

Two new circulars were written during the latter part of the year for the New Horticultural Series—No. 54, "Loganberry Culture," and No. 55, "Raspberry Culture." However, these will not be received from the King's Printer until after the New Year. Other circulars on strawberries, blackberries, currants, and gooseberries are in the course of preparation.

CORRESPONDENCE AND OFFICE-WORK.

This work has taken up an increasing amount of time, and despite the fact that the work in the Upper Country has not been directed from this office as in former years, the amount of correspondence is well up to the average. There have been a great many inquiries from prospective settlers as well as new and old settlers.

A great many visitors have also called at the office seeking information, and all the assistance possible has been given. This again is another line of work for which there is not much to show at the end of the year.

All of which is respectfully submitted.

E. W. WHITE,
Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, LOWER MAINLAND DISTRICT.

W. H. ROBERTSON.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith beg to submit my report as Assistant Horticulturist and Inspector of Fruit Pests from September 1st to December 31st, 1919.

FALL FAIRS.

Fall fairs were held this year at various points on the Lower Mainland. Those at which I acted as judge in either the fruit or vegetable sections are as follows: Vancouver, September 8th to 13th; Port Coquitlam, September 17th; Maple Ridge, September 24th; Aldergrove, September 26th; Delta, September 26th; Ganges Harbour, October 1st.

A full report on each of the above fairs, with marked prize-list and recommendations for improvement, has been submitted.

AGRICULTURAL STATISTICS.

Considerable time was devoted to gathering figures relating to fruit and vegetable production. Work along this line was undertaken on the Lower Mainland; the field-work being followed by work in the office compiling data collected.

OFFICE AND FIELD WORK.

Due to the fact that there have been and still are a large number of settlers going into fruit-growing, there is continuous demand for information on fruit-growing subjects. This has entailed a heavy correspondence; personal letters to the grower being supplemented with circulars and bulletins from the Department. Wherever possible, personal visits have been made to various growers and instruction given in pruning and other phases of orchard work.

All of which is respectfully submitted.

W. H. ROBERTSON,
Assistant Horticulturist.

REPORT OF DISTRICT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, OKANAGAN VALLEY.

B. HOY, B.S.A.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—Below is a report of the work done by the Horticultural Branch of the Department of Agriculture during the year 1919 in the Interior of British Columbia.

LECTURES AND FALL FAIRS.

During the year members of the Horticultural Branch attended and lectured at many farmers' and fruit-growers' meetings, assisted in judging at the fall fairs, and in judging field-crop and garden competitions. Reports covering this work have from time to time been submitted to the Department.

The writer judged the fruit and vegetables at Nelson, Oyama, and Summerland, and assisted in the judging at Creston, Kelowna, and Penticton. Lectures on horticultural topics were given at the British Columbia Fruit-growers' Convention at Penticton, Vernon Farmers' Institute, Salmon Arm Farmers' Institute, Naramata Farmers' Institute, and at Rutland.

PACKING AND PRUNING SCHOOLS.

No packing or pruning schools were held during last year. Owing to the expense of conducting packing-schools and such a very small percentage of pupils ever taking up packing in the organized fruit districts, packing-schools do not accomplish the desired results. However, in unorganized districts, where there is no other means of people learning how to pack, packing-schools are useful.

Announcements and application forms for pruning classes this winter have been sent out, and as an indication of the demand for instruction in this branch of orcharding the following applications have been received to date: From Vernon for three schools with full number of pupils, from Kelowna for two schools, and one school at each of the following places: Ewing's Landing, Woods Lake, Naramata, Grand Forks, Cawston, Kaleden, and Willow Point. It is expected that during the next two weeks several more applications will be received at this office.

FIRE-BLIGHT.

A very great deal of your Inspector's time is taken up in the control of this disease. This year shows considerable improvement over last year in the amount of blight-infection. Kelowna and a small section of orchard on the Vernon Road near Duck Lake suffered more than any other district this year. At Kelowna three special Inspectors were employed for a month this spring to make a thorough inspection and urge the cleaning-up of blight in every possible way. This work resulted in many infected trees being cut out and, for the time at their disposal, a good general clean-up. Though Kelowna had considerable blight last summer, there was not more than 30 per cent. as much as in the summer of 1918. During the summer newspaper articles have been written and circulars distributed concerning the control of blight, and your Inspectors have continually kept in touch with owners of blight-infected orchards. Much summer and fall cutting of blight has been done and many growers are busy at the present time cutting out blight and pruning. From present indications there is every reason to believe that orchards will be freer from blight when growth starts next spring than they have been for several years.

Your Inspectors have all been instructed to enforce the new regulation in Horticultural Regulations. This has also been given wide publicity.

CODLING-MOTH.

Detailed reports on the control of the codling-moth in Vernon, Walhachin, and Westbank are attached to this report. At Westbank the work was done the same as in previous years and no worms were found in the district. Although this district may be assumed to be free from this pest, in order to be safe the spraying and inspection of bands should be undertaken by the Department of Agriculture for another season.

At Vernon considerable headway was made in the control of codling-moth, but there is yet a great deal of work to be done before the pest is eradicated.

In 1918 394 specimens were captured, and from the same area in 1919 195, showing a decrease of 50 per cent. However, in 1919 a new infected area was discovered, and from this area 178 specimens were taken, bringing the total captured in 1919 to 372. All the adjacent orchards to those infected are now held under quarantine; this, combined with the strict inspection put into force and with careful work on the part of the Inspectors, should aid materially in preventing any further spread. Most thorough and painstaking work is required on the part of the Inspectors, especially in scattered orchards just out of the main infected area, because it is only by preventing further spread and thoroughly cleaning up the outside scattered areas and gradually reducing the size of the area under quarantine that we can hope for eradication. This also requires the most earnest co-operation of growers close to the quarantined areas.

Three hundred and seventy-eight foreign cars were inspected at Okanagan Landing and eighty-eight at Similkameen. This is a very important phase of codling-moth control in this Province. At Okanagan Landing a total of 203 specimens were taken from these cars. In car 53101, Illinois Central, twenty larvæ were captured on November 19th. A recommendation has been sent to the British Columbia Fruit-growers' Association pointing out the dangers from this source, and requesting them to take some action regarding a system of disinfection at divisional points.

The Walhachin codling-moth area we may now regard as free from this pest. Spraying and band inspection was again carried out last summer, with the result that no worms were found.

EXPERIMENTAL WORK.

Apple-scab.—Experiments were conducted in the control of apple-scab at Vernon, Salmon Arm, and in the Kootenay. Separate detailed reports of these experiments by Messrs. Hunt, Evans, and Barlow are attached to this report. These experiments should all be continued next year.

Aphis Experiments.—At Vernon tests were made in the control of green aphis. In this test we found Black Leaf 40, 1 part to 2,000 gallons of water, with 2 lb. of freshly slaked lime added to each 100 gallons of mixture, killed the green aphis satisfactorily. When spraying for aphis alone the cost of this mixture is less than half of the ordinary mixture used in the control of aphis, which is Black Leaf 40, 1 to 1,000, with 3 to 5 lb. of soap in every 100 gallons.

Cover-cropping.—A small amount of hairy vetch and sweet clover seed was placed with growers in the Kootenay, Okanagan Centre, and Salmon Arm to demonstrate the value of cover-cropping in these districts.

Lime Tests.—At Salmon Arm tests are being made with lime on acid soils. Several tests are being made, including all the soil types in the district. This season was very dry and the results obtained are neither satisfactory nor conclusive. Mr. Barlow's report outlines this work in detail.

Pruning.—Experiments to demonstrate the results of various degrees of cutting have been started at Vernon by H. H. Evans. This is valuable work if carried to completion, and every encouragement should be given Mr. Evans to continue and complete this work.

Peach and Apricot Inspection.—As in previous years, peaches and apricots were inspected at shipping-points by your Inspectors for the peach-worm. Spraying for this pest again demonstrated the value of lime-sulphur spray at the time the blossoms are opening. This single spray put on as late as possible, before the blossoms are open, will give good commercial control of the peach-twig borer.

STATISTICAL WORK.

Crop estimates and figures on tonnage of fruit and vegetables shipped out and handled by the canneries, evaporators, etc., are gathered by members of this Branch and sent in to the Statistician for compilation.

GENERAL WORK OF BRANCH.

The same general policy as followed in previous years was carried out this year; your Inspectors have at all times been at the service of the growers. Owing to many new soldier settlers and Prairie men a great deal of your Inspector's time has been taken up in consulting and advising new-comers. The demand in this line of work has been greater than ever before. It is valuable work, but takes considerable time that would otherwise be spent in inspection and demonstration work among the established settlers.

Respectfully submitted.

BEN HOY,
District Horticulturist.

REPORT OF DISTRICT FIELD INSPECTOR, SOUTHERN OKANAGAN, SIMILKAMEEN, AND BOUNDARY DISTRICTS.

W. T. HUNTER.

Dr. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith respectfully beg to submit my annual report as District Inspector for Penticton, Naramata, Grand Forks, Keremeos, comprising the Southern Okanagan, and Similkameen and Boundary Districts.

INSPECTION-WORK.

The work along this line was slightly interfered with by duties in connection with the seed-work on behalf of the United Seed Growers, Limited, but close observation was maintained at all seasons in connection with the following pests, and every endeavour was made by your official to assist in their control wherever found:—

Fire-blight.—This disease remained very quiescent throughout the whole of the district under my jurisdiction this season. Slight outbreaks occurred in a very limited section at Penticton and at Grand Forks. It was found, however, that growers were paying strict attention to the

cutting-out of al infections where found, with the possible exception of a few growers at Grand Forks, and I would urge the advisability of the Department placing an official in the Grand Forks District permanently in order that a close and more effective inspection of the work can be carried out in that important district.

Peach-worm.—Measures recommended by the Department, acting on the advice of R. C. Treherne, Dominion Entomologist for British Columbia, for the control of this pest proved very satisfactory this year wherever carried out, and it was found in all cases where the semi-dormant or pink spray was carefully applied that almost complete control was obtained with this one application, and we have no hesitation in saying that for commercial purposes this spray is the most effective spray to use. Close inspection of peach and apricot shipments was made throughout the shipping season for the detection of this pest, and the hearty co-operation of the shipping concerns throughout the district was obtained in this work.

Powdery Mildew of the Apple.—This disease is becoming very prevalent throughout the southern district, particularly Penticton and Naramata sections, the growers finding great difficulty in controlling same with a reasonable amount of expenditure for spraying operations. I would like to recommend that a series of experiments be undertaken in connection with this disease to determine the most reliable and at the same time the most economical method of controlling it.

Blister-mite.—Very little trouble was experienced with this pest on pears the past season, but rather serious outbreaks occurred in the Keremeos section on apples, and the experience of the growers seems to be that more difficulty occurs in controlling blister-mite on apples than on pears. Spraying with dormant strength lime-sulphur must be done very early in the season, and at high pressure, in order to effect control.

Minor Pests and Diseases.—Slight infestations of aphides occurred throughout the section, but were very local in extent. Some oyster-shell scale appeared at Grand Forks. On the whole, we can say that this section was remarkably free from serious diseases and insect pests this year.

DEMONSTRATION-WORK.

Cover-crops.—An attempt was again made to conduct demonstration plots to illustrate the value of nitrogenous annual cover-crops, but considerable difficulty was encountered, due to the fact that a shortage of irrigation-water occurred at the time the cover-crop should have been sown, and the results of this work were negligible. Demonstrations in pruning were given throughout the district and also advice on top-working both by budding and grafting.

SEED-WORK.

The time of your official was very greatly taken up this past year with the organization and business of the United Seed Growers, Limited, and it easily took the greater portion of the time. The company was organized in June, 1919; incorporated in September, 1919; and both before and after incorporation our fullest assistance was given to this work, and the volume of business which was built up and the amount of seed which was handled co-operatively for the growers in our opinion fully justified the amount of time devoted to this work.

JUDGING.

Fall fairs were judged at Nanaimo, Alberni, Denman Island, and Courtenay. A separate report of which was forwarded to you some time ago.

GENERAL CONDITIONS.

The fruit-crop throughout the section exceeded the crop of last year quite considerably and was of very high quality. The District of Naramata suffered in mid-season from a shortage of water, but otherwise the growers have few complaints.

OFFICE-WORK.

Owing to the volume of correspondence throughout the year, particularly in connection with the seed-work, additional help had to be secured, the cost of which was partially borne by the United Seed Growers, Limited. The Department's office, located as it is on the main street of Penticton, has become the centre for the agricultural activities of the district, and its popularity

is attested by the fact that your official received three times as many requests for advice and assistance the past season as in the season before.

All of which is respectfully submitted.

W. T. HUNTER,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, VERNON.

H. H. EVANS.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I herewith beg to submit my annual report as District Field Inspector for the Okanagan Centre, Oyama, Vernon, Armstrong, and Enderby Districts for the year 1919.

FARM-GARDEN COMPETITION.

A farm-garden competition was held under the auspices of the Northern Okanagan Farmers' Institute; there were five entries, the judging being performed by Ben Hoy, District Horticulturist, and your Inspector.

JUVENILE GARDEN COMPETITION.

This competition was held under the auspices of the Kalamalka Women's Institute, and to the writer's knowledge is the only one of its kind held in the Okanagan. The judging was performed by your Inspector. Separate reports and scores of the above have been previously submitted.

EXHIBITION-WORK.

Your Inspector acted as judge at the Armstrong and Naramata Fall Fairs, reports of same having been submitted. Judging at the Northern Okanagan Women's Institute Fair and the Oyama Juvenile Fair was performed by your Inspector and Ben Hoy, District Horticulturist.

PEST-INSPECTION WORK.

Inspection of Export Fruit and Vegetables.—Only one car of export apples for Australia was inspected at Vernon in 1919.

Nursery Inspection.—Smith & Gorham's nursery at Hullcar was given two inspections by your Inspector during the spring shipping season, and considerable stock condemned through being infected with *Armillaria mellea* (mushroom root-rot). Separate reports of the above have been submitted.

Inspection of Foreign Cars.—A report of this work is incorporated in the detailed report of codling-moth control work attached hereto.

FIELD-WORK.

Codling-moth Control.—A separate report of this is attached.

Powdery Mildew.—This fungous disease has obtained a firm grip in the Oyama and Okanagan Centre sections. The orchardists in these sections have now become fully alive to the serious menace of this disease to the apply industry, and in consequence there is more promise of systematic spraying being performed by the growers in the coming year to combat this disease. During the spring of 1919 two growers at Oyama, on the advice of your Inspector, carried out systematic spraying for the control of this disease, and the results of same were gratifying.

Oyster-shell Scale.—Though very prevalent in some of the older orchards, where it undoubtedly causes serious loss to the individual, this pest is not a serious menace where proper spraying methods are practised, and it becomes a problem of the individual orchardist entirely as to the degree of cleanliness of his orchard.

Aphides.—Green apple-aphis has not been a serious orchard pest during 1919, but woolly aphis was very generally distributed; where proper methods of control have been used this pest has not been serious.

Fire-blight.—Throughout the whole of your Inspector's district fire-blight is more or less scattered. The most serious infection during 1919 has been in the Okanagan Centre and Duck Lake sections.

Owing to the steady demand on your Inspector's time throughout the summer by the codling-moth work thorough supervision of blight-control has been unavoidably lacking; a strong effort will be made, however, for a general clean-up before spring. It can be definitely asserted that over the whole district there is greater freedom from this disease now than in the two previous years.

EXPERIMENTAL WORK.

Control of Apple-scab and Apple-aphides.—Separate reports on the experimental work on the above are attached.

Pruning Experiment.—Owing to the lack of uniformity of system and methods practised by the general run of pruners in the Okanagan it was decided to institute a series of pruning experiments over a period of years, whereby data could be gathered to determine the most satisfactory method of pruning the apple in the Okanagan from the age of two years to maturity, or thirteen to fourteen years of age; the results of which could be published in bulletin form for the benefit of our orchardists.

For this experiment two blocks of orchard have been loaned to the Department, one block of eight-year-old bearing trees by the Coldstream Estate Company, and one block of two-year-old trees by A. T. Howe, both situated in the Vernon District.

Ben Hoy, District Horticulturist, assisted your Inspector to draw up the plans of operation as regards styles of pruning to be adopted and system of records to be kept. The experiment covers a five-year period, and taking ages of the two series, the results will provide data covering tree development and yields over a ten-year period of growth. It is expected that, if this experiment can be conducted to the end of the period set, records will be obtained of inestimable value to the orchardists of the Okanagan.

GENERAL.

Special calls and visits for growers and institutions throughout the district have increased tremendously with the advent of soldier settlement, and with the general routine office-work combine to absorb considerable time throughout the year.

Your Inspector hereby wishes to acknowledge the assistance accorded him by R. C. Treherne and M. H. Ruhmann, of the Entomological Branch, in the breeding and identification of specimens taken in the field.

All of which is respectfully submitted.

H. H. EVANS,
District Field Inspector.

I.—REPORT ON EXPERIMENTS FOR THE CONTROL OF APPLE-SCAB.

H. H. EVANS.

Experinments were conducted on the W. S. Johnston orchard. Variety, McIntosh Red. Trees, fifteen years old. Same plots as in previous years. The experiments comprise two series. Series A is an efficiency test of three commercial compounds of sulphur—namely, liquid lime-sulphur, soluble sulphur, and dry lime-sulphur. This experiment is in its first year. Series B is for testing of liquid lime-sulphur at varying strengths; the work of 1919 completes the three-year period of Series B. Table 5 gives the three-year average results of Series B.

Definition of Abbreviations.—L.S.=Liquid lime-sulphur. S.S.=Soluble sulphur. D.L.S.=Dry lime-sulphur. Hd.L.=Hydrated lime.

Following are the tables of application and results:—

SERIES A, TABLE 1.—MATERIALS TEST.

Spray Period.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot. 6.	Plot 7.
Pink	S.S. 1 lb. to 40 gals.; Hd. L. 5 lb.	.....	D.L.S. 3 lb. to 40 gals.	.....	.....	L.S. 1-60..	Check.
Calyx	S.S. 1 lb. to 40 gals.; Hd. L. 5. lb.	S.S. 1 lb. to 40 gals.; Hd. L. 5 lb.	D.L.S. 2 lb. to 40 gals.	D.L.S. 2 lb. to 40 gals.	L.S. 1-50..	L.S. 1-60 .	"
10 to 14 days later..	.....	.....	.....	.....	.....	.....	"
10 to 14 days later..	S.S 1. lb. to 40 gals.; Hd. L. 5 lb.	S.S. 1 lb. to 40 gals.; Hd. L. 5 lb.	D.L.S. 2 lb. to 40 gals.	D.L.S. 2 lb. to 40 gals.	L.S. 1-50.	L.S. 1-60..	"

SERIES A, TABLE 2.—RESULTS OF MATERIAL TESTS AS PER TABLE 1.

Plot.	No. of Apples counted.	Free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	2,953	99.2	0.5	0.3	99.7
2	3,237	98.33	1.24	0.43	99.57
3	4,718	99.57	0.33	0.10	99.90
4	3,396	98.37	1.48	0.15	99.85
5	2,985	95.55	3.45	1.00	99.00
6	3,535	98.98	0.71	0.31	99.69
7 (check)	2,846	82.75	15.81	1.44	98.56

In comparing the total marketable percentages of the above table the differences are apparently small; but in studying the two columns, culls on account of scab and scabbed but marketable, the differences are more noticeable, and would count considerably from the commercial standpoint, by lowering the percentage of No. 1 grade and consequent loss in returns.

SERIES B, TABLE 3.—EXPERIMENTS TESTING DIFFERENT STRENGTHS OF LIME-SULPHUR.

Following are the tables of application and results for the season 1919:—

Table of Application.

Spray Period.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Check.
Pink	.....	L.S. 1-35	L.S. 1-40	L.S. 1-40	.....
Calyx	L.S. 1-35	L.S. 1.40	L.S. 1-45	L.S. 1-50	.....
10 to 14 days later	L.S. 1-35	L.S. 1-40	L.S. 1-45	L.S. 1-50	.....

SERIES B, TABLE 4.—RESULTS OF APPLICATION, TABLE 3.

Plot.	No. of Apples counted.	Free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	4,230	98.94	0.78	0.28	99.72
2	3,296	100.00	....	...	100.00
3	2,699	100.00	....	...	100.00
4	3,822	100.00	....	...	100.00
5 (check)	2,846	82.75	15.81	1.44	98.56

The above completes the three-year experiment on these plots.

SERIES B, TABLE 5.

Below is given the three-year averages of the above plots in years 1917-18-19:—

Plot.	No. of Apples counted.	Free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	2,133	99.31	0.48	0.21	99.79
2	2,253	98.85	1.09	0.06	99.94
3	1,801	99.70	0.25	0.05	99.95
4	2,405	99.65	0.18	0.17	99.83
5 (check)	2,093	74.48	22.95	2.57	97.43

Average yield per plot free over the three-year period of Table 5 is attached. Average weight per box, 40 lb. Average number of apples per box, 163.

TABLE 6.

Plot	1.	2.	3.	4.	Check.
Pounds of fruit per tree	533	547	440	587	507

In summarizing the results of Series B both for the year 1919 and over the three-year period covering this experiment, it will be noted that the weaker strengths of lime-sulphur solution have given absolutely satisfactory control of apple-scab in the Vernon District with three applications.

As shown by Plot 1, Table 3, two applications of the stronger mixture, 1 to 35, have given complete commercial control. In spite of this showing, however, in years known as scab years it is advisable to make the third application.

To emphasize this statement, the results of a previous experiment over the three-year period, 1916-17-18, with two applications, pink and calyx stages, showed 3.1 per cent. less fruit free from scab than any other sprayed plot.

In the years 1917-19 early infection of scab was the cause of the greatest amount of injury. In 1918 both early and late infection occurred, with the greatest amount of injury from late infections.

There has been no noticeable injury by sulphur-burning, from the application of liquid lime-sulphur during these experiments, but on plots treated in 1919 with soluble sulphur, burning was in evidence; more data on this compound, also dry lime-sulphur, will be available at the end of the three-year test period.

In comparing the three-year average tree production in Table 6, the writer would point to the fact the trees in this plot run smaller on the average.

II.—REPORT ON EXPERIMENTS FOR THE CONTROL OF GREEN APHIS.

H. H. EVANS.

Experiments were conducted on the orchard of B. Weatherly, South Vernon District. Age of trees, three years old. Total trees treated, 117.

The following experiment has been conducted with a view to finding, if possible, a cheap and efficient spray for control of the green apple-aphis; also to test the efficiency of various materials in combination with Black Leaf 40, with special reference to the application on Plot 4.

TABLE 1.—MATERIALS TEST, 1919.

Plot.	Materials tested.	Count taken of Aphis.		Average per Cent. Dead.
		Live.	Dead.	
1	B.L. 40 to gal. to 2,000; L.S. 1 gal. to 40	85	900	91.37
2	B.L. 40 1 to 1,000	19	1,400	98.66
3	B.L. 40 1 to 900; whale-oil soap, 4 lb. to 100	10	1,040	99.00
4	B.L. 40 1 to 2,000; slaked lime 2 lb. to 100	15	2,160	99.30
5	Whale-oil soap 8 lb. to 100	856	680	44.30
6	B.L. 40 1 gal to 2,000; L.S. 1 gal. to 40; slaked lime 2 lb. to 100	556	2,371	81.00

Taking of the check and count of the above plots was performed two days after application, and eight of the most heavily infested trees in each plot was selected for obtaining the count. By a study of the table it may be seen that neither Plot 5 nor 6 compare favourably with either of the first four plots.

Below is given the three-year averages of the above experiment on Plots 1 to 4 and the two-year average on Plot 5. Plot 6 is omitted in Table 2, as 1919 was the first trial given this application.

TABLE 2.—MATERIALS TEST, THREE-YEAR AVERAGE, 1917-18-19.

Plot.	Materials tested.	Count taken of Aphis.		Average per Cent. Dead.
		Live.	Dead.	
1	B.L. 40 1 to 2,000; L.S. 1 to 40	470	2,630	84.84
2	B.L. 40 1 to 1,000	44	2,890	98.50
3	B.L. 40 1 to 900; whale-oil soap 2 lb. to 100	40	3,020	98.70
4	B.L. 40 1 to 2,000; slaked lime 2 lb. to 100	203	4,558	95.73
5	Whale-oil soap 8 lb. to 100	871*	1,415*	61.90

* Two-year average.

All counts taken two days after application.

Table 2 establishes the fact that the application of B.L. 40 and slaked lime, as per Plot 4, will give very efficient control of green apple-aphis where the work is done thoroughly. In addition, to the credit of this formula may be added its cheapness; the cost of application being but 51 per cent. of the second cheapest spray combined with satisfactory control.

III.—REPORT ON CODLING-MOTH CONTROL WORK, VERNON AND OKANAGAN LANDING DISTRICTS.

H. H. EVANS.

Following is the report of control measures carried out by the Department of Agriculture for 1919 in the codling-moth infested areas of the Vernon District; also tables of spray dates, material captured, cost of operation, etc.

The total acreage under treatment in 1919 was approximately 223 acres, divided as follows: Okanagan Landing, 115 acres; South Vernon, 100 acres; Vernon Town, 8 acres. Of this total, actual infestation has been found on about 117 acres. The balance of 116 acres is in what can be described as the danger-zone, same being contiguous to and within a defined area of the infested blocks; the object of the work on this 116 acres is for protection and insurance against the further encroachment of this dangerous pest.

In the season of 1918 the crop on about 50 acres of the Okanagan Landing infestation was acquired by the Department and destroyed before maturity, with the object to, if possible, entirely eradicate the pest from this block, as in 1917 the degree of infestation had been decreased to a small percentage; this, however, has not proved a satisfactory method of control for one year's application, as during the past season about sixty-five worms have been captured on this 50 acres.

SPRAYING.

Formulæ.—A. of L. 2-40 paste; A. of L. 1-40 powder.

Dates of Application.—First spray, May 27th to June 7th; second spray, June 30th to July 11th; third spray, August 19th to 26th.

In the third spray only a portion of the infested area was covered, due to delay in receiving our shipment of arsenate of lead and the serious drawback of water-haulage.

Number of trees banded and sprayed, 11,422. In addition to the above, all fruit for shipment from these trees was inspected; the total number of boxes inspected being 19,401.

LIST OF GROWERS AND APPROXIMATE NO. OF TREES, OKANAGAN LANDING SECTION.

Grower.	Trees.	Grower.	Trees.
J. Mutrie	2,000	R. Swift	330
G. Mickleborough	2,300	C. O'Keefe	450
J. Wylie	500	C. Fulton	170
W. C. Calhoun	100	M. L. Donaldson	150
A. J. L. Clark	100		
H. B. Smart	425	Total	6,525

W. F. van Antwerp, J. Weeks, P. R. Phillips, J. A. Munroe, M. Munroe, R. Peters, B. Johnson, J. Ollerhead, W. Peters, R. Curtiss, P. R. Finlayson (per H. Card), P. Welch, F. B. Phillips. These growers have small home orchards totalling approximately 600 trees.

SOUTH VERNON SECTION.

Grower.	Trees.	Grower.	Trees.
W. Whalley (now Mr. Woitte)	280	L. Harris	150
T. Graham	190	Miss Harris	125
B. Weatherley (now Mr. Black) ...	250	B. Scott	140
J. Burrows	325	W. H. Baxter	260
J. Fuhr	100	Mrs. Gorbett	275
F. Henry	225	S. Boonde (late J. Carson)	160
J. Carron	346	G. N. Kearns	100
P. Burns	150	J. Campbell	110
J. Massey	251	J. Ripley	200
W. Jennings	50		
T. S. Fryer	260	Total	4,247
W. H. Thornton	300		

VERNON TOWN.

G. E. Wright, C. Christian, J. A. Morrison, Dr. J. W. Arbuckle, J. Highman, R. Stevenson, G. Dobie, Bickford Estate, J. Bellevue, Ellison Estate, Wm. Forrester, J. C. Agnew, W. J. McDowall, A. L. C. Madden, J. Campbell, Mrs. A. Olliver, E. D. Watts, Mrs. Stainton, W. H. Clark, R. Swift, W. H. Smith, P. Dickson, P. Rogers, J. Smith, H. Laing, F. Smith, Hankey & Co., G. Adams. The above lot-owners and a few others unknown have approximately 8 to 10 acres all told, being spread over about 100 acres area of the town; approximately 650 trees.

No. of trees, South Vernon	4,247
„ Okanagan Landing	6,525
„ Vernon Town	650
Total No. of trees	11,422

INSPECTION OF BANDS AND FRUIT—DATES AND MATERIAL TAKEN.

Old Infested Area A, Okanagan Landing.

Orchard-owner.	BAND INSPECTION.						Larvæ.	Pupæ.
	1st, July 4 to 9.	2nd, June 30 to Aug. 9.	3rd, Aug. 11 to 20	4th, Aug. 25 to Sept. 15.	5th, Sept. 20 to Oct. 6.	6th, Oct. 27 to Nov. 17.		
J. Mutrie	.....	2 lar.	.....	.....	.....	15 lar.	17	..
"	.....	4 pup.	.....	8 pup.	.....	.....	..	12
G. Mickleborough	.....	4 lar.	.....	.....	4 lar.	44 lar.	52	..
"	.....	3 pup.	.....	.....	.....	.....	..	3
J. Wylie	.....	10 lar.	5 lar.	3 lar.	28 lar.	11 lar.	57	..
"	.....	19 pup.	12 pup.	1 pup.	4 pup.	.....	..	36
R. Swift	.....	.....	1 lar.	1 lar.	.....	1 lar.	3	..
C. O'Keefe	.....	4 pup.	.....	.....	.....	.....	..	4
J. Wylie and J. Mutrie *	.....	.....	.....	.....	.....	.....	1	1
G. Mickleborough †	.....	.....	.....	.....	.....	.....	4	..
J. Ollerhead †	.....	.....	.....	.....	.....	.....	6	..
Totals	.....	.....	.....	.....	.....	.....	140	56

New Infested Area B, Okanagan Landing.

P. R. Finlayson	.....	.....	4 lar.	8 lar.	.....	.....	12	..
"	.....	.....	14 pup.	.....	.....	.....	..	14
H. B. Smart	.....	2 lar.	.....	2 lar.	.....	.....	4	..
J. Ollerhead	.....	2 lar.	.....	28 lar.	.....	.....	30	..
J. A. Munroe	.....	1 lar.	.....	.....	.....	.....	1	..
Totals	.....	.....	.....	.....	.....	.....	47	14

* Over-wintering material. † Captured in fruit by weeks, September 22nd to 30th.

Totals from Okanagan Landing—

Larvæ	187
Pupæ	70
Total	257

Old Infested Area C, Vernon Town.

Orchard-owner.	Band Inspection.						Larvæ.	Pupæ.
	1st, July 4 to 9.	2nd, July 30 to Aug. 9.	3rd, Aug. 11 to 20	4th, Aug. 25 to Sept. 15.	5th, Sept. 20 to Oct. 6	6th, Oct. 27 to Nov. 17.		
C. Christian	.....	.....	2 lar.	.....	.....	.....	2	..
"	.....	.....	2 pup.	.....	.....	.....	..	2
J. Bellevue	.....	1 lar.	.....	.....	.....	.....	1	..
Totals	.....	.....	.....	.....	.....	.....	3	2

New Infested Area D, Vernon Town.

Ellison Estate (care T. Norris)	.....	3 lar.	5 lar.	1 lar.	50 lar.	.....	59	..
	.....	5 pup.	3 pup.	1 pup.	.....	.....	..	9
E. D. Watts	.....	.....	1 lar.	.....	.....	.....	1	..
"	.....	.....	1 pup.	.....	.....	.....	..	1
J. Highman	3 lar.	.....	.....	.....	.....	.....	3	..
"	2 pup.	.....	.....	.....	.....	.....	..	3
Ellison Estate*	.....	.....	.....	.....	.....	.....	3	4
E. D. Watts†	.....	.....	.....	.....	.....	.....	10	..
J. Highman†	.....	.....	.....	.....	.....	.....	10	..
Totals	.....	.....	.....	.....	.....	.....	94	17

* Over-wintering material. † Captured in fruit by weeks, July 23rd to 31st; October 6th to 11th.

Totals from Vernon Town—

Larvæ	97
Pupæ	19
Total	116

		Per Cent.
Okanagan Landing section, Tables A and B	257	68.90
Vernon Town, Tables C and D	116	31.10
Totals	373	100.00

Old Area Infestations.

	Material captured.		Per Cent. of Increase.	Per Cent. of Decrease.
	1918.	1918.		
Okanagan Landing	381	190	.....	50.13
Vernon Town	13	5	.....	61.54
Totals	394	195	.....	50.51*

* Average decrease, 50.51 per cent.

New Area.

	1919.
Vernon Town	111
Okanagan Landing	67
Total	178

COST OF OPERATION, CODLING-MOTH CONTROL.

	Cost to Grower.	Cost to Dept.
Spraying—		
Arsenate of lead, 1,200 lb. paste, 259 lb. powder		$ 349 60
Man-labour, 1 man, 107 days at $4		428 00
Man and team, 32 days at $8		256 00
Supplies, material, and repairs		243 78
Freight and cartage		26 53
		$1,303 91
Arsenate of lead, 1,076¼ lb. paste, 229 lb. powder	$347 51	
Man and team, 19¼ days at $8	154 00	
Man-labour, 4¼ days at $4	17 00	
	$518 51	
Band and fruit inspection—		
Materials and supplies		75 45
Labour, 1 man, 405 days at $4		1,620 00
Foreign-car inspection—		
Man-labour, 1 man, 40 days at $4		160 00
Flash-light batteries, etc.		6 60
		$3,165 96
Gross cost to Department of Agriculture	$3,165 96	
„ Growers	518 51	
Net cost to the Department	$2,647 45	

SUMMARY AND RECOMMENDATIONS.

As can be noted by the figures presented on the preceding pages on fruit and band inspection, foreign-car inspection, and spraying, this work is a big problem, added to the other work which officials of the Department of Agriculture have to handle, and one perhaps not yet fully appreciated by the majority of orchardists and others in studying the field operations of the officials.

The work of codling-moth control in the Vernon District has been such during 1919 as to take up all of the Field Inspector's time from the beginning of May until the end of November; inability to get sufficient labour, inadequate water-supply, and the area being split into so many small holdings add considerably to the work and expense.

Despite these difficulties and the increased area brought under treatment, good headway has been made during the past season's operations, as shown by the percentages of decrease in captures made in the areas under treatment previous to 1919.

The percentage of infestation must appear light when one realizes that a total of only 373 captures have been made in six inspections of the 11,422 trees banded and 19,401 boxes of apples inspected; this last item necessitating the handling of every apple.

The destruction of culls and windfalls have been by no means complete during 1919 operations, and different measures for handling this phase of the problem should be instituted for 1920.

The work of foreign-car inspection is increasing tremendously. During 1918 a total of fifty-eight cars was inspected, and for 1919 to the end of November a total of 378 cars, with a total capture of worms to the number of 230; added to this were many Canadian Pacific Railway cars of which no record is kept.

Owing to the unsatisfactory manner in which the Canadian Pacific Railway employees carried out the destruction of refuse swept from foreign cars, the Department from early September on has undertaken the clearing-out and burning of this refuse. These cars are undoubtedly a serious avenue of infestation, as it was noted by your Inspector that Car No. 95865, N.P., inspected July 25th, contained sixty empty pupal cases and two pupæ, which were captured. The ventilators of this car were open, and evidently sixty moths had made good their escape; it is impossible to say where, but might easily have happened in British Columbia anywhere along the line of transit, as at this time first brood-moths were in flight.

In view of this, it is suggested that some method by superheating for the destruction of codling material contained in foreign cars be instituted, and the work done outside of the fruit belts if possible.

REPORT OF DISTRICT FIELD INSPECTOR, SUMMERLAND.

J. TAIT.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—The Districts of Summerland, Peachland, and Westbank have passed through another most successful season. (Excepting for the untimely early frost in October, which caught many growers unprepared; for loss in apples *see* another part of this report.) The districts were fairly free from serious pests and diseases, excepting Summerland, where the blister-mite on apples has got a hold in three sections. In the Westbank District, which has been quarantined for codling-moth for the past five years, field-work and inspection resulted in no moths being found. The spraying of stone-fruits was not as thoroughly done as last year owing to the lack of spray-machines; but the growers are realizing more and more the advisability of more spraying, and many new spray-machines will be operating next season. The fire-blight disease in Summerland this year was not so very severe, mostly twig-blight. The good clean-up last spring helped considerably in checking this disease. Woolly aphis is causing some trouble in some orchards, also powdery mildew on apples.

INSPECTION-WORK.

Fruit and vegetable express shipments from this district were very heavy and inspection entailed much evening work. The stone-fruit on the whole was up to the usual standard, but several cases of peaches and apricots were turned back for repacking, having some wormy fruit. Kept close inspection of all export shipments, also shipments to Ontario, by visiting the various packing-houses, and kept watch for anything new in pests. The codling-moth work at Westbank was conducted along same lines as last year—two sprayings and three band inspections. Another band inspection was to be done, but the extreme cold weather prevented it.

PAPERS READ AT MEETINGS.

It was your Field Inspector's privilege to lead in discussion with the members of the United Farmers' Association, Trout Creek; subject, "Grafting and Budding." At Peachland with the members of the Farmers' Institute; subject, "Sprays and Spraying." At Westbank with the members of the Farmers' Institute; subject, "Soil-fertility and Irrigation." Also attended pruning demonstrations at Kaleden, Naramata, and Experimental Farm, and gave some hints on pruning at Peachland and Westbank; also gave some instructions in packing at Walters, Limited, and T. J. Garnett's, to some new-comers.

FALL FAIRS.

Helped to judge fruit, vegetables, and grains at Quesnel and Smithers Fall Fairs. Separate reports were sent in to the Department. Gave considerable help to the directors at the Summerland Apple-show.

During the season the following officials were shown over the district: J. W. Eastham, Plant Pathologist; F. M. Clement, British Columbia University; R. C. Treherne, Dominion Entomologist; E. W. Buckell, Inspector of Codling-moth; A. McMeans, Dominion Seed Specialist.

GENERAL CONDITIONS OF ORCHARDS.

Pruning operations have not commenced yet owing to the extreme low temperature that has prevailed for the past four weeks. There are some blight-cankers and blighted limbs on apples to be cut out this season. Trees did not make a strong growth this year owing, no doubt, to the heavy crop produced. In many orchards the leaves are still clinging to the trees.

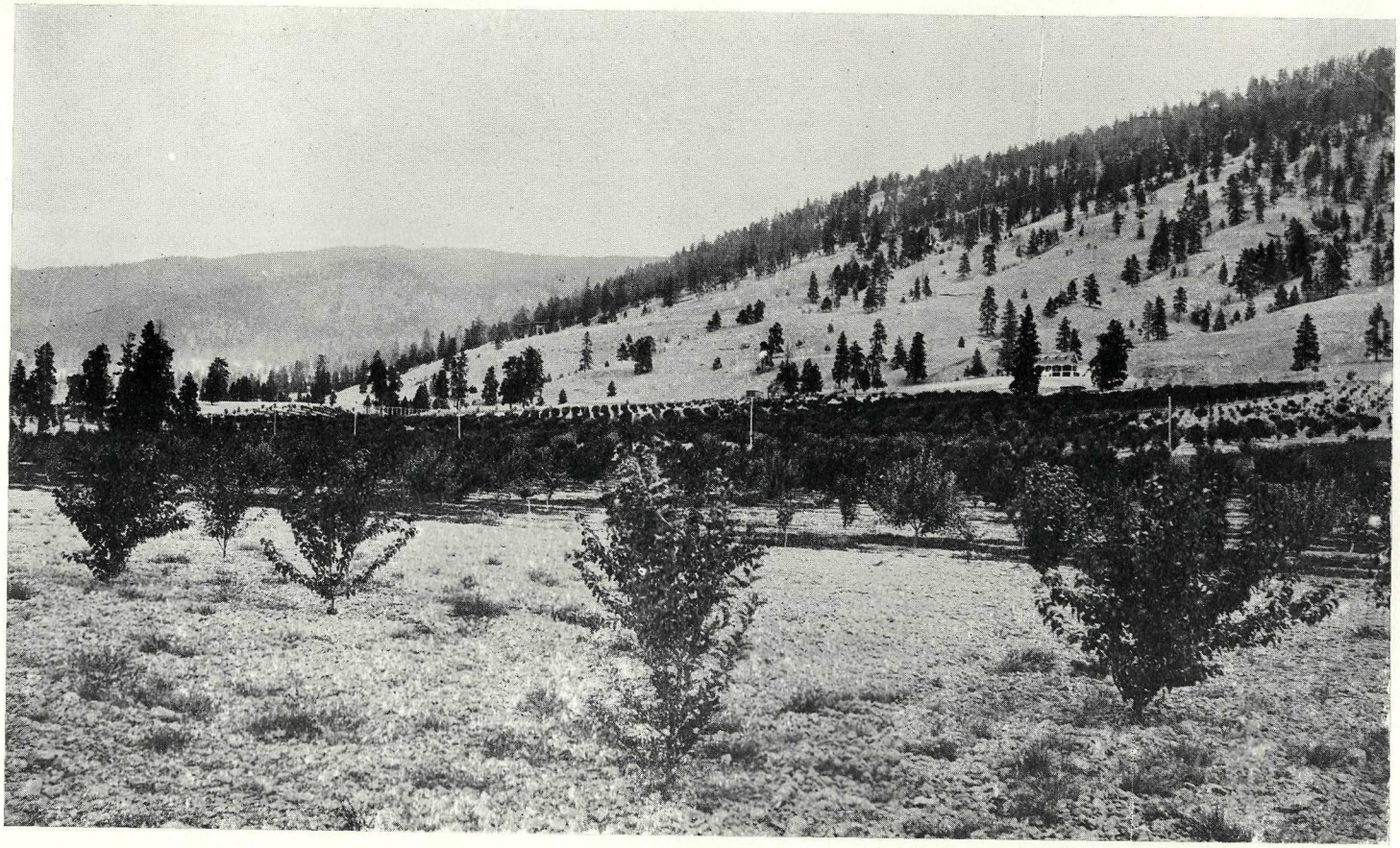
Gave considerable time to helping returned men who have taken up orchard-work on their own in this district. Also helped directly to put seller and buyer of live stock (cows and hogs) in communication with each other, whereby sales were effected.

As apple-mildew is getting more prevalent in many orchards, would like to see some experiments for control.

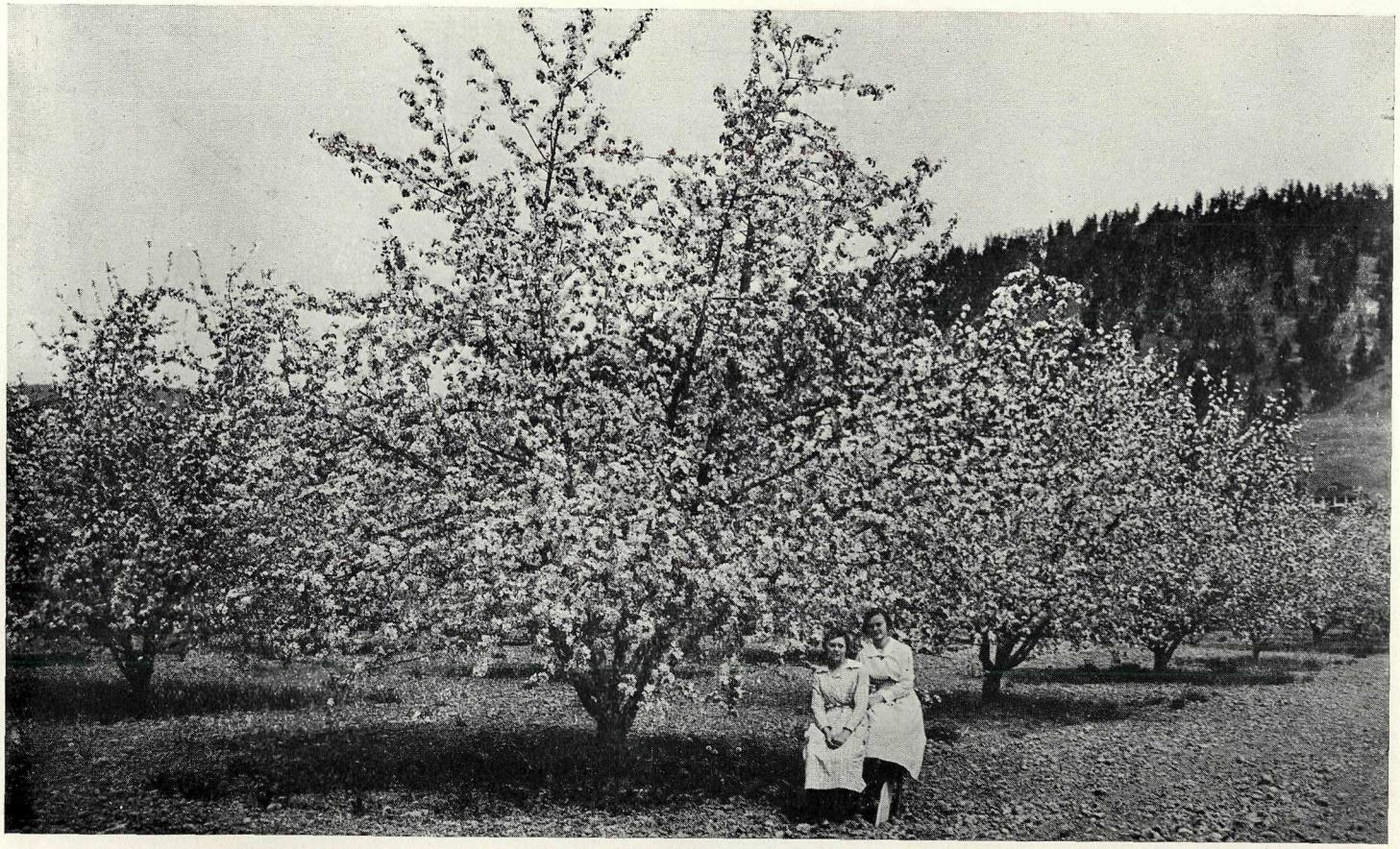
Estimated Loss by Early Frost.—Summerland, 31,000 boxes of apples; Peachland, 6,000 boxes of apples; Westbank, 2,500 boxes of apples.

Respectfully submitted.

JOHN TAIT,
District Field Inspector.



A typical young orchard on the Penticton Benches, Okanagan Valley.



A McIntosh Red apple orchard at Penticton, in the Okanagan Valley.

REPORT OF ACTING DISTRICT FIELD INSPECTOR, KELOWNA.

T. M. ANDERSON.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I respectfully submit report of my work from March 17th to December 31st, 1919.

FIRE-BLIGHT.

On taking over my duties in March I found a considerable amount of fire-blight in this district. With the assistance of Mr. Paret and Mr. Barber, we were able to make an orchard-to-orchard inspection and to make a fairly good clean-up of this disease. In nearly all cases we had the co-operation of the growers, and in no case did we find it necessary to adopt stronger measures than persuasion.

During the past summer there have been slight outbreaks of this disease, and most of my time has been taken up visiting orchards affected. In some cases it has been necessary to visit some orchards three and four times. There is still a small amount of fire-blight left, and I have strongly advised growers to have a thorough clean-up during the coming winter.

SPRAYING.

Spraying is not carried out as it should be in this district. Notwithstanding this, there has been no serious outbreak of any kind. In the Glenmore District there was a fair amount of scab and woolly aphis, due to the fact that there is a very serious shortage of water during the spraying season. This shortage, it is hoped, will be overcome during the coming season. Blister-mite made its first appearance on Rome Beauty apples in an orchard on the K.L.O. Benches, and as no control measures were used the crop was badly damaged.

During the past month three car-loads of spraying-machines have been sold in this district, and it is hoped that a large amount of good work will be done during the coming season.

CROPS AND WEATHER.

The fruit-crops in this district were the heaviest on record. Prices were high and so were the spirits of the growers. The spring opened up late, followed by a very dry summer. Very little rain fell from early in May until October. The third week in October frosts were experienced, and owing to the shortage of cars and the difficulty of obtaining shook many thousands of boxes of apples were still on the trees. A careful examination of this fruit failed to show any appreciable damage, the only apparent defect being a slight premature maturing which would probably shorten the keeping qualities. Zero weather was experienced on October 10th and 11th and the estimated loss has been computed at a minimum of 50,000 boxes.

Onion-crops showed a small increase over last year and was marketed in good condition. Potatoes, owing to dry season, were almost a complete failure. Tomato-crop was very short this year, and owing to the early frosts about 50 per cent. decrease of last year's crop only was used in canneries.

PACKING-HOUSES.

Frequent inspections were made of the packing-houses in conjunction with the Dominion Fruit Inspector. Considerable improvement was noticeable in the systematic handling of fruit, but the houses were much handicapped for want of space owing to the crops being much under-estimated and the very serious shortage of cars and shook.

Owing to the dry season experienced and the want of proper thinning the percentage of small fruit was above the average necessitating heavy culling. A little scab was found in McIntosh apples and I have notified growers.

I have inspected the following for export during the past season: 106 cars to Great Britain; 27 cars to New Zealand; 5 cars to China; 1 car to West Indies; 1 car to Norway.

OFFICE-WORK.

A good deal of my time has been taken up answering inquiries. Changes in ownership of ranches has been greater than usual during the past year, and there has been a number of soldier settlers locating in this district. There has also been a great demand for Department literature and publications.

Respectfully submitted.

T. M. ANDERSON,
Acting District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SALMON ARM AND CANADIAN PACIFIC RAILWAY MAIN LINE DISTRICT.

C. R. BARLOW.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I herewith beg to submit my annual report of work in my district during the year 1919.

PEST-CONTROL.

Apple-scab, which is by far the most serious economic pest that the fruit-growers in the district have to contend with, has caused comparatively small loss this season. In orchards where efficient spraying was carried out the loss for this disease was negligible. The season has been exceptionally dry and consequently unfavourable for the development of the disease.

Fire-blight, though present in the district, shows no sign of becoming a serious menace at the present time. Your assistant has so far been able to deal with each outbreak in its initial stages, and will make careful inspection of infested orchards during the dormant season and attend to the cutting-out of all hold-over cankers.

Anthracnose (Neofabræa malicorticis).—This disease is making its appearance in many orchards, and while its spread is not so rapid as in the more humid Coast districts, if not controlled, is undoubtedly capable of causing serious damage. The majority of the growers whose orchards are affected are, however, alive to the necessity of controlling the disease and will take steps to do so next fall.

Codling-moth.—This pest occurred at Walhachin in 1916 and 1917. In the spring of 1917 steps were taken by the Department for its control, which were followed up by further work in 1918 and 1919. Although during the work of 1918 no sign of infestation was met with, it was not considered safe to remove the quarantine restrictions. This season the orchards were sprayed by the growers, the bands were inspected three times, and the fruit was examined after picking. No larvæ or pupæ were found in either the bands or the fruit throughout the entire season. It would therefore appear safe to assume that the pest has been eradicated, and that the quarantine restrictions can be safely removed. However, it will be necessary to maintain a careful watch in the district for a possible new outbreak.

Cutworms were again the cause of very considerable losses in the early part of the season. Growers, however, who used the poisoned baits recommended by the Department report very satisfactory control.

San Jose Scale.—At Spences Bridge, where this pest occurred, the orchards originally infested remain free from the scale, but it is still persisting on the wild growth in isolated spots. Spreading from these spots has been largely controlled by cutting and burning all new growth early in the spring. Care will have to be taken to prevent any spreading from these centres of infection, which from the nature of the ground are almost impossible to eradicate.

Oyster-shell Scale.—This pest has caused serious loss in some of the older orchards this season, and where allowed to go unchecked is spreading rapidly. Many growers have of late years abandoned the use of the dormant strength lime-sulphur spray, and this is no doubt to a large extent the cause of the trouble. Your assistant will this year take steps to secure control where necessary.

Apple Fruit-miner (Marmara pomonella).—This insect was found in a small number of apples in an orchard at Sorrento. Should it occur again next year your assistant will endeavour to supply material to the Entomological Branch for the working-out of its life-history and control.

EXPERIMENTAL WORK.

Spraying Experiments.—Experiments on the control of apple-scab were carried out by your assistant at Salmon Arm, the object of the experiment being to determine the minimum strengths of lime-sulphur solution which will efficiently control apple-scab under local conditions. The variation in strengths of solutions used covers a wide range, and very little difference in results was observed in this year's work, excellent results being obtained with even the weakest solutions. This is probably due to the fact that the season was exceptionally unfavourable to the development of apple-scab, and to obtain reliable results it will be necessary to carry on this work through two more seasons.

Liming Experiments.—Three ¼-acre plots situated in various parts of the Salmon Arm District were limed last winter and a ¼-acre check-plot kept in each case. Plot 1 was a heavy clay soil on which hydrated lime was applied at the rate of 3 tons to the acre. The soil on this plot showed a marked improvement in physical condition at seeding-time as compared with the soil on the unlimed plot. Alfalfa was seeded with oats as a nurse crop. The oats showed a considerable increase in yield over those on the check-plot. Improvement in the alfalfa was not so noticeable, but it is probable that the difference will be more marked next season.

Plot 2 was a clay loam soil on which hydrated lime was applied at the rate of 3 tons per acre. Considerable improvement was shown in the physical condition of the soil on the limed plots by seeding-time. Red clover was seeded on both limed and unlimed plots, and not only was the catch very much better on the limed plot, but the growth made was greatly improved. However, the growth did not warrant a cutting being made on either plot this year, but no doubt some interesting data will be available from this plot at the end of next season.

Plot 3 was a sandy loam soil on which hydrated lime was applied at the rate of 3 tons per acre. This plot was seeded with red clover. The seeding was done somewhat late, and unfortunately practically all was killed out by drought. Your assistant has reseeded this plot to hairy vetch, and it is hoped that results will be available next year. Your assistant will arrange the results of these experiments in tabulated form at the end of next season, when full data will have been obtained.

Cover-crop Experiment.—A ½-acre plot of sweet clover seeded late in the fall of 1918 as a cover-crop was allowed to stand over till this fall in the expectation of obtaining a stand to turn under. Unfortunately only about 25 per cent. of the seeds germinated, and this was completely killed out by drought. The plot was ultimately ploughed up and swede turnips put in by the owner.

PRUNING DEMONSTRATIONS, ETC.

Pruning and grafting demonstrations were given by your assistant to growers requesting same. Forty-six demonstrations were given at Salmon Arm, Sorrento, Kamloops, Walhachin, and Lytton.

MEETINGS.

Your assistant attended four meetings of the Salmon Arm branch of the British Columbia Fruit-growers' Association, reading papers on various horticultural subjects. Your assistant acted on the Board of Directors of the Salmon Arm Farmers' Exchange, attending eleven meetings of the Board, and also acted on the committee of the Farmers' Convention held at Salmon Arm in February, and attended four meetings in connection with same.

FIELD INSPECTION.

General field inspection was carried out throughout the season, your assistant making many hundreds of personal visits to growers throughout his district.

FALL FAIR.

Your assistant acted as judge in fruit and vegetable sections at Pritchard, Invermere, and Cranbrook Fall Fairs; also assisted E. W. White at Kamloops Fall Fair.

CROP COMPETITION.

At the request of the Soil and Crop Division, your assistant acted as judge in the Boys' and Girls' Club potato-growing competition at Silver Creek.

NEWSPAPER ARTICLES.

Your assistant has at various times contributed short articles dealing with horticultural subjects to the local newspaper.

GENERAL.

Fruit-trees have gone into the winter in fair condition, and there is every prospect of a good average crop next year. Some damage has probably been caused to the cane-fruits and strawberries by the unusually cold weather in December, which occurred at a time when there was no snow protection. The fruit-crop in this district shows a considerable increase over last year, in spite of the fact that approximately 8 per cent. was a total loss from frost. The vegetable-crop was light, but prices were satisfactory.

Respectfully submitted.

C. R. BARLOW,
District Field Inspector.

RESULTS OF SPRAYING EXPERIMENTS AT SALMON ARM.

Plot.	Date applied.	Clean.	Scabbed.	Boxes per Tree.	Remarks.
		Per Cent.	Per Cent		
1	L.S. 1-30, May 5; L.S. 1-35, May 28; L.S. 1-35, June 24	99.81	0.19	13	Early infections.
2	L.S. 1-30, May 5; L.S. 1-35, May 28; L.S. 1-35, June 24; L.S. 1-60, July 4	99.87	0.13	12½	,,
3	L.S. 1-35, May 5; L.S. 1-40, May 28; L.S. 1-45, June 24	98.91	1.09	12	,,
4	L.S. 1-40, May 5; L.S. 1-45, May 28; L.S. 1-45, June 24	99.01	0.99	16	,,
5	L.S. 1-40, May 5; L.S. 1-50, May 28; L.S. 1-50, June 24	98.76	1.24	11½	,,
6	S.W.R.S. 3-45, May 5; S.W.R.S. 2-45, May 28; S.W.R.S. 2-45, June 24	96.23	3.77	14	,,
7	Check	43.01	56.99	9	Infection of all ages (90 per cent. early).

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, EAST AND WEST KOOTENAY DISTRICTS.

E. C. HUNT, B.S.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for East and West Kootenay for the year 1919.

LECTURES AND FALL FAIRS.

Lectures on horticultural subjects were given at Willow Point, Harrop, and Shoreacres Farmers' Institute meetings. Fall fairs were attended in the capacity of judge of fruit and vegetables at Natal, Fruitvale, Kaslo, Trail, Needles, Kelowna, and Nakusp. A separate report on each fair with a marked prize-list has been submitted. Your assistant also judged the fruit and vegetables at the Nelson Rose-show and at the Willow Point Women's Institute Flower-show.

EXPERIMENTAL SPRAYING.

Spraying experiments were conducted again this year for the control of apple-scab. These experiments were for the purpose of testing out different spray materials and the different strengths of lime-sulphur.

The locality experiment conducted at Forslund's (Arrow Lakes) in 1917 and 1918 was again carried on this year with the same plots. Bordeaux mixture and soluble sulphur were tested out against lime-sulphur at Willow Point, and weaker strengths of lime-sulphur were tested out in the control of scab at Sunshine Bay. Some sulphur-dusting experiments for scab-control were also made at Willow Point.

The following is a summary of the experiments:—

A. Locality Experiment.—Conducted on same plots as in 1917 and 1918 at Forslund's, near Needles (Arrow Lakes). Variety, McIntosh Red. Trees, twelve years old and in full bearing. (L.S.=Lime-sulphur.)

Table of Plots and Sprays used on each.

Spray.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.
Delayed dormant	L.S. 1-25	L.S. 1-25	.....	.....	.....	.....	Check.
Pink	L.S. 1-30	.....	L.S. 1-30	L.S. 1-30	L.S. 1-30	L.S. 1-30	,,
Calyx	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	,,
14 days later	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	.....	.....	,,
14 days later	L.S. 1-35	L.S. 1-35	L.S. 1-35	.....	.....	L.S. 1-35	,,

In making the final count, an average number of apples from all parts of one uniform tree in each plot were carefully examined and notes taken on the scab. In 1917 and 1918 all the apples on one uniform tree in each plot were counted to make up the results.

The table below gives the results of the fruit-counts made on the McIntosh Reds at Forslund's in 1919, as well as an average of the results for the three years, 1917, 1918, and 1919.

Results.

Plot.	No. of Apples counted, 1919.	Fruit free from Scab.	Scabby Fruit.	Culls on Account of Scab.	Total Marketable Fruit.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	492	96.32	3.68	0.40	99.60
1	3-year average	95.70	4.30	0.20	99.80
2	481	91.47	8.53	1.24	98.76
2	3-year average	87.85	12.15	2.01	87.99
3	521	91.90	8.10	0.80	99.20
3	3-year average	95.43	4.57	0.27	99.73
4	454	50.20	49.80	1.76	98.24
4	3-year average	78.83	21.17	0.75	99.25
5	470	19.15	80.85	4.68	95.32
5	3-year average	50.72	49.28	1.83	98.17
6	557	86.89	13.11	1.43	98.57
6	3-year average	88.26	11.74	0.74	99.26
7*	308	0.12	99.88	18.50	81.50 (No. 3's)
7	3-year average	9.71	90.29	35.37	64.63

* Check-plot.

It can be seen from these results, covering the three-year period, that fruit can be produced free from scab, even those varieties most susceptible to the disease, and in an orchard or district where the maximum of infection would take place. In 1917 three sprayings as per Plot 4 gave the best and most economical results; while in 1918 and 1919, Plot 3, with four sprayings, gave the best results. Plot 6, with the pink and calyx sprays and one thirty days later (after the calyx), gave the best results for the money expended. Taking the three-year averages, the results show that to control apple-scab in the Arrow Lakes section it is necessary to put on four sprayings as per Plot 3. From the results of the three-year experiment carried on during 1916, 1917, and 1918 at Nelson, the same number of sprays as per Plot 3 are necessary for the control of scab in the Kootenay Lake sections as for the Arrow Lakes. While at Creston the three-year experiment demonstrated that three sprays as per Plot 4 or 6 were sufficient to control the disease.

B. Material Test or Experiment.—B.M.=Bordeaux mixture. S.S.=Soluble sulphur. L.S.=Lime-sulphur. S.D.=Sulphur-dust (dust-spraying). This experiment or test was conducted on McIntosh Red and Wealthy apples at Willow Point. Trees all of bearing age. Materials: Bordeaux mixture, 2 to 3 lb. of bluestone, 10 lb. of hydrated lime, and 40 gallons of water; soluble sulphur, 1 lb. to 40 gallons of water; lime-sulphur, 1 gallon to 30 or 40 gallons of water, based on a 32-degree Beaume reading; sulphur-dust, 85 per cent. finely ground sulphur, 15 per cent. filler (gypsum), 90 per cent. ground sulphur, and 10 per cent. lead arsenate.

Table of Sprays and Plots.

Spray.	Plot 1.	Plot 2.	Plot 3.	Plot 4.
Delayed dormant	B.M. 3-10 40	L.S. 1-30	S.D. 85%, 15% filler	Check.
Pink	B.M. 2-10-40	L.S. 1-35	S.D. 85%, 15% filler	"
Calyx	S.S. 1-40	L.S. 1-40	S.D. 90%, 10% arsenate	"
14 to 20 days later	B.M. 1-10-40	L.S. 1-40	S.D. 90%, 10% arsenate	"

All the apples on one uniform tree in each plot were picked and carefully examined and notes taken on the scab. The table below gives the results of the fruit-counts made on the McIntosh Red and Wealthy apples.

Results.

Plot.	Apple.	Fruit free from Scab.	Scabby Fruit.	Culls on Account of Scab.	Total Marketable Fruit.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	Wealthy	99.60	0.40	....	100.00
1	McIntosh Red	91.66	8.34	0.27	99.73
2	Wealthy	93.96	6.04	....	100.00
2	McIntosh Red	88.55	11.45	0.40	99.60
3	Wealthy	49.36	49.64	9.70	90.30
3	McIntosh Red	13.05	86.95	13.14	86.86 (No. 3's)
4	McIntosh Red (check)	3.24	96.76	39.59	60.41

NOTE.—Seventy-five per cent. of the marketable fruit in Plot 3 would grade No. 3's and 85 per cent. in Plot 4 would grade No. 3's.

From the above results it will be seen that Plot 1, sprayed with Boredaux mixture and soluble sulphur, gave the highest percentage of clean fruit. Plot 2, sprayed with lime-sulphur, was second; and Plot 3, sprayed with sulphur-dust, was third in percentage of clean fruit.

The McIntosh Red tree counted in Plot 1 had 1,634 apples on it, while the McIntosh Red tree in Plot 2 only had 1,240 apples. The two trees were as near the same size as it was possible to get, and were average trees, in respect to set of fruit, for each plot. Plot 1 gave the best set of fruit, about 15 per cent. better than Plot 2. The lime-sulphur caused some burning to the foliage on the McIntosh at the time of or just after the calyx spray was put on. There was also quite a drop to the fruit on the McIntosh in Plot 2 after the calyx spray, but very little (if any) after the later sprays were applied. Lime-sulphur caused very little burning to the foliage and no drop to the fruit on the Wealthy tree. The Bordeaux mixture with the soluble sulphur did not cause any burning to the foliage or any apparent drop of the fruit. The healthy appearance of the foliage in Plot 1 over that in Plot 2 was quite noticeable up to August 1st, when very little (if any) difference in the condition of the foliage on first two plots could be noticed. On Plot 3 the set of fruit on both varieties was good, no burning to the foliage, but both the foliage and the fruit were very scabby.

Plot 1, which was sprayed with Bordeaux mixture and soluble sulphur, had 47.43 per cent. of the fruit on the McIntosh russeted on account of the burning of the Bordeaux. This russeting lowered 38.65 per cent. of the apples to grades 2's and 3's.

It is hoped that this experiment will be carried on for one or two years longer.

C. Experiment to test Weaker Strengths of Lime-sulphur in the Control of Apple-scab.—Conducted at Sunshine Bay on McIntosh Reds and Jonathans. Trees, eleven years old.

Table of Plots and Sprays.

Sprays.	Plot 1.	Plot 2.
Early pink	L.S. 1-40	L.S. 1-50
Late pink	L.S. 1-40	L.S. 1-50
Calyx	L.S. 1-40	L.S. 1-50
14 days later	L.S. 1-40	L.S. 1-50

The table below gives the results of the fruit-counts made on the McIntosh Red and Jonathan apples.

Results.

Plot.	Apple.	Fruit free from Scab.	Scabby Fruit.	Culls on Account of Scab.	Total Marketable Fruit.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	McIntosh Red	66.13	33.87	1.80	98.20
1	Jonathan	97.50	2.50	...	100.00
2	McIntosh Red	63.78	36.22	1.50	98.50
2	Jonathan	96.55	3.45	...	100.00

It will be seen from the above results that these weaker strengths of lime-sulphur did not give quite as good results in the control of scab on the McIntosh Red as the stronger ones usually applied for these four sprayings. It might be well to point out the fact that these plots were inspected on August 19th and the fruit carefully examined on the trees. Very little scab-infection was to be found on the fruit at this time. At the time of picking the fruit, September 22nd, the scabby fruit was divided into two classes—namely, *early infection*, as shown by the large and medium scab-spots, and *late infection*, as would be shown by the "pin-head" type of scab-spot. The results were as follows: Plot 1, McIntosh Red, showed 27.15 per cent. late infection and only 6.72 per cent. early infection; Plot 2, McIntosh Red, showed 31.02 per cent. late infection and 5.2 per cent. early infection.

To give these weaker strengths of lime-sulphur a fair test in the control of scab, a later spray should have been applied and one of the pink sprays left out. This late spraying put on some time in August would have prevented a great deal of the late infection on the McIntosh. This experiment should be carried on for another year, because if these weaker strengths of lime-sulphur will control apple-scab just as good as the stronger ones usually applied a great saving can be effected in the cost of spraying.

The table below gives the dates on which the different sprays were put on for the three experiments, A, B, and C:—

Spray.	Experiment A.	Experiment B.		Experiment C.
		B.M. and L.S.	Dust.	
Delayed dormant	April 25	April 28	May 1	May 5
Pink	May 7	May 13	May 13, 14	„ 16
Calyx	„ 27	„ 27	„ 28	June 2
14 days later	June 16	June 12	June 12	„ 20
14 days later	July 8	.....	.....	.....

COVER-CROP EXPERIMENTS.

With a view to keeping up and improving the fertility of our orchard soils in the large- and small-fruit areas, the Horticultural Branch of the Department of Agriculture has undertaken the demonstration of cover-crops in a few leading orchards in a number of sections of the Kootenay District. Accurate data are to be kept on these cover-crops, as to their adaptability, cost, and soil-building qualities of the different soils.

The cover-crops that are being tested out in the Kootenay District at the present time are winter vetch and sweet clover. The plats are located at Birchbank, Willow Point, Sunshine Bay, and Creston. Each plat contains about 2½ acres. The vetch was sown at the rate of 25 lb. per acre and the sweet clover at the rate of 16 lb. per acre. It is the intention to run these experiments for three years on the same plats with the same cover-crop. As this is the first year of the experiments, very few data are available to report on.

DISEASES AND INSECT PESTS.

Apple-scab.—This is by far the worst disease in the Kootenay District. The disease was quite prevalent again this year in the Kootenay and Arrow Lakes sections, the rains in mid-August bringing on a very bad late infection. This late infection, however, was confined to those varieties most susceptible to the disease and only where the growers had left off the late spray. A detailed analysis of the results on apple-scab control in the Kootenay District is found elsewhere in this report.

Fire-blight.—This year very little (if any) damage was done by this disease. The different infected trees at Nelson were thoroughly cleaned up during the dormant season and no new infections were found during the year. At Creston two infected trees were found during the spring. This is the first appearance of blight in this district. All infections were cut out thoroughly and no new infections were located during the summer or fall. Close inspection will be required for new outbreaks of this disease during the coming year.

Pear and Cherry Slug.—A very bad outbreak of this insect occurred in the Fairview District at Nelson during August and September, and considerable damage was done to the pear and cherry trees of this district. The insect is quite easily controlled if proper spray measures are used.

Other insects and diseases of the district were of about normal severity, causing more or less damage to the fruit and vegetable crops where proper preventive measures were not adopted. All of the above insect pests and diseases were attended to, as far as time would permit, by making personal calls on growers and giving advice and information on the methods of control and eradication.

ORCHARD VISITS AND DEMONSTRATIONS.

Many personal visits to different orchards of the district were made during the year; a great number of requests coming in from growers for demonstrations and advice on various horticultural subjects. This line of work takes up an increasing amount of time, but is very valuable and much appreciated by the growers.

CROP REPORTS.

Crop estimates and reports are furnished from time to time during the growing season, and at the end of the year a detailed report is made of the total production of all fruits and vegetables in the district. Information and data are also collected in a similar way from the jam-factories of the district. These reports have been submitted to the Department.

OFFICE-WORK.

There has been a largely increased amount of correspondence during the year. Many inquiries were received and answered on matters connected with horticulture in this district. The necessary correspondence with the Department and other office duties were also attended to.

During the shipping season your assistant was called upon to inspect export shipments of fruit and also to advise *re* various diseases and pests in connection with shipments.

Respectfully submitted.

E. C. HUNT,
Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF DISTRICT AGRICULTURIST AND FIELD INSPECTOR, CRESTON.

C. B. TWIGG.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as District Agriculturist and Field Inspector for East Kootenay and that portion of West Kootenay south of Kootenay Lake for the month of December, 1919.

I was appointed to this position since my discharge from the army on December 1st, 1919, with headquarters at Creston, and during that month I spent most of the time in Mr. Hunt's office at Nelson, making myself acquainted with the nature of the work entailed and helping him in office routine.

Since taking up my residence in Creston requests have come in from growers to visit their orchards and I have given advice in various horticultural subjects to growers. All necessary correspondence was carefully attended to.

All of which is respectfully submitted.

C. B. TWIGG,
District Agriculturist and Field Inspector.

REPORT OF PROVINCIAL PLANT PATHOLOGIST.

J. W. EASTHAM, B.Sc.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report for 1919.

NEW DISEASES.

No disease of commercial importance not previously recorded has been noticed during the past season, but a number that have hitherto attracted little attention have been, for one reason or another, more prominent.

YELLOW RUST OF RASPBERRIES (PHRAGMIDIUM IMITANS).

This is a native fungus which occurs on several species of wild *Rubus* throughout the Pacific slope from California to British Columbia. The early stage of the disease appears as little yellow spots on the leaves the size of a pin-head or smaller. These may be very numerous, a single leaf showing many hundreds of such infections. In such cases the leaf-tissue is damaged, the vitality reduced, and in hot, dry weather such leaves wither and fall prematurely to the detriment of the developing crop.

The disease is very different from the so-called orange-rust (*Gymnoconia interstitialis*) of Eastern Canada and United States, not only as regards the technical character of the causal fungus, but in general aspect and mode of growth. This latter disease is characterized by the bright orange-red colour of the spore-masses, which are large and almost continuous over the entire surface of the leaf, so that an affected plant is conspicuous from a distance. The mycelium is perennial in the roots and the only remedy is to dig up and destroy the attacked plant.

This disease has so far not been found in British Columbia. Our native rust, which is here called the yellow rust to distinguish it, was unusually prevalent, especially on red raspberries, in the spring of 1919 and many inquiries were received. A large plantation at Burnaby was so severely affected that hardly a leaf could be found free from rust-pustules, while many leaves showed hundreds of infections.

Considerable anxiety was manifested by growers, especially as it was not possible to predict from previous experience how serious the results might be. Careful observation was therefore kept of such plantations. It was found that the results hardly warranted serious alarm. The summer of 1919 was exceptionally dry and the combined causes of drought and rust together did not reduce the yield on an average more than 20 per cent. below that of 1918. There seems reason, therefore, to suppose that the disease is not likely to become a serious menace to the grower of small fruits or to render it necessary to take special measures to combat it. However, where it is practicable, it would be a good thing to rake together the fallen leaves and burn them, as in this way large quantities of spores would be destroyed.

BACTERIAL BLIGHT OF WALNUTS (PSEUDOMONAS JUGLANDIS).

This attacks leaves, young shoots, and, more particularly, the young nuts, often causing the loss of the entire crop. It is the worst enemy of the walnut-grower in the Pacific States.

During the past season we received inquiries regarding a trouble of young walnuts in the vicinity of Vancouver, and examination showed practically every nut to be diseased with bacteriosis, the entire crop being destroyed. In this particular case the commercial value of the crop was not of special importance, but in view of frequent recommendations for the planting of English walnuts on the Lower Mainland it is important to recognize that this destructive disease is already present here and may become very severe in certain seasons under our conditions.

No satisfactory control measures have been found. Different varieties, however, are known to vary greatly in susceptibility in California. While resistance often varies under new conditions, it would be preferable, at least, to use those varieties which have been found resistant elsewhere, in starting a plantation, until some experimental data of our own are available. It has also been found that late-blooming varieties often escape the disease, while earlier varieties suffer severely, infection taking place as a result of foggy, damp weather. These considerations would probably apply also under our conditions. The disease has so far not been recorded from the Interior.

WESTERN TOMATO-BLIGHT.

This resulted in considerable loss to tomato-growers in certain parts of the Southern Okanagan during the past season, occasionally as many as 25 per cent. of the plants in a field being affected. Affected plants appear dwarfed and sickly; the leaves curl and turn yellow, while the veins become purplish in colour, giving a purplish tinge to the leaf. The fruit does not mature and the whole plant dies prematurely.

This disease is apparently due to a fungus present in the soil which attacks the roots through injuries made at the time of transplanting. No remedy is known, and from the nature of the disease it is not likely that any direct means of treatment will be found satisfactory. There is, however, much difference in the powers of resistance among plants in the same batch growing under the same conditions, and there is every reason to believe that by selection of seed from these resistant plants growers can build up strains of tomatoes showing a high degree of resistance to the disease under their particular conditions. This seems to be the most promising line of defence against this and similar diseases.

CANE-BLIGHT OF RASPBERRIES (LEPTOSPHÆRIA CONIOTHYRUM).

In previous years, in certain places, considerable loss has been attributed to this disease. There is no doubt that it can be serious and has been found so in many places, both in the East and in the West of the continent. There is evidence, however, that the worst cases of injury in this Province which have been attributed to this disease have been partly, if not mainly, due to other causes. The worst affected plantations are on land which, although it has a good slope and is tile-drained, has an irregular hard-pan which comes close to the surface at numerous points, forming pockets. As a consequence, some plants are killed outright as a result of "wet feet" and winter injury, while others, which are injured to a less degree, are nevertheless root-injured and sickly. Such canes succumb to an attack of cane-blight which might not prove serious to healthy plants. A good deal of the damage with which cane-blight is associated is probably due to these physical conditions more than to the disease itself.

OTHER DISEASES AND PESTS OF SMALL FRUITS.

With the great extension of the areas under small fruits in the next few years, it is only to be expected that diseases and pests will also have a chance to multiply. It is highly important that growers take every reasonable care in what may be termed sanitary precautions in caring for their plantations. This means the cutting-out of old canes, and the destruction of them and other refuse as quickly as possible, instead of leaving them to lie around indefinitely. Also a careful watch for the earliest signs of infection and the destruction, preferably by burning, of diseased or infested plants. During the past season certain diseases and pests have been noticed more frequently than in previous seasons, and it is probable that these are actually on the increase; for instance, the anthracnose of the raspberry (*Glœsporium venetum*) and rose-scale (*Aulacaspis rosæ*). Crown-gall on the canes, which proved troublesome a few years ago on the Snyder blackberry on the Government experimental plots at Chilliwack, has also been noticed as occurring quite severely on the loganberry. The only remedy is to cut out all diseased canes and secure conditions for good growth. It is quite probable that the new canes will show it to a much less extent. In this way the disease was brought under control on the experimental plot.

EXPERIMENTAL WORK.

Apple-tree Anthracnose.—The three years' spraying experiment conducted in conjunction with Mr. White, of the Horticultural Branch, has now been concluded and the results have been very satisfactory. A detailed account of them has been published in the *Agricultural Journal*, and it is only necessary here to allude to one or two of the more important results.

First: 3-4-30 Bordeaux mixture has proved to be sufficient in most cases instead of the old 8-8-40 formula. This reduces the cost of materials to about one-third of that under the old formula.

Secondly: Spraying when the fruit is still on the tree has not increased the cost of handling the fruit, at least in the case of winter varieties which are stored for some time before picking and shipping. The Bordeaux mixture has been found to disappear from fruit during such storage. The chief objection on the part of the grower to spraying early enough to protect the trees is thereby removed.

Thirdly: Sprayed apples have shown much less rot in storage. Anthracnose being well known to cause a rot of the fruit, control of the disease on the tree naturally means sounder fruit, while spraying when the fruit is unpicked gives direct protection against infection.

The cost of the necessary early spray averaged about 14 cents per tree during the three years' experiment, which is a small amount to pay for insurance against this disease.

Potato-spraying.—This year the experimental work for this purpose was carried out in only two locations—one at South Sumas and the other near Sullivan. The primary purpose of this experimental work was again frustrated owing to the fact that the unusually dry season prevented a development of the destructive late blight (*Phytophthora infestans*). Incidentally, however, some valuable information was gained. Early blight (*Alternaria solani*) was very bad on the Sullivan plot and reduced the yield materially, the foliage being blackened and killed several weeks before it should have been. One of the main purposes of this experiment was to determine whether spraying against late blight could be postponed until later in the season, say early in August, epidemics having been observed to occur only late in the season. It has at least been conclusively proved that this would not be sufficient. Even with our comparatively moist climate of the Lower Mainland, early blight has shown itself exceedingly destructive in certain seasons like that of 1919, and it will be necessary to begin spraying when the plants are from 6 to 9 inches high to obtain proper protection against this disease. It is also indicated that such a spraying will give better protection against late blight, as it will give a better covering of the spray materials to the lower leaves where the blight begins. In the later stages of growth, when the plants are large and spreading, it becomes very difficult to fully cover the lower and interior foliage.

Another result of the work was to show very clearly the good results of proper seed-selection. The seed for these plots was very carefully selected, especially as regards freedom from disease, and also disinfected with formaldehyde. The plot at Sullivan occupied one portion of a field of potatoes, the remainder of the field not having been planted with selected seed. In the experimental plot, only a small proportion, varying from 1 to 5 per cent. of the plants, showed *Fusarium* wilt, while in the other portion of the field the percentage of *Fusarium* infection was from 10 to 25 per cent. These *Fusarium* diseases appear to be on the increase. This is especially the case where, as in so many areas, the cultivation of potatoes is largely in the hands of Chinamen. Seed-selection is the only means of controlling these diseases, and it is almost impossible to get the Chinese grower to pay any attention to this. It appears to be a maxim with him never to use for seed anything that is saleable for any purpose.

Apple-mildew.—This Branch did not directly undertake experimental work in this connection, but the Plant Pathologist gave an address on the control of the disease at the British Columbia Fruit-growers' Association and later at the Farmers' Institute at Penticton. Later he visited several growers in the Penticton District who wished to take measures against this disease and gave them further instructions.

Spraying with lime-sulphur concentrate 1 to 40 when the blossoms are showing pink and again after the petals fall was carried out. Some of the orchards had suffered from a bad attack of powdery mildew the previous season, and the growers were beginning to be alarmed about the ultimate results of the spread of this disease. Two inspections for this disease made during the summer where the spray measures were carried out indicated considerable improvement as the result of the sprayings. Owing, however, to the exceptionally dry season, mildew did not have much chance to spread later in the season, and ultimately there was not a great deal of difference between the checked trees and the sprayed ones. There is little doubt, however, that these sprayings persisted in will prevent powdery mildew from becoming a serious pest with the apple-grower, as it is not a disease of much consequence in those parts of the Province where climatic conditions render spring and early summer sprayings a necessity for the control of other diseases such as apple-scab.

OTHER WORK.

I attended the summer school for agricultural instruction to teachers held at Victoria in July and gave a short course of lectures and demonstrations on bacteriology and plant-pathology. I have also been giving from five to eight afternoons per month for the past six months to instruction-work in connection with the Soldiers' Civil Re-establishment classes held by the University of British Columbia at its Point Grey site. My work has dealt with practical measures

for controlling the various plant-diseases and insect pests which the agriculturist or fruit-grower has to combat in this Province. This work has been, I believe, of considerable help to the men who are taking up land and is much appreciated by them.

I attended the convention called at Portland, Oregon, on April 21st and 22nd last to consider ways and means of protecting the Pacific slope against the possible introduction of white-pine blister-rust, which has now become well established in the eastern part of the continent. On my return a report was submitted and a new regulation was subsequently added to those of the Board of Horticulture covering this point. This regulation, taken in conjunction with the restriction on importation and transportation of carriers of the disease by the Dominion Government, should give adequate protection to the Province.

VERNON OFFICE.

As in the previous year, this has been the headquarters of R. C. Treherne, of the Dominion Entomological Branch, and Mr. Ruhmann has carried out work under his direct supervision. Mr. Ruhmann's report follows in detail.

Respectfully submitted.

J. W. EASTHAM,
Provincial Plant Pathologist.

REPORT OF ASSISTANT PLANT PATHOLOGIST.

M. H. RUHMANN.

J. W. Eastham, Esq.,
Provincial Plant Pathologist, Vancouver, B.C.

SIR,—I have the honour to submit the following summary of work in the Okanagan District for the year 1919, under the direction of R. C. Treherne, B.S.A., Dominion Field Officer for British Columbia:—

The major subjects of the season's work were the study of the life-history and control of the onion-maggot (*Phorbia ceparum*) and control experiments with the cabbage-root maggot (*Phorbia brassicæ*).

The minor subjects for the year: (*a*) Arranging insect specimens and photographic displays for farmers' fairs and exhibitions; (*b*) arranging specimen mounts and photographs for the offices of Agricultural District Representatives and Farmers' Institute rooms throughout the Province; (*c*) the collection in the field and breeding of specimens to be used under (*a*) and (*b*); (*d*) to take charge of the library of the Horticultural, Plant Pathological, and Entomological Branches of the Provincial Department of Agriculture's offices at Vernon; (*e*) to act as curator of the entomological collection at Vernon. The insect collection is now in good order and fairly representative of the insect fauna of the Interior.

ONION-MAGGOT.

Life-history.—The life-history of the first brood of this insect was secured for the year 1919, also considerable notes on the second brood. This study will be continued during 1920.

Control.—Experiments were conducted with poison baits as recommended for the Eastern Provinces. These proved quite ineffective under our conditions.

Observations.—Heavy oviposition was noted on volunteer onions. These are usually removed at the first cultivation. Instructions were given to allow a large percentage of these to remain in the field for further observation, from which the following facts were obtained: Oviposition was entirely confined to the volunteer onions over the heavy oviposition period. As many as 563 eggs were collected from one volunteer plant between May 22nd and June 13th. This covers the main period of heavy oviposition of the first brood. Light oviposition on seedling onions was first observed on May 24th, but did not become general until June 3rd and continued until August 14th. As a second generation was in evidence on August 7th, it is evident the oviposition of the first and second brood overlap. The height of larval infestation was reached on June 16th. As thinning of the onion-crop is generally commenced early in June, it is evident that heavy oviposition by the first brood may result after the crop has been thinned. In this experiment thinning was withheld until the height of larval infestation had been reached, and thinning

was commenced on June 16th, the volunteer plants being removed at the same time and with the thinnings from the seedlings were burned at the end each day's work, thereby destroying the largest possible percentage of the first-brood larvæ and resulting in a second brood of little economic importance to the crop.

The summary of conclusions reached on the season's work for control measures are as follows:—

(*a.*) Save the small cull onions from the season's crop and plant an occasional short row of these the following spring in the newly seeded onion-field as a trap-crop. (Have the culls sprouted before planting.) Plant 3 inches deep.

(*b.*) Commence thinning the crop on June 16th, taking up the trap-crop at the same time. In thinning take out all seedlings that are drooping and wilting, as these will contain maggots. Destroy all thinnings and trap-crop onions by burning at the close of each day's work.

In the experiment it was found that infestation of seedlings at the time of thinning did not exceed 20 per cent., which left a practically clean crop after thinning. The poison baits were found to be of no practical value for the Dry Belt and cultural methods must be entirely relied upon.

CABBAGE-MAGGOT.

Although satisfactory results were being obtained with tarred felt disks on cabbages, a comparative test was undertaken at the request of the Dominion Entomologist with a bichloride of mercury treatment. A suitable planting of cabbages and cauliflowers for the experiment was found at Armstrong. A block of approximately 2,000 cauliflowers was selected for the experiment, with several acres of cabbages in the same field for comparative observations. The results were very satisfactory in every way, although the experiment had to be discontinued early in June owing to severe frost destroying the cauliflowers.

The results show that with three treatments of bichloride of mercury at a strength of 1 oz. to 6, 8, and 10 gallons of water the results were, on June 5th, maximum infestation 1.8 per cent., as compared with check-plots 76.5 per cent. and tarred-disk plots 25.3 per cent. On cabbages observations show that tarred-disk plots had approximately 5 per cent. infestation, check-plots 50 per cent. infestation. None was treated with the mercury.

The results show that for cauliflowers the tarred-disk treatment is not satisfactory. Furthermore, there was distinct injury to a further 36 per cent. of the cauliflowers, mainly due to the tarred disks applied, showing that they are injurious to the plants on moist bottom lands.

The mercury was applied with a watering-can having the rose removed, about ¼ pint being applied to the base of each plant, the quantity being increased slightly at each application, sufficient being applied to moisten the soil encircling the base of each plant.

Considerable time was also taken up with correspondence and the determination of insect and other material.

The fall fairs at Armstrong, Kelowna, Naramata, Penticton, and Summerland were attended and exhibits of insect pests and plant-diseases were displayed. These appear to have been thoroughly appreciated at the respective fairs.

Respectfully submitted.

M. H. RUHMANN,
Assistant Entomologist.

REPORT OF CHIEF INSPECTOR OF IMPORTED FRUIT AND NURSERY STOCK.

W. H. LYNE.

Dr. David Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my report of the work carried out by your Inspector of Imported Fruit and Nursery Stock and his staff of assistants during the year 1919.

The duty of this Branch of your Department is the inspection of horticultural and field products imported into the Province of British Columbia, and into other parts of Canada by way of this Province, for the purpose of preventing the entry of any injurious insect pests or disease. In order to carry out the work as intended all importations requiring such treatment are also subjected to fumigation, and, if infested or infected with certain pests or diseases of sufficient importance, may be destroyed or shipped out of the country.

INSPECTION AT ENTRY-PORTS.

Quarantine Officers are stationed at the several entry-ports to inspect all fruit, vegetables, rice, corn, peas, beans, etc., and render their reports to your Inspector each month, together with inspection fees charged for such work. Your Inspector in turn forwards such reports and inspection fees to your Department at Victoria, after recording all details regarding them at the office in the Court-house at Vancouver.

VANCOUVER OFFICE.

At the Vancouver office, being the headquarters of your Inspector, all details and correspondence dealing with the inspection of imported fruits, vegetables, nursery stock, etc., are there on record. The office is equipped with horticultural, entomological, and plant-pathological text-books, microscopes, etc., for reference and investigation. A laboratory is also provided for J. W. Eastham, your Plant Pathologist, who makes it his headquarters. The agricultural and horticultural bulletins for public distribution are always on hand. Thus equipped, the Vancouver office has become a very popular information bureau.

Number of letters received, 588; number of letters sent out, 853 (not including Mr. Eastham's correspondence). (Miss Hawes is our recording clerk and stenographer.)

QUARANTINE STATIONS.

Quarantine Officers or Assistant Inspectors are stationed at the following entry-ports: Vancouver, four men, including New Westminster; Victoria, one man, with an occasional assistant; and one man at each of the other stations: Prince Rupert, Abbotsford-Huntingdon, Osoyoos, Similkameen, Bridesville, Myncaster, Midway, Grand Forks, Cascade, Waneta, Rossland, Trail, Kingsgate, Newgate, Cranbrook, Fernie, and Revelstoke.

The four men stationed at Vancouver are on regular salary, the other twenty men being paid for actual time spent inspecting shipments whenever they arrive.

NEW APPOINTMENTS.

Your Inspector paid a visit to each of the Quarantine Officers during the month of July, with the exception of officers stationed at Prince Rupert and Revelstoke. A visit was made to Prince Rupert during September at the time your Inspector acted as judge at the annual fair, Revelstoke being the only place omitted. Each officer was apparently endeavouring to fulfil his duty to the best of his ability and was given special instruction regarding details of his work. This being the time at which the summer importations of fruit were being received, your Inspector was able to give a few practical lessons to good effect.

The following new Quarantine Officers were appointed during the year: R. H. Eby, at Abbotsford, taking the place of P. R. Peele, who was leaving the district owing to being appointed Collector of Customs at New Westminster; on July 9th R. W. Grigor, Customs Officer, was appointed Fruit Quarantine Officer at Rossland in place of R. T. Evans, who was leaving to take up private business in Spokane; on July 19th Andrew Porter, Customs Officer, was appointed at Myncaster to take the place of Mr. Bruce, who changed his residence to another part of the country. M. L. Bird returned to his duties on the Vancouver staff after two years' military service in France.

REGULATIONS AMENDED.

Certain clauses in the Horticultural Regulations were amended in order to more clearly define the details of procedure and a few alterations were made in the scale of inspection and fumigation fees.

NURSERY STOCK INSPECTED AT VANCOUVER.

All imported nursery stock consisting of trees, shrubs, and plants, scions or cuttings are forwarded to Vancouver, where proper facilities are provided for their inspection and fumigation, the Provincial officials carrying out both the Dominion and Provincial regulations, thus avoiding duplication of work. All such work is handled with the utmost care and dispatch, the respective transportation companies being notified immediately the consignment is ready for forwarding to destination.

There have been a few complaints from consignees regarding Eastern shipments for Kootenay and Okanagan having to come to Vancouver for inspection and fumigation. They also request that such work be carried out at the eastern end of the Province. The present system, however, has strong points in its favour if properly complied with. The shipper should be instructed to bill to destination "via Vancouver for inspection." By so doing the shipments would come direct with very little delay. The cost of transportation is the same to the consignee as though he received his shipment direct. No charge is made from Vancouver to destination.

The facilities for handling stock at the Vancouver Inspection Station are such as to give it every chance of reaching the consignee in as good condition as if it had gone direct. It would cost the Government a considerable sum to erect and equip another fumigating station and provide extra officials and labour for the comparatively small amount of nursery stock shipped in from the East to the eastern parts of the Province at present, although conditions may change and warrant the extra provision. At present it is far better to have one well-equipped station with a properly trained staff of Inspectors and packers than two or three crude arrangements where the work could not be carried out as thoroughly and efficiently.

A classified list of all nursery stock imported into the Province during the year as compared to the year previous is included in this report, also the amount condemned and rejected. Complete lists are also given of all fruit, vegetables, rice, corn, peas, beans, etc., that have been inspected at the several entry-ports. There is also a list of rice, corn, beans, peanuts, etc., fumigated at the Vancouver and Victoria fumigating chambers, the Victoria chambers being devoted to that work only.

INSECT PESTS AND DISEASES.

Insect pests and diseases for which imported nursery stock has been condemned are as follows: Several species of scale-insects, including San Jose scale (*Aspidiotus perniciosus*), European scale (*Aspidiotus ostræformis*), blackberry and rose scale (*Aulacaspis rosea*), oyster-shell scale (*Lepidosaphes ulmi*), cottony cushion-scale (*Pulvinaria innumerabilis* and *Icerya*), *Lecanium* scale (*L. hemisphæricum* and *L. hesperidum*), *Diaspis* and *Chionaspis*, peach- and plum-root borer (*Sanninoidea exitiosa*), blackberry-crown borer (*Bembecia marginata*), grape *Phylloxera*, eggs of gipsy-moth, root-aphis (*Eriosoma lanigerum* and *Eriosoma pyri*). Diseases: Blight (*Bacillus amylovorus*), anthracnose, crown-gall, and sour-sap.

SHORT ON NURSERY STOCK.

Nursery stock has not been so plentiful during the last three or four years, and there appears to be a shorter supply than ever this season, especially certain varieties of standard fruit-trees. The principal reason for this is probably the fact that most nurserymen have been carrying less than usual in order to economize. In former years they lost heavily by overstocking.

Importations of ornamental trees and shrubs from Holland promise to be numerous this coming spring.

FROZEN STOCK.

A car of ornamental trees and shrubs from Holland for a local nurseryman arrived on December 15th severely frozen, necessitating careful thawing-out before the stock could be inspected (some of which will be a total loss).

Several small shipments from the United States have arrived in a frozen condition also, but careful attention to the process of thawing-out has so far resulted in very little loss.

About twenty cases of ornamental shrubs very recently arrived from Yokohama Nursery Company, Japan. This gave us very little trouble regarding pests or disease, which is a great improvement as compared to former years.

PANAMA ROUTE.

There is a prospect that most of the nursery stock from England, France, and Holland will be shipped via the Panama Canal in future, and thus escape the danger of frost incurred by shipping overland during the winter. A new firm of importers informed your Inspector they were considering the Panama route in anticipation of shipping in three or four car-loads of stock from Holland to arrive early this coming spring, providing direct connection could be made with Vancouver without transfer.

FRUIT AND VEGETABLES.

Fruit and vegetable importations have been fairly regular during the year, including a considerable quantity of certain varieties that could have been produced in our own Province, although each succeeding year gives evidence that home production is gradually increasing.

Your Inspector and his assistants have earnestly endeavoured to prevent any serious insect pests or disease entering the Province, and several shipments of apples and pears infested with codling-moth have been rejected, besides other fruits and vegetables, such as peaches, plums, and apricots infested with peach-worm and scale-insects, brown-rot, and other fungus-diseases; Mexican tomatoes infested with cotton-boll or tomato-worm and fungus-disease; sweet potatoes and yams infested with weevil and rot. All common potatoes are carefully inspected for tuber-moth, canker, or other serious fungus or bacterial disease; fruit and vegetables from fruit-fly ports also receive careful attention.

CODLING-MOTH.

Our persistent fight against the importation of codling-moth and that which has gained a footing in a few small areas still gives our orchards the reputation of being generally free from infestation. A comparison of the conditions existing south of the International Boundary has called forth some very complimentary remarks from our friends on the other side. Just how long we can retain such a good reputation is very uncertain, but results appear to warrant our efforts of prevention.

Besides inspecting all commercial importations of fruit, extra precautions are taken against infestation by way of tourist and wagon-road traffic entering the Okanagan and Kootenay Districts.

CODLING-MOTH INFESTING WALNUTS.

Recent development of codling-moth larva infesting California walnuts has necessitated extra precaution against such infested nuts entering the Province. Under the circumstances, your Inspector considers he is justified in charging an inspection fee on imported walnuts similar to the amount charged for the inspection of imported peas, beans, or corn, no inspection fee having been charged on walnuts previously. A similar fee is also justifiable for peanuts owing to necessary inspection for *Plodia interpunctella* moth, which causes considerable damage to the nuts in storage.

FUMIGATION OF STORED PRODUCTS.

Considerable quantities of Manchurian corn, rice, beans, and peanuts from Japan, China, and Strait Settlements have been fumigated at Vancouver and Victoria during the year owing to infestation of moth, beetle, and weevil, the tabulated amount of which is included with this report.

The recent and still prevailing shortage and high price of many varieties of stored cereal products has drawn the attention of merchants and dealers to the tremendous loss resulting from insect-infestation, which during a time of plenty and easy prices was very much ignored. Some dealers who formerly objected to the expense of having their corn, peanuts, etc., fumigated at the Government chambers have quite cheerfully submitted their imported shipments during the last year or so. In some cases the consignee has refused to accept his consignment until fumigated.

Special investigation regarding infestation of stored products was started recently by the Dominion Entomological Department and also the Federal United States Department. These circumstances would appear to more than justify the action taken by your Department during the last fifteen years in the matter of compulsory fumigation of infested importations.

Repairs to Vancouver Fumigating Station during the year consisted in reshingling and tarring a large portion of the roof at a cost of $475, some of the shingles having done service for over fifteen years. Repairing and renewing eave-troughs, pipes, and gutters was also included in this work.

QUARANTINE CO-OPERATION.

One of the important incidents during the year was the opportunity given your Inspector to attend the Western Plant Quarantine Conference held at Riverside, California, May 26th to 30th. This was composed of a representative gathering of officers in charge of plant-quarantine

work from the Western States, New Mexico, Hawaiian Islands, and British Columbia. Such a conference was naturally of great benefit to every official there, the principal subjects being regulations and methods of enforcing them, insect pests and diseases prevalent in different parts of the world that should receive our special attention, etc. The Conference completed its sessions by forming the Western Plant Quarantine Board, of which your Inspector has the honour to be the charter member representing British Columbia. The routine procedure of the Board will be carried out in a way to keep all members informed regarding any importation developments relating to quarantine-work.

In order to provide all Quarantine Officers stationed at British Columbia entry-ports with technical information relating to their duties, each one is being supplied with an up-to-date manual of insect pests and diseases affecting orchard, field, and garden products. These manuals, being the property of the Provincial Department of Agriculture, will be retained by the officials while engaged in the quarantine-work and transferred to their successors.

Your Inspector takes great pleasure in expressing his appreciation of the hearty co-operation and faithful service rendered by all the members of his staff, realizing that without their intelligent assistance we could not succeed in guarding the Province against disastrous importations.

Respectfully submitted.

W. H. LYNE,
Inspector of Imported Fruit and Nursery Stock.

SYNOPSIS REPORT OF THE DOMINION ENTOMOLOGICAL BRANCH IN BRITISH COLUMBIA.

R. C. TREHERNE, ENTOMOLOGIST IN CHARGE.

PEACH-TWIG BORER (ANARSIA LINEATELLA).

Studies on the life-history, habits, and control of this insect were carried on again this year, in much the same way as in 1918, at Penticton. Larval activity was pronounced in hibernaculæ on April 9th, but a period of cold, backward weather delayed any larval movement to the buds until the third week of April, or at a time of growth when apricots were approaching full bloom and peaches were showing "pink," but with no blossoms open. In 1918 the same degree of larval movement took place on April 10th, when apricots and peach-blossom buds could only be considered as "well swollen." Larvæ were first found to be infesting terminal buds of peach on April 27th in 1919 and on April 16th in 1918. Peach-trees, however, were in bloom approximately on the same dates, April 25th to 27th, in both years. Larvæ completed their growth and commenced the formation of pupæ on May 28th and moths commenced to emerge on June 16th. Minute larvæ were found again on July 14th in the field, evidently the progeny from moths that made their appearance in the middle of June. These larvæ bred to maturity in confinement in August, thus proving that under laboratory conditions this insect has at least a partial second generation. This data assists in establishing some information on the disputed number of generations of this insect, wherein from one to three generations are claimed by investigators in the Western United States. Hibernaculæ were found in the orchards on August 20th, and it is possible that larvæ forming hibernaculæ at this time were the progeny from late-appearing moths. If this were so the insect is single-brooded. On the other hand, moths were being continually bred to maturity under laboratory arrangements established to approximate natural conditions until late in September, which indicates, at least, that a certain percentage of the larvæ will persevere to maturity in the autumn months.

Control.—We are again satisfied that applications of lime-sulphur 1-9 applied to the trees as close to, but previous to, the blossoming period as possible will achieve good commercial results. Applications of arsenate of lead at 2 lb. to 40 gallons applied to the trees after the fall of the blossoms is offered as a method of control secondary in importance to the earlier lime-sulphur application, but it is suggested as a method of control should the grower find it inconvenient to apply the first spray. Either application individually will present commercial results. The two applications, each made separately, are suggested in cases of severe infestation.

THE PEAR-THRIPS (TÆNIOTHRIPS INCONSEQUENS).

This insect was again the subject of study at Victoria to determine the period of emergence from the soil as a guide to the spraying operations of the fruit-growers. The first adults were taken in soil cages on March 21st, a few days earlier than in previous years. Cool weather retarded the opening of the buds, resulting in the first spray applications being made on March 31st.

FRUIT-WORM STUDIES.

For many years the correct identity of the various fruit-worms and bud-moths infesting Okanagan apple-orchards has been in doubt. Emphasis is laid on the importance of a close study of such insects, for the reasons that severe injury is sometimes caused to the buds and fruit of apple-trees and because of their superficial resemblance to and possible confusion with the larvæ of the codling-moth, an insect which has not as yet become generally established in the Okanagan Valley. Larval feeding and structural characteristics have been studied this year of each of the various "worms" found and notes were taken on their comparative abundance. The following insects have been observed and identified: *Tmetocera (Eucosma) ocellana*, *Argyroploce consanguiniana*, *Cacœcia rosaceana*, *Mineola tricolorella*, and *Laspeyresia prunivora*. There are a few more larvæ that have not as yet been determined. Preliminary notes on the life-history of each of these species have been taken, and it is hoped that further studies will be undertaken during 1920.

An apple-tree bark-beetle (*Magdalis sp.*) caused conspicuous injury to the foliage of the apple-trees in the Vernon District by the feeding activity of the adults. The epidermis on the upper surface of the leaves is devoured and an injury similar to that produced by the larvæ of the pear-slug on pear and cherry leaves is caused. Copulation takes place in early June and females were observed excavating egg-chambers at the base of buds of the previous year's growth.

FIRE-BLIGHT DISTRIBUTERS.

Owing to the anxiety on the part of many fruit-growers in Interior districts over the effects of the fire-blight disease in apple and pear orchards, preliminary studies were undertaken in 1919 to determine what insects were liable to be associated with the spread of the bacillus in the early spring and during the summer. This study was undertaken this year entirely at Vernon, and while the season closed with many negative results it is felt that the work has presented a base upon which to build the inquiry another year. Fortunately the disease was not severe this year owing to the dry season, and many artificial inoculations failed to take. The common insects considered liable to be the means of spreading the disease were enclosed, under field as well as laboratory conditions, with diseased twigs and leaves. Each series was in turn introduced on to normal and healthy growth and allowed to feed under mica chimneys. The following insects were used in the experiments: The apple-leaf hopper (*Empoasca mali*), 11 series; the rose-leaf hopper (*Empoa rosœ*), 25 series; the apple-aphis (*Aphis mali*), 20 series; the tarnished plant-bug (*Lygus pratensis*), 35 series; the pear-slug (*Eriocampoides limacina*), 4 series; the woolly aphis (*Eriosoma lanigera*), 6 series; a pentatomid (*Euschistus variolarius*), 1 series; a leaf-hopper (*Thamnotettix sp.*), 6 series. A great majority of these trials proved entirely negative, but *E. mali*, *A. mali*, and *L. pratensis* have been shown to be blight distributers. So far as early spring distribution is concerned, ants, honey-bees, click-beetles, apple-aphis, and bark-beetles are incriminated. Of the click-beetles, *Cardiophorus fenestratus* was observed commonly on the stumps of pear-trees which had been cut down for blight and was seen to be feeding on blight exudate. *Corymbites fallax* and *Corymbites inflatus* were both observed on apple-trees; the latter species in particular caused considerable damage to young apple-trees by eating out the buds in early spring. *C. inflatus* is to be found in numbers on the blue lupine and is by far the commonest and doubtless the most injurious of the various click-beetles infesting orchards at Vernon.

THE ROSE-LEAF HOPPER (EMPOA ROSÆ).

This insect in our experiments is not as yet incriminated as a blight-carrier, and, so far as can be determined, it has not been shown to be such by other investigators. During 1919 it occurred in extraordinary numbers in many Okanagan apple-orchards, producing the well-known discoloration of the leaves and causing considerable damage, and it may yet prove to be an

important carrier of summer blight. Brief notes were taken on its life-history this year which clearly show that the early spring generations occur on rose-bushes, both cultivated and wild. During June migration takes place to the apple, where nymphs and adults may be seen until September, when the great majority return to the rose for oviposition. As a control it may be seen that proper consideration should be given the pruning, burning, or spraying of rose-bushes. If this is not done, nicotine-sulphate and soap applications should be applied to the under-surface of apple-leaves in July, when the nymphs make their appearance.

SMALL-FRUIT INSECTS.

The Strawberry-root Weevil (Otiorhynchus ovatus).—The investigation into the life-history and control of the strawberry-root weevil on Vancouver Island was continued during the past season. W. Downes, assistant in charge, has carried on extensive control operations in association with the Horticultural Branch of the Provincial Department of Agriculture. A section of land has been engaged for a period of six years to demonstrate crop-rotation and the maintenance of soil-fertility as a control against the weevil. Experiments which promise well have been undertaken to prevent weevil migration in early summer by means of a tanglefoot barrier. Several new and important points in the life-history of this insect have been brought to light by Mr. Downes. Notable among these observations have been the fact that the adults are parthenogenetic and that over-wintering adults deposit eggs in the spring.

The Raspberry-crown Borer (Bembecia marginata).—A commencement was made in the study of this insect on Vancouver Island, and it is hoped that next year further experiments for control and life-history notes will be undertaken. This insect is proving of great importance to growers of raspberries and loganberries in Coast sections.

Other small-fruit insects which received some attention in the Coast districts were the loganberry-leaf hopper (*Empoasca sp.*), which was successfully controlled by a soap and nicotine spray; the raspberry-cane maggot (*Phorbia rubivora*); the strawberry-crown borer (*Aristotelia fragariæ*); *Synanthedon rutilans.*

The Currant Fruit-fly (Epochra canadensis).—This insect is the subject of a great deal of inquiry in Coast and Interior districts. Certain notes on the life-history of these species were taken in the Okanagan Valley during 1919 and an effort was made to test the value of the sodium-arsenate and molasses bait. Flies were abundant at Vernon on May 19th and many eggs were present in the fruit on May 22nd. This was at a period in the growth of red currants when some fruit had commenced to form, but with some blossoms still in evidence. Red currants were in full bloom during the first two weeks of May. Maggots started to leave the fruit for pupation at the end of June, entering the soil to a depth of from 1 to 4 inches. As a result of the work carried on it is not possible as yet to recommend the poison-bait method of control. Growers are recommended to rely on cultivation and the use of chickens for the present until further records can be obtained on the value of sprays.

VEGETABLE INSECTS.

The Onion-maggot (Hylemyia antigua).—An extensive experiment with the use of sodium-arsenite and molasses bait (¼ oz. to 1 pint) as a control measure against the onion-maggot was carried on at Vernon this year. Specially constructed cans were made, filled with water, which allowed a certain quantity of water to filter down on to felt pads arranged in trays. The felt pads, having been soaked in the bait and a few ounces of the poisoned liquid poured over them, retained their moisture for four to ten days under all temperatures. Twenty of such bait-cans were placed to the acre between the rows of onions, and 2½ acres in an 8-acre field, in all, were treated in this experiment. The bait-cans were set on May 14th, five days before any eggs were laid in the field, and they were maintained continuously until the end of June, and again during the first two weeks in August. Samples of the poisoned liquid were taken two or three times a week from the trays and fed to flies. The adults were observed to be in distress within five minutes of actual feeding and were completely stupefied in thirty minutes, and this condition prevailed throughout despite frequent dilutions from rain and from the water in the reservoirs above the felt pads. Flies left to their own devices in the laboratory in the presence of crops of poisoned bait gave a 100 per cent. mortality in less than twenty-four hours. Circular fly-traps arranged in the field, each baited with different essential oils and mixtures, undoubtedly showed that molasses was the most suitable substance to attract the flies. Despite these two favourable

circumstances, we are unable to claim that the poisoned-bait method is a satisfactory control under such field conditions as they prevailed at Vernon in 1919. Oviposition took place on seedling onions and on volunteer onions (from the crop of the previous year) in such numbers that it was impossible to state that the poison bait had any effect in checking oviposition. In several instances volunteer onions gave as many as 500 eggs to the plant during May and June. The influence of a suitable type of volunteer onions as a trap-crop for the first generation presents a phase of onion-maggot control that must be regarded very highly. In the 8-acre experiment of 1919 a number of sections of onion-seedling rows were examined daily for egg oviposition, and it may be stated that there was no material difference in oviposition in the baited area or in the non-baited area. Further, there was no indication that the maggot attack was more severe in any one part of the field over any other.

The first male flies appeared in the field on May 10th; the first females a few days later. The height of the oviposition period was not passed until June 6th. Eggs were laid in the field on May 19th and continually from this date until August. The length of the larval period varied from sixteen to twenty-nine days and the pupal period from fourteen to twenty-six days. The earliest pupa formed was found on June 14th. Second-generation adults appeared on July 7th. The first generation of flies extended over a period between May 10th and July 7th; the second generation until August 23rd. Two generations occur and doubtless a third, but the life-history notes on the last generation have not been obtained with accuracy. A great many notes have been obtained on the habits of the fly and particular attention has been paid to temperatures and weather conditions.

The Cabbage-root Maggot (Phorbia brassicæ).—An experiment was conducted at Armstrong on about 1,600 cauliflowers in an effort to control the cabbage-root maggot. The block was divided into twelve sections, where the relative merits of tar-paper disks and treatments with mercury bichloride were compared. Three control, untreated areas were maintained to judge the degree of efficiency. It was clearly shown that, with cauliflowers growing on cold bottom land with an abundance of subsoil moisture, mercury bichloride, in three treatments at 1 to 1,000, was superior to the use of tar-paper disks. Tar-paper disks with this type of crop and soil produced a distinct collar-rot on the plant beneath the disk, causing a direct loss of at least 36 per cent. The loss by maggot attack in the mercury-bichloride blocks at strengths ranging from 1 oz. to 6 gallons of water, 1 oz. to 8, and 1 oz. to 10 was less than 2 per cent., with three treatments. With two treatments at 1 oz. to 6 the loss by maggots was 6 per cent.; at 1 oz. to 8 and 1 oz. to 10 the loss was over 60 per cent. On cabbage the tar-paper disks proved entirely satisfactory, resulting in a loss by maggot attack of not more than 5 per cent.

Cutworms.—No experimental work was conducted this year on cutworm-control. The former recommendation in the use of the poisoned-bran bait applied broadcast in the early spring, before the crops are planted or appear above the ground, is still offered growers as a suitable and economical remedy.

Thanks are due Mr. Speare, Mycoentomologist of the United States Bureau of Entomology, for determining the probable identity of *Entomophthora megaspermum*, a fungus-disease described in 1873 and never having been recorded since to the best of his knowledge. This fungus was found at Keremeos, attacking a noctuid larva associated with the common plant *Chrysothamnus sp.* It is possible that this fungus may prove of economic importance in the control of cutworms.

FORAGE-CROP AND GRAIN INSECTS.

Grasshoppers or Locusts.—The last two years in British Columbia have been dry and conditions have been produced in range and grain areas which are usually considered favourable to grasshopper increase. During 1919 outbreaks have been reported from four widely separated districts—viz., in the Bridesville-Rock Creek area; at Celista, on Shuswap Lake; in the Chilcotin District, 150 miles north of Ashcroft; and in the Huntingdon area of the Fraser River Valley. At Bridesville *Camnula pellucida* was the chief injurious species involved; at Celista it was *Melanoplus atlanis;* in the Chilcotin, *Camnula pellucida;* and in the Fraser Valley, *Melanoplus femur-rubrum.* Each of these areas was visited this year to determine the nature and degree of injury, and, in addition, close watch was kept upon the development of locusts in the Fairview area, south of Penticton, owing to the attention this district will attract within the next few years under the soldiers' land-settlement scheme. About thirty different species of locusts have been taken this year in all the districts mentioned and systematic and ecological

notes have been obtained of many of the species taken. It is felt that the importance of locusts as crop-destroyers will be realized in the future, and it is believed that the work accomplished this year, which was largely in the nature of survey of the entire problem, will serve as a useful base for later investigation. Of the parasites and predaceous insects, forty-six different species of insects were taken in areas associated with locust attack. No efforts were made to determine the correct relationship of these insects with the locusts. The species taken include members of the Asilidæ, Bombyliidæ, Tachinidæ, and Sarcophagidæ. *Epicauta maculata* and the mite *Trombidium locustarum* were also observed present.

SPRAYING INVESTIGATIONS.

All spraying-work undertaken this year has been carried on by the officers of the Provincial Horticultural Branch at the Coast, in the Interior, and in the Kootenays. These studies involved the control measures used against apple-scab and apple-aphides, with variations in the strengths of lime-sulphur sprays and the use of various different proprietary mixtures.

OTHER INSECTS OF NOTE.

The western tussock-moth (*Hemerocampa vetusta* form *gulosa*) was reported at Chase, Armstrong, and Vernon. Where this insect occurred in numbers this year it caused complete defoliation of Douglas-fir trees and western yellow pines; the hairs of the caterpillars producing a pronounced itch and swelling on the human skin.

A pentatomid bug (*Apateticus crocatus*) is reported from Victoria by W. Downes to be of considerable economic importance in destroying the larvæ of the tent-caterpillar and the oak-looper (*Ellopia somniaria*). These bugs were often seen climbing the oak-trees in search of larvæ upon which to feed.

The tent-caterpillars (*Malacosoma pluvialis* and *erosa*) were common in Coast and Island districts. These insects were the subject of a memorandum on control to the City and Municipal Councils in the infested districts. They were also studied by A. B. Baird, of the Dominion Entomological Branch, from the standpoint of natural controlling agencies.

The syrphid fly (*Eumerus strigatus*) has been taken at Vernon and Kelowna. This insect is recorded elsewhere as injurious to onions, but thus far no records have been received which indicate that it is a pest in British Columbia.

The apple fruit-miner (*Marmara pomonella* Busck), which was identified first for British Columbia by A. L. Quaintance, of the United States Bureau of Entomology, in 1917 from apples received from Creston, was again taken this year from Sorrento on October 25th.

The Colorado potato-beetle was reported for the first time in the Province this year from the south-east corner of the Kootenay District. An interesting record was also received from Vancouver, where earwigs, probably *Forficula auricularia*, were reported as a pest in an apartment-house. The codling-moth breeding and life-history records were continued in 1919, as in previous years, from the material brought in by the Provincial Field Inspectors. A report on the codling-moth situation as it existed at the close of the year will doubtless be included in the Annual Report of the Department of Agriculture.

ACKNOWLEDGMENT.

This synopsis report has been written from the entomological records obtained by the officers of both the Provincial and Dominion Departments, Messrs. Ruhmann, Buckell, Venables, and Downes, to whom I acknowledge my indebtedness for their co-operation and assistance.

REPORT OF LIVE STOCK COMMISSIONER.

W. T. McDONALD.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report for the year ending December 31st, 1919.

GENERAL CONDITIONS.

The scarcity of labour still presents a considerable handicap in the operations of a large number of our farmers. This has been particularly felt in dairy districts and on the larger stock-ranches. It was hoped that shortly after the conclusion of the war this question would be solved, but it is now apparent that many of the men formerly employed on our farms are either turning their attention to other industries for the time being or taking up farms for themselves. It is very evident that the high wages paid in shipyards and other urban industries have had the tendency of drawing men away from agricultural labour, and that it will require time for the readjustment to take place. As a labour-saver the milking-machine has come into more extensive use on dairy-farms, while some dairymen have seen fit to reduce or sell off their herds.

The prices of feedstuffs have shown a tendency to advance. This has had the effect of encouraging co-operative buying, which is now being practised in many districts, and with much benefit to the producer, who hopes in this manner to maintain production on a profitable basis. The conditions referred to have also tended towards greater efforts in the production of substitutes for feedstuffs formerly purchased.

The hay situation in the latter summer and early fall appeared extremely serious owing to the drought which extended over Southern Saskatchewan, Southern Alberta, the Kootenays and Boundary Districts of British Columbia. Early fall rains in the affected areas tended to improve conditions, and before very much buying had been done the situation improved greatly. The removal of the duty on hay from the United States had a decided tendency to lower prices and increase the available supply. The assistance given by the Provincial Government in bearing part of the expense of freight on hay in drought-affected areas enabled the stockmen to retain their breeding animals. In making an inspection of conditions in the East Kootenay during the month of August, I was particularly impressed with the desirability of developing hay meadows in order to supply winter feed. There is sufficient summer range to carry several times the number of cattle now being handled, but at the present time the supply of winter feed is the limiting factor. It is to be hoped that feasible irrigation schemes may be developed for the production of alfalfa and other forage-crops.

It is interesting to note that there is a great interest in the breeding of better live stock, as evidenced by a large number of farmers who are making a beginning in the breeding of pure-bred flocks and herds. This applies to practically all sections of the Province, and has probably been most apparent in the Okanagan Valley, where a considerable number of pure-bred herds of both beef and dairy cattle have recently been established. We also find that along the Grand Trunk Pacific a considerable number of pure-bred females have been introduced. This development is gratifying from several standpoints, but most of all in that it furnishes a source of supply for good pure-bred sires. The need for such sires is probably not fully appreciated. In the most advanced districts the scrub sire is still to be found occasionally, while over large areas the percentage of pure-bred sires is very small. In many cases this condition is due to indifference on the part of live-stock owners, while in many other cases it is due to the impossibility of securing registered animals without shipping them in from some considerable distance. Taking the Province as a whole, we find that only a very small percentage of the pure-bred beef bulls required are produced within the Province, and many stock-raisers feel diffident about purchasing animals which they have not seen and for which they must pay a considerable price. Educational work and personal canvass of the farmers affected will do much to improve the condition, and, while in some cases it may require more than argument to effect a change, still, I do feel that in the past we have underrated the intelligence of our stockmen, and that, as a whole, they would readily respond to any encouragement given them along this line.

HORSES.

The horse-breeding industry has passed through a period of depression brought about by a combination of circumstances. First of all, the cessation of extensive development operations, such as construction-work in cities and on railways, threw a large number of surplus horses on the market, and at the same time motor-trucks, motor-cars, and tractors were being perfected, while the scarcity of labour encouraged the use of the tractor on the theory that one man could take the place of two or more where horses were used. The popularity of motor-power has also been augmented in a very large degree by extensive and aggressive campaigns of advertising on the part of manufacturers. In other words, the horse was being eliminated from competition by advertising. We now find that under many conditions the tractor and motor-truck are proving more expensive in operation than horses, and we are convinced that the horse will resume his place in fields from which he was temporarily driven, and the demand thus created will be augmented by the extensive development of new agricultural areas. Our statistics show a slight decrease in the number of horses in the Province for 1919 as compared with the year 1918, there being 43,717 horses in the Province, as compared with 44,131 for the year 1918. Very few stallions have been brought into the Province during the last two or three years, while our two leading studs of Clydesdale horses have been dispersed.

The present demand is for a heavy horse, which is becoming comparatively scarce owing to the export of this class of animal, and there is no doubt that this type of horse is the one which the market will require in future. To those in a position to do so, the breeding of heavy horses of good quality should prove one of the most profitable branches of the live-stock industry, and we cannot emphasize too much the desirability of securing stallions possessing size.

CATTLE.

The statistics which we have been able to secure show practically the same number of cattle in the Province for 1919 as for 1918, though I am convinced that, were we able to secure accurate statistics for Central British Columbia and the Peace River District, we would find that the increase in beef cattle would more than offset the decrease in dairy cattle in those areas where the labour problem has been serious. Late in the year large numbers of cattle were driven into the Peace River District, the movement of which had originated in Southern Saskatchewan and Southern Alberta. From such information as we have been able to secure, we feel justified in stating that the majority of the men who have taken cattle into the Peace River Block will continue and extend their operations in British Columbia. As in 1918, shipments of cattle have continued to move into that part of the Province tributary to the Grand Trunk Pacific, and particularly from Prince George west to Hazelton. During the year 134 cars of live stock left the Union Stockyards at Edmonton for points in British Columbia, which does not include the extensive shipments made to the end of steel and driven into the Peace River country in this Province. Conditions would indicate that this movement will continue with increasing numbers for some time, as the areas mentioned are essentially mixed-farming districts, in which the produce of the farms will be largely marketed in the form of live stock and live-stock products. Extension-work in these new areas along the line of encouraging more and better live stock will result in much benefit. While many good animals are being taken in at the present time, we find in many cases a lack of appreciation of the value of good sires.

Considerable numbers of grade and pure-bred dairy cattle are going into Central British Columbia, and with the establishment of creameries this feature of the live-stock industry will make rapid progress. The most serious problem which presents itself at present is the source of supply of first-class dairy cattle at reasonable prices. Good dairy cows are selling as high as $250 and over, both in the dairy sections of British Columbia and in the State of Washington. The Prairie Provinces are not in a postion to furnish any considerable number of dairy cattle, and should present conditions maintain it may be found desirable to bring shipments from the dairy districts of the Northern Central States.

Shipments of pure-bred dairy cattle have been made during the past few months to Australia and the Hawaiian Islands, while we are reliably informed that orders from the Orient will soon be placed in this Province. These facts are significant of the appreciation of the merit of the dairy herds of this Province, and no doubt will prove the beginning of a more or less extensive trade.

The situation in regard to bovine tuberculosis continues satisfactory, and it is gratifying to note the aggressive stand being taken by our dairymen in regard to this disease. Results of work already done have served to place our breeders of dairy cattle in an enviable position. We are pleased to note that the Federal Department of Agriculture has adopted a plan of accredited herds for pure-bred dairy cattle, and this is already being taken advantage of by some of our breeders. This will facilitate export trade, particularly to the United States, and altogether lend encouragement to breeders, as well as furnishing a guarantee to prospective purchasers in so far as tuberculosis is concerned.

SHEEP.

The numbers of sheep in the Province have remained fairly constant as compared with last year, though with the administration of the public ranges as contemplated by the Lands Department the numbers will undoubtedly increase. Markets would indicate that the high point in prices has been passed, and during the fall of the year breeding ewes could be purchased for less money than during the two previous years. In the Boundary country some sheepmen are again venturing into the business where a few years ago they felt compelled to abandon it owing to the prevalence of disease attributable to a wood-tick. The prices obtained for wool have been good, and the present world conditions relative to the wool-supply would indicate that good prices may be expected for some time to come. A large portion of the wool produced in the Province was handled by the Interior Wool-growers' Association, and marketed through the Canadian Co-operative Wool-growers' Association, with headquarters in Toronto. In most cases the prices secured were well over 50 cents. per pound, and shippers generally were exceedingly well pleased with the results. The Interior Wool-growers at present contemplate the extension of their operations to include the interior Province, which doubtless would result in benefit to all concerned and strengthen the Canadian Co-operative Wool-growers' Association.

Some sheep are being shipped in along the Grand Trunk Pacific, where they will be handled mainly as a side-issue on the farms, and where they will prove a profitable adjunct.

SWINE.

The numbers of swine in the Province show an increase from 39,805 to 44,960 as compared with 1918. The prices received have been fairly good, but the cost of production in most cases has been very high. We have encouraged cheaper production by the use of pasture crops where such can be utilized. Grain feeds must of necessity remain comparatively high in this Province owing to our dependence on the Prairies for a considerable portion of our supply, and it will be necessary for our farmers to give careful attention to the cost of production in handling this class of live stock.

We have been remarkably free from hog-cholera during the year, and the reduction of bovine tuberculosis in our dairy herds has doubtless resulted in controlling this disease among swine.

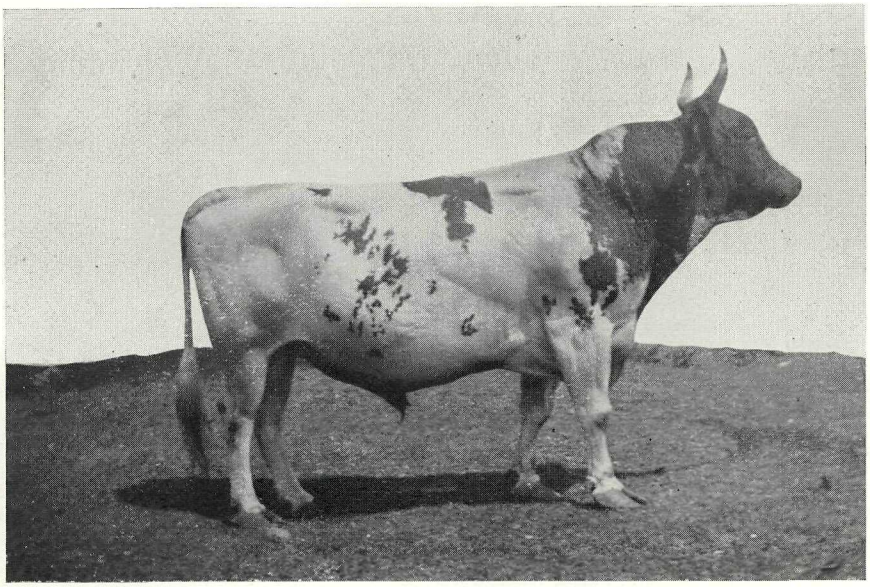
Early in the year numerous complaints were made regarding a fishy flavour in pork, and upon investigation we found that this matter had presented itself as a serious problem to one of our large meat-packing companies. Apparently the trouble was due to the feeding of salmon secured during the spawning season, and while we have endeavoured to discourage the use of fish, especially towards the close of the feeding period, we have found it difficult to secure definite information regarding this practice.

GOATS.

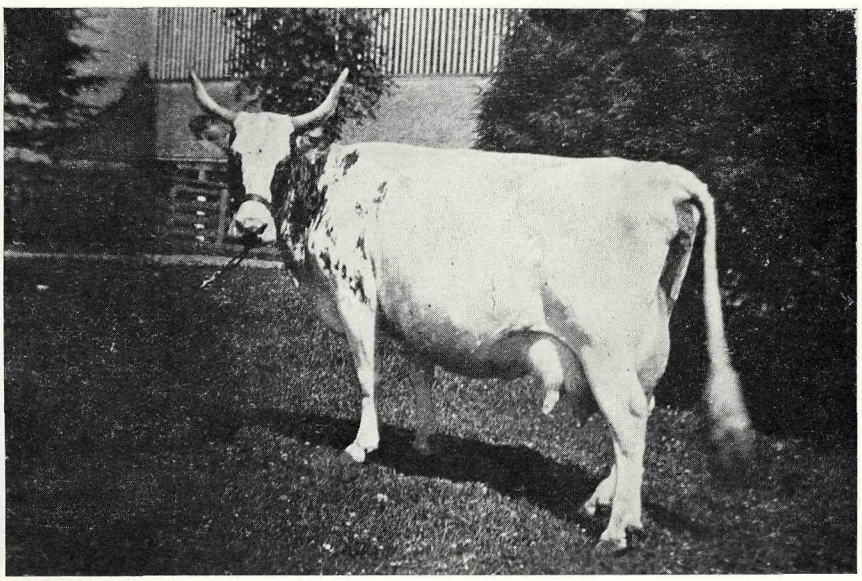
The interest in milch goats has made a remarkable growth, and they will doubtless furnish an important source of supply of dairy products in suburban districts. The number of milch goats in the Province is now over 3,500, and the Provincial Goat-breeders' Association now has a membership of approximately 350.

SALES.

Under the auspices of the British Columbia Stock-breeders' Association, a very successful sale of beef cattle (principally bulls) was held in Kamloops on March 25th. Throughout the cattle-grazing districts it has been necessary to import from outside of the Province a very large proportion of the bulls used, and in the past there has been no point in British Columbia where the same could be purchased and no medium of exchange of bulls already in the Province.



Imported Ayrshire bull, "Lessnessock Comet." Owned by Shannon Bros., Cloverdale, B.C.



"Evergreen Maid 2nd," No. 27277. Record, 13,013 lb. milk, 484.58 lb. butter-fat, test 4.04 per cent. Owned by Edwin A. Wells, Sardis, B.C.

Exhibit *re* diet for children, made at the Vancouver Hotel, Vancouver, B.C., by the Domestic Science Branch of the Department of Agriculture at the B.C. Dairymen's Convention.

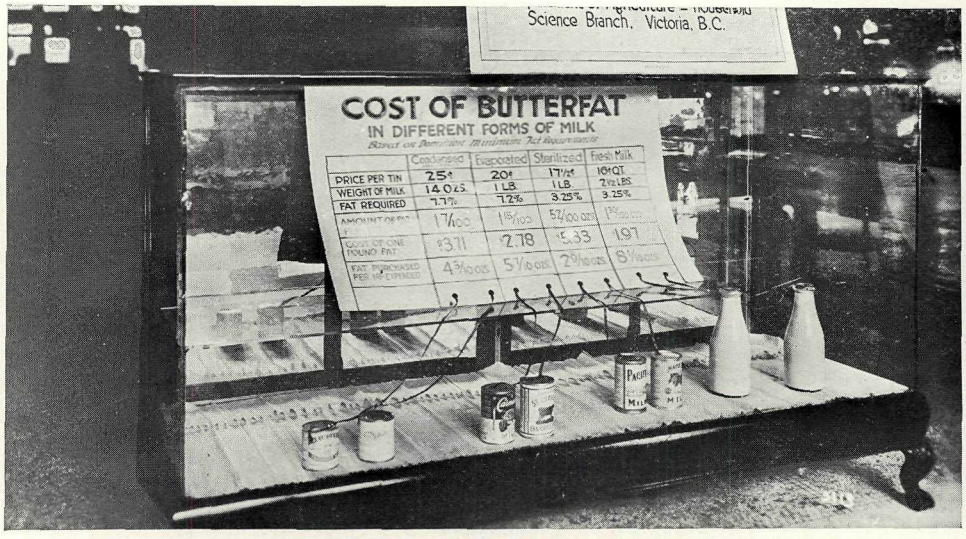


Exhibit made at the Vancouver Hotel, Vancouver, B.C., by the B.C. Dairymen's Association in connection with milk and milk products.

Those who closely watched the sale could not help but be impressed with the stimulus it was giving to live-stock improvement and the encouragement felt by those contemplating the breeding of pure-bred beef cattle. It is the purpose of the British Columbia Stock-breeders' Association to make this sale an annual event, to be permanently located in the City of Kamloops, which is considered the most central point for the beef-cattle industry. The same association held a sale of sheep and swine at Armstrong on September 26th, which also proved very successful. Plans are being made for the holding of sales at other points in the Province, to include, in addition to sheep and swine, dairy cattle.

PURCHASES FOR LAND SETTLEMENT BOARD.

As in 1918, I was requested to go to Edmonton for the purpose of purchasing cattle and sheep on behalf of the Land Settlement Board for settlers in the Bulkley Valley and the Ootsa Lake District. We were successful in securing good grade cattle at a very reasonable price, and 200 head of sheep were purchased at a figure considerably lower than we anticipated. I have come to the conclusion that the middle of October is about the best time to purchase in the Edmonton yards, but a stranger going there to purchase should plan to spend a few days in the yards in order to acquaint himself with prices and the class of cattle offering before attempting to purchase. A year ago conditions were such, coupled with my lack of knowledge of conditions at Edmonton, that I concluded it was best to place the order in the hands of a buyer in the yards on a commission basis. This year, however, I purchased direct, with very satisfactory results.

The shipments sent into the Bulkley Valley by the Land Settlement Board last year have proven highly satisfactory, and no doubt the recent shipments will prove equally so. I am convinced that the policy of the Land Settlement Board in this connection is to be highly commended. Leaving Edmonton, I went to Brandon, Manitoba, to assist in the selection of some Aberdeen-Angus bulls and heifers for farmers in the Aspen Grove District. Excellent animals were secured, and, as the heifers were choice individuals and bred to excellent bulls, this shipment should prove of great value in the cattle industry of the Aspen Grove District.

FAIRS.

I judged at the two large exhibitions in the Province, and also at the Duncan Fair. The display of live stock at Vancouver and Westminster was very commendable, the outstanding feature undoubtedly being the large number of exhibitors of dairy cattle from within the Province, and the improvement made by our local exhibitors in the condition in which their animals were brought into the ring. I also judged the dairy breeds at Edmonton Exhibition, and Percheron and Belgian horses at Regina Exhibition; and during my vacation judged the beef breeds and draught horses at the Washington State Fair. At all of these fairs it was pleasing to observe indications of rapid improvement of Western herds and flocks. At the Edmonton Exhibition the Colony Farm exhibited a herd of Holsteins, which were successful in securing a large proportion of the highest awards.

KAMLOOPS DISTRICT.

The Kamloops District has been served in a most capable manner by George C. Hay, District Representative of the Live Stock Branch. Mr. Hay has succeeded in securing the confidence and co-operation of the farmers of the district, and has rendered valuable assistance in the organization and administration of co-operative enterprises. I am submitting herewith Mr. Hay's report, which covers in detail the operation of the two dry-farming stations and some variety tests carried on with potatoes.

SILOS.

The extension-work carried on by the Department for the purpose of encouraging the use of silos has given excellent results, and this method of providing a cheap, succulent feed is being extended to districts that until recently were not considered suitable. In addition to proving a valuable asset to the dairy-farmer, breeders of beef cattle are now finding silage to be economical and satisfactory in every respect. Many who have built one silo as more or less of an experiment have been so pleased with results as to feel justified in building one or more additional silos. This work has been under the direct charge of R. J. Ferris, and I am attaching his report hereto.

SOIL AND CROP DIVISION.

During 1919 Everett W. Hogan, who had been in charge of the Soil and Crop Division, resigned in order to engage in farming operations in Mexico. His place was taken by William Newton, who had been absent on leave on active service. Mr. Newton has since been granted leave of absence for the purpose of taking up post-graduate work in California in order to better fit himself for the work which he is following.

POULTRY DIVISION.

At the beginning of the year it was decided that the most effective work could be done by moving the headquarters of H. E. Upton, of the Poultry Division, from Victoria to New Westminster, where he has an office in the Court-house. By thus dividing the work between J. R. Terry, Chief Poultry Instructor, and Mr. Upton, a good deal of travelling and expense has been eliminated, and apparently the poultrymen of the Province are obtaining better satisfaction.

I am submitting herewith a complete report from J. R. Terry, Chief Poultry Instructor.

Respectfully submitted.

W. T. McDONALD,
Live Stock Commissioner.

REPORT OF CHIEF VETERINARY INSPECTOR.

DR. A. KNIGHT, V.S.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit the report of the Veterinary staff for the year from January 1st to December 31st, 1919.

During the year, besides attending to the contagious diseases among the live stock, some little time has been devoted to the examination and prescribing for stock in the outlying districts where it was impossible to obtain a veterinarian. The owners of such stock apparently appreciated this movement on the part of the Department.

HÆMORRHAGIC SEPTICÆMIA.

Hæmorrhagic septicæmia has been somewhat more prevalent during the year than in previous years. An outbreak was reported at Hilliers, Alberni, Valdes Island, the Bulkley Valley, and one on the Fraser River. This disease was confined in all cases to young stock under one year of age. As in previous years, the trouble is more prevalent where the stock is allowed access to pasturage on low-lying ground. The onset of this disease is so rapid that we have found treatment of little or no avail. Cattle in contact with diseased animals were advised to be isolated and moved to higher ground. Stables where sick animals were housed were also thoroughly disinfected. The disease did not appear to spread after such precautional measures were taken. The most serious loss from this disease occurred in Valdes Island, where the party lost six well-matured calves.

ACTINOMYCOSIS.

A few cases of actinomycosis were reported during the past year, especially in the Okanagan and Bulkley Valley. In the advanced cases the animals were advised to be destroyed. For the disease when found in the early cases the iodine treatment was advised, apparently with success.

GOITRE.

Goitre amongst swine and other domestic stock is still proving a handicap to stock-raising in some parts of the Province. The iodine treatment, where given a fair trial, I believe is proving effective in relieving this condition. In conversation with several stock-owners in the Pemberton Meadows and Bulkley and the Nechako Valley, I heard that where this remedy has been conscientiously applied good results have followed. In previous years the iodine treatment has been tried more exclusively on sows with good results. The young pigs when farrowed appeared to be in

normal and thrifty condition. A number have tried the same treatment with their mares and cows and report good results, and I believe at present the iodine treatment is being used quite extensively among stock-owners in those districts where goitre is so prevalent. However, this remedy does not get at the seat of the trouble.

INTERNAL PARASITES AFFECTING SHEEP.

Several cases of losses among sheep were reported during the last year. Upon investigation, stomach-worm (*Hæmonchus contortus*) was found to be the cause of the trouble, these worms being found in the fourth stomachs. In all cases these animals were found pasturing on low ground. A change of pasture was recommended and the infected ground to be burnt over or ploughed where possible. The administration of copper sulphate was also found to be quite effective, the dose being for lambs six months to one year 2 oz. of the solution, and mature sheep 2½ to 4 oz.; 2 oz. of the copper sulphate was dissolved in 1 gallon of water as a stock solution and the above dose was given.

PLANT-POISONING.

In the late spring and early summer during this past year a number of cases were investigated of losses among cattle which proved to be due to plant-poisoning, more especially of the water-hemlock. Also a number of specimens were received at the office from the northern sections of this Province. Plant-poisoning has apparently caused considerable loss. In the great majority of cases the water-hemlock was the cause of death. On the opening-up of wider ranges and the advent of more stock in our northern sections plant-poisoning is becoming more prevalent than in the past. It is quite possible that the ranges are being eaten more closely and stock being forced to eat plants which they would otherwise avoid if pasturage were more plentiful. Little can be done unless the stock-owners themselves undertake to fence such areas as are infested with such injurious plants. In one case in the Okanagan a farmer reported losses among his calves. On looking into the case we found the owner was feeding his calves on patented and commercial calf-meal, which had set up gastric trouble and occasioned considerable loss from death of his calves.

TUBERCULOSIS.

During the year 2,068 premises were visited and 14,309 head of cattle tested. Of these, 567 reacted and six clinical cases were found. There has been an active demand for the tuberculin test from parties holding auction sales and individuals wishing to purchase private cows. This feature has been more noticeable during the past year than previously. Intending purchasers of stock are apparently realizing the importance of safeguarding their own private milk-supply and also milk sold. We have endeavoured also to work in conjunction with the milk officers of our cities and have endeavoured to test all cattle within city limits. In Greater Vancouver alone some 670 cows have been tested. Considerable time has been taken up in carrying out this work, as most of the parties have only one or two animals on the premises. While cities have jurisdiction as to sanitary matters within their boundaries, I must say that the sanitary arrangements of some stables within these municipalities are not what they should be, and I deem it is up to the city health authorities to give this matter of sanitation of stables and dairies within their jurisdiction closer attention. In our tuberculosis-work during the past year we have devoted most of our time to those herds where tuberculosis was found on previous tests, and naturally we expected to find a somewhat higher percentage of reactors than if we had applied the test more universally. I deem it essential in the eradication of tuberculosis to clean up those infected herds as rapidly as possible, and during this coming year a good deal of attention should be given to these particular herds where tuberculosis has been found in the past. Now that the Dominion Government is instituting the accredited herd system, the breeders of this Province will no doubt be the first in the field, as I believe the great majority, if not all, of our pure-bred breeders were the first to clean up their herds and have been free of tuberculosis for some time.

I herewith submit the list of the districts in which our men have been working during the past year, together with the number of premises visited in each district, the number of cattle tested, and reactors. (*See* Appendix No. 16.)

The average amount of compensation paid to the owners last year was practically $32 per head.

SANITATION OF STABLES AND DAIRIES.

On the whole, we find a considerable improvement in the sanitary conditions of the stables and dairies. Inspectors have endeavoured to make this feature of their work as educative as possible to the farmer. The high cost of labour and building materials has prevented in a number of instances any improvement in this line, but I find there is a general tendency of the milk-producer to keep his premises in a cleanly condition. Where at all possible, the owners are replacing their older dairies and stables by better sanitary and modern buildings.

A number of milk-producers during the past year were notified to improve the sanitary condition of their stables, especially in regard to floors and gutters, and also were instructed to install more light and to clean up their premises in general. These instructions were carried out to the satisfaction of the Inspectors.

Respectfully submitted.

A. KNIGHT,
Chief Veterinary Inspector.

REPORT OF CHIEF POULTRY INSTRUCTOR.

J. R. TERRY.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith report for the year 1919.

GENERAL CONDITIONS.

During the past year there has been a very large increase in the number of poultry-breeders in the Province. A large majority of these are returned soldiers, most of whom have taken advantage of the assistance towards re-establishment being given by the Soldiers' Land Settlement Board. Owing to the feed restrictions many of the old-established breeders were forced to cut down their flocks to the minimum, and as a result the abnormal demand for hatching-eggs and day-old chicks taxed them to the utmost. As is often the case, some of the less scrupulous breeders went so far as to mate up immature pullets for the purpose of supplying the demand for hatching-eggs.

During the early spring there was a tremendous demand for breeding stock of the more popular varieties. The prices paid approximated those asked in the boom times of 1911. In some few instances it would perhaps have been better if the stock sold for breeding purposes had been marketed the previous fall. Some of the breeding stock sold was undoubtedly older and less virile than good breeding stock ought to be.

Through the year a very large number of geese were raised; in fact, it will be safe to estimate that at least the number of geese in the Province at the end of the year was 100 per cent. more than in the previous year.

WEATHER CONDITIONS.

During the natural hatching season weather conditions were, on the whole, very favourable to heavy egg production. It was noted that the average egg production during April, May, and June was much higher than during the past few years. The cool spring-like weather in June tended to keep down broodiness among the general-purpose fowls, and also kept up the spring flow of eggs longer than usual. The cool weather, however, was not at all favourable to good chick-growth. In the Coast districts and adjacent islands the abnormal rainfall during the hatching and rearing season proved very disastrous. Coccidiosis was very prevalent in this month. The last time the ravages of this disease were felt was during the spring of 1916, in which year weather conditions closely followed those of the past year. It is safe to estimate that 15 per cent. of the chicks hatched died owing to the scourge.

PRICE OF FEEDS.

Beginning with the New Year, the Food Controller threw off the restrictions on wheat-feeding. The regulated price later on was taken off bran and shorts; needless to state, all three

commodities went up in price during the year. As showing the gradual rise of prices since before the war, the table below should be of interest:—

Price of Feeds.

Feed.	2nd Contest, 1913.	3rd Contest, 1914.	4th Contest, 1915.	5th Contest, 1916.	6th Contest, 1917.	7th Contest, 1918.	8th Contest, 1919.
Wheat and corn, 100 lb. ..	$1 75	$1 95	$2 20	$2 15	$2 25	$3 80	$4 10
Dry mash, 100 lb.	1 95	1 97	2 80	2 10	2 33	3 00	3 63
Wet mash, 100 lb.	2 02	1 93	2 80	2 10	2 33	3 00	3 20*
Grit and clam-shell, 100 lb.	1 12	1 08	1 10	1 12	1 30	1 25	1 70
Beef-scraps, 100 lb.	....	4 50	4 50	4 50	4 50	6 10	8 00
Mangels, ton	....	12 00	....	....	12 00	....	....
Straw, bale	70	65	63	50	65	70	85

* Scalded oats.

The above figures were those paid by the Department in connection with the Egg-laying Contest held in Victoria since 1913.

EGG PRICES.

Comparison of Prices (Wholesale) from 1905-19 (inclusive).

	Cents.		Cents.
1905	24½*	1913	35
1906	29½	1914	35
1907	31	1915	32½
1908	31½	1916	34
1909	33¾	1917	41
1910	34¼	1918	50
1911	34¾	1919	60¼
1912	41		

* Figures supplied by ranchers from 1905 to 1911. From 1912 onwards prices are those received for contest eggs.

The number of chicks hatched and reared during the past year will average about 25 per cent. higher than the total of 1918. The experienced breeders have by constant selection, care, and attention been able to show profits sufficient to give them a reasonable labour income. Inter-provincial trade has increased during the year. Each year the poultry-breeders to the east of the Rockies are becoming more conversant with the superior records obtained by our breeders. Throughout the year breeding stock was shipped as far east as Quebec. Inquiries were also received from the Orient, and several valuable pens of utility fowls were shipped to Shanghai.

RABBIT-BREEDING.

The rabbit industry more than held its own in the past year. Many of the returned soldiers taking up land are also going in for rabbits and bees, as well as poultry. The principal breeds of rabbits kept are those of sound utility qualities, such as the Belgian Hares, Flemish Giants, and New Zealand Reds. In addition, quite a few rabbits bearing white or black fur are kept. The high price of furs is making it profitable for this latter class of animal. The breeders of the utility rabbits, however, are still finding it somewhat difficult to get a remunerative price for the pelts. The breeders, members of the Coast Rabbit Associations, are, however, co-operating in this matter, and are now beginning to get reasonably good prices for the skins. During the year the rabbit-breeders staged excellent exhibits at the various Coast exhibitions, and the Island Association held the first rabbit-show in the Province.

DIVISION OF WORK.

Early in the spring Mr. Upton, of this Department, was given charge of the Lower Mainland District, with headquarters at New Westminster. The writer now has the Island and the rest of the Province to take care of. The provision of a motor-car has been of invaluable service in

this respect. Notwithstanding this, however, the Interior of the Province has been neglected owing to the enormous increase in correspondence and visitors to the office in the Department. It has been the custom of the Dominion Soldiers' Re-establishment organizations to pass intending settlers on to this Division. At one period no less than 100 soldiers per month were applying for loans to take up poultry-keeping. The increase of work placed on this Branch can therefore be realized. During the year the writer paid several visits to the new soldiers' settlements in the Province. The settlers showed much interest in the poultry industry and are continually asking for further visits.

Fall Fairs.

As in former years, the members of this Division have judged poultry and allied exhibits at the fall fairs and exhibitions. The shows this year have exceeded former years in quality in most instances. Additional interest continues to be shown by commercial breeders, many of whom have won prizes at the fall fairs.

Lectures and Demonstrations.

Whenever possible, lectures and demonstrations have been given to the members of the Farmers' and Women's Institutes, and also the local Poultry Associations.

Provincial Poultry Association.

The local associations have without exception taken on a new lease of life during the past year. Many of the associations which were originally formed for the purpose of holding shows primarily are now taking an active interest in co-operative work. The Provincial Poultry Association held its annual convention at Vancouver during the Provincial Poultry-show. The show itself was by far the most successful ever held. A change was made in the management of the show, a secretary-manager being given sole charge of the show in place of the usual show committee. The additional remuneration paid this official has more than justified its expediture. Including pet-stock entries, there were nearly 3,000 exhibits.

The Provincial Association again published its Directory of Breeders. Owing to the unprecedented demand for copies the edition soon ran out. The association again distributed premiums to its members in the shape of egg-record books, packets of poultry-lettuce, and sample tins of egg-preservative. Members of the association who entered in the Egg-laying Contest held in the United States again did well. One of the association members won first prize in the competition held at the Washington State College. His pen of six birds reached the high average of 245 eggs each. During the year the association has co-operated with a newly formed co-operative body, the Poultrymen's Union of British Columbia. The latter body, a joint-stock company, has under wise leadership made vast strides since its organization. The writer was, as per Constitution, appointed Secretary-Treasurer of the Provincial Association.

Egg-laying Contest.

The Eighth Egg-laying Contest ended September 14th, 1919, being of eleven months' duration. The classes were as follows: Class 1, 21 pens; Class 2, 19 pens.

Owing mainly, in the writer's opinion, to the favourable weather conditions, the Eighth Contest was able to produce nearly 1,000 more eggs than its immediate predecessor. With the exception of two, the contestants were all resident in the Province. No less than eight pens were disqualified, due to the fact that the average weight of one dozen eggs laid was under the stipulated weight allowed—i.e., 24 oz. While, no doubt, it is rather discouraging to a breeder whose pen lays sufficient eggs to place them near the top to have such pen disqualified for laying undersized eggs, yet at the same time, if other winning pens produce eggs above grade, it is only fair to ask the disqualified ones to at least comply with this condition. The Poultrymen's Union of British Columbia mentioned above is very strict in grading its members' eggs. Before long this system of grading will be compulsory throughout the Dominion. The sooner our breeders keep fowls laying normal-sized eggs, the better. The Provincial Poultry Association again provided cash prizes, diplomas, and ribbon badges to winners each month. A report of the contest, together with summary of same, is shown in Appendices Nos. 17 and 18.

BOYS' AND GIRLS' COMPETITIONS.

The competitions this year have again been very successful. There were twenty-two competitions, with a total of 181 contestants. The average quality of the flocks was very high. Owing to the increase of work the writer was unable to judge the up-country competitions. These were, however, handled by the judges sent out by the Department to fall fairs. It might be interesting to record that one (1918) competitor was able through the sale of stock and eggs to purchase a $100 Victory bond last November.

The following are the names of the clubs organized: Beresford, Celista, Creston, Errington, Westholme, Grandview (Vancouver), Langley Fort, Lord Tennyson (Vancouver), New Denver, North Vesuvius, Port Coquitlam, Sidney, Simon Fraser (Vancouver), Sooke, Westbank, Fruitvale, and Fire Valley.

"EGGS MARKS ACT."

The writer, as one of the Inspectors under the Act, made the usual visits to the cold-storage plants in the Province under his supervision. During the year several small shipments of canned Chinese eggs were brought into Victoria and sold to confectioners. Owing to provision not being made in the Act whereby this class of egg could be discriminated against, nothing could be done outside of warning the users of such eggs. It is proposed to remedy this matter shortly by Order in Council. Dominion Orders in Council will shortly be passed regulating shipments of Oriental eggs, and also all other eggs imported from outside the Dominion. When these regulations are brought into being they will strengthen our Provincial "Eggs Marks Act," and thus protect our Provincial poultry-breeders more thoroughly.

PUBLICATIONS.

The monthly reports of the International Egg-laying Contest were sent out during the year as heretofore. Copies were sent to all known poultry journals in Europe, Australia, and America, and also to all Agricultural Colleges, etc. Special articles on poultry topics were supplied to various newspapers in the Province, poultry journals of the Dominion, and also the Department's publication, the *Agricultural Journal*.

INSPECTION AND INSTRUCTION WORK.

As mentioned above, owing to the division of the Province a great deal more work has been put upon the writer. Due to the increased number of breeders, particularly on the Island, the Interior and northern parts of the country have not been visited by the writer this year. At the recent Provincial Poultry Association Convention this matter of neglecting the Upper Country was brought up, and a resolution passed asking for an additional instructor to be provided for the Interior. At the same time assistance was also asked for in the head office. The provision of a stenographer with a knowledge of poultry-keeping would be of inestimable service in the office during the absence of the writer.

POULTRY-DISEASES.

Outside of the serious outbreak of coccidiosis, very few cases of contagious diseases were reported. The usual fall trouble amongst turkeys (black-head) was again present. Would again urge those breeders intending to take up turkey-culture to either refrain, or to be certain at least that they have a sufficient area of land to allow the turkeys absolute freedom for roaming purposes.

OFFICE-WORK.

During the year the following totals of mail were received and delivered by the Poultry Division: Inward letters, 1,926; outward letters, 3,023. The time consumed in dictating about half of these communications could be saved by the employment of office help as outlined in another paragraph. The time saved could be spent in necessary field-work. It is to be hoped that the Dominion Government Land Settlement organizations will provide the necessary Poultry Inspectors to take care of the very large number of soldiers availing themselves of the Government loan.

ARTIFICIAL ILLUMINATION OF POULTRY BUILDINGS.

During the past year a considerable number of our commercial poultry-breeders have, owing to favourable reports in other sections, provided artificial illumination in the hen-houses during the winter months. In a majority of cases electric light is used, either provided by the electric-lighting companies or by means of the light-producing plants designed especially for farm use. It is customary to light up the buildings from about 4.30 until 7 p.m., and to light them in the morning around about 5 o'clock and leave them burning until daylight. By this means it has been found that the egg production is considerably increased during the winter months.

In the majority of cases, however, the egg yield during the year has not increased, but owing to a larger percentage of the eggs being laid during the high-priced period the lighting system has been found profitable. It has been found inadvisable, however, to make use of this system where the breeding stock is concerned. A heavy winter egg yield from breeders nearly always means a lack of fertility and vitality in the eggs in the spring.

In conclusion, the writer desires to acknowledge the co-operation and assistance given him by W. H. Stroyan, the poultryman in charge of the Egg-laying Contest, who is also an Inspector under the "Eggs Marks Act."

Respectfully submitted.

J. R. TERRY,
Chief Poultry Instructor.

REPORT OF DISTRICT POULTRY INSTRUCTOR FOR LOWER MAINLAND.

H. E. UPTON.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—We beg to submit herewith the annual report of work executed as Instructor of Poultry Husbandry for the district comprising the Lower Mainland on the Poultry Division in this Department of Agriculture, which position was taken over on March 1st, 1919.

CO-OPERATION AND ASSOCIATIONS.

We again have to report keen interest in co-operative work taken up by various Poultry Associations in the Lower Mainland. Those associations that have been at work along co-operative lines all report great progress.

BULLETINS AND CIRCULARS.

The bulletin on "Feeding" has been revised and published during the second quarter of this term. A circular was prepared on "Culling," which after being revised was published. We have also written some half-dozen articles for publication in poultry journals and assisted in preparing the prize-list for the local Provincial Exhibition. We have also prepared several charts for the purpose of illustrating lectures which we have delivered at various meetings held during the last quarter.

Our other time spent in the office has been utilized with correspondence in relation to poultry-raising, work on bulletins, handling all disease cases and post-mortem examinations, and other work that comes up daily in connection with our office.

PERSONAL INTERVIEWS.

More than the usual number of interviews have been granted from this office, chiefly to returned soldiers wishing to take up poultry-raising, many of whom have been sent to us by the Soldier Settlement Board in Vancouver; but in this we still find it a hardship to give interviews to all persons desiring same owing to the fact that there is no one present to keep the office open at all times, and appointments for interviews have to be given by letter.

OFFICE-WORK.

Although it has been practically impossible to keep a correct record of all letters received and dispatched, we have record of approximately 600 letters being sent out from this office from

March 1st last. Several long-distance telephone calls, ranging from Chilliwack to and including Vancouver, were made, so that the expense of installing a telephone in this office has not been unwisely spent. We endeavour to be present in this office on each Saturday morning from 9 a.m. to 1 p.m. for personal interviews at all times.

FALL FAIR WORK.

We officiated as judge at the following fairs: Ioco, Agassiz, Vancouver, Abbotsford, New Westminster, and Duncan. The poultry exhibits in the majority of these fairs were extremely good; in fact, we can state that the exhibits that are staged from year to year gradually improve in quality in the majority of British Columbia fairs.

The poultry exhibit at the New Westminster Exhibition was undoubtedly the best exhibit of poultry that has ever been staged in British Columbia at any of the fall fairs. The Royal Industrial and Agricultural Society, which is the governing body of the New Westminster Fair, also allowed the Poultry Committee to run amateur judging competitions in connection with their exhibition, which created a great amount of interest, some nine classes being staged for competitive work, and there were from six to fifteen competitors in each class. Suitable medals properly engraved and diplomas were given to the winners in each class. Such work is to be highly commended, and the other Fair Associations in the more important poultry districts might take up this work to the advantage of our poultry producers. Over 200 single entries of commercial birds were shown at this fair.

Special comment should also be made in connection with the Cowichan Fair held at Duncan, upon the extremely good quality shown in all classes.

DRESSED POULTRY AND EGG CLASSES.

The commercial classes in all the fall fairs were of exceptional quality, and we can report that at all fairs and association shows which we have visited this year a marked improvement is being made along these lines. It is hoped that the British Columbia Poultry Association or the Department of Agriculture can some time see their way clear to present or donate a small sum to each group association with which to purchase a glass case, which could be electric-lighted (and refrigerated, if necessary, in warm weather), so that dressed poultry and eggs can be exhibited in prime quality whilst preventing the public from handling the exhibits. Until a method like this is followed the dressed poultry and eggs on exhibition will always be more or less of a loss to the exhibitor after the fair or show is over.

LECTURES AND DEMONSTRATIONS.

During the past year we have delivered several lectures with illustrations and otherwise, and have also given a number of demonstrations on culling. (*See* Appendix No. 20.) In this work we have handled some thousands of birds, both adult and young stock.

GENERAL EXTENSION-WORK.

During the past nine months we have been on the road quite extensively, having covered over 10,000 miles in visiting the different people desiring knowledge in connection with poultry matters throughout the district.

EXTENSION AND EDUCATION WORK.

We have endeavoured during the past nine months to impress upon all persons interested in poultry that only proper management of the birds in their flocks would ensure good returns. We have endeavoured to point out the absolute folly of doctoring fowls. We have further tried to educate the ordinary public that even at the present time 200-egg hens are not a commercial success as a whole, and that it is impossible to expect commercial flocks to average such high egg-producing results. So much material is published at this time in connection with marvellous laying strains that the public of British Columbia must be protected in all ways possible.

We have a continual demand on our extension trips for personal visits on personal places. We believe, however, that we will be forced to divide each district up into small groups of six persons in order to cover the territory more thoroughly in answer to personal demands. It is quite impossible to visit each person interested in poultry, and we believe that this is the only way to overcome the difficulty. We would then be able to call upon one of the six persons each

time when visiting said sections and the other five parties to be present at the same time to discuss their problems. Then if any one of the group should need personal attention for some unexplained reason, time could be given to this individual before leaving the district.

DISEASES.

We are pleased to report no disease in epidemic form during this past year. The case of diphtheritic roup which we worked upon the first quarter of our work in this district has been combated successfully. There have been a few mild colds which have called for prompt treatment, which we were fortunate in keeping down to a minimum mortality. There have been a few cases of coccidiosis. Last spring there were some incubation and brooding troubles, but much of this was due to poor management.

Appendix No. 21 shows the various diseases, etc., and the number of flocks affected with such diseases, which we have been called upon to assist in checking during the past nine months.

CONCLUSION.

We are pleased to report that the outlook for the majority of poultry-keepers is quite bright for 1920, although there has been quite a rise in the price of wheat at the time of writing. The poultrymen feel quite certain that conditions will right themselves in the near future. The price of eggs during the latter part of 1919 has certainly not kept time with the cost of foodstuffs.

A great amount of attention will be expected by the returned men who are upon the land engaging in poultry production at this time.

The demand for hatching-eggs and baby chicks has never been so great as for the coming spring, due largely to the above fact. The one big drawback to any one engaging in the poultry business at this time is the exceedingly high price of lumber, which ranges from 100 to 150 per cent. higher than in 1916. During the past year good reports of profitable egg production have been much more general than in the years gone by.

Respectfully submitted.

H. E. UPTON,
District Poultry Instructor.

REPORT OF DISTRICT AGRICULTURIST, KAMLOOPS.

GEO. C. HAY.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as District Agriculturist for the year 1919.

CANADIAN CO-OPERATIVE WOOL-GROWERS, LIMITED.

A most prosperous year for sheep-raisers and the Canadian Co-operative Wool-growers, Limited, was that of 1918. This was the first year of its operation and exceptionally high prices prevailed. Without the existence of the growers in organized strength it is reasonably contended that the high prices would not have been maintained or realized. The advantages of co-operative unity on the part of the Canadian sheepmen was so decided in 1918 that there was little difficulty for the British Columbia Wool-growers' Association in getting a much larger quantity of wool to handle the following year. In 1918 this association handled 53,806 lb. of wool and in 1919 they handled 98,771 lb. These figures speak for the success of the organization and we have every reason to expect a bigger and better year's business to follow.

Your Agriculturist has represented this Province as director of the Canadian Co-operative Wool-growers, Limited, during the past year and considerable of his time was occupied endeavouring to strengthen the organization.

The development of a home market for more and more of our wools is most helpful. The preparation of a standardized and honest product is meeting with approval and will ensure steady trade in both Canada and the United States. The wholesome character of the business this year cannot help but establish successful progress for the Canadian Co-operative Wool-growers, Limited.

INSTITUTE MEETINGS.

During the past year various institute meetings were arranged and on different occasions addresses were given on agricultural topics. A series of meetings were held early in June in the Okanagan, Nicola, Chilliwack, Duncan, and Kamloops Districts, mostly in connection with the marketing of wool.

FALL FAIRS.

The fairs visited during the past year were Vancouver, New Westminster, Kamloops, Armstrong, and Summerland. At these fairs, with the exception of Vancouver and New Westminster, your Agriculturist assisted the judging of live stock and field products.

BOYS' AND GIRLS' CLUBS.

From time to time an effort was made to keep in touch with the various Boys' and Girls' Clubs and to assist in the judging, etc.

POTATO EXPERIMENT.

An interesting experiment with different varieties of potatoes was carried on in Kamloops, with the following results:—

Potato Experiment conducted in 1919.

Variety.	Measurement of Land occupied by Potatoes.	Date of Planting.	Date of Digging.	Total Weight of Crop.	Marketable Potatoes.	Yield per Acre.	Remarks.
				Lb.	Per Cent.	Tons.	
Reeve's Rose..	Drill 30', 12" apart	May 10..	Oct 2.	42	71.0	8.71	Rather small; no scab or blight.
Wee McGregor	Drill 21', 12" apart	" 9.	Sept. 30.	55	90.9	20.94	Very large; no scab or rot; good.
Carmen No. 1..	Drill 24', 12" apart	" 9.	Oct. 4.	48	72.8	12.70	Nice smooth skin; no scab or rot.
Empire State..	Drill 31', 12" apart	" 9.	Oct. 3.	56	80.3	12.72	Good appearance; smooth skin; no scab or rot.
Eureka	Drill 23', 12" apart	" 10.	Sept. 29.	68	87.9	22.91	Large; smooth skin; no scab or rot; good.
Early Ohio....	Drill 26', 12" apart	" 10.	Oct. 3.	30	66.6	6.70	Fair; no scab or rot.

BRITISH COLUMBIA STOCK-BREEDERS' ASSOCIATION SALES.

A very successful bull-sale was held in Kamloops on March 26th. The animals brought good prices and the sellers and buyers appeared to be well satisfied. It is believed that the bull-sale will be an annual event. A statement of the first annual sale follows herewith. (*See* Appendix No. 22.)

A very successful sale of sheep and hogs was also conducted at Armstrong on September 26th. For a statement of this sale *see* Appendix No. 23.

OFFICE.

The above lines of work, together with the supervision of the Quilchena Dry-farming Station and frequent inquiries for information at the office in Kamloops, has kept your Agriculturist especially busy during the past year. The local farmers and those interested in the work of the Department of Agriculture have been patronizing the agricultural office with an increasing interest in the work, and the furthering of the agricultural interests in this district by the Department of Agriculture is greatly appreciated by all concerned.

QUILCHENA DRY-FARMING STATION.

The Quilchena Dry Farm has been managed since May 12th, 1919, by Clarence Phelps, who has been working under adverse circumstances to make a success of the place. He has had a good year and accomplished considerable, as can be seen from his report, which follows:—

"SIR,—I beg to submit the following statement of work done on Quilchena Dry Farm since May 12th, 1919:—

"Built corral around dipping-vat and repairing vat. Hauled out and scattered seventy-five loads of manure over fields. Broke 8 acres of sod and took stones off same. Took down and built half a mile of fence. Summer-fallowed 30 acres and picked rocks off same. Cut and stacked 15 acres of grain-hay, also 4 tons mixed hay; estimated yield, 30 tons. Bound and stacked 42 acres of grain, which yielded about 15 tons of threshed grain—7 acres wheat, 7 acres barley, 23 acres oats, 2½ acres fall rye, and 2½ acres fall wheat; estimated at 15 bushels per acre. Prepared ground and seeded 10 acres fall wheat and 10 acres fall rye. Planted and took up ¼ acre turnips, which yielded 8 tons. Planted ⅛ acre of potatoes; yield, 1 ton. Raised 300 lb. cabbage, but owing to dry weather and frosts every month other garden-truck not very good. Cut and peeled 100 fence-posts. Built sheep-corral containing 250 square rods. Built 130 feet of stationary feed-rack and trough for sheep. Built sheep-shed, 20 x 20 feet, of rough lumber. Built root-house, 12 x 24 feet.

"I believe this includes all the important work. Of course, there is other ranch-work too numerous to mention, such as getting wood, looking after stock, repairing fences, buildings, etc.

"Respectfully submitted.

"CLARENCE PHELPS."

(*See* Appendix No. 24.)

105-MILE DRY-FARMING STATION.

The 105-Mile Dry-farming Station has been under the managership of J. W. McKinley during the past year, and his report follows, which shows the work done on this farm for the year 1919:—

"SIR,—I wish to submit the following crop and work report for year 1919 on 105-Mile Dry-farming Station:—

"Summer-fallowed 28 acres stubble and cleared and summer-fallowed 2 acres forest. Cleared (not stumped) 4 acres forest made up of points of forest that projected into the cultivated fields, making their boundaries irregular. Built 540 yards Russell fence 6 feet high and 600 yards stake and rider fence 6½ feet high; this is the Virginia lock pattern and has a rock under each corner to prevent rotting. Built one stack-yard containing 9,000 square feet; this makes three stack-yards situated so that all grain may be stacked without long haulage. These yards have stack-floors made of poles on mud-sills, leaving an air-space under all stacks. Cleared and graded a road from the Cariboo Road to the rear of the farm, making it possible to reach all fields with our largest implements without driving through crops or cultivated land. The fence-posts set by my predecessor are pine, many of which have rotted off. I have replaced these with peeled fir.

"Grain threshed, season 1919: Fall rye, 1,291 lb., yield per acre 23 bushels 3 lb.; fall wheat, 750 lb., yield per acre 14 bushels 17 lb.; Prelude wheat, 976 lb., yield per acre 8 bushels 8 lb.; Huron wheat, 3,155 lb., yield per acre 6 bushels 44 lb. and 5 bushels 25 lb.; Garton oats, 6,440 lb., yield per acre 12 bushels. None of the spring grain is fit for seed. We require a full line of new seed for next season. White hull-less barley and tame hay again a failure. Seed-oats did not arrive here early enough; hence were frozen before ripening, making them very light.

"I broke up 6 acres timothy after haying, making 36 acres ready for crop. Our west field is very low and surrounded by forest; this field has been subject to summer frosts. I have slashed an opening through the timber in a north-east direction to the end of Pasture Lake. I am now slashing on the opposite side to Watson Lake; this will cause a draught through this field and lessen the danger from frost.

"Respectfully submitted.

"J. W. MCKINLEY,
Farm Manager."

(*See* Appendix No. 25.)

REPORT OF SILO DEMONSTRATOR.

R. J. FERRIS.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report for the year 1919.

During the year 1919 there has been a large number of silos built in British Columbia. When this work was first started the aim of the Silo Branch was to place silos in all the farming districts of the Province. By continued efforts this is now practically an accomplished fact. Three silos were built in the Bulkley Valley and because of the practical benefit received by the farmers upon whose farms they were built a large number will be erected in 1920.

Two filling demonstrations were held at Crawford Bay, on the Kootenay Lake, and a building and filling demonstration at Harrop. The silo is a familiar object along the borders of our rivers and large inland lakes. Its use is resulting in a large number of our fruit-farmers adopting dairying as a side-line, and also gives them a means of providing fertilization for the soil.

Altogether ten silos were built under the Department of Agriculture's supervision during the past year and five filling demonstrations held. An increasing amount of correspondence was received at the office. The outstanding feature respecting silo-construction in British Columbia is that large numbers of farmers are building a second silo to keep company with the first one.

During the year 1920 circumstances point to a shortage of dairy feed for this Province. There always is the possibility of an abnormal crop, but this, like a lot of other things which bear upon the cost of production around the farm, is problematical. The aim and object of British Columbia farmers could well be an attempt to eliminate as far as possible the feed bill by production on their individual farms. The silo, if intelligently used, will be a big feature in bringing this healthy condition to British Columbia.

Respectfully submitted.

R. J. FERRIS,
Silo Demonstrator.

REPORT OF DAIRY COMMISSIONER.

H. RIVE.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my report as Dairy Commissioner for the year 1919.

I résumed work on July 14th, 1919, with the Department of Agriculture, from which I had been absent since January, 1916.

GENERAL CONDITIONS.

The weather conditions during the summer were none too favourable for the industry. A cold backward spring with a cool early summer, followed later by a prolonged drought towards fall, seriously influenced the yield of dairy feeds in many parts of the Province. The Coast districts particularly were lucky in securing heavy hay and forage crops, but roots and corn in general suffered.

Prices of dairy feeds have remained high throughout, with upward tendencies, and nothing that can be done to stimulate the growing of cheap and bulky milk-producing foods should be neglected, for the dairy-farmer will undoubtedly have to rely on these more and more for economical production as prices of by-products advance.

Returned men have been of considerable assistance during the year to dairy-farmers, whose labour troubles have lessened proportionately.

Dairy stock is urgently needed in many of the newer districts now developing. The older districts are quite unable to supply the demand, and the progress of the industry will be hampered to a great degree unless some means of introducing some thousands of animals during the next five years can be devised.

Prices of dairy products have been uniformly high, due no doubt to the necessary exports to Europe. Butter shows no signs of weakening in price. The price of cheese appears rather less stable. The result of the co-operative efforts of the dairy-farmers of British Columbia has been to hold down the price of fresh milk to consumers.

COW-TESTING ASSOCIATIONS—MILK RECORD WORK.

The work of these associations has been good, but has not been properly appreciated by their own members. The number of cows tested is not as great as it should be, and a slackness on the part of local officials has prevented these institutions from becoming, as they might, live centres of progress.

Four associations have been in existence for several years. Two were started during the year. It is expected that two more will be instituted in the Interior next spring.

A list of associations in the Province is appended. (*See* Appendix No. 26.) The Department continues its liberal policy of contributing $50 per month towards each Supervisor's salary, besides equipping each association at its inception. The associations are considering, at the request of the Department, the raising of their annual tax per cow from $1 to $1.50 in order to provide sufficient salary to employ and retain good men as Supervisors. The institution of a record of production to round off and stimulate this work is also under way.

At a meeting in Vancouver on January 20th, 1920, it was recommended that a permanent record, based on production alone, be established for two-year-old heifers giving 300 lb. of butter-fat in 300 days and for mature animals giving 450 lb. in the same period.

With two new associations in operation by next summer, making a total of eight, it is highly desirable that closer supervision be maintained by this Department in order that uniformity of work on the part of testers be brought about, and that members may be helped to avail themselves of the information placed at their disposal.

It is respectfully recommended that an assistant be secured by this Branch, if only temporarily, for work chiefly with this valuable feature of our dairy economy.

Testers under the official rules of the Holstein Friesian Association were supplied. This phase of testing-work finds less favour with breeders than formerly as the value of sustained tests over seven and thirty-one days becomes more established. Several long tests have, however, been carried out in this Province under these regulations.

The following is quoted from the report of T. A. F. Wiancko, Provincial Dairy Instructor:—

"Testers for Holstein Friesian Record of Merit work were furnished for testing at the Colony Farm, and such testing was also carried on at the Dominion Experimental Farm at Agassiz. Some very creditable records were made by British Columbia cows.

"'Zarilda Clothilde III. De Kol,' owned by the Colony Farm, completed a year's work with 33,153.6 lb. of milk, containing 1,194.17 lb. of butter, carrying a calf during 200 days of the test.

"This record stands second only to that of 'Tilly Alcartra,' and is the largest milk record ever made in Canada. She is likewise the only cow, except 'Tilly Alcartra,' to make two-year records above 30,000 lb., or three averaging over 31,000 lb. each, as is shown by the following table:—

Age.	Butter-fat, Lb.	Milk, Lb.
Five years	782.8	29,826.0
Six "	857.0	30,467.3
Eight "	955.3	33,153.6
Average	865.0	31,148.9 "

CREAMERIES.

The report of the Provincial Dairy Instructor under this heading is here given:—

"As much attention as time would allow was devoted to creamery and dairy inspection and instruction, and all creameries received one or more visits during the year.

"A new creamery was established at Vernon in April, when the greater portion of the plant of the Lumby Creamery, which was operated at Lumby some years ago, was removed and put into shape for operation at Vernon. From reports to hand some 47,000 lb. of butter was manufactured from April to December, and about $24,000 was paid to patrons for cream

supplied. This is an exceedingly good start and would indicate that this district will increase very rapidly in dairy production.

"At the Comox Creamery, Courtenay, mechanical refrigeration was installed, together with a well-equipped plant for the manufacture of ice-cream. New pasteurizing equipment has been installed also in several of the creameries in order to further ensure keeping quality in the butter manufactured.

"Sanitary conditions in the creameries and dairies continue to show improvement in general, showing that the owners and operators are striving to put out a better quality of dairy products.

"Continued improvement in the quality of British Columbia creamery butter has been noted, due largely to the keener interest that butter-makers are taking in their work. Improved methods of pasteurizing, with more careful handling and selection of the cream at many of the creameries, has resulted in great improvement in the keeping qualities of the butter.

"A list of active creameries, condenseries, and cheese-factories of the Province is given herewith." (*See* Appendix No. 28.)

DOMINION EDUCATIONAL BUTTER-SCORING CONTEST.

"On the invitation of J. A. Ruddick, Dominion Dairy and Cold Storage Commissioner, three British Columbia creameries participated in the Dominion Educational Butter-scoring Contest, and supplied a 14-lb. box of butter each monthly for six months, May to October, inclusive.

"These were sent to cold storage at Montreal along with the monthly samples from the other Provinces, to be scored and rescored monthly for the purpose of comparison, so that uniform Canadian standards might be fixed and that uniform manufacturing methods might be established throughout the Dominion.

"Dairy officials from the different Provinces were invited to visit Montreal at different times for the purpose of being present while the scoring of the samples was being carried out.

"Your Dairy Instructor was given the privilege of being present at the October scoring, and the information secured, it is hoped, will be of much value in the carrying-on of work in connection with the improvement of quality in butter in this Province."

CHEESE-MAKING.

The past few years have seen a revival of cheese-making in British Columbia, prices previously for many years having been such that local manufacturers were unable to compete with Eastern Canada. The market has not been exacting and a profitable business has been done.

A list of cheese-manufacturers is appended:—

Name.	Place.	Variety.
Fraser Valley Association	Clayburn	Cheddar.
Fraser Valley Association	Sardis	,,
Revelstoke Creamery	Revelstoke	,,
Ferrara Co.	Chilliwack	Fancy varieties.
Dominion Experimental Farm	Agassiz	,,

In addition to these, several dealers are offering cream cheese which they put up, and a number of farmers are finding good sale for farm-made cheese of the softer kinds.

The manufacture of cottage cheese is not receiving the attention it should on farms in this Province.

DAIRY LEGISLATION.

An effort has been made to consolidate the existing dairy legislation, and accordingly a new "Creameries and Dairies Regulation Act" has been prepared, embodying the principles of the old "Dairies Regulation Act" with amendments, and doing away with the "Milk Fraud Act" and Part VI. of the "Agricultural Associations Act" relating to inspection-work.

OPERATION OF THE "DAIRIES REGULATION ACT" DURING 1919.

Testers' Licences.—Fifteen candidates were examined by the Dairy Branch and sixty-five licences were issued. List of testers holding licences appended.

Creamery and Dairy Licences.—To fifty persons or firms buying milk and cream on the butter-fat basis licences for businesses were issued. List of dairies or creameries licensed appended.

Official Testers under "Dairies Regulation Act."—Appointed under the above Act, the Branch has at Sardis and at Vancouver an official stationed. Extracts from their reports giving details of their duties are herewith appended:—

"VANCOUVER, January 13th, 1920.

"From January 1st to December 31st the milk-tester has been engaged in the work of making regular tests of milk shipped by the farmers to the various dairies of the city and to the condenser at Ladner. Each month approximately 800 composite samples are tested for butter-fat, and the test accepted as the basis of settlement by the seller and by the buyer.

"In addition to this specifically timed and stated work, your official milk-tester attends to the correspondence arising out of the tests, and also to the work and correspondence attending a request from any farmer or dairy whatsoever for a check-test from the milk shipments as they arrive, either at the different stations or at the dairies. It is usual to make several tests before reporting on the same.

"In addition to the tests for butter-fat, an effort is being made to encourage more care in the shipping of the milk, by making use of the filter and filter-pads supplied by the Department to demonstrate the amount of sediment which a pint of improperly handled milk contains.

"A demonstration of this usually results in a marked improvement. Use is also made of the acid test to demonstrate the value of cooling in order to ensure delivery to the city in good condition. Altogether not less than 10,000 samples of milk have been tested during the last year.

"E. RIVE."

"SOUTH SUMAS, January 1st, 1920.

"With the exception of the first month of January, your tester spent his time at the Borden Co., Ltd., Factory at South Sumas. At the request of the manager of the Fraser Valley Milk Producers' Association, that month was occupied taking samples and testing at the Chilliwack Creamery. The number of shippers to the creamery was 228 of milk and twenty-two of cream, while at the condensery (Borden's) there were 250 shippers of milk only. During the month of January the taking of samples at the condensery was under the supervision of your tester, who did the testing thereof.

"Each month it has been the practice to note all marked variations and to make a check-test of the fresh milk, which information was carefully indicated on the regular test-slips sent out twice monthly like sample attached. Although no retests were demanded, there were on an average twenty made each month just for the satisfaction of all concerned. Several requests, however, were received for check-tests, and information in explanation of the variations in tests, and these were always promptly responded to. The result of this plan has been very successful in reducing to a minimum the complaints to the factory.

"By way of assisting the dairymen to a better understanding of their problems in proper feeding and care of their herds, sanitary handling of their milk, and particularly the variations in the test of milk and cream, W. K. McLeod, manager of the Chilliwack Creamery, jointly with your tester, held dairymen meetings during the winter months at Rosedale, East Chilliwack, Sardis, Atchelitz, and Fairfield Island. There were approximately 200 farmers present at these meetings, who evinced lively interest in the subjects discussed.

"It can be stated that the work of Government testing has, as a whole, proven entirely satisfactory not only to the buyer, but to the dairymen, by having eliminated the elements of suspicion and mistrust that the farmers have heretofore felt that they were not realizing the fairest results under the old plan.

"J. B. WATSON."

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION.

The affairs of this association have naturally taken up a considerable part of the time of the members of this Branch. Competitions of various kinds are still carried out by the association and refunds are granted to members on transportation charges on pure-bred dairy stock within the Province. In addition to the annual convention in winter, summer meetings are held at different points in the Province.

FALL FAIRS.

Assistance in judging was given, as usual, at a number of fall fairs, and at some milk tests and competitions were conducted.

NEW CREAMERIES.

Estimates for two creameries to be started by the Department this spring in the Northern Interior have been prepared by this Branch.

Many districts are inquiring as to the assistance given by the Department in the institution of creameries and purchase of dairy stock.

Respectfully submitted.

HENRY RIVE.
Dairy Commissioner.

REPORT OF PUBLICATIONS BRANCH.

R. J. FERRIS.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit the following annual report for 1919:—

An important feature of the work of this Branch during the past year was the large individual demand made upon the Department for farming literature. The number of individual applications to the Publications Branch amounted to 4,640, and there were sent out during the year 184,480 bulletins and circulars. Comparing this number with the 1918 figures, which were 50,000, shows an increase of more than 270 per cent. Such a large increase as hereby shown may leave the impression of a wastage of material. This is not the case.

By co-operation with the Dominion Soldier Settlement Board we have been able to place reliable information before the returned soldiers who have been taking to farming as a means of livelihood.

The offices which are in charge of the various members of the Provincial Agricultural staff throughout the Province keep a large supply of bulletins and circulars on hand for distribution. Supplies have been forwarded to the Prairie Markets Commissioner, Calgary, and the Agent-General's office for British Columbia in London, England.

The large numbers of returned soldiers who are taking up short-course studies in agriculture at the British Columbia University and elsewhere also rely mainly upon the Department of Agriculture for bulletins.

A pleasing feature of the distribution of the Department's agricultural literature is that the teachers in the city and country schools throughout the Province, after personal application, have been provided with bulletins to aid them in giving the school-children a knowledge of agriculture. By so doing these teachers will take one of the foremost places in laying a true foundation to the agricultural development of British Columbia.

THE AGRICULTURAL JOURNAL.

The circulation of this *Journal* has increased from 6,000 to 8,500 monthly. From the general tone of resolutions passed at farming conferences in various parts of the Province, it is helping to cultivate a spirit of united effort among farmers in those things which are vital to the proper growth of the agricultural industry.

Respectfully submitted.

R. J. FERRIS,
Editor of Agricultural Journal and Chief of Publications.

REPORT OF STATISTICS BRANCH.

G. H. STEWART.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith the annual report of the Statistics Branch for the year 1919.

SCOPE.

For the first three months of the year the work of this Branch was carried on by A. B. Tweddle, who resigned on March 31st last. Most of this time was spent in securing data and preparing statements for the 1918 Statistics Bulletin. Owing to no appointment being made of a Statistician for the Department of Agriculture, the work in connection with this Branch was held in abeyance until the position was filled by your present Statistician on July 1st last.

The duties of this Branch during the past six months consisted of the collection of data relating to agricultural products, imports and exports. In obtaining figures relating to crop areas and numbers of live stock, the same procedure was followed as for the years 1917 and 1918. In co-operation with the Dominion Bureau of Statistics, card schedules were distributed to all farmers in this Province, the names of farmers being abstracted from the records of the Canada Registration Board's census as of date June 22nd, 1918, together with additional names of farmers who have gone on the land since that date. Data relating to imports from other Provinces in Canada are collected by means of returns sent to this office from the distributers of agricultural food products in this Province. The results obtained this year have been most satisfactory; up to date 90 per cent. of the returns dispatched have been filled out and returned to this office, which gives great promise for the future. Data relating to foreign imports are obtained from the Dominion Bureau of Statistics, Ottawa.

POSTAL CENSUS, 1919.

The total number of cards mailed to individual farmers was 15,146; compiled, 7,970. The following were returned blank, etc.:—

"Removed" or "gone away"	192
Returned by recipients "not farming"	269
Returned noted "dead"	39
Duplicate returns	8
Not called for at post-office	396
Returned by post-office, no notation or "unknown"	499
Total	1,403

The estimated number of actual farmers is 13,743 after deducting the 1,403 cards returned by the post-offices. The total number compiled would be 58 per cent. of the estimated total farmers, to which was added 42 per cent. of the latter total.

It is gratifying to note the increased returns received from the individual farmers over those for the year 1918; the percentage of returns received last year being 42.5 per cent. of the total number of actual farmers, while for the year 1919 the returns received were 58 per cent. of the total estimated farmers in the Province.

It appears from the returns received that the farmers of this Province are beginning to realize the importance of rendering full and accurate returns to this office, and I think that it is only a matter of a short time until this work will bear the desired results in the Province of British Columbia.

It is worthy of note that the Province of British Columbia takes first place above all the other Provinces in the Dominion as regards the total number of returns received, as the following figures extracted from the Monthly Bulletin of Agricultural Statistics for November, 1919, published by the Dominion Bureau of Statistics, Ottawa, will show:—

Province.	Number of Farms, 1919.	Number of Returns.			Percentage of Returns.		
		1917.	1918.	1919.	1917.	1918.	1919.
Prince Edward Island ..	13,705	.....	7,766	3,770	..	54	27
Nova Scotia	53,634	.....	20,868	12,136	..	38	24
New Brunswick	37,204	.....	13,937	6,643	..	36	17
Quebec	143,958	28,133	34,894	24,735	21	20	17
Ontario	184,337	.....	79,968	36,213	..	43	19
Manitoba	49,855	.....	17,808	10,536	..	38	21
Saskatchewan	103,912	35,592	46,089	35,531	34	44	34
Alberta	67,603	14,444	13,574	4,919	21	20	7
British Columbia	13,743	6,886	6,534	7,970	46	42.5	58
Totals	667,951	.....	241,438	142,453	..	36	21.5

CROP CORRESPONDENTS.

During the month of July the voluntary services of ninety-eight reliable farmers in different parts of the Province were secured to act as crop correspondents. Their duties consisted chiefly

of reporting on crop conditions, climatic conditions as affecting crops, etc., from the beginning of July until the end of December. Of this number, sixty-one of the correspondents reported regularly each month, while the remaining thirty-seven reported about every second month. In addition to the correspondents reporting to this Branch, ninety-three were appointed by the Dominion Bureau of Statistics, Ottawa. At the beginning of each month the two offices exchanged figures and agreed upon averages; by this agreement the result of having conflicting figures was eliminated, at the same time assuring a greater degree of accuracy.

FARM ACCOUNTING.

During the past year numerous requests have been received by this Branch for some simple method of farm accounting, and with this purpose in view your Statistician has designed a book which is now before the Deputy Minister for his perusal. The time has arrived when the farmer, in keeping with the methods of men engaged in other pursuits, must keep an accurate and up-to-date record of all his business methods, and it is to be hoped that this book will meet with approval and be published.

GENERAL.

Since taking over the duties of this Branch on July 1st last, the total number of letters received was 620, while the total number of letters dispatched was 525. As no record of outgoing and inward correspondence was kept previous to that date, I am unable to give figures for the first six months of the year. Owing to the large increase in the correspondence of this Branch it was necessary to install a new filing system, which took up considerable time. The system adopted was that of an alphabetical index, together with a subject-index system. During the past year sixteen circular letters were sent out to crop correspondents, manufacturers of dairy products, and Farmers' Institutes, etc., comprising in all 2,385 letters. Of the 1,000 copies of Bulletin No. 82, "Agricultural Statistics, 1918," 980 copies have been dispatched. With the compilation of the results of the 1918 postal census, the monthly returns received from crop correspondents, together with other routine matters, the entire time of your Statistician has been taken up.

All of which is respectfully submitted.

G. H. STEWART,
Statistician.

REPORT OF EXHIBITION-WORK.

A. H. SHOTBOLT.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit my annual report on the above work for the year 1919.

It was decided by the Department of Agriculture to take advantage of the offer made by the Department of Natural Resources, Canadian National Railway Company, to join them in a Provincial display to be staged in their pavilion at the Canadian National Exhibition, held in Toronto from August 25th to September 6th, 1919. Fully three-quarters of the floor-space was given to the British Columbia exhibit. A large and well-arranged display of fruit, vegetables, and general farm products, also minerals, fisheries, Indian curios, and game, attracted great attention.

The transparencies of our British Columbia fruit valleys made good advertising for this important industry. Five thousand copies of the "Handbook of British Columbia" and 2,000 copies of the mineral reports were placed for general distribution. There was also great demand for pamphlets on game and fisheries.

I feel convinced that our grains and grasses could be kept in better condition and shown to better advantage in cases, also that some small transparencies of views of British Columbia would be a great attraction. We were also greatly handicapped by the shortage of fresh fruits, which undoubtedly would have accomplished a great deal of good by advertising British Columbia fruits in the Eastern markets.

One million and seventy-nine thousand visitors passed through the turnstiles, Labour Day having the greatest single-day attendance, there being 189,500 visitors on that day. I would like to express my appreciation of the valuable assistance rendered us by C. Price Green, Publicity Agent of the Canadian National Railway Company, who showed the greatest interest in our combined exhibit. His company very kindly carried our exhibits free of charge.

An exhibit was staged at Vancouver from September 8th to 13th, but owing to the late arrival of the main exhibit from Toronto the display was not as extensive as it might have been.

The Victoria Home Products Fair was held in the Hudson's Bay Company's building from September 22nd to 27th and proved a great success. The attendance was large and interest kept up until the closing day. The display consisted of fruit and vegetables. Sixty-four boxes of choice apples of different varieties were shown, also a great variety of home vegetables.

Miss Hayes, of the Domestic Science Branch, staged a display on food values which was both instructive and attractive. A great number of agricultural bulletins were distributed and were in great demand.

The Provincial Exhibition, New Westminster, was opened by H.R.H. the Prince of Wales on September 29th and closed on October 4th. This was the first exhibition in New Westminster since 1913 and was one of the finest ever staged there. The weather was not favourable, but the attendance was large. A large portion of the Toronto exhibit was staged there. The Domestic Science Branch was also represented.

The British Columbia Dairymen's Association Convention was held in Vancouver at the Vancouver Hotel from January 21st to 26th, at which an exhibit was displayed to show the food value of milk. This proved a great attraction and was well patronized by both grown-ups and children.

Respectfully submitted.

A. H. SHOTBOLT.

REPORT OF COAST MARKETS COMMISSIONER AND INSPECTOR IN CHARGE OF EXPORTS.

R. C. ABBOTT.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith beg to submit to you my annual report for the year 1919.

OFFICE-WORK.

During the year 1919 our office-work has steadily increased. Producers throughout British Columbia are rapidly coming to realize the great benefit they can derive from keeping themselves posted "to the minute" on market conditions and prevailing prices. Since the middle of last June we have been running short-handed, expecting that the work would drop off to some extent, but it has increased and we will require additional help next year.

Our office-work includes the regular correspondence work and filing, export certificate work and filing, general report work, weekly market letter work, general information in all lines of marketing, distribution of Department publications, general information on fruit and vegetable canning, etc.

During the year more than 4,000 people have visited our office.

WEEKLY MARKET LETTERS.

The first letter of the 1919 series was issued on June 28th and continued each week. Owing to many requests from producers for this letter we propose to continue it at least semi-monthly through the early spring. Our mailing-list is now well over the 2,000 mark.

We have received many requests during the season asking us to extend the scope of our report. In making up this weekly letter great care is taken to publish only reliable information in as condensed a form as practicable, and to make what recommendations we feel fit and proper to benefit our producers. With an increased office staff next season, we hope to make this weekly letter still more interesting and beneficial to producers, shippers, and dealers.

DEPARTMENT PUBLICATIONS.

The distribution of Department bulletins from this office is greatly appreciated by the public. During 1919 over 10,000 bulletins and circulars pertaining to agriculture, horticulture, apiculture, and canning have been handed out and mailed. These go into the hands of those directly interested.

From the great number of inquiries we have for information relating to small fruits, we are of the opinion that a series of circulars dealing with the planting and growing of all the various kinds of small fruits would be well received by the public.

There is also a big demand for information in apiculture, and we believe it quite possible that much benefit would be derived by the public if the Vancouver District Bee Inspector would make our office his headquarters.

MARKETING.

Since the inauguration of this office there has been a great change for the better in the marketing of farm produce in this city. The writer, personally, looks into any complaints, assists in distribution, the adjusting of claims, and marketing information.

Each year since 1914 has seen a large decrease in wastage, and this factor alone means much to the producer and dealer. A great deal of attention is given to the proper storage and car-loading of perishable farm products, and it is our aim to reduce wastage to a minimum, as there is no doubt that wastage, although indirectly, affects the prices both to our producers and consumers.

INSTRUCTION-WORK IN MARKETING.

This office continued the personal and mail instruction work in marketing during the year, and, where requested, interviews were given to returned soldiers with regard to selection of districts for the growing of various kinds of produce.

FRUITS.

During the 1919 season small fruits were supplied this city in quantities just large enough to supply the trade. This was accomplished successfully owing to the heavy cannery demand. Practically all the strawberries came from the Japanese settlements at Haney.

While the quantity of strawberries and raspberries was not nearly so large as former seasons, it is quite evident that there was plenty, as the movement was slow on account of the high prices.

There is a large acreage of raspberries in the immediate vicinity of Vancouver and many consumers are supplied direct, thus making it impossible to estimate the supply actually sold to consumers for canning.

The demand was good for currants and fair for gooseberries, while the supply of loganberries was far below the requirements of the retail trade. It will not be out of place here to say that this berry is fast becoming a favourite amongst the housewives, and with the large increase in acreage due to bear this season we would suggest that some advertising be done to better acquaint the housewives on how to use this berry to the best advantage.

The greater portion of our supply of apricots and peaches are imported. Plums and prunes were scarce, and where we usually looked for heavy waste in these lines we are pleased to state that any wastage this season was due only to "plum-rot" and not slumping.

About this time the pinch of the sugar shortage was beginning to be felt and prunes, crab-apples, and pears suffered very materially. Nevertheless, the sugar shortage, which is no doubt only temporary, cannot be taken into consideration when one is dealing with the supply and demand of a market, and we are of the opinion that there is a great future for the Coast districts in growing Bartlett pears and Hyslop crab-apples in quantities large enough to ship properly.

Apples remained at a fairly high price all season, and, with the exception of a few cars of Wageners, British Columbia supplied our market. In spite of the high prices more apples moved into consumption this season than any season previously. British Columbia apples are now a permanent fixture on this market.

NUTS.

Small quantities of sweet chestnuts grown at Ruskin were well received by the dealers. This office has received many inquiries regarding the supply of these, as Greek fruitmen claim the sweet chestnut grown in British Columbia is far superior to that grown in Italy. As this

nut bears early and heavily in the Fraser Valley, it is our opinion that the Department could conscientiously encourage the development of this industry as a safe commercial enterprise. The quantity required each year to supply Western Canada is approximately four car-loads.

There was also a small quantity of filberts and walnuts from Mission, Hatzic, Ruskin, and Whonnock. The walnuts were of good quality, while the filberts appeared to have been picked too green, the kernels of which were badly shrunken.

VEGETABLES.

Leaf-lettuce came on the market early in the fall of 1918 and continued until late spring. The price averaged around $1.25 per dozen. Head-lettuce was imported from California in large quantities until June, when our local supply came in and continued until late in the summer or early fall. Although head-lettuce has only been produced here during the last two seasons in limited quantities, the growers are now able to produce this in quantities large enough for the local market, and the "heading" and quality is equal to the best. A few shipments of this lettuce were sent to the Prairie Provinces, and from reports we anticipate a good market in the future in the Middle-West cities.

Forced Rhubarb.—The shipments during January, February, and March were larger than former years and the demand continued good.

Field Rhubarb.—Only small quantities came in and prices remained high. Dealers were compelled to import to supply the demand.

Hothouse Tomatoes.—The supply was steady from February to September and prices remained high until the field stock came in in large quantities. The shipments of hothouse tomatoes to the Prairies exceeded former years by over 500 per cent.

Field Tomatoes.—The supply of these was equal to the demand, and owing to poor loading and the shipment of unripe stuff the wastage was heavy.

Peppers.—The major portion of our supply this season came from the Okanagan districts and most of the shipments were of No. 1 stock.

Cantaloupes.—The imports were heavy, and while our British Columbia shipments were larger than former seasons and the quality equal to the best, we must admit that our grading is far below the standard required to assure a fair price.

The supply of other vegetables was equal to the demand locally, with the exception of cabbage and parsnips. Several car-loads of mixed vegetables were exported.

POTATOES.

Early Potatoes.—Local-grown early potatoes arrived on the market on June 12th in quantities. Export shipments started on July 1st and continued until digging-time.

Late Potatoes.—The market during the first half of the year was "sluggish" and prices varied from week to week. Owing to the closing of the evaporators a heavy supply was thrown on this market, and the ability of this office was heavily taxed in order to keep the channels clear and save slumping and wastage.

During the last week in March 19,000,000 lb. of potatoes held by the evaporators for the United States War Department were offered to the local market. Practically 80 per cent. of these had been imported stock and on examination were found to be diseased. These were promptly quarantined and ordered resorted, regraded, and shipped back to the United States or sold here only in the large cities and with our special consent. This action was taken to safeguard our Province against the potato-diseases which infected this block of potatoes. Ninety per cent. of this block was shipped to Chicago, Kansas City, and Portland for distribution to other points. Over 300 men were engaged in resorting these and the work was done under the supervision of this office. It might be stated here that the writer personally recommended, on different occasions and very emphatically to the Chicago buyer, that these potatoes should be shipped in refrigerator-cars heavily iced. All cars were rolled without ice and the claims now under investigation by the Great Northern Railway Company amount to over $65,000.

The British Columbia main crop was somewhat badly damaged by frost and our loss was approximately 300 car-loads. Of this crop 250 car-loads have been exported to the United States to date.

INSPECTION-WORK.

During the year the total inspections made by this office were as follows:—

Potatoes for export	24,600	tons.
Potatoes for local use	4,800	„
Potato-seed inspection, 280 inspections	3,100	„
Apples for export	10,600	boxes.
Mixed vegetables	500	tons.
Total inspections made for report-work and instruction-work in connection with marketing, in all lines	7,200	
Total inspections *re* caterpillar-work	483	
Total inspections under "Eggs Marks Act"	619	
Potatoes ordered resorted	12,300	tons.
Potatoes condemned	8,300	„
Potatoes finally passed	12,000	„
Total inspections made on potatoes in addition to U.S. War Board block under quarantine	2,334	„

On U.S. War Board stocks under quarantine, 3 men 10 weeks, 1 man 2 weeks.

When practicable, attention was given to the hay, grain, and live-stock markets, and much valuable work was done in assisting up-country districts to secure hay from farmers on the Lower Mainland. We also assisted farmers in making collections and adjusting freight claims, etc.

Respectfully submitted.

R. C. ABBOTT,
Coast Markets Commissioner and Inspector in Charge of Exports.

REPORT OF PRAIRIE MARKETS COMMISSIONER.

J. A. GRANT.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit my report for the year 1919.

The season of 1919 has been one of mixed experiences and one in which both climatic, elements, and mechanical conditions have had an influence. In the mechanical part the strikes, sugar shortage, and box shortage have played a part, not new, but very hard to combat. The sugar shortage came as a bolt from the blue, and for the first time in the writer's recollection its extent was universal and no relief could be obtained from any source.

The season opened with unusual activity on the part of jam-factories, when keen competition for the year's crop raised the price of jam-berries from 8 cents in 1918 to 16 cents and up for 1919. The bulk of the contracts were made at 16 cents f.o.b. shipping-point.

APPLICATION BY EXPRESS COMPANIES TO ABOLISH COMMODITY RATES.

C. E. McIntosh, in charge of transportation, Ottawa, called our attention to the above application, which in our opinion threatened the existence of the fruit and vegetable industry in British Columbia. We suggested that the British Columbia Fruit-growers' Association take charge of the case, and a committee from that body secured evidence which was presented at sittings held at Vernon and Nelson. R. M. Winslow represented the case for the British Columbia Fruit-growers' Association, while the interests of the Department of Agriculture were represented by your Markets Commissioner.

The result of the fight waged by the Provincial Government shippers and Prairie jobbers, as well as the fruit interests of Eastern Canada, was a complete victory for the growers, as no increase was granted the express companies. The point assailed by the express companies was the commodity tariff covering fruit and vegetables making them subject to general tariff, and the finding of the Board of Railway Commissioners was favourable to retaining this and against any increase in the rate.

EXTENDING MARKETS TO GREAT BRITAIN.

During six weeks in British cities the wholesale fruit trade was canvassed on the prospects for marketing British Columbia apples and pears. The opinions of auctioneers, private treaty, and f.o.b. buyers were freely expressed and were all of a favourable kind. Several of the leading buyers were invited to visit British Columbia, and seven of the number took advantage of the reconstruction to visit British Columbia and were very favourably impressed with our apples, pears, and plums.

A considerable number of cars of apples were bought f.o.b. shipping-point, while many went forward and were sold by private treaty. The prices obtained by the latter method and at auction were equal to the best obtained on the markets of Europe, and the trade was very favourably impressed with our fruit. Concentration in marketing was largely responsible for this satisfactory advertisement, and the quantity and quality of fruit sent forward was an agreeable surprise to British fruit-dealers.

Some very important things were demonstrated to be necessary to prevent loss and misunderstanding: The securing of boxes by wiring ends to prevent lids coming off; using the words "British Columbia" on every box; that sizes from 120 to 188 are most popular; that large sizes are always lower-priced than medium sizes; that the grade No. 1, No. 2, and No. 3 is confusing on our boxed apples, as the same marking applies to barrels. The trade suggests that we follow the plan of our Washington and Oregon competitors and mark box stuff "extra fancy," "fancy," and "choice." Any one seeing apples coming out of a barrel and out of a box at the market end would see the force in the argument for a change in nomenclature. Fancy and No. 2 should be equal quality, and apples of equal quality marked No. 2 made a less price than fancy apples, and the grade-mark was the only difference. Concentration in bulk on the market and shipping only our best apples in Britain is very important. Although there is a demand for No. 2, the supply of this grade should be withheld until the superiority of our apples is fully established.

THE SEASON ON THE PRAIRIES.

Notwithstanding the persistent efforts of Prairie jobbers to "bear" the market by buying from hand to mouth and refusing to buy in advance to any extent, the prices set by the shippers early in the season were well maintained. Most of our strawberries and raspberries arrived in car-lot shipments. These berries averaged $4 per crate f.o.b. shipping-point. About forty cars of British Columbia strawberries found a ready market at the above rate. The price predicted by your Markets Commissioner last year for berries was fully realized, and it is safe again to predict that prices will be higher in the season of 1920. The condition of arrival was excellent.

Raspberry shipments were greater by L.C.L. than in car-lots owing to the unfortunate experience with refrigerator-cars last year. The raspberry shipments by car-lots greatly increased and all arrived in a satisfactory condition, excepting two cars to Winnipeg, which showed some shrinkage due to mould. There is good reason to believe that air-cooling before and during transit is preferable to refrigeration for fruits. Experiments will be undertaken this year under the supervision of the Dominion and Provincial Governments and express companies, so that evidence may be on hand to guide shippers as to the best method of shipping perishable fruits. The two-stop privilege was continued by order of the Board of Railway Commissioners. This privilege is indispensable and future efforts to remove it should be resisted by growers and shipping organizations.

PUBLIC MEETINGS.

Addresses were delivered at Penticton, Kelowna, Vernon, Summerland, Salmon Arm, Burnaby, Mission, Hatzic, Hammond, and Chilliwack on the value of organization and Prairie market requirements. This was followed by a campaign in the Kootenay, and the work of organizing that district for markets was fully discussed at Nakusp, Robson, New Denver, Bonnington, Shoreacres, Nelson, Crawford Bay, Queens Bay, Harrop, Willow Point, and Kaslo.

PACKING AND GRADING.

A noticeable improvement of fruit-pack was noticed during this season. Few complaints of short weight were received. The greatest improvement was noted in strawberries, raspberries, and apples.

Several isolated districts marred the general good effect obtained by organized districts, and a campaign should be immediately organized to give the struggling growers instructions as to the market requirements. Apple-packing schools and short courses would do much towards this end.

ADVERTISING.

During the height of the sugar shortage this office, on behalf of the British Columbia Fruit-growers' Association, conducted a vigorous campaign of publicity. Considerable advertising was done in the city dailies. Many articles were written and interviews given commenting on the emergency.

British Columbia booklets were mailed to inquirers, giving information on canning fruit without sugar. (This propaganda is still unpopular on the Prairies and very little fruit was canned without sugar.)

Advertising the best time to buy fruit and vegetables during the peak of the various fruits is more effective; this action stimulates distribution at the right time.

PRAIRIE MARKETS BULLETIN.

This publicaion is fast increasing in public favour. The circulation in 1918 increased to 1,500 weekly, and up to November, 1919, the circulation has reached 2,500 weekly. The demand for it in Great Britain from the wholesale trade there exceeds 100.

We were forced to increase its size owing to the demand for broader market information, which now includes vegetables, hay, straw, grain, and honey.

POTATOES.

We expect to bring potato-marketing, especially quotations for early potatoes, more into prominence. There are about four weeks each year when the bulk of the Prairie supply of potatoes can be drawn from British Columbia.

Owing to the unorganized state existing amongst Lower Mainland Chinese they are at the mercy of the jobbers and brokers, who see-saw their quotations without regard to the market. Last year potatoes were selling in Calgary at $80 per ton when the Fraser Valley offerings were made. Their first figure quoted on a bare market was $70 per ton, then $65. At this price a sale was made of a car-lot. Before it was loaded $60 was quoted from Vancouver and the $65 car was duly cancelled. Before a potato rolled the price reached $55 and the market was hungry for new potatoes. When potatoes were only three-quarters grown they had reached the lowest price of the year.

The chief trouble in this muddle is that the Upper Country, where many white men are growing potatoes, have to meet the prices named by individuals without any consideration to the cost of production. The need of a strict potato grade was never greater than now. If British Columbia will line up to the standard they are maintaining in organized apple-shipping, the potato industry of the Province would increase to tenfold its present size. A system of grading and inspection would bring about this result. To-day our Fraser Valley seed-potatoes are selling in Seattle at $100 per ton wholesale when the ordinary price for selected potatoes for culinary purposes is around $70 per ton.

Ungraded and nondescript potatoes can be bought much cheaper. There is only one way to make the potato business pay, and that is a system of grading and inspection and supervision during the growing period.

ONIONS.

The onions have been of good quality and well cured, but the size shows careless growing methods and a standard grade should be vigorously demanded. Prices were good, but the name we are making for grade is not creditable when our possibilities are taken into consideration.

HAY, GRAIN, ETC.

A beginning was made during last season to get in touch with Prairie farmers and organizations who were seeking a market for feed-oats, wheat, baled straw, and hay.

An advertisement was carried for one month in the *Market Examiner*, Calgary, and many responded with their offerings. A number of British Columbia buyers were put in communication with Prairie sellers. We will continue this policy next season and will extend it, believing that future trade will be highly beneficial to farmers in general.

In this connection, as well as in fruit-distribution, the effort to connect individuals is laborious. The organizations of the Prairies and of British Columbia can and will make an economic success of interprovincial trading. Individual efforts are too cumbersome to be effective.

RHUBARB.

Rhubarb is produced in smaller quantities than formerly at Hatzic and Mission. There is a market for an increased supply at least double the present output. If this industry could co-operate with early-vegetable growers and ship in mixed cars it would meet the needs of Prairie buyers better than shipping in straight cars of rhubarb.

The season of 1919 was very satisfactory to the growers and good prices were obtained. The Vernon Fruit Company, of Calgary, handled most of the car-lots shipped from British Columbia.

BERRY SHIPMENTS.

All berries except blackberries were marketed before the acute sugar shortage became pronounced, and therefore commanded good prices. An average of $4 per crate for strawberries, raspberries, and loganberries was netted to shippers f.o.b. shipping-point for good berries. Very little preserving was done as the Prairie housewife thought the price too high.

The demand was greater than the supply, chiefly caused by heavy jam-factory contracts in the Province and also in Ontario and the State of Washington. The original contract price of 16 cents for strawberries was increased as the demand became keen and 17 cents was obtained by some growers. This industry is very much underdone, especially in strawberry and raspberry production. More than double the expected output was shipped to the Prairies owing to the favourable rain at the right time.

Prunes opened at a fair price. The United States points expected to take care of their own crop. Sugar shortage there caused prices to slip under those set by British Columbia shippers, resulting in Prairie jobbers buying many cars of Washington fruit at a time when British Columbia was coming on the market.

The same cause brought about the same effect in marketing our prunes and peaches, and crab-apples were the worst hit of all. The sugar situation reflected on the sale of early apples used for pies, etc., and during the whole season its shortage has lessened consumption.

SUGAR SHORTAGE.

Early in August a serious shortage occurred. The cause of this has never been fully explained, but the loss to fruit-growers was great. Strenuous efforts were made by your Markets Commissioner, calling attention to the immediate need of an embargo on export sugar. The British Columbia Fruit-growers' Association, co-operating with the British Columbia Traffic and Credit Association and the Western jobbers, sent R. M. Winslow to Ottawa, and after many interviews and establishing a cast-iron case for supply to save the British Columbia fruit industry, orders were made to supply 1,800 tons of sugar to the West under conditions that it was to be used for preserving Canadian fruit. The sugar that did arrive was not so applied and the order of the Board of Commerce was almost totally ignored.

The amount of sugar promised was not shipped and the promises made to Prairie buyers of fruit of adequate supply of sugar to preserve it were not kept. At no time from August 1st to date has there been enough sugar in the West to supply ordinary domestic needs, let alone preserve fruit, and at this date, early in January, we read official statements about supplies of sugar existing in the hands of wholesalers and others that have no foundation in fact. The fruit industry is so allied to the sugar-supply that the prevention of shortage of sugar is the only means of avoiding disaster to the fruit industry. On January 3rd we wired the Chairman of the Board of Commerce as follows:—

VICTORIA, B.C., January 3rd, 1920.

Chairman, Board of Commerce, Ottawa.

What action does your Board propose to prevent repetition of loss to fruit-growers through failure of sugar-supply last year? Will discuss situation at Vernon and Vancouver this month. Please give definite assurances or reasons why they cannot be given.

J. A. GRANT,
Prairie Markets Commissioner,
Department of Agriculture, Victoria, B.C.

The following reply has been received:—

OTTAWA, January 6th, 1920.

J. A. Grant, Esq.,
Prairie Markets Commissioner, Department of Agriculture, Victoria, B.C.

DEAR SIR,—In reply to your telegram of the 3rd inst., I beg to state that this Board has nothing to do with the distribution of sugar in any part of Canada, its function being merely to see that unfair profits are not exacted for necessaries of life. I shall, however, forward your telegram to such department of the Government as I think may be able to appropriately deal with the question. If, however, during the early summer you find there is likely to be repetition of the serious situation in which the British Columbia fruit-crop was placed by reason of the sugar shortage last year, I shall do my best to provide against a similar contingency happening this year.

Yours truly,
W. WHITE,
Secretary.

In view of the above reply, passing along the responsibility for providing sugar, it behoves our shipping organizations to press for an effective embargo on export sugar and have prices set more in line with competitive markets, and to insist on Federal Government regulation of shipping to ensure sufficient quantity of raws coming in to allow refineries to meet the known demands for domestic needs, preserving of fruit, and manufacturing requirements.

1919 APPLE DEAL.

The unexpected freeze in October brought disaster to many of our late-keeping apples. Box shortage and car shortage combined to congest packing-houses and picking had to be proportioned to the movement. Most of the loss would have been eliminated if apple-growers had made provision for temporary storage on the farm; very few orchardists have provided any such storage. We believe the lesson of that freeze will be the means of correcting this short-sightedness.

The question of selling and shipping-out of all apples before the end of December has been decided by some as being more profitable on the average than storing and feeding on the market. It is very easy to suggest this, and in theory it looks well.

If it pays the shipper best to ship before the end of December because prices in spring do not on the average warrant storage, it is obvious that some one is taking a loss by storing. Prairie buyers are refusing to continue this storage for the fast growing supply from our Province. Sufficient cars cannot be obtained to move the crop by that date; these with many other factors entering into the question places the solution of the problem on the growers and shippers.

We must either give credit, consign, or store a reasonable portion of our apples, and in our opinion storage with a view to feeding the market will become necessary. High prices are retarding consumption, sugar shortage has cut down the culinary demands, and our apple market had to be extended this year to overcome these difficulties.

Great Britain took about 400 cars and could have taken four times that amount at prices realized there. About 300 cars went to the United States markets and our Jonathans commanded a premium over all competitors in the New York market. Eastern Canada took about 250 cars, shipments going as far as St. John, N.B. Prairie markets absorbed about 250 cars more of our apples than last year, due to the fact that comparatively little competition came from the United States.

It is estimated that the annual output of British Columbia will be 6,000 cars of apples in three years, and that the Prairies and home market will only take care of 4,000 cars of this amount. We consider this a fair estimate.

Growers should not allow this to retard their planting, provided they plant the right varieties in proportion to the market's demands in the right locality. We have an even chance on the markets of Great Britain and Europe with all competitors, and the British trade alone will buy 2,000 cars of our apples annually.

Considering the displacement of barrel apples by boxed stock all over Canada and the United States, we think our market prospects good. We cannot survive as the fittest if we slacken up on our apple-planting.

UNITED FARMERS BUY B.C. APPLES.

We are pleased to report that for the first time the United Farmers of Alberta, Saskatchewan, and Manitoba have bought British Columbia apples. We prepared a statement explaining that

extra fancy equalled No. 1; fancy, No. 2; C Grade, No. 3. Since that time the apples have been delivered and nothing but praise as to their quality has been heard.

There is every possibility that the Prairie farmers' apple-supply in the future will come from British Columbia. Buying from the United Farmers of the Prairies is also on the increase in British Columbia. Interprovincial trading is encouraged by the present adverse rate of exchange.

The abnormal demand for small fruits and stone-fruits for preserving has again raised the prices. Contracts for 1920 have been made for strawberries at 20 cents per pound and for sour cherries at 9½ to 10½ cents per pound, containers found. These prices indicate very high prices for fresh fruits.

In conclusion, we invite a continuance of the inquiries which featured the 1919 season, both from buyers and sellers on both sides of the water, also in the Western States.

Our British visitors were struck with the thoroughness of our organization, one of them claiming that it was the most perfect he had come across. Our future can be helped by more sacrifice of individual liberty in the common good by so-called independent shippers, who absorb all the benefits of co-operative efforts without becoming responsible in any way for the success it has brought about.

Respectfully submitted.

J. A. GRANT,
Prairie Markets Commissioner.

REPORT OF PROVINCIAL INSTRUCTOR OF HOUSEHOLD SCIENCE.

MISS OLIVE E. HAYES.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit my annual report for the year 1919.

CREATION.

Owing to numerous requests having been received from Women's Institutes of the Province for assistance and direction along the lines of home economics, the Hon. E. D. Barrow, Minister of Agriculture, decided to create a Household Science Branch in the Department of Agriculture. At his request I took charge of this division of the work on January 1st, 1919, as Provincial Instructor of Household Science and Official Organizer of Women's Institutes.

SCOPE.

The duties of this Branch were to consist of the following: Conducting short courses in home economics, conducting demonstrations, preparation of publications, judging at fairs, dealing with correspondence relating to household science, organizing Women's Institutes, co-operating with the Women's Institutes in their various activities, and co-operating with the Education Department in the extension of household science in rural schools.

ACTIVITIES.

Demonstrations and Short Courses.—The work during the year consisted largely of short courses and lecture demonstrations in connection with the Women's Institutes of the Province. Many requests for such courses and lectures have been received from various organizations and societies throughout the Province, as well as from the Women's Institutes. The Women's Institutes have received my first attention, but I regret that during the year I have been unable to visit all of the institutes who applied for instruction. This phase of the work alone requires the attention of at least two instructors. During the year 112 demonstrations on home economics were given to Women's Institutes, Boys' and Girls' Clubs, and at exhibitions.

Following is the list of lecture demonstrations with subjects: Foods and dietetics, 77; canning and preservation of foods, 15; laundry and dry-cleaning, 17; commercial jam-making (Errington Co-op.), 3.

The territory covered during the year was the Lower Mainland District, the Kootenay District, and parts of the Okanagan and Vancouver Island Districts. The classes and meetings

A portion of food exhibit displayed at Provincial Fair, New Westminster.

New Westminster Exhibition, 1919. Exhibit of foods and food values suitable for young children, made by the Domestic

held were exceptionally well attended. I found the women intensely interested in the vital importance of correct feeding, and I think that the institutes realize more fully than ever that nutrition is one of the biggest factors in health.

JUDGING AT FAIRS.

The following fall fairs I attended in the capacity of judge: Central Park, Strawberry Vale, Milner, Surrey, Colwood, Victoria Home Products, and New Westminster. Mrs. Carter, of Victoria, assisted me at New Westminster and acted as judge at Parksville.

At Colwood, Victoria, and New Westminster lecture demonstrations were given in canning and jam-making and use of the pressure cooker. Educational food displays, teaching the principles of proper feeding, and the comparative nutritive value of commonly used foods were shown at New Westminster and Victoria Fairs.

The products judged were fair in quality, but the small number of entries in many cases showed a lack of interest on the part of the women. It is hoped, however, that next year the Women's Institutes of the Province will be in a position to take a more active part in this important division. Where prizes were offered for children's work there was keen competition and splendid work shown. At Surrey and Milner this department was outstanding owing to the organized efforts of the teachers and instructors in the various schools and the enthusiasm created among the children. The educational value of such work in connection with schools cannot be estimated.

PUBLICATIONS.

There has been a great demand for food and canning bulletins, and during the year I prepared Bulletin No. 83, "Preservation of Food," 16,000 copies of which have been distributed among the Women's Institutes and in connection with food exhibits. Three circulars, Nos. 24, 25, and 26, on foods for children were issued and a large number distributed. During the year special stress was put upon the increased consumption of milk, and in connection with this subject a circular was prepared on the vital importance of milk in the diet. A start has been made on a bulletin, "Foods and Cookery," and during the coming year it is hoped it will be in circulation.

SUMMER SCHOOL.

Twenty-two lectures were given to the students at the summer school for teachers, which was held in Victoria during the month of July; the subjects taken were "School Lunches" and "The Teaching of Domestic Science in the Rural School."

FOOD EXHIBITS.

Three food exhibits were planned and displayed. These were held at the Provincial Fair, New Westminster; the Home Products Fair, Victoria; and at the Vancouver Island Conference of Women's Institutes, which was held in March at Duncan.

A central feature were show-cases displaying menus with their proportionate amount of calories necessary for the various ages of children. The foods on display were of the simplest variety and only the simplest rules of cooking being necessary in order to prepare the demonstrated menus. In conjunction with this part of the exhibit a set of food-cards stating the principles of proper feeding, and giving menus suitable for children from one to two years, two to five years, and five to seven years, were distributed to those people wishing information.

Another part of the exhibit was a display of foods high in lime content, those rich in iron, and those rich in phosphorus. The importance and necessity of these organic minerals in the diet was clearly explained by large printed cards.

One hundred caloric portions of protein, carbohydrate, and fat foods were shown in separate show-cases, making plain the fact that the amount of money paid for a food is no indication of the amount of food value it contains.

Another feature of the exhibit was a display of foods which promote growth and give health. In connection with this feature of the exhibit, photographs of animals, which Dr. McCollum, of Johns-Hopkins University, had used for his experiments on "Newer Nutrition," were shown. These experiments showed conclusively the effect of incorrect feeding on growth and mentality. Foods containing the substances which prevent such diseases as scurvy, beriberi, and many other forms of malnutrition were arranged, emphasizing the vital importance of such foods as milk, butter-fat, egg-yolk, and green vegetables in the diet.

Mrs. Carter, of Victoria, assisted me in arranging the exhibits at New Westminster and Victoria Fairs, and in taking charge during the time of the exhibit for the purpose of explaining it, and answering questions.

These exhibits drew a great number of interested people, not only the women, but men who are interested in this important question. The practical value of food exhibits in teaching the comparative nutritive value of foods and the diets necessary to induce health and growth and good nutrition cannot be estimated. This method of making plain the principles of feeding is more effective and far-reaching than the reading of all the bulletins and scientific articles that can be had.

CORRESPONDENCE.

A number of letters were received asking for information and help in connection with problems relating to home economics. In addition, the usual number of letters in connection with lecture demonstrations and itineraries were received and answered.

CONCLUSION.

This report would be incomplete without reference being made to the appreciation of the Women's Institutes of the Province for the assistance given them by the Department and their recognition of the necessity of a Home Economics Division in the Department of Agriculture.

All of which is respectfully submitted.

OLIVE E. HAYES,
Provincial Instructor of Household Science.

REPORT OF SECRETARY OF BRITISH COLUMBIA WOMEN'S INSTITUTES.

MRS. V. S. MACLACHLAN.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—In submitting the annual report for the year 1919, it is with a feeling of relief that the war is over and sorrow over the empty places in so many of the homes of our members.

In looking over the work done during pre-war years, the home, the garden, and poultry received attention individually. We were more or less inclined to the material side of life. Then the war came like a thunderbolt from a clear sky to most of us, although our great men had for some years been seeing the sinister cloud gathering.

War came, and we could not believe that it would be for long—three months or six months—because we said: "Conscripts cannot fight like volunteers"; but we found that if they couldn't fight like volunteers they could fight like a soulless machine. With every fresh horror, with every sickening defeat, a renewed determination, "We must win the war," became the living, ever-present sentiment of each member of our organization.

I think it was Horace Greeley who said of the American Civil War that it "was won on the bended backs of the women," and as we read of the work done by the women on the farms left without men, and the Red Cross work, in addition to this, by hands hardened and roughened by such unusual toil, we feel at least that the burden laid upon us was borne cheerfully and, thank God, successfully.

It may be too soon yet for us to count the benefits accruing to us. Our vision is still too tear-dimmed to see clearly, and yet we are aware of a new spirit among us, or rather of a renewed spirit, a wonderful spirit of goodwill and co-operation, the same spirit which actuated men of all ranks to stand side by side in the trenches and die shoulder to shoulder for a common cause, the cause of humanity.

We are now turning that wonderful spirit of goodwill and co-operation to our children, to our babies, and to our mothers with the same grim yet loving determination in this same cause of humanity, for with this spirit is the knowledge that "the colonel's lady and Judy O'Grady are sisters under the skin"; that our King and country truly need the son and daughter of Judy O'Grady just as much as they need those of the colonel's lady. The colonel's lady knows it and

Judy O'Grady knows it, for again the war showed us that the man or woman is unborn who can say which cradle rocks the genius or under which roof the world's saviours are being reared. Realizing the need, true to British traditions, we are shouldering the responsibility. New institutes are springing up with child-welfare, school-welfare, and district nursing, sanitary improvement and community welfare, etc., as the aims and objects. There are constant inquiries for literature, information, and direction on how to conduct the institute in order to get the best and immediate results along these lines.

New Institutes.—New institutes formed during the year 1919 are Kootenay Valley, Bonnington and South Slocan and New Denver in the Kootenay and Boundary District; Armstrong has been organized and will be formally inaugurated at an early date this year; Langley Triangle, South Vancouver, and Mount Lehman in the Lower Mainland, and Strawberry Vale and Denman Island in Vancouver Island District.

Of the sixty-four institutes in active operation, the membership is 2,940; money raised, including Government assistance, $18,874; money disbursed, $15,261. Thirty-nine held either flower-shows or exhibits of school-work. Several held health exhibits, using panels loaned by the Board of Health, and exhibits of proper food for children of different ages and proper school luncheons. Lectures by different speakers on various subjects, such as "Teeth of School-children," "Venereal Disease," and "State Health Insurance," were included in these exhibits.

School-welfare.—Twenty-four report active work in the school-welfare. This includes providing a hot lunch for the school-children, improving rural school-grounds and (Heaven knows they need improving!) sanitary conditions, agitating for consolidation of schools, supporting the school-gardens, domestic science, and manual training. One institute erected a shed where the children may play on rainy days; another conducts a juvenile musical club; another erected a drinking-fountain in the playgrounds as a memorial to the fallen soldiers; and in most of the institutes a school committee is formed which visits the school periodically.

Public Health.—Twenty-two institutes report active efforts along public-health lines, while just about the entire number is interested and anxious to have a public-health nurse in the district. The entire sixty-nine which will be in operation before the end of January, 1920, stand ready to support to their limit the public-health nurse directly she is available.

In the Okanagan District three of the large institutes put on the child-welfare exhibit of Rev. Hugh Dobson's, asking the co-operation of the adjoining smaller institutes. In each case the exhibit was very successful, numbers attending and showing the greatest interest in the subject-matter both of the pictures and lectures, and has given the public-health movement an added impetus.

In connection with this, I may say that a resolution sent in by an institute, which is being endorsed by not only the Women's Institutes, but the farmers as well, is the following: "The Women's Institutes of the Province respectfully petition the Hon. the Provincial Secretary to make such provision in the Estimates to be presented to the House during the coming session that will allow of assistance being granted to such districts as will upon examination be proved to be unable to assume the total cost of the installation of a health centre presided over by a public-health nurse."

The Department was fortunate at the beginning of the year 1919 in securing the services of Miss Olive E. Hayes as Demonstrator and Organizer for the institutes. Short courses in household science, including such subjects as "Milk," "Vegetables," "Food for the Growing Child," "Invalid Cookery," and "Dry-cleaning," have been given to the institutes in the Lower Mainland and Kootenay Districts, and splendid exhibits of balanced foods have been put on at the different fairs under the able direction of Miss Hayes.

There has been some interest evinced in industries such as knitting, weaving, basket, toy, and glove making. This is only in the preliminary stages yet, but promoting and educating is the very important work that the institutes can do.

No institute has reported study courses other than a short time given at each meeting to the reading of portions of the "Busy Woman's Handbook."

Four district conferences were held in the Province during the month of October as per attached. (*See* Appendices Nos. 31, 32, 33, and 34.)

Respectfully submitted.

V. S. MACLACHLAN,
Secretary, B.C. Women's Institutes.

REPORT OF CHIEF INSPECTOR OF APIARIES, KOOTENAY DISTRICT.

W. J. SHEPPARD.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit my report herewith as Chief Inspector of Apiaries for the Province, together with the reports of the Inspectors for Vancouver Island, Greater Vancouver, Lower Fraser, and Upper Fraser, for the past season.

Representations having been made to the Department in 1918 as to the seriousness of the foul-brood situation on the Lower Mainland, I was requested to make a special inspection in the Surrey Municipality during June and July of that year. About a month was spent on this work. Out of the 476 hives examined, 235 were found to be affected with European foul-brood. It was therefore evident that quick and drastic action was necessary to endeavour to get the disease under control, and also to prevent it from spreading over the whole Province. With the approval of the Minister of Agriculture, the Hon. E. D. Barrow, amendments to the "Foul-brood Act, 1911," were framed as soon as possible, which were afterwards passed into law by the Provincial Legislature as the "Apiaries Act, 1919." Under the authority of the new Act the Minister declared the whole of the Lower Mainland as far west as Agassiz to be an infected area, in which the moving of bees is now prohibited without a certificate of inspection showing freedom from disease. In order to keep trace of all persons keeping bees the new Act requires all bee-keepers to register annually on or before March 31st, and pay a small registration fee so as to assist in defraying the greatly increased cost of protecting their interests. This provision of the Act has been resented by a few, who appear to look on it as an additional tax, but when it is considered that a visit from the Inspector, apart from the question of protection from disease, is usually worth much more than the fee payable, from an educational standpoint alone, it can readily be seen what little grounds there are for complaint.

The three additional Inspectors appointed last spring—namely, W. H. Turnbull, Lower Fraser; A. W. Finlay, Upper Fraser; and A. Keir, Greater Vancouver, the two latter returned soldiers—although fresh to their work, have been untiring in their efforts, and, as their reports show, have accomplished a very great deal in combating foul-brood. Their visits have also proved to be of much value in educating and stimulating the bee-keepers to adopt improved methods, thereby raising the standard of bee-keeping and increasing production. The splendid exhibits at the Vancouver and New Westminster Exhibitions last fall, aggregating about 3 tons of honey at each, which were the most extensive and the best ever made in the Province, bear testimony to the value of the work done during the past season. Another distinct advantage that has resulted from the more thorough inspection-work is the large number of Italian queens that have been introduced to colonies on the Lower Mainland during the past season, where it was the exception before to find anything but black bees, Italians being considered more immune to disease than the latter and better honey-producers.

KOOTENAY DISTRICT.

In the Kootenays the past season has been about an average one for honey production. In two districts, Creston and Castlegar, owing to the prolonged dry weather, honey-dew was gathered by the bees and darkened the honey. Three colonies in two apiaries were found affected with American foul-brood, and it was proved beyond a doubt that the disease had been brought in with package bees imported from the United States. In the Slocan District 2,100 lb. of honey was obtained from three hives, spring count, the largest yield so far recorded in the Province.

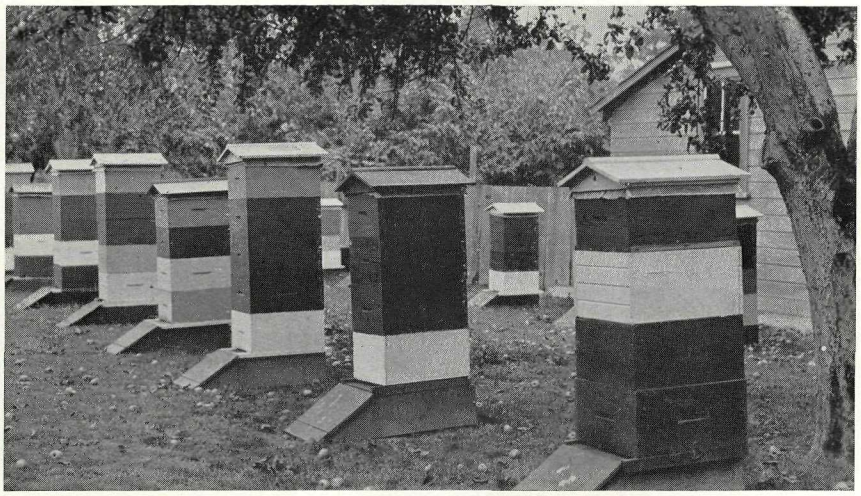
OKANAGAN DISTRICT.

L. Harris, Inspector for the Okanagan, states that two hives at Penticton and two at Summerland were found affected with American foul-brood, and that the honey-crop is estimated to be 50 lb. per hive.

The estimated honey-crop for 1919 is given in Appendix No. 35.

All of which is respectfully submitted.

W. J. SHEPPARD,
Chief Inspector of Apiaries.



A good specimen of a modern apiary in British Columbia. A. I. Alexander, Ladner, B.C.

A Chinese apiary in Lower Fraser Valley prior to destruction by Department Inspectors.

REPORT OF INSPECTOR OF APIARIES, OKANAGAN DISTRICT.

L. HARRIS.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit report of bee-inspection work and general conditions of the bee-keeping industry in the Okanagan and Upper Country districts of British Columbia.

The weather conditions in the spring of 1919, though comparatively late, were the best in years for the building-up of the colonies. There appeared to be no set-back to bees, from the earliest blossoming flowers, such as dandelions, fruit-trees, etc., until the clover-flow was ready, and many of the colonies stored quite a respectable surplus from the early nectar-bearing plants; but, alas! it was too good to last, and the clover-flow was one of the shortest the writer has ever known, commencing about June 18th and ending July 8th, and many of the colonies from that time lost weight to the extent of 14 lb. in less than three weeks, with never a rally that amounted to anything as regards surplus.

As a consequence the queens discontinued laying, with the result that many hives having old queens in them will become very weak towards spring, by reason of the working-bees being too old at the commencement of the winter, as they will have run their course and be ready to die just at the time when the hives need all the energy and vitality the bees can supply; hence the importance of requeening at the close of the main honey-flow in order to fill the hives with young bees of the right age to go into winter quarters.

Inspection.—Inspections were commenced early in April in the Vernon District, and all apiaries examined appeared to be clean; no trace of disease being found.

On April 16th proceeded to Rutland by request of one large bee-keeper to examine his hives, he having sold a number of colonies and wishing to have them examined before removal. As far as could be seen, no disease existed, but upon going into this district again later in the season one colony was discovered having American foul-brood, which was totally destroyed by fire, etc.

On April 10th, by request, we went to Ashcroft to examine some bees whose owner wished to move them from Ashcroft to Salmon Arm, but owing to some transportation trouble we did not get there until the day after we had arranged, and the bees were loaded into a car, so that a proper examination was not possible at that time.

Most of the bees in this district were in good condition "very strong and early." Having examined all the bees in this district that we could locate, we proceeded to Lillooet and Lytton, where conditions generally were earlier and colonies were building up in good shape, some of them having second stories on them and storing a little honey in them.

After leaving Lillooet on our return journey the weather turned very cold, and when we arrived at Ashcroft on May 2nd our last examination was made while it was snowing.

Further inspections were for the time being out of the question, and we turned our attention towards Vernon to await more favourable weather conditions.

On July 15th a second trip down the Okanagan Lake District was made, and apiaries generally were clean and in good condition until we got to Rutland, where one hive was found to be infected with American foul-brood, as before stated. This district, which was a hotbed for foul-brood four or five years ago, appears to be practically clean at the present time.

Kelowna also apparently is free from disease, as also is Peachland. Summerland has developed American foul-brood in two different apiaries. It is puzzling and perplexing to know how the disease gets into a new district where it is claimed no bees from outside the Province have been brought in, other than queens.

Penticton also developed the disease in three different apiaries. It is easy to account for two of the cases, which were offshoots of one that was simply rotten, but from where the other one got it is still a mystery. It may yet develop in the bees where these bees were procured, though no trace could be seen of disease when they were examined.

Taking up Bee-keeping.—The number of persons taking up bee-keeping as a means of livelihood is steadily increasing, and many who have hitherto kept only a few colonies are increasing their stock annually, while many others are coming into the business with the ultimate view of making something out of it.

Referring to the latest bee legislation, with regard to the registration of bees, this does not appear to be in many quarters very popular; the complaint being that it is not equable, and that

its aim is to put the small bee-keeper out of business, their contention being that a bee-keeper, "if he chooses," can keep a thousand hives or more for the same amount as a smaller bee-keeper can keep twenty hives, and that a more equable arrangement would be to charge a maximum fee and 10 cents for every hive in the Province. This would hit the larger bee-keeper harder and relieve the small man who keeps only a few colonies for the benefit of his fruit-crops, and is not interested in them further. On the other hand, the industry should be protected against careless bee-keepers, such as keep only a few and leave them generally to look after themselves.

That the bee-keeping industry is here to stay, and to benefit mankind generally, there is no manner of doubt, and that $1,000 a year can be made easier and with less effort than from any other branch of industry connected with agriculture, providing one is well acquainted with the habits of the honey-bee, is certain; therefore this industry should be encouraged, not only because a good living can be made, but because the product is one of the most wholesome and enjoyable of staple foods that can be produced. Therefore let us produce honey, and if we want something more to do let us produce more honey. The demand for it, in spite of the higher prices, is greater to-day than ever before in the history of bee-keeping, by reason of its food value becoming more and more appreciated.

Respectfully submitted.

L. HARRIS,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, LOWER FRASER DISTRICT.

W. H. TURNBULL.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my report as Inspector of Apiaries for the season ending October 31st in Delta, Surrey, Langley, Matsqui, Maple Ridge, and Richmond Municipalities.

The inspection-work was started on April 21st, and from that time until October 31st the distance covered by motor-car was 5,915 miles. Outside of the regular inspection-work, forty-seven special trips were made for the purpose of inspecting bees the owners desired to move, both in this and other districts.

Most of the regular inspection-work was carried out in Surrey and Langley Municipalities, as these two districts were badly affected with European foul-brood in 1918. In fifty-four apiaries in Surrey European foul-brood was found or reported, and early in the season dequeening and requeening after twenty-one days was the system of treatment advocated, and in most cases carried out, as the Inspector usually removed the old queens. It was found in June, however, that bee-keepers were experiencing considerable trouble in obtaining queens when required and a good many lost colonies from this cause. A new system of treatment was then tried. The combs containing diseased brood were all removed from the hive and destroyed and full sheets of foundation substituted. A new Italian queen was ordered, and upon her arrival the old one was removed and the new one introduced. This was found to work exceptionally well and European foul-brood was rarely found on the second visit. In most cases two visits were made if there were many hives affected.

In Langley Municipality thirty-two cases of European foul-brood were found and the same course of treatment carried out as in Surrey.

No disease was found in Matsqui, with the exception of sac-brood, which was very prevalent, requeening being recommended in every case. In Surrey, Langley, and Matsqui 60 per cent. of the bees have been requeened with good Italian stock.

In Maple Ridge two apiaries were found with European foul-brood, and in both cases the diseased colonies were destroyed, with the full approval of the owners, who were glad to thus have all source of infection removed. In isolated cases this is no doubt the best treatment to follow.

Richmond Municipality was not given a very thorough inspection owing to so much disease being found nearer home. It is safe to say that the whole district is more or less affected with European foul-brood, and it should get a thorough inspection as early as possible next spring.

Delta has shown a remarkable freedom from disease of any kind, and although European foul-brood was reported several times, it was found to be either sac-brood or a false report in every case. Later, in the fall, European foul-brood was found in one apiary in Ladner, and Inspector Finlay and myself spent three weeks in the district without finding another case, so it would appear that this is an isolated one. One other case was found at the extreme east end of Delta, on Tilbury Island, and was treated by destroying all the diseased brood and requeening.

A large number of returned soldiers are taking up bee-keeping in the Fraser Valley, and in almost every case are buying inspected stock and seeking all available information before making a start.

A very considerable number of box hives have been transferred in this district this year, and in one more season all the bees will probably be on movable frames.

The honey-crop in this district has been very good, averaging 50 lb. per colony and totalling about 59 tons. In some districts a yield of 350 lb. per hive was not uncommon, while some bee-keepers reported yields of as much as 400 and 500 lb. from a single colony. One bee-keeper near Cloverdale reports 2,000 lb. from eight colonies. Some of the largest bee-keepers report between 3 and 4 tons, which at 28 cents per pound makes a good return.

All of which is respectfully submitted.

W. H. TURNBULL,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, UPPER FRASER AND CHILLIWACK DISTRICT.

A. W. FINLAY.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my annual report on the past season's work as Inspector of Apiaries in the Upper Fraser and Chilliwack Districts.

The principal work consisted in the inspection of hives for the purpose of eliminating foul-brood diseases. Some 230 apiaries were examined, containing approximately 1,300 colonies. The district to the north of the Fraser, from Mission to Agassiz, was found to be free from foul-brood, with the exception of one case of the American variety. Sac-brood was, however, found to be very prevalent all through this district, which very possibly is an indication of weakened and run-down stock. Considerable time was given to educational work in this district, so as to impress on the bee-keepers the necessity of requeening with vigorous, pure-bred Italian queens, not only as one of the first principles of better bee-keeping, but as an insurance against foul-brood. The district on the south side of the Fraser, from Abbotsford to Rosedale, was fairly free from disease, only eight cases of European foul-brood and two of American having been found. The usual treatment of dequeening and subsequent requeening in the case of European foul-brood was first of all tried and not found as satisfactory as expected, partly owing to the latter part of the treatment—namely, cell-cutting and requeening—having to be left to the bee-keepers. Later in the season the shaking system, which had proved very efficient in the Lower Fraser District, was adopted here, and the results were entirely satisfactory.

In spite of heavy importations of bee supplies into the Province this year, such as hives, frames, and foundation, these have been very difficult to obtain, the demand being far in excess of the supply. This shortage greatly affects the time taken to clean up diseased colonies, especially with the shaking plan.

SEASON.

The season opened up early this year with a good honey-flow in this district from maples, dandelion, fruit-bloom, etc. Clover looked very promising early in the season, but cool nights, followed later by a long spell of dry weather, cut off the honey-flow from this source. In districts where fireweed was abundant a fair crop was obtained, but the average was below normal. The total honey-crop produced is greatly in excess of previous years owing to the increase in the number of bee-keepers. Inspection of hives at the close of the season showed

very little winter stores in brood-chambers, and with the difficulty of obtaining sugar for winter feed it is feared that the mortality will be high during the coming winter.

Owing to the seriousness of the foul-brood situation in the Lower Fraser I went to the assistance of Inspector W. H. Turnbull, and worked with him in the Ladner District during the latter part of August and during September.

All of which is respectfully submitted.

ANDREW W. FINLAY,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, GREATER VANCOUVER DISTRICT.

ALEX. KEIR.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit herewith my annual report on the past season's work as Inspector of Apiaries for Greater Vancouver District.

During the season 437 visits were made and 1,607 colonies of bees were inspected. Reinspections and inspections for moving bees are not included in the latter total.

Some 373 cases of European foul-brood were found in 116 apiaries, the districts mostly affected being Burquitlam, New Westminster, Burnaby, Marpole, Kerrisdale, and the vicinity of Hastings Park.

Dequeening and the introduction of young Italian queens after a queenless period of twenty-one days was the treatment mostly employed to combat the disease. In the earlier part of the season a good deal of disappointment and some loss was caused through the failure of queen-breeders to forward queens on time.

Many Italian queens for the purpose of requeening diseased colonies and as a prevention against disease have been imported into this district during the year. The introduction of so much new blood ought to help the bee-keeping industry considerably. American foul-brood was found in five apiaries and six colonies of bees were destroyed.

SEASON.

The season started well, with dandelions and fruit-blossoms yielding quite a supply of honey. Natural swarming was of frequent occurrence during the last days of April and first week of May. Colonies which failed to store any surplus honey in May had a hard time in June, when the honey-flow stopped, and they did not build up in time to be able to store any surplus from the main honey-flow. Stimulative feeding during this period would have increased the honey-crop. The average crop of honey is small, the dry spell during the time the fireweed was in bloom and the presence of so much disease being contributing factors. Honey-dew was stored in apiaries at Beaconsfield, Marpole, Point Grey, and North Vancouver City.

West Vancouver and Lochdale Districts were visited, but it was too late in the year for any inspection-work to be done. These districts should have first attention next season.

All of which is respectfully submitted.

ALEX KEIR,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, VANCOUVER ISLAND AND GULF ISLANDS.

F. DUNDAS TODD.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my report as Inspector of Apiaries for Vancouver Island and Gulf Islands for the past season.

On commencing the season's work for 1919, my first duty was to inspect apiaries on the Lower Mainland whose owners purposed selling bees or moving them to new districts. In the course of the month of April three of these special inspections prevented the removal of infected bees into districts which were supposed to be clear of foul-brood. This work done, regular inspection-work was undertaken in Vancouver for two weeks, when the new Inspectors for the Lower Mainland having been appointed, I was transferred to Vancouver Island.

Starting from Victoria, work was continued on the south end of the Island until a call came for a special inspection at Parksville. There three apiaries were found affected with a mild type of European foul-brood, for which there was no accounting, as no bees had been brought into the district for several years. My next visit was to Nanaimo, where American foul-brood had been lingering in one apiary since 1914. One mild case was found, although there had been no signs of it in 1918, and only one mild case in 1917.

The district round Victoria kept me busy until the middle of August, the only interruption being a series of lectures, of a week's duration, on bee-keeping, delivered to the teachers of the Province at the summer school in Victoria. In all, about 170 bee-keepers were found in Victoria and vicinity, being just twice the number of names on the lists of the Department. The largest apiary visited contained twenty colonies.

A rumour that foul-brood was present in the Comox Valley drew me to that district. There I found forty apiaries, all free from disease. I was particularly struck with the great improvement in methods since my first visit in 1911. That year only one bee-keeper produced any honey, but in 1919 I estimated that there were at least 4 tons of surplus honey in the hives. Two days on Denman Island came next; then Alberni District, where I found twenty-five bee-keepers, all on a small scale, practically all beginners.

During the month of September most of the time was devoted to honey-judging at agricultural exhibitions, North Vancouver, Vancouver, Nanaimo, Duncan, and New Westminster being those visited. While at Nanaimo and Duncan opportunity was taken to see as many bee-keepers as possible.

In previous years I had paid short visits to Vancouver Island when reports of disease necessitated such, but this is the first season when systematic work was attempted. The Department lists were rather out of date; consequently much time was lost in visiting people who had ceased to keep bees and in revisiting districts as new names were added. For example, round Victoria forty old names had to be removed, while 120 new names were added.

The number of bee-keepers on Vancouver Island has increased very rapidly in the past two years, and there is call for instruction.

All of which is respectfully submitted.

F. DUNDAS TODD,
Inspector of Apiaries.

APPENDICES.

APPENDIX No. 1.

TOTAL CORRESPONDENCE RECEIVED AND DISPATCHED BY THE DEPARTMENT OF AGRICULTURE (AT VICTORIA) FOR THE YEARS ENDING DECEMBER 31ST, 1918 AND 1919.

	Received.		Dispatched.	
	1919.	1918.	1919.	1918.
Office of the Deputy Minister—				
General	6,459	5,408	4,123	6,302
Farmers' Institutes	1,563	1,582	1,534	1,451
Women's Institutes	784	992	652	920
Agricultural Associations	527	408	839	534
Secretary, Women's Institutes	422	....	399	....
Statistics Branch	620	....	525	....
Home Economics Branch	....	....	....	....
Horticultural Branch	1,158	1,955	1,440	1,976
Inspection of Imported Fruits Branch	....	613	....	733
Live Stock Branch—				
General	6,247	5,659	6,974	5,509
Soil and Crop Division	340	2,053	517	2,197
Poultry Division	1,926	2,333	3,023	2,804
Dairy Branch	2,113	1,000	2,505	1,300
Publications Branch	1,739	1,005	1,117	768
Totals	23,898	23,008	23,648	24,494

APPENDIX No. 2.

SUMMARY OF APPROPRIATIONS VOTED FOR DEPARTMENT OF AGRICULTURE.

	Fiscal Year 1917-18.	Fiscal Year 1918-19.	Fiscal Year 1919-20.
General—			
Salaries of staff officials	$ 65,752 00	$ 78,184 00	$ 87,344 00
Administration, General Department vote, travelling expenses of officers on duty, and miscellaneous	38,000 00	70,000 00	61,490 00
Agricultural Associations, including grants in aid of prize-lists, judges' expenses, etc.	20,000 00	16,000 00	35,000 00
Exhibition and publicity work	*Nil*	500 00	2,000 00
Institutes, Farmers' and Women's	22,500 00	16,000 00	18,000 00
Horticulture—			
Board of Horticulture, demonstration spraying, control of fruit pests and diseases, etc.; B.C. Fruit-growers' Association grant and inspection of imported fruit, nursery stock, etc.	34,250 00	13,250 00	23,750 00
Live stock—			
Various association grants	.....	5,500 00	7,750 00
Compensation for cattle slaughtered for tuberculosis	27,500 00	20,000 00	33,500 00
Bee-keeping—			
Grant to association and compensation *re* foulbrood in bees	.....	250 00	1,500 00
Noxious weeds, control of	.....	.....	1,000 00
Totals	$208,002 00	$219,684 00	$271,334 00

APPENDIX No. 3.

EXPENDITURE IN AID OF FARMERS' INSTITUTES, YEARS ENDING DECEMBER 31ST, 1918 AND 1919.

	Year 1918.		Year 1919.	
	Total.	Average Cost for 153 Institutes.	Total.	Average Cost for 159 Institutes.
Membership allowances	$4,356 00	$28 40	$4,264 25	$26 81
Competitions—				
Field crop	1,312 24	8 57	45 00	....
Seed production	140 00	....	.....	....
Pure-bred stock supplied	1,590 08	10 39	1,479 79	9 30
Gopher campaign—				
Supplies	454 36	2 96	.....	....
Grants	80 00	....	40 00	....
Stump-pullers	.....	....	96 20	....
Advisory Board expenses	66 90	....	1,611 19	9 47
Agricultural Conference at Smithers	.....	....	1,283 93*	....
District conferences	.....	....	50 00	....
Grants in aid of fairs	200 00	....	100 00	....
Postage, printing, and advertising	894 45	5 84	722 90	4 54
Manure-hopper at Prince Rupert	70 91	....	.....	....
Miscellaneous	143 16	....	90 21	....
Totals	$9,308 10	$60 83	$9,783 47	$61 53

* This represents total vouchers paid, several accounts outstanding at close of year.

APPENDIX No. 4.

EXPENDITURE IN AID OF WOMEN'S INSTITUTES, YEARS ENDING DECEMBER 31ST, 1918 AND 1919.

	1918.		1919.	
	Total.	Average Cost for 62 Institutes.	Total.	Average Cost for 70 Institutes.
Membership allowances	$1,276 50	$20 59	$2,146 25	$30 67
Flower-shows—				
Grants	337 75	5 44	145 25	2 08
Prizes	130 76	2 10	178 08	2 54
Advisory Board—				
Secretary's salary and expenses	665 55	10 73	620 64	8 87
Expenses of members	630 07	10 16	2,567 24	36 67
Lectures	426 70	6 88	433 81	6 20
Conferences and delegates' expenses	508 15	8 20	1,202 21	17 17
Household-science work—				
Salary	.....	....	1,800 00	25 71
Expenses and equipment	.....	....	1,146 27	16 38
Printing and advertising	490 35	7 90	512 25	7 30
Motion-picture films	251 76	....	.....	....
Miscellaneous, including postage	109 16	1 76	161 55	2 31
Federation of Women's Institute, affiliation fee	.....	....	100 00	1 43
Totals	$4,826 75	$77 85	$11,013 55	$157 34

APPENDIX No. 5.

GRANTS TO AGRICULTURAL ASSOCIATIONS, ETC., HOLDING FAIRS, YEAR ENDING DECEMBER 31ST, 1919.

Abbotsford-Sumas Agricultural Association	$ 100 00
Agassiz Agricultural and Horticultural Association	200 00
Alberni Agricultural and Industrial Association	200 00
Aldergrove Agricultural Association	100 00
Armstrong and Spallumcheen Agricultural Society	1,000 00
Arrow Lakes Agricultural and Industrial Association	150 00
Bella Coola Fair and Agricultural Association	50 00
Burquitlam Agricultural Association	150 00
Cariboo Agricultural and Horticultural Association	300 00
Central Park Agricultural Association and Farmers' Institute	150 00
Chilliwack Agricultural Association	750 00
Cobble Hill and District Agricultural Association	100 00
Comox Agricultural and Industrial Association	300 00
Coquitlam Agricultural Society	150 00
Cowichan Agricultural Association	750 00
Cranbrook Agricultural Society	600 00
Creston Valley Agricultural Association	250 00
Delta Agricultural Society	250 00
Elk Valley and Natal Agricultural Association	100 00
Fruitvale Agricultural Association	100 00
Islands Agricultural and Fruit-growers' Association	250 00
Kalamalka Agricultural Association	100 00
Kamloops Agricultural Association	750 00
Kamloops District Stock-breeders' Association	400 00
Kelowna Agricultural and Horticultural Association	500 00
Langley Agricultural Association	200 00
Lasqueti Island Agricultural Association	50 00
Maple Ridge Agricultural Association	200 00
Matsqui Agricultural and Horticultural Association	200 00
Mission Agricultural Association	200 00
Nanaimo Agricultural and Horticultural Association	500 00
Nanoose Agricultural Association	100 00
Needles and District Agricultural Association	150 00
Nelson Agricultural and Industrial Association	500 00
North and South Saanich Agricultural Society	300 00
North Vancouver Horticultural Society	100 00
Northern British Columbia Agricultural and Industrial Association	500 00
Penticton Agricultural and Horticultural Association	250 00
Pritchard Agricultural Association	150 00
Royal Agricultural and Industrial Society	10,000 00
Slocan Lake Agricultural Association	150 00
Smithers Agricultural Association	250 00
Summerland Agricultural Association	350 00
The District of Surrey Agricultural Association	250 00
Trail Fruit Fair Association	250 00
Vancouver Exhibition Association	5,000 00
Windermere District Agricultural Society	250 00
Denman Island Farmers' Institute	60 00
Kaslo Women's Institute	250 00
Pouce Coupe Farmers' Institute	100 00
Metchosin Farmers' and Women's Institute	75 00
Total	$28,135 00
Total, year 1918	$10,850 00

APPENDIX No. 6.

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH.

Date.	Initial and No.	Larvæ.	Pupæ.	Date.	Initial and No.	Larvæ.	Pupæ.
Jan. 27	G.N. 51275	...	...	Sept. 1	N.Y.C. 152342	...	...
„ 27	„ 502292	...	...	„ 1	N.D. 97071	...	...
„ 27	„ 50186	...	...	„ 1	„ 97394	...	...
„ 27	„ 51922	...	...	„ 1	„ 96575	...	...
„ 27	P. & E. 12065	...	...	„ 1	„ 97543	...	...
„ 31	„ 4031	...	...	„ 2	„ 94958	1	...
„ 31	G.N. 50535	...	...	„ 2	„ 95813	3	...
„ 31	„ 50201	...	...	„ 2	„ 95462	...	...
„ 31	„ 50133	...	...	„ 2	„ 96322	...	...
„ 31	P. & E. 2563	...	...	„ 2	„ 95351	...	...
Feb. 3	G.N. 53893	...	...	„ 3	„ 97512	...	...
„ 3	„ 50921	...	...	„ 3	P.R.R. 108749	2	2
„ 3	„ 51708	...	...	„ 3	„ 100674	2	...
„ 7	P.F.E. 3129	...	...	„ 3	Soo Line 151180	...	...
„ 7	C.B. & Q. 39497	...	...	„ 3	C. & E.I. 45332	...	...
„ 7	G.N. 53250	15	...	„ 5	I.C. 57579	...	...
„ 7	„ 253425	5	...	„ 5	„ 59257	...	...
„ 7	„ 53276	...	...	„ 5	N.Y.C. 155907	...	2
„ 7	„ 52988	60	...	„ 5	Soo Line 141704	...	...
„ 7	„ 52376	...	...	„ 5	„ 151208	...	...
„ 11	„ 52196	...	...	„ 5	G.T. 41100	...	...
July 7	U.R.T.C. 1875	...	...	„ 5	N.P. 97315	...	...
Aug. 21	N.P. 97712	...	...	„ 5	„ 97728	...	...
„ 21	„ 94624	...	...	„ 5	„ 95632	...	...
„ 22	I.C. 53690	...	...	„ 5	„ 97732	...	...
„ 22	N.Y.C. 141485	...	...	„ 9	„ 95506	...	2
„ 22	N.P. 94773	1	2	„ 9	„ 95736	...	...
„ 22	L.V. 35002	...	2	„ 9	„ 95597	...	2
„ 23	L. & N. 50022	...	...	„ 9	L. & N. 50050	...	...
„ 23	N.D. 98688	...	...	„ 18	N.P. 98024	1	2
„ 25	G.N. 51560	...	2	„ 18	„ 96986	...	...
„ 25	I.C. 56868	...	...	„ 18	Mich. Cent. 87425	...	...
„ 25	N.D. 95990	...	1	„ 18	L.V. 35179	...	...
„ 25	„ 95865	...	2	„ 18	I.C. 59443	...	...
„ 26	N.P. 96815	...	4	„ 18	P.R.R. 102698	...	...
„ 26	„ 95601	...	...	„ 20	C.N.W. 13716	...	...
„ 26	I.C. 56901	...	...	„ 20	„ 31826	...	...
„ 26	N.D. 94821	...	...	„ 20	Rock Island 66143	...	...
„ 27	I.C. 59277	...	...	„ 20	A.B.C. 201	...	...
„ 27	„ 58184	...	...	„ 20	N.P. 97116	1	...
„ 27	P.R.R. 101973	...	...	„ 22	„ 98451	...	...
„ 27	N.P. 98089	...	...	„ 22	„ 97477	...	...
„ 27	„ 95676	...	...	„ 22	„ 93639	...	...
„ 27	„ 98524	...	2	„ 22	„ 97934	...	...
„ 27	„ 94523	...	...	„ 22	„ 97195	...	...
„ 27	„ 95949	...	...	„ 22	„ 96657	...	...
„ 27	„ 96630	...	...	„ 22	„ 94677	...	...
„ 29	A.B.C. 201	...	...	„ 22	„ 96375	...	...
„ 29	G.T. 46343	...	...	„ 22	„ 95755	...	...
„ 29	P.R.R. 103527	...	...	„ 22	„ 94959	...	...
„ 29	I.C. 59290	...	...	„ 22	I.C. 57046	...	...
„ 29	L. & N. 50190	...	...	„ 22	„ 56747	...	...
„ 30	N.Y.C. 141000	1	2	„ 22	„ 59935	...	...
„ 30	I.C. 58532	...	...	„ 22	G.N. 53154	...	...
„ 30	P.R.R. 102422	3	...	„ 22	„ 52490	...	...
„ 30	N.P. 98872	...	...	„ 25	C.B.A.Q. 36130	...	...
„ 30	„ 95621	...	...	„ 25	G.N. 51945	...	...
„ 30	„ 95331	...	...	„ 25	„ 53634	...	...
„ 30	„ 95706	...	...	„ 25	I.C. 58758	...	...
Sept. 1	I.C. 53719	...	...	„ 25	„ 56761	...	...
„ 1	„ 53156	...	...	„ 25	„ 53860	...	...
„ 1	Lake Erie 61933	...	...	„ 25	A.S.D. 628	...	...

APPENDIX No. 6—*Continued.*

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH—*Continued.*

Date.	Initial and No.	Larvæ.	Pupæ.	Date.	Initial and No.	Larvæ.	Pupæ.
Sept. 27	N.P. 96722	...	...	Oct. 13	P.R.R. 104089	2	...
„ 27	„ 95659	...	...	„ 13	N.Y.C. 151850	...	...
„ 27	„ 94407	...	...	„ 13	„ 144259	...	...
„ 27	„ 95399	...	4	„ 13	„ 145592	...	...
„ 27	I.C. 53860	...	...	„ 13	I.C. 59034	...	...
„ 27	„ 57214	...	...	„ 13	Soo Line 11082	...	...
„ 27	„ 59737	...	...	„ 13	G.N. 53571	...	...
„ 27	„ 58597	...	...	„ 13	„ 50252	...	...
„ 27	„ 53955	...	...	„ 13	„ 53824	...	...
„ 27	G.N. 50141	...	...	„ 13	„ 53033	...	...
„ 27	„ 53225	...	...	„ 13	„ 52764	...	...
„ 27	Soo Line 70042	...	...	„ 13	G.T. 46520	...	...
„ 27	C. & M. 400460	...	...	„ 13	C.G.W. 30194	...	...
„ 29	C.M.&St.P. 400101	...	...	„ 13	I.C. 53051	...	...
„ 29	G.N. 53939	...	1	„ 14	„ 56971	...	...
„ 29	N.P. 96265	...	...	„ 14	N.Y.C. 145801	...	...
Oct. 2	„ 96792	...	...	„ 14	Soo Line 151208	...	...
„ 2	„ 97722	...	...	„ 14	G.N. 52478	...	...
„ 2	G.N. 53662	...	...	„ 14	„ 50217	...	...
„ 2	I.C. 59504	...	...	„ 14	G.T. 41122	2	...
„ 2	„ 58695	2	1	„ 14	„ 41022	...	...
„ 4	„ 59280	...	...	„ 14	„ 46774	...	...
„ 4	G.N. 52346	...	...	„ 14	„ 41171	...	...
„ 6	N.P. 95013	2	1	„ 14	N.P. 97616	...	...
„ 6	C.B. & Q. 36617	3	2	„ 14	„ 97583	...	...
„ 9	N.Y.C. 155564	...	...	„ 14	„ 98551	...	...
„ 9	„ 152342	...	...	„ 14	„ 96827	...	...
„ 9	C.B. & Q. 36144	...	...	„ 14	„ 95764	...	...
„ 9	D.L.W. 6362	4	...	„ 14	P.F.E. 11720	...	...
„ 9	F.R.L. 1070	3	...	„ 14	St. Louis S.L.R.X. 3515	...	...
„ 9	B. & Q. 14677	...	...				
„ 9	C.N.W. 31644	...	...	„ 15	S.F.R.D. 6687	...	...
„ 9	I.C. 58397	...	...	„ 15	N.P. 96084	...	...
„ 10	„ 53156	...	...	„ 15	„ 96025	2	...
„ 10	„ 57616	...	...	„ 15	Lake Erie 61122	...	...
„ 10	„ 57145	...	...	„ 15	G.T. 45053	...	...
„ 10	N.Y.C. 140158	...	...	„ 15	P.R.R. 102130	...	...
„ 10	G.N. 52252	...	...	„ 16	G.N. 53061	...	...
„ 11	N.P. 97949	...	...	„ 16	„ 53340	...	...
„ 11	Lake Erie 62074	...	...	„ 16	„ 51504	...	...
„ 11	P.R.R. 105009	...	...	„ 16	„ 53805	...	...
„ 11	D.L.W. 6227	...	...	„ 16	„ 53339	...	...
„ 12	N.P. 95440	1	...	„ 16	„ 51461	...	...
„ 12	„ 94415	...	...	„ 16	N.P. 94651	...	...
„ 12	„ 98716	2	...	„ 16	„ 95284	2	...
„ 12	I.C. 59617	...	...	„ 16	„ 97589	2	...
„ 12	C.N.W. 30720	...	...	„ 16	„ 97769	...	...
„ 12	G.N. 50901	...	...	„ 16	„ 96010	...	...
„ 12	„ 52872	...	...	„ 16	„ 96804	...	...
„ 12	„ 50224	...	...	„ 16	„ 95700	...	...
„ 12	„ 51381	...	...	„ 16	„ 97105	...	...
„ 12	R.L1 67342	...	...	„ 16	I.C. 57032	...	...
„ 12	P.R.R. 110019	...	...	„ 16	„ 53829	...	...
„ 12	G.T. 41127	...	...	„ 16	„ 58876	...	...
„ 13	N.P. 97661	...	...	„ 16	„ 59581	...	...
„ 13	„ 94736	...	...	„ 16	„ 58313	...	...
„ 13	„ 95534	...	...	„ 16	„ 59651	...	...
„ 13	„ 95346	...	...	„ 16	G.T. 41165	...	...
„ 13	„ 96988	...	...	„ 16	„ 46732	...	...
„ 13	„ 95564	...	...	„ 16	„ 45053	...	...
„ 13	P.R.R. 103204	...	...	„ 16	P.R.R. 104887	...	...
„ 13	„ 105108	...	...	„ 16	„ 103130	...	...
„ 13	„ 100147	...	...	„ 16	C.N.W. 31320	...	...
„ 13	„ 104010	3	...	„ 16	N.Y.C. 151076	...	...

APPENDIX No. 6—*Continued.*

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH—*Continued.*

Date.	Initial and No.	Larvæ.	Pupæ.	Date.	Initial and No.	Larvæ.	Pupæ.
Oct. 16	N.Y.C. 151692	...	...	Oct. 31	S.F.R.D. 3313	...	...
„ 16	Soo Line 151142	...	...	„ 31	C.M. & St. P. 25946	...	...
„ 16	„ 1292	...	...	Nov. 8	N.Y.C. 145478	...	...
„ 16	O.W. 6509	...	...	„ 8	Ann Arbor 9007	...	...
„ 16	N.Y.D.L. 13714	...	...	„ 8	C.M. & St. P. 8094	...	...
„ 17	C.M. & St. P. 26830	...	...	„ 8	P.R.R. 101497	...	...
„ 17	„ „ 29182	...	...	„ 8	G.T. 46635	...	...
„ 17	G.T. 45003	...	...	„ 8	 41136	...	...
„ 18	N.P. 97370	...	...	„ 11	G.N. 52976	...	...
„ 18	„ 95351	...	...	„ 11	Soo Line 11209	...	...
„ 18	„ 97396	...	...	„ 11	F.R. 1058	...	...
„ 18	„ 95822	4	...	„ 11	N.Y.C. 145868	...	...
„ 18	„ 95083	...	...	„ 11	„ 140409	...	...
„ 18	„ 96394	...	...	„ 12	G.N. 53507	...	...
„ 18	G.N. 52488	...	...	„ 12	P.R.R. 101573	...	...
„ 18	„ 53873	...	...	„ 12	N.Y.N.H. 22131	...	...
„ 18	N.Y.D. 4322	...	...	„ 12	G.T. 46116	...	...
„ 18	P.R.R. 104294	...	...	„ 12	„ 40093	...	...
„ 18	„ 101264	...	...	„ 12	N.P. 96110	...	...
„ 18	„ 67031	...	...	„ 12	C.M. & St. P. 26630	...	...
„ 18	C. & E.F. 45123	...	...	„ 13	N.P. 94651	2	...
„ 18	I.C. 53430	...	...	„ 13	„ 94583	2	...
„ 18	„ 53388	...	...	„ 13	C.B.Q. 38357	...	...
„ 18	C. & N.W. 31640	2	...	„ 14	G.N. 53805	...	...
„ 18	L. & N. 50215	...	...	„ 14	I.C. 58875	...	...
„ 18	N.Y.C. 140136	...	...	„ 14	„ 57815	...	...
„ 18	„ 152306	...	...	„ 14	„ 53051	...	...
„ 20	L.N. 50050	...	...	„ 14	N.P. 96184	...	...
„ 20	„ 50068	...	...	„ 14	„ 98756	...	...
„ 20	I.C. 56670	...	...	„ 17	„ 95363	2	...
„ 20	„ 59966	...	...	„ 17	G.N. 51546	3	...
„ 20	„ 57540	...	...	„ 17	 253427	...	...
„ 20	„ 59297	...	...	„ 18	L.V. 35244	...	...
„ 20	„ 57333	...	...	„ 18	N.Y.C. 84836	...	...
„ 20	„ 53776	...	...	„ 18	D.L.W. 6648	...	...
„ 20	„ 57388	...	...	„ 18	N.P. 96010	...	...
„ 20	„ 58798	...	...	„ 18	L.E. 66865	...	...
„ 20	„ 53509	...	...	„ 18	G.T. 40078	...	...
„ 20	C.B. & Q. 36441	2	...	„ 18	„ 41014	...	...
„ 20	S.F.R.D. 12918	...	...	„ 19	I.C. 53101	20	...
„ 20	B. & O. 14232	...	...	„ 19	 57163	...	...
„ 20	N.Y.C. 141448	...	...	„ 19	N.Y.C. 16038	...	...
„ 20	N.P. 95746	...	...	„ 19	„ 84705	...	...
„ 20	„ 94536	...	...	„ 19	G.T. 340154	...	...
„ 20	„ 98329	...	...	„ 19	„ 340035	...	...
„ 20	„ 95470	...	...	„ 21	I.C. 53030	...	...
„ 20	„ 97884	...	...	„ 21	„ 59730	...	...
„ 20	„ 98500	...	...	„ 21	C.R.R. & N.J. 9447	...	...
„ 20	G.N. 53163	...	...	„ 21	C.M. & St. P. 25882	...	...
„ 20	„ 52554	...	...	„ 24	N.P. 96818	...	...
„ 22	„ 253029	...	...	„ 24	„ 99119	...	...
„ 20	„ 53022	...	...	„ 24	G.N. 52222	...	...
„ 20	P.R.R. 105012	...	...	„ 24	„ 53061	...	...
„ 22	N.Y.D. 2640	...	...	„ 24	G.T. 46716	...	...
„ 25	I.C. 59937	...	...	„ 24	 340185	...	...
„ 31	N.P. 98694	...	...	„ 26	C.R. Sx. 219	...	...
„ 31	P.R.R. 104646	5	...	„ 26	G.T. 46503	...	...
„ 31	N.Y.C. 151076	...	...	„ 26	 41290	...	...
„ 31	G.T. 41171	...	...		Total material ..	167	36

APPENDIX No. 6—*Continued.*

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH—*Continued.*

Total captures—	
Larvæ	167
Pupæ	36
	203
Total cars inspected, 1919	378

Definition of Abbreviations in Car Initials.

G.N.	Great Northern.
N.P.	Northern Pacific.
P.F.E.	Pacific Fruit Express.
C.B. & Q.	Chicago, Burlington & Quincy.
V.R.T.C.	Union Transit Refrigerator Co.
I.C.	Illinois Central.
N.Y.C.	New York Central.
L. & N.	Louisville & Nashville.
L.V.	Lehigh Valley.
P.R.R.	Pennsylvania Railroad.
A.B.C.	
A.S.D.	Atlantic Seaboard Dispatch.
S.L.	Soo Line.
C.M. & St. P.	Chicago, Milwaukee & St. Paul.
D.L.W.	Delaware, Lackawana & Wawanesa.
L.E.	Lake Erie.
G.T.	Grand Trunk.
S.F.R.D.	San Francisco Refrigerator Dispatch.
C.N.W.	Chicago North Western.
C.G.W.	Chicago Great Western.
B. & O.	Burlington & Owaner.
C. & E.I.	Chicago & Eastern Illinois.
N.Y.D.	New York Dispatch.
A.A.	Ann Arbor.
N.Y.N.H.	New York, New Haven.
N.Y.N.J.	New York, New Jersey.

APPENDIX No. 7.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, CORN, ETC., INSPECTED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA.

	1918.	1919.
Apples (boxes)	100,213	24,710
„ (½ boxes)	467	450
„ (bbls.)	2	8
Crab-apples (boxes)	39	70
Pears (boxes)	18,007	32,076
„ (½ boxes)	229	51
Plums (boxes)	11,099	10,965
Prunes (boxes)	515	3,290
Peaches (boxes)	55,665	60,107
Apricots (boxes)	29,296	26,176
Nectarines (boxes)	.....	16
Quince (boxes)	1	47
Cherries (boxes)	6,621	8,140
California oranges (boxes)	65,234	130,382
Japanese oranges (boxes)	99,364	138,141
Chinese oranges (boxes)	169	364
Tangerines (boxes)	65	5
Lemons (boxes)	19,719	23,601
Grapefruit (boxes)	10,052	10,987
Limes (boxes)	2	.....
Pineapples (boxes)	247	816
Pomeloes (boxes)	20	79

APPENDIX No. 7—*Continued.*

MEMORANDUM OF IMPORTED FRUIT, POTATOES, CORN, ETC., INSPECTED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA—*Continued.*

	1918.	1919.
Persimmons (boxes)	.....	269
Pomegranates (boxes)	25	248
Tomatoes (boxes)	3,630	5,955
Peppers (boxes)	241	1,072
Egg-plants (boxes)	15	152
Potatoes (crates)	356	2,132
„ (tons)	8,067	3,838
Sweet potatoes (crates)	3,503	5,262
Yams (crates)	548	940
Taro (crates)	969	1,800
Mango (crates)	.....	2
Rice (tons)	42,630	15,211
Corn (tons)	4,415	5,719
Beans (tons)	3,249	12,885
Peas (tons)	1,737	3,275

APPENDIX No. 8.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA.

	1918.	1919.
Apples (boxes)	10,512	2,804
„ (½ boxes)	25	46
Crab-apples (boxes)	24	1
Pears (boxes)	7,173	2,613
Plums (boxes)	....	92
Peaches (boxes)	42	1,490
Apricots (boxes)	5	227
Cherries (boxes)	5	166
California oranges (boxes)	....	670
Japanese oranges (boxes)	6	....
Grapefruit (boxes)	....	41
Tomatoes (boxes)	12	30
Sweet potatoes (crates)	1	355
Potatoes (pkg.)	1	....
„ (tons)	....	113
Nutmegs (cases)	191	....
„ (200-lb. sacks)	12	....
Cherry-boxes fumigated	....	1,466

APPENDIX No. 9.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., INSPECTED AT VANCOUVER.

		1918. Tons.	1919. Tons.
121,112	50-lb. sacks rice		
114,009	100-lb. „		
550	110-lb. „		
759	180-lb. „	 35,919	11,929
3,996	200-lb. „		
21,657	224-lb. „		
11,100	50-lb. mats rice		

APPENDIX No. 9—*Continued.*

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., INSPECTED AT VANCOUVER—*Continued.*

	1918. Tons.	1919. Tons.
4,213 50-lb. sacks beans 63 80-lb. „ 27 95-lb. „ 232,392 100-lb. „ 1,500 102-lb. „ 10,103 200-lb. „	3,193	12,815
175 50-lb. sacks peas 1,823 100-lb. „ 2 85-lb. „ 2 120-lb. „ 229 175-lb. „ 1,028 180-lb. „ 19,879 200-lb. „ 9,626 224-lb. „	1,711	3,274
271 100-lb. sacks corn 28,787 180-lb. „ 3,146,259 lb. bulk corn 26,780 lb. popcorn	3,331	4,190
The following were fumigated:—		
325 100-lb. sacks rice	345	16
17 50-lb. sacks beans 51 100-lb. „	59	3
Peas	45	....
9,008 180-lb. sacks corn	....	810
4,675 100-lb. sacks peanuts 20 160-lb. „	613	235
40 bundles empty sacks.		
11,265 empty sacks.		
2 bales corn-husks.		

APPENDIX No. 10.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, ETC., INSPECTED AT VICTORIA.

	1918. Tons.	1919. Tons.
Rice	6,711	3,282
Corn	1,083	1,529
Beans	50	70
Peas	25	1
The following were fumigated:—		
Rice	1,232	1,010
Corn	....	75
1,466 cherry-boxes.		
Peanuts	84	....

APPENDIX No. 11.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., INSPECTED AT VANCOUVER.

	1918.	1919.
Apples (boxes)	79,243	19,976
„ (½ boxes)	342	206
Crab-apples (boxes)	25	2
Pears (boxes)	16,153	30,220
„ (½ boxes)	185	50
Plums (boxes)	8,853	8,222
Prunes (boxes)	1	2,921
Peaches (boxes)	42,006	36,160
Apricots (boxes)	26,770	22,097
Quince (boxes)	.....	42
Cherries (boxes)	5,431	6,264
California oranges (boxes)	47,914	94,550
Japanese oranges (boxes)	202,162	291,745
„ (boxes) shipped out	117,495	181,636
Chinese oranges (boxes)	169	364
Tangerines (boxes)	10	5
Lemons (boxes)	14,527	18,151
Grapefruit (boxes)	7,496	9,060
Pineapples (boxes)	165	561
Pomeloes (boxes)	5	.....
Persimmons (boxes)	.....	230
Pomegranates (boxes)	25	173
Tomatoes (boxes)	2,011	4,092
Peppers (boxes)	168	411
Egg-plants (boxes)	12	72
Potatoes (crates)	82	98
„ (bulk and pounds) (tons)	7,942	3,577
Sweet potatoes (crates)	2,703	3,745
Yams (crates)	407	794
Taro (crates)	812	1,717
Mango (crates)	.....	2

APPENDIX No. 12.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT VANCOUVER.

	1918.	1919.
Apples (boxes)	8,362	2,334
„ (½ boxes)	25	45
Crab-apples (boxes)	24	1
Pears (boxes)	6,833	2,533
Plums (boxes)	....	92
Peaches (boxes)	40	153
Apricots (boxes)	....	95
Cherries (boxes)	....	166
California oranges (boxes)	....	670
Japanese oranges (boxes)	6	....
Tomatoes (boxes)	....	4
Sweet potatoes (boxes)	....	353
Potatoes (pkg.)	1	....
„ (tons)	....	110
Nutmegs (cases)	191	....
„ (lb.)	2,400	....

APPENDIX No. 13.

MEMORANDUM OF IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER.

	1918.	1919.
Standard fruit-trees—		
Apple	33,642	25,968
Crab-apple	1,042	465
Pear	6,347	9,605
Cherry	7,922	6,478
Plum	4,011	3,652
Prune	2,420	4,669
Peach	2,498	4,703
Quince	227	153
Nectarine	73	53
Apricot	5,311	10,489
Fig	31	5
Mulberry	123	59
Nut-trees—		
Walnut	451	277
Filbert	100	48
Chestnut	75	11
Almond	13	14
Seedlings and grafts—		
Fruit seedlings	223,566	238,769
Fruit grafts	41,116	66,270
Small-fruit bushes and plants—		
Grape-vines	3,581	1,409
Currant-bushes	1,247	2,944
Gooseberry-bushes	4,416	6,776
Raspberry-bushes	3,293	13,956
Blackberry-bushes	19,796	16,452
Strawberry-plants	56,674	97,246
Strawberry-plants inspected at Nelson	.....	78,100
Miscellaneous—		
Ornamental trees, etc.	97,887	20,739
Ornamental seedlings	33,550	.....
Ornamental grafts	126,400	87
Rose-bushes	44,332	34,969
Plants (herbaceous)	64,404	26,289
Bulbs and roots	507,936	375,807
Totals	1,292,484	1,046,462

APPENDIX No. 14.

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER.

	1918.	1919.
Standard fruit-trees—		
Apple	1,739	246
Crab-apple	100	22
Pear	238	272
Cherry	56	169
Plum	25	42
Prune	37	13
Peach	7	1,026
Quince	5	3
Nectarine	1	2
Apricot	21	249
Mulberry	19	....

APPENDIX No. 14—*Continued.*

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER—*Continued.*

	1918.	1919.
Nut-trees—		
Filbert	2	2
Chestnut	1	....
Seedlings and grafts—		
Fruit seedlings	131	604
Fruit grafts	....	1,947
Small-fruit bushes—		
Grape-vines	614	86
Currant-bushes	36	61
Gooseberry-bushes	421	18
Raspberry-bushes	33	83
Blackberry-bushes	231	223
Miscellaneous—		
Ornamental trees	104	168
Ornamental seedlings	100	....
Rose-bushes (1,110 dead)	1,223	197
Plant	1	....
Bulbs and roots	....	2,509
Totals	5,145	7,942

APPENDIX No. 15.

MEMORANDUM OF VEGETABLES, FRUIT, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED.

	1918. Crates.	1919. Crates.
Artichokes	83	71
Asparagus	2,057	1,250
Green beans	60	64
Beets	198	7
Cabbage	5,568	2,612
Cantaloupes	8,554	11,733
Carrots	2,002	3,839
Casabas	366	3,050
Cauliflower	3,903	3,180
Celery	2,259	493
Corn	121	55
Cucumbers	676	1,032
Garlic	6	73
Horse-radish	4	11
Lettuce	8,223	7,783
Melons	6,949	7,110
Onions	12,566	10,282
Parsley	52	135
Green peas	240	195
Radish	103	158
Rhubarb	2,864	2,347
Spinach	153	67
Sprouts	28	116
Squash	300	385
Turnips	482	12
Vegetables	63	42
Seed (miscellaneous)	....	3,024

APPENDIX No. 15—*Continued.*

MEMORANDUM OF VEGETABLES, FRUIT, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED—*Continued.*

	1918. Crates.	1919. Crates.
Watermelons	....	58,672
Bananas (bunches)	29,672	49,622
Gooseberries	31	26
Grapes	20,510	34,301
Cranberries	147	367
Loganberries	6	10
Raspberries	68	35
Strawberries (207 condemned)	5,483	10,931
Almonds	420	8,710
Brazil nuts	....	4,282
Chestnuts	2	207
Cocoanuts	....	142
Peanuts	30,709	11,388
Walnuts	900	14,147

APPENDIX No. 16.

TESTING FOR TUBERCULOSIS IN CATTLE.

District.	Premises visited.	Cattle tested.	Reactors.
Agassiz	73	685	10
Alberni	1	1	1
Aldergrove	3	44	..
Blaings	10	23	..
Bowen Island	5	18	..
Burns Lake	1	10	..
Burnaby	10	19	1
Cassidy	2	34	3
Cedar	5	40	1
Chemainus	22	66	..
Chilliwack	129	1,454	24
Cobble Hill	19	130	5
Courtenay	3	93	..
Duncan	264	1,343	46
Denman Island	29	214	..
Dewdney	8	170	2
Essondale	1	220	..
Gibson Heights	21	40	..
Glen Valley	1	16	..
Francois Lake	1	8	..
Hammond	1	73	..
Hillbank	2	27	..
Kamloops	6	75	3*
Kingcome Inlet	3	49	..
Ladner	28	367	34
Langley	77	563	18
Ladysmith	33	54	3
Lulu Lsland	185	1,687	75
Matsqui	29	396	4
Moresby Island	1	36	..
Mission	3	63	3
North Bend	5	27	1
North Vancouver	55	245	20
Pemberton	3	15	3
Pender Island	16	89	..

* One quarantined.

APPENDIX No. 16—*Continued.*

TESTING FOR TUBERCULOSIS IN CATTLE—*Continued.*

District.	Premises visited.	Cattle tested.	Reactors.
Pitt Meadows	4	19	3
Point Grey	24	105	9†
Prince Rupert	2	60	..
Queen Charlotte Islands	13	46	..
Saltair	11	56	7
Saanich	224	1,538	77
South Vancouver	88	212	15*
Sea Island	8	50	9
Sechelt	3	13	1
Smithers	6	30	..
Sooke	6	14	1
Surrey	34	507	72‡
Sumas	110	1,117	19
Vancouver	128	354	2
Vanderhoof	7	41	..
Victoria	72	249	26
Webster's Corners	1	1	..
Westminster	13	140	1
West Vancouver	1	2	..
Yale	1	5	..
Armstrong	65	280	..
Burton City	2	15	..
Black Pines	1	2	..
Creston	2	16	..
Crescent Valley	4	166	11
Chase	14	32	..
Clinton	1	1	..
Celista	11	20	..
Castledale	2	3	..
Commonage	1	1	..
Duck Creek	1	1	..
Erickson	1	1	..
Edgewood	1	11	..
Ewings	1	1	..
Golden	31	131	2
Glenrosa	1	1	..
Hefferly Creek	1	5	..
Nob Hill	1	1	..
Kaslo	1	1	..
Larkin	1	10	..
Mons	1	1	..
McDonald Landing	3	32	..
Notch Hill	14	52	..
Nelson	40	185	29
Nicholson	2	5	..
Okanagan Landing	2	25	..
Oyama	3	6	2
Penticton	3	12	..
Peachland	1	1	..
Revelstoke	3	38	..
Shuswap	1	8	..
Summerland	1	8	..
Sicamous	2	12	..
Salmon Arm	31	162	2
South Vernon	1	1	..
Tranquille	1	42	1
Vernon	4	4	..
Westbank	2	4	..
Woods Lake	1	1	..
Keremeos	1	1	..
Kelowna	8	88	2

* One quarantined. † Four quarantined. ‡ Five quarantined.

APPENDIX No. 17.

EIGHTH INTERNATIONAL EGG-LAYING CONTEST.

The Eighth International Egg-laying Contest was held under the auspices of the Poultry Division, Provincial Department of Agriculture, at the Exhibition Grounds, Victoria, B.C., from October 15th, 1918, to September 14th, 1919, a period of eleven months. The total number of eggs laid is as follows:—

Pen No.	Name and Address.	Breed.	No. of Eggs.
	Class 1.—Light-weight Varieties (Six Birds to a Pen).		
15	M. H. Ruttledge, Sardis, B.C. (first prize, $50) ...	White Leghorns	1,274
5	T. W. Palmer, R.M.D. 4, Victoria, B.C. (second prize, $25, and silver medal for heaviest winter egg yield)	,, ...	1,221
19*	E. J. White, Kerrisdale P.O., B.C.	,, ...	1,184
16	W. M. Alcorn, Port Hammond, B.C. (third prize, $10)	,, ...	1,131
2	D. Edwards, Somenos, B.C. (fourth prize, *Canadian Poultry Review* bronze medal)	,, ...	1,115
6	H. W. Tripp, Ganges Harbour, B.C.	,, ...	1,111
11	J. A. Hanson, Corvallis, Oregon, U.S.A.	,, ...	1,098
4	Norie Bros., Cowichan, B.C.	,, ...	1,091
14*	W. and F. Tozer, Milner, B.C.	,, ...	1,084
20	C. G. Golding, Qualicum Beach, B.C.	,, ...	1,076
13	H. A. Ismay, Box 117, Victoria, B.C.	,, ...	1,059
17	H. A. Hincks, Langford, B.C.	,, ...	1,055
12	F. E. Pullen, Whonnock, B.C.	Mottled Anconas	1,002
18	J. J. Dougan, Cobble Hill, B.C.	White Leghorns	958
7*	A. Unsworth, R.R. 1, Sardis, B.C.	,, ...	914
3	W. E. Senior, McPherson Avenue, Victoria, B.C. ..	,, ...	913
21*	Oregon Agricultural College, Corvallis, Ore., U.S.A.	,, ...	878
9	W. Bradley, Langford, B.C.	,, ...	835
1	J. Thackeray, R.R. 2, Chilliwack, B.C.	,, ...	828
10	G. O. Pooley, Duncan, B.C.	,, ...	811
8*	J. E. Joyce, Pembroke Street, Victoria, B.C.	,, ...	778
	Total	.....	21,416
	Class 2.—Heavy-weight Varieties (Six Birds to a Pen).		
28	J. S. Baiss, Cobble Hill, B.C. (first prize, $50) ...	White Wyandottes	1,114
37	Dean Bros., Keating, B.C. (second prize, $25, and silver medal for heaviest winter laying)	,, ...	1,110
36	A. W. Cooke, Kelowna, B.C. (third prize, $10) ...	,, ...	996
27	G. D. Adams, R.R. 1, Langley Prairie, B.C. (fourth prize, *Canadian Poultry Review* bronze medal)	,, ...	968
35	S. S. F. Blackman, R.R., Sidney, B.C.	Single Comb Reds	948
22	T. Bridge, Dundas Street, Vancouver, B.C.	White Wyandottes	935
26	E. K. Merkley, 206 49th Avenue E., Vancouver, B.C.	Single Comb Reds	928
40	W. H. Catterall, Mount Tolmie, B.C.	White Wyandottes	873
29*	M. S. Stephens, Courtenay, B.C.	Barred Rocks	865
23*	C. G. Golding, Qualicum Beach, B.C.	,, ...	862
30	G. Watson, Gordon Head, B.C.	White Wyandottes	830
33*	State College, New Mexico, U.S.A.	,, ...	802
38	Mrs. L. Feast, 209 19th Avenue W., Vancouver, B.C.	,, ...	797
34	E. D. Read, Duncan, B.C.	,, ...	788
39	B.C. Red Club (D. Nicol, Secretary), Victoria, B.C.	Single Comb Reds	785
32	T. Cheshire, 103rd Street, Edmonton, Alta.	White Wyandottes	757
31	J. Dickson, Atchelitz, B.C.	Barred Rocks	752
25	W. H. Willins, Stannard Avenue, Victoria, B.C. ...	Rose Comb Reds	741
24	A. F. Atkinson, Box 181, Nelson, B.C.	White Wyandottes	703
	Total	.....	16,554

* Eggs under weight.

B.C.P.A. diploma and badge winners: Class 1, Pens 15, 6, and 19; Class 2, Pens 28, 33, and 26.

APPENDIX No. 18.

Summary of Results, Eighth International Egg-laying Contest, Victoria, B.C.

Duration of contest (months)	11
Number of pens	40
Number of birds	240
Total number of eggs laid	37,970
Total value of eggs laid	$1,906.41
Total cost of feeding	$823.72
Profit over cost of feeding	$1,082.69
Average market price of eggs per dozen	.60¼
Average cost to produce dozen eggs	.26
Average number of eggs laid per pen	949.25
Average number of eggs laid per bird	158.2
Average cost of food per pen (six birds)	$20.59
Average cost of food per bird	$3.43
Profit over cost of food per pen	$27.06
Profit over cost of food per bird	$4.51
Eggs laid by winning pen, Class 1	1,274
Average per bird, winning pen	212.3
Eggs laid by winning pen, Class 2	1,114
Average per bird, winning pen	185.6

APPENDIX No. 19.

British Columbia Poultry Association—Executive for 1920 and Directors for 1920-21.

President: A. H. Anderson. *Vice-President:* R. Wilson.

Executive:

Rev. C. McDiarmid. A. H. Turvey. R. H. Baird. H. E. Waby.

Directors:

Arrow Lakes	R. H. Baird.
Central Park	J. Thurston.
Chilliwack	A. H. Turvey.
Cobble Hill	G. Bonner.
Cowichan	J. J. Dougan.
Cranbrook	W. Harvey.
Fernie	J. Clark.
Grand Forks	T. Bowen.
Kamloops	J. H. Wilson.
Kelowna	D. Enniss.
Langford	W. Bradley.
Maple Ridge	A. H. Anderson.
Mission City	Rev. C. McDiarmid.
New Denver	B. Parkinson.
Northern Okanagan	R. Arnott.
North Vancouver	F. Kasel.
Penticton	R. F. Dynes.
Point Grey	D. R. Hall.
Summerland	W. Beattie.
Trail	J. Wadsworth.
Vernon	
Victoria	M. Blackstock.
Vancouver	R. Wilson.
West Kootenay	G. Horstead.
Clayburn	W. J. Dwyer.
Corbin	S. Knight.
Salmon Arm	H. E. Waby.

Sec.-Treas.: J. R. Terry. *Assistant Secretary:* H. E. Upton. *Auditor:* F. W. Laing.

APPENDIX No. 20.

TABLE OF CULLING DEMONSTRATIONS HELD DURING THE PERIOD OF MARCH 1ST, 1919, TO DECEMBER 31ST, 1919.

Name and District.	No. of Birds handled (Young and Old Stock).	No. culled.
R. T., Burnaby Lake	670	167
T. M., Burnaby	1,210	251
C. M., Hammond	1,140	75
S., New Westminster	250	50
——, Clayburn	250	100
C., South Vancouver	300	25
R. Mc., Haney	350	160
L., Burnaby	600	200
P., Hammond	350	25
W. S., Chilliwack	2,600	350
R., Chilliwack	1,000	160
B., Chilliwack	1,800	300
S., Burnaby	500	200
P., Eburne	150	50
A. N., Eburne	700	180
M., New Westminster	120	50
M., New Westminster	100	60
Totals	12,090	2,403

APPENDIX No. 21.

TABLE OF DISEASE CASES ATTENDED DURING THE PERIOD MARCH 1ST, 1919, TO DECEMBER 31ST, 1919.

Disease.	No. of Cases.
Colds	10
Diphtheritic roup	5
Liver trouble	1
Catarrhal roup	2
Pneumonia	2
Rheumatism	1
Coccidiosis	8
Worms	4
Poisoning	1
Leg-weakness	2
Ovarian trouble	2
Sterility	2
Apoplexy	1
Various other troubles	45

Vaccinations—2,820 birds vaccinated, 4,640 doses.

APPENDIX No. 22.

STATEMENT OF RECEIPTS AND EXPENDITURES, KAMLOOPS BULL-SALE, MARCH 26TH, 1919.

Receipts.

By Commission on sale at 3 per cent. on $16,430	$	492 90
Shipping fee at 75 cents per head (6)		4 50
Freight collected		236 00
Exchange received on cheques		6 70
Advertisements in catalogue		127 50
Feed supplied to stock		82 50
Entry fees on stock		244 00
Membership fees to B.C.S.B.A., 1919 (36)		37 00
Rebate, C.N.R. overcharge on Prairie stock		2 00
	$	1,233 10

Expenditures.

To Freight on bulls	$	356 27
Advertising in papers and posters		109 65
Catalogue for sale		60 00
Carpenter's work and material on sheds		54 50
Labour		86 40
Straw for sheds		10 00
Sawdust for sheds		4 00
Water for stock		10 00
Tags for bulls		4 50
Crate for bull expressed		7 20
Cartage on bull expressed		5 00
Feed for stock		82 50
Auctioneers (2)		250 00
Postage		5 00
Incidentals		1 55
Telegrams		6 64
Exchange to bank on cheques		13 75
Membership fees to head office, Victoria (36)		36 00
Rebate of membership fee (Fowler)		1 00
Rebate of advertising (Fowler)		5 00
Rebate of entry fees (Fowler)		42 00
Costs of injury to R. Cahilty's horse		68 61
Balance to credit in bank		13 53
	$	1,233 10

NOTE.—To this balance on hand should be added a rebate to come from the C.P.R. of half-freight on animal from Salmon Arm, B.C. (freight $13.35).

APPENDIX No. 23.

STATEMENT OF RECEIPTS AND EXPENDITURES, ARMSTRONG SALE, SEPTEMBER 26TH, 1919.

Receipts.

By	Stock sold (31 sheep and 2 pigs)	$1,465 00
	Entry fees	63 75
	Membership fees to B.C.S.B.A.	6 00
	Commission of 3 per cent. on sales	46 88
	Freight	23 75
	Advertising in catalogue	65 50
	Exchange received on cheques	1 25
	Crate	4 00
		$1,676 13

Expenditures.

To	Stock purchased (31 sheep and 2 pigs)	$1,464 50
	Advertising	93 70
	Catalogue	69 50
	Freight	14 15
	Crates	8 00
	Membership fees to B.C.S.B.A., Victoria	6 00
	Rebate of fees (Western Stock Ranches)	6 85
	Disbursements	3 07
	Bank exchange	2 25
	Cash on hand	8 11
		$1,676 13

APPENDIX No. 24.

QUILCHENA DRY FARM, SHEEP STATEMENT, DECEMBER 31ST, 1918.

Sheep on Farm, December 31st, 1918.

	Value.
4 pure-bred rams at $50	$ 200 00
100 ewes at $20	2,000 00
25 ewes at $19	475 00
13 ewes at $12	156 00
	$2,831 00

(Seven head of ewes died during the winter.)

APPENDIX No. 24—*Continued.*

QUILCHENA DRY FARM, SHEEP STATEMENT, DECEMBER 31ST, 1918—*Continued.*

Sheep and Wool sold since December 31st, 1918.

			Returns.
April	17.	Sold wool to Interior of B.C. Wool-growers	$ 7 53
July	8.	„ „ „ „ „	357 53
„	8.	„ sheep-pelts „ „ „	35 15
June	16.	„ 16 ewes, 2,080 lb. at 13c.	270 00
Sept.	16.	„ 15 lambs, 1,215 lb. at 15c.	182 25
„	18.	„ 1 Oxford ram at $45	45 00
„	18.	„ 2 ewes at $23	46 00
„	18.	„ 10 ewes at $17.50	175 00
„	18.	„ 1 lamb at $26	26 00
„	18.	„ 1 lamb at $16	16 00
„	18.	„ 1 ewe at $3	3 00
„	18.	„ 32 ewes at $15	480 00
„	18.	„ 46 lambs, 3,680 lb. at 13½c.	496 80
„	27.	„ 1 Shropshire ram at $50	50 00
Oct.	1.	„ 1 Shropshire ram at $50	50 00
Nov.	1.	„ 1 lamb at $6	6 00
Dec.	1.	„ 1 lamb at $10	10 00
			$2,256 66

Sheep on Farm, December 31st, 1919.

	Value.
2 pure-bred Oxford Down rams at $100	$ 200 00
1 „ Cheviot ram at $40	40 00
66 mature ewes at $20	1,320 00
51 ewe lambs at $15	765 00
	$2,325 00

STOCK AND EQUIPMENT ON QUILCHENA DRY-FARMING STATION, DECEMBER 31ST, 1919.

Live stock—
- 1 aged mare.
- 2 mares, 10 years old.
- 1 mare, 6 years old.
- 1 gelding, 3 years old.
- 1 gelding, 5 years old.
- 2 mares, 2 years old.
- 1 cow, 7 years old.
- 1 heifer, 3 years old.
- 3 spring calves.
- 1 spring colt (gelding).
- 3 rams.
- 56 ewes.
- 51 ewe lambs.
- 18 chickens.

Harness, etc.—
- 2 sets heavy harness.
- 1 set new heavy harness.
- 1 stock-saddle.

Implements—
- 1 heavy wagon, 4-inch tire and box.
- 1 set bob-sleighs.
- 1 6-foot Massey-Harris binder.
- 1 I.H.C. land-packer, 2,000 lb.
- 1 Massey-Harris 11-shoe drill.
- 1 disk harrow.
- 1 set drag-harrows, 3-section lever.
- 1 McCormick 10-foot rake.
- 1 Verity combination plough.
- 1 Planet horse-hoe.
- 1 Oliver plough.
- 1 grindstone.
- 1 No. 25 Planet garden-seeder.
- 1 Chatham fanning-mill.
- 1 set farm scales, capacity 2,000 lb.
- 1 new mower, Emerson.
- 2 4-inch x 6-foot hotbed-sashes.
- 1 chop-mill.

Horseshoeing outfit—
- 1 hammer.
- 2 pairs pincers.
- 1 paring-knife.
- 1 rasp.

Blacksmith's outfit—
- 1 Chicago portable forge.
- 1 anvil.
- 1 hammer.
- 1 pair tongs.

APPENDIX No. 24—*Continued.*

STOCK AND EQUIPMENT ON QUILCHENA DRY-FARMING STATION, DECEMBER 31ST, 1919—*Continued.*

Hand-tools—
- 1 scoop shovel.
- 2 long-handled shovels.
- 1 short-handled shovel.
- 1 spade.
- 2 stable-forks.
- 3 hay-forks.
- 1 pinch-bar.
- 1 bar-stud.
- 2 picks.
- 1 steel hammer.
- 1 splitting-maul.
- 3 wedges.
- 2 axes.
- 1 5-foot lance-toothed saw.
- 1 fence-wire stretcher.
- 1 logging-chain.
- 1 peavey.

Carpenter's tools—
- 1 hand-saw.
- 1 steel square.
- 1 set brace and bits.
- 1 hammer.
- 2 chisels.
- 1 spirit-level.

Buildings—
- 1 granary, 14 x 26 feet x 8-foot wall.
- 1 stable, 20 x 40 feet x 7-foot wall.
- 1 bunk-house, 12 x 12 feet x 8-foot wall.
- 1 cabin (2 rooms), 12 x 10 feet and 10 x 12 x 6-foot wall.
- 1 tent, 12 x 16 feet.
- 1 tent, 14 x 16 feet, with flies.
- 1 sheep-shed, 20 x 40 x 7 feet.
- 1 sheep-shed, 22 x 42 feet, straw roof.
- 1 stationary feed-rack, 130 feet, with trough.
- 1 root-cellar, 12 x 24 feet.
- 1 sheep-corral.

Household effects—
- 1 Rowena range (new).
- 1 three-quarters bed, springs, and mattress.
- 2 camp-cots.
- 2 pairs blankets.
- 2 pillows.
- 4 kitchen chairs.
- 1 wash-tub.
- 1 wash-boiler.
- Pots, pans, etc.
- 1 heating-stove (box).

Miscellaneous—
- 1 10-foot pump.
- 1 barrel.
- 2 water-tubs.
- 2 lanterns.
- 1 Greener double-barrel 10-gauge shotgu

Fencing—
- Fences erected, 580 rods.
- Fence-wire, 900 rods (woven).
- „ 79 „ „
- „ 48 „ „
- „ 400 „ (barbed).
- One extra wire put on 2 miles of fence.

Hay and feed—
- 1 stack green hay, 20 tons.
- 2 „ „ 6 „
- 10 acres fall wheat.
- 10 „ fall rye.
- 2 stacks barley-sheaves (unthreshed).
- 3 „ oat-sheaves (unthreshed).
- 2 „ wheat-sheaves (unthreshed).
- 1 „ rye-sheaves (unthreshed).
- 2 loads peas.

Roots—
- Turnips, 8 tons.
- Carrots.
- Sugar-beets, ½ ton.
- Potatoes, ½ ton.

Weather-observation instruments—
- 1 wet- and dry-bulb thermometer.
- 1 minimum thermometer.
- 1 maximum thermometer.
- 1 rain-gauge.
- 1 screen.

APPENDIX No. 25.

INVENTORY OF EQUIPMENT AT 105-MILE DRY-FARMING STATION, DECEMBER 31ST, 1919.

Live stock—
- 1 gelding, 9 years old.
- 1 mare, 5 years old.
- 1 mare, 11 years old.
- 1 colt, 19 months old.

Buildings—
- 1 cottage, 20 x 24 feet.
- 1 stable, 18 x 36 feet.
- 1 lean-to stable, 13 x 18 feet.
- 1 implement-shed, 15 x 50 feet.

APPENDIX No. 25—*Continued.*

INVENTORY OF EQUIPMENT AT 105-MILE DRY-FARMING STATION—*Continued.*

Buildings—*Continued.*

1 granary, 20 x 24 feet.
2 frame granaries, 8 x 10 feet.
1 chicken-house, 11 x 14 feet.
1 stock-shed, 16 x 32 feet.
1 wood-shed, 12 x 15 feet.
1 root-cellar.
2 corrals.
3 stack-yards.
2,426 yards barb-wire fence, 4 wires high.
816 „ „ 5 „
1,550 „ „ 3 „
1,320 yards woven-wire fence, 3 barb wires on top.
280 yards woven-wire fence, 3 barb wires on top.
390 yards woven-wire fence, 1 barb wire on top.
260 yards woven-wire fence, 1 barb wire on top and 1 between.
400 yards woven-wire fence.
2,550 pickets, woven into woven-wire fence, 2 feet apart.
600 yards Virginia-lock S. and R. fence, 6½ feet high.
540 yards Russell fence, 6 feet high.

Machinery—

1 6-foot binder with truck and transport truck.
1 grain-cradle.
1 5-foot mower.
1 9-foot rake.
1 single-disk drill.
1 packer.
1 3-section harrow with 2 draw-bars.
1 disk harrow with truck.
1 Oliver sulkey plough, with 2 bottoms and 3 shares.
1 Planet Jr. cultivator.
1 Planet Jr. cultivator and seeder (garden).
1 hand-cultivator.
1 3¼-inch wagon.
1 set 2-inch sleighs.
2 hay-racks.
1 set scales, capacity 240 lb.

Tools—

1 hoe.
2 spades.
2 shovels.
1 wheelbarrow.
6 forks (5 hay and 1 manure).
1 watering-can.
1 wire-stretcher with 30 feet of rope.
4 axes (3 chopping and 1 bench).
100 feet ¾-inch rope.
4 wrenches.
2 pairs pliers.
1 crowbar.
1 pick.
2 ladders.
1 rasp.
1 log-chain.
1 comb and brush (stable).
2 blast-lanterns.
1 pump.
1 well.
1 branding-iron.
1 8-lb. sledge-hammer.
1 iron wedge and set of dogs.
1 grindstone and fixtures.
2 watering-troughs.
2 feed-troughs.
1 stone-boat.

Carpenter's tools—

1 brace and set of bits.
1 auger, 1½ inches.
1 5-foot saw.
1 hand-saw.
1 rip-saw.
1 draw-knife.
2 hammers.
1 steel square.
1 tape measure.

Grain and hay—

10 tons hay.
3 tons straw.
1,200 lb. rye.
6,000 lb. oats.
3,100 lb. wheat.

Furniture—

1 cook-stove.
1 heater.
1 bed with springs and mattress.

Weather instruments—

1 thermometer, maximum.
1 „ minimum.
1 „ maximum and minimun
1 hygrometer with glass and measuring
1 rain-gauge.

Miscellaneous—

2 mail-bags with locks.
15 lb. binder-twine, oil, nails, stock-salt.
100 grain-sacks.
2 sets harness.
7 halters (old).
1 scythe and snath.

APPENDIX No. 26.

COW-TESTING ASSOCIATIONS IN BRITISH COLUMBIA.

Name.	Instituted.	Secretary.	Supervisor.
Chilliwack	March 17, 1913	Wm. Dusterhoeft, Chilliwack	J. A. Munn, Sardis.
Comox	April 23, 1914	J. Pritchard, Comox	T. Menzies, Courtenay.
Langley-Surrey	June 8, 1914	H. S. Berry, Langley Prairie	Wm. Egerton, Langley Prairie.
Delta	April 12, 1915	W. N. Townsend, Ladner ...	G. H. Candy, Ladner.
Richmond	March, 1919	G. E. C. Hooper, Eburne P.O.	E. G. Wozencroft, Eburne P.O.
Dewdney	August 30, 1919	Thos. Brearley, Dewdney ...	A. S. Rankin, Mission.

APPENDIX No. 27.

AVERAGE YIELDS IN DIFFERENT ASSOCIATIONS SINCE 1914.

	1914.		1915.		1916.		1917.		1918.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Chilliwack ...	6,706	278	7,152	297.6	7,693	314.5	7,482	303.4	6,487	266.7
Comox	....	...	4,950	231.3	5,044	229.7	5,958	280.7	6,193	303.6
Langley-Surrey	....	...	6,553	241.6	6,847	267.7	6,798	258.4	6,660	252.5
Delta	....	...	....	....	6,448	247.9	6,805	269.4	7,866	296.4

APPENDIX No. 28.

LIST OF CREAMERIES, CONDENSERIES, AND CHEESE-FACTORIES IN BRITISH COLUMBIA, 1919.

Name.	Manager or Secretary.	P.O. Address.
Burns, P., & Co., Ltd.	M. R. Silver	Woodland Drive, Vancouver.
Comox Creamery Association	R. U. Hurford ...	Courtenay.
Cowichan Creamery Association	W. Paterson	Duncan.
Curlew Creamery Co.	R. E. Jenne	Grand Forks.
,, ,, ...	Geo. Smith	Nelson.
Clayburn Creamery	Cooper & Seldon ..	Clayburn.
Fraser Valley Milk Producers' Ass'n.	E. G. Sherwood ...	1170 Hornby Street, Vancouver.
Chilliwack Creamery	W. K. McLeod ...	Chilliwack.
Fraser Valley Dairies, Ltd.	G. O. Clark	405 Eighth Ave. W., Vancouver.
Hefferly Creek Creamery	Thos. Bunting	Hefferly Creek.
Kamloops District Creamery Ass'n. ..	W. Van der Wall .	Kamloops.
Kelowna Creamery Co., Ltd.	W. G. Benson	Kelowna.
Meadowbrook Creamery Co.	A. P. Slade	199 Water Street, Vancouver.
Nanaimo Creamery Association	Jos. Randle	Nanaimo.
Northwestern Creamery, Ltd.	Norton & Snelling	Victoria.
Northern Okanagan Creamery Ass'n. .	A. E. Sage	Armstrong.
New Westminster Creamery Society, Ltd.	D. E. Mackenzie ..	New Westminster.
Revelstoke Creamery Co., Ltd.	J. E. Carman	Revelstoke.
Royal Dairy Co.	W. C. McAllister ..	1110 Douglas Street, Victoria.
Saltspring Island Creamery Ass'n. ...	A. W. Drake	Ganges.
Salmon Arm Creamery Association ..	R. Karnagel	Salmon Arm.
Spencer, David, Ltd.	D. W. Matheson ..	Vancouver. [Vancouver.
Turner's Dairy, Ltd.	F. Turner	Seventeenth Ave. and Ontario St.,
Vancouver Creamery Co., Ltd.	J. M. Livingstone .	15 Alexander Street, Vancouver.
Vernon Creamery	H. W. Knight	Vernon.
Condensers.		
The Borden Milk Co., Ltd.	L. Chevalley	Sardis.
Courtenay Milk Condensing Co., Ltd.	E. G. Emery	Courtenay.
Pacific Milk Co., Ltd.	.....	Ladner.

APPENDIX No. 28—*Continued.*

LIST OF CREAMERIES, CONDENSERIES, AND CHEESE-FACTORIES IN BRITISH COLUMBIA IN 1919—*Continued.*

Name.	Manager or Secretary.	Address.
Cheese-factories.		
Fraser Valley Milk Producers' Ass'n.	E. Haggarty	Sardis.
" " "	M. Valentin	Clayburn.
Ferrara Cheese Manufacturing Co. ...	A. G. Ferrara	Chilliwack.
Revelstoke Creamery Co., Ltd.	J. E. Carman	Revelstoke.

APPENDIX No. 29.

MILK-TESTERS LICENSED UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919.

Name.	Address.
Barker, B. S.	509 Twenty-ninth Avenue East, Vancouver.
Bates, Herbert F.	Sardis.
Batey, Herbert S.	1170 Hornby Street, Vancouver.
Brooks, Frank	1938 Second Avenue West, Vancouver.
Bunting, Thomas	Hefferly Creek.
Burmeister, J.	Sixth Avenue and Sixth Street, New Westmin-
Calder, Jas.	882 Hamilton Street, Vancouver. [ster.
Campbell, Andrew M.	Webster's Corners.
Carman, J. E.	Revelstoke.
Carradice, F. W.	Sixth Avenue and Sixth Street, New Westmin-
Carroll, W. J.	Courtenay. [ster.
Carter, Jas. N.	Seventeenth Avenue and Ontario Street, Van-
Chevalley, Frank	Sardis. [couver.
Clarke, F. J.	850 Fourteenth Avenue West, Vancouver.
Craig, John	930 North Park Street, Victoria.
Douglas, D. K.	327 Seventh Avenue, Vancouver.
Dudman, Alfred	199 Water Street, Vancouver.
Dunn, J. S.	Nanaimo.
Egerton, Wm.	R.M.D. No. 4, Victoria.
Emery, E. G.	Courtenay.
Fish, James	2469 Oxford Street, Vancouver.
George, H. H. S.	Kamloops.
Hall, F. D. B.	Chilliwack.
Hanson, H. M.	Matsqui.
Hooper, Wm. J.	1001 Pender Street West, Vancouver.
Iwanami, J.	1111 Fort Street, Victoria.
James, David A.	1225 Eleventh Avenue West, Vancouver.
Jenne, R. Everett	Grand Forks.
Johnson, Alf.	Vernon Creamery, Vernon.
Karnagek, R.	Salmon Arm.
Kell, Geo.	New Westminster.
Lewarne, Alf.	Essondale.
Lewarne, A. E.	400 Pender Street East, Vancouver.
Livingstone, John M.	23 Alexander Street, Vancouver.
McAllister, W. C.	Douglas Street, Victoria.
Mackenzie, H. H.	New Westminster.
MacLeod, W. K.	Chilliwack.
Magar, John A.	Sardis.
Matheson, D. W.	Care Spencer's, Limited, Vancouver.
Metcalfe, John F.	Oak Street, Vancouver.
Munn, J. H.	Sardis.

APPENDIX No. 29—*Continued.*

MILK-TESTERS LICENSED UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919—*Continued.*

Name.	Address.
Naud, Daniel	930 North Park Street, Victoria.
Nelson, Chas. E.	2144 Twelfth Avenue West, Vancouver.
Norton, F. H. A.	1311 Broad Street, Victoria.
Rive, Chas.	2226 Twelfth Avenue West, Vancouver.
Rive, Elias	2226 Twelfth Avenue West, Vancouver.
Russell, Geo. F.	Courtenay.
Sackville, Miss Stella	Courtenay.
Sejrup, V. M.	Duncan.
Sellers, Jas. H.	414 Pender Street East, Vancouver.
Sherwood, Ernest G.	1327 Standard Bank Building, Vancouver.
Silver, Mark R.	2215 Powell Street, Vancouver.
Smith, Geo. W.	Nelson.
Smith, W. S.	2146 York Street, Vancouver.
Thomas, S. J.	Kelowna.
Thornbery, G. H.	Courtenay.
Trimble, C. A.	Armstrong.
Turnbull, Miss Margaret	Kelowna.
Valentin, V. M. B.	1170 Hornby Street, Vancouver.
Van der Wall, W.	Kamloops.
Washington, F. J.	1170 Hornby Street, Vancouver.
Watson, J. B.	Sardis.
Wells, Bruce	Ladner.
Wheeler, Fred. L.	1311 Broad Street, Victoria.
Wozencroft, E. G.	Eburne.

APPENDIX No. 30.

CREAMERY OR DAIRY LICENCES UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919.

Name.	Address.
Almonds, Ltd.	400 Pender Street, Vancouver.
Borden Milk Co., Ltd.	Sardis.
Burns, P., & Co., Ltd	Woodland Drive, Vancouver.
City Dairy & Produce Co., Ltd.	Sixth Avenue and Sixth Street, New Westmin-
„ „ „	414 Pender Street East, Vancouver. [ster.
Clayburn Creamery	Clayburn.
Comox Creamery Association	Courtenay.
Courtenay Condensed Milk Co., Ltd.	„
Cowichan Creamery Association	Duncan.
„ „	930 North Park Street, Victoria.
Curlew Creamery Co.	Grand Forks.
„ „	Nelson.
East End Dairy	2469 Oxford Street, Vancouver.
Ferrara Cheese Co., Ltd.	Chilliwack.
Fraser Valley Milk Producers' Association	„
„ „ „	Clayburn.
„ „ „	Sardis.
„ „ „	1170 Hornby Street, Vancouver.
„ „ „	1327 Standard Bank Building, Vancouver.
Grandview Dairy	1170 Semlin Drive, Vancouver.
Hefferly Creek Creamery	Hefferly Creek.
Hillcrest Dairy	131 Fifteenth Avenue West, Vancouver.

APPENDIX No. 30—*Continued.*

CREAMERY OR DAIRY LICENCES UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919—*Continued.*

Name.	Address.
Kamloops District Creamery Association	Kamloops.
Kelowna Creamery Co., Ltd.	Kelowna.
Knight, H. W.	Vernon Creamery, Vernon.
Mainland Dairy	Nineteenth Avenue and Oak Street, Vancouver.
Maple Leaf Dairy Co.	Nanaimo.
Meadowbrook Creamery	199 Water Street, Vancouver.
Nanaimo Creamery Association	Nanaimo.
New Westminster Creamery Society, Ltd.	New Westminster.
Northern Okanagan Creamery Association	Armstrong.
Northwestern Creamery, Ltd.	1311 Broad Street, Victoria.
North Vancouver Dairy	133 Fifth Street East, North Vancouver.
Pacific Milk Co., Ltd.	332 Drake Street, Vancouver.
Price & Green	905 Twenty-fourth Avenue East, Vancouver.
Revelstoke Creamery Co., Ltd.	Revelstoke.
Royal Dairy Co.	1001 Pender Street West, Vancouver.
„ „	Douglas Street, Victoria.
Salmon Arm Creamery Association	Salmon Arm.
Saltspring Island Creamery Association	Ganges.
Spencer, David, Ltd.,	Hastings Street West, Vancouver.
South Vancouver Milk Co.	537 Twenty-ninth Avenue East, Vancouver.
Standard Milk Co., Ltd.	405 Eighth Avenue West, Vancouver.
Steves, J. M., Dairy Co.	2144 Twelfth Avenue West, Vancouver.
Turner's Dairy, Ltd.	Seventeenth Avenue and Ontario Street, Vancou-
Valley Dairy, Ltd.	1569 Sixth Avenue West, Vancouver. [ver.
Vancouver Creamery, Ltd.	15-23 Alexander Street, Vancouver.
Vancouver Island Milk Producers' Association	930 North Park Street, Victoria.
Victoria City Dairy	1111 Fort Street, Victoria.
White Lunch, Ltd.	124 Hastings Street West, Vancouver.

APPENDIX No. 31.

LOWER MAINLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA.

(Held at the Masonic Hall, Abbotsford, B.C., Tuesday, Wednesday, and Thursday, October 14th, 15th, and 16th, 1919.)

Tuesday, October 14th, 2 p.m.—

"God Save the King."
Prayer.
Chairman's address.
Welcome: Reeve McCallum.
Greetings from Matsqui Women's Institute, Mrs. Phinney, President.
Greetings from Upper Sumas Women's Institute, Mrs. T. F. York, President.
Response, Central Park Women's Institute, Mrs. C. G. Reid, President.
Greetings from Vancouver Island Women's Institutes, Mrs. A. Blackwood-Wileman.
Greetings from the Okanagan Women's Institutes, Mrs. Trask.
Greetings from the Kootenay Women's Institutes, Mrs. Chalmers.
"The Aims and Objects of the Women's Institutes," read by Mrs. V. S. MacLachlan, Secretary.

Tuesday, October 14th, 3.30 p.m.—

Address: Hon. E. D. Barrow, Minister of Agriculture.
Music.
"Co-operation." Mrs. Chalmers and Haney Women's Institute.

APPENDIX No. 31—*Continued.*

LOWER MAINLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Tuesday, October 14th, 3.30 p.m.—*Continued.*

"Poultry and Egg-marketing." By Mr. Benson.

Appointment of Resolutions Committee.

Tuesday, October 14th, 7.45 p.m.—

"O Canada."

Paper: "The Division of the Family Income."

Music.

Address: "Consolidation of Schools."

Address: "Review of Benefits under Prohibition."

Wednesday, October 15th, 9.30 a.m.—

"The Maple Leaf."

Roll-call.

Three-minute reports from Institutes.

Wednesday, October 15th, 10.30 a.m.—

General Discussion of and Suggestions for Institute-work, led by Mrs. W. V. Davies, Chilliwack.

Wednesday, October 15th, 11.30 a.m.—

A talk from Miss Hayes, Household Science Instructor.

"Poulticing Hints." Mrs. Gaynor, Chilliwack.

Nominations for Advisory Board member.

Wednesday, October 15th, 2 p.m.—

"O Canada."

Roll-call.

Paper: "The Garden—an Asset to the Farm." Mrs. Tucker, Hazelmere.

Address: "Preventive Measures and Medical Inspection of Schools." Dr. Swift, of Abbotsford. Discussion led by Mrs. Reynolds, Chilliwack, and Mrs. Hardy, Hazelmere.

Wednesday, October 15th, 3.30 p.m.—

Address: "Mental Hygiene of School-children." Dr. J. G. McKay, New Westminster.

Music.

"Food and Diet." Miss Hayes.

Address: Mrs. Ralph Smith, M.P.P.

Address: "Womanly Ideals." Mrs. J. L. Campbell, Central Park.

Banquet, 6.30 p.m. Hostesses: Matsqui and Upper Sumas Women's Institute members.

Wednesday, October 15th, 8.30 p.m.—

Music.

Address: "Primitive Life." Professor Charles Hill-Tout.

"God Save the King."

Thursday, October 16th, 9.30 a.m.—

"The Maple Leaf."

Official delegates meet to elect the district member of Advisory Board.

Paper: "Relaxation." Mrs. Croft.

Paper: "Conservation of Effort." Mrs. J. B. Kirk, Strawberry Hill.

Paper: "The Need of Healthful Amusements and Recreation for Our Young People." Mrs. Cox, Coquitlam. Discussion led by Mrs. V. S. MacLachlan.

Thursday, October 16th, 2 p.m.—

"O Canada."

Inauguration of member of Advisory Board.

"Public Health." Mrs. V. S. MacLachlan. Discussion.

Reports of Resolutions Committee.

"God Save the King."

List of delegates—

Agassiz—Mrs. H. Fooks, Mrs. R. Roach, Mrs. W. S. Moore, Mrs. J. McRae.

Atchelitz—

APPENDIX No. 31—*Continued.*

LOWER MAINLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

List of delegates—Continued.

Burquitlam—Mrs. Marmost, Miss G. Bunting.
Central Park—Miss Summers, Mrs. J. C. Campbell, Mrs. G. C. L. Reid, Mrs. B. Forsyth.
Chilliwack—Mrs. W. V. Davies, Mrs. E. Gaynor.
Coquitlam—Mrs Johnston, Mrs. Cox.
Haney—
Hatzic—Miss Morrison, Mrs. Ferguson, Mrs. Fripp.
Hazelmere—Mrs. J. Halt, Mrs. E. H. Hardy.
Langley Fort—Mrs. M. A. Kent, Mrs. Leeder.
Matsqui—
Mission City—Mrs. Galloway, Mrs. Middleton.
Surrey—
Strawberry Hill—Mrs. Ethel McDougall.
Tynehead—Mrs. M. A. Inglis, Mrs. F. W. Currie.
Upper Sumas—Mrs. E. L. Winson, Mrs. T. F. York.
Langley Triangle—

APPENDIX No. 32.

KOOTENAY CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA.

(Held at Nakusp, B.C., Tuesday, Wednesday, and Thursday, October 21st, 22nd, and 23rd, 1919.)

Tuesday, October 21st, 2 p.m.—

"The Maple Leaf."
Invocation.
Opening address: J. Nelson, Esq., M.P.P., Slocan.
Welcome: President, Nakusp. Response: Mrs. Pitts, Vice-President, Nelson.
Song: Miss Brown Bonnington.
Greetings from Vancouver Island Women's Institutes, Mrs. A. Blackwood-Wileman.
Greetings from Lower Mainland Women's Institutes, Mrs. Fadden.
Greetings from Okanagan Women's Institutes, Mrs. Trask.
Chairman's address: Mrs. Chalmers, Thrums.
"Prohibition—How it Can Be Made More Helpful." Mrs. Fadden.
Roll-call: "Prohibition, Reason For or Against."
Appointment of Committees.
Music.

Tuesday, October 21st, 8 p.m.—

"The Maple Leaf."
Greeting: Mr. Abriel, Nakusp. Reply: Mrs. McLennan, Rock Creek.
"How Our Institutes are Co-operating." Open discussion led by Mrs. Ogilvie, Harrop; Mrs. Roberts, Kaslo; Willow Point; Mrs. Lyttle, Crawford Bay; and others.
"Red Cross Work in France." Miss Kaye, Nelson.
"Bees," lantern-slides. Mr. Sheppard, Nelson.
Music.

Wednesday, October 22nd, 9.30 a.m.—

"O Canada."
Reports of Secretaries; five minutes each.
"Public Health." Mrs. MacLachlan.
"Ways of Raising Money for Institute Funds." Mrs. Pratt, Thrums. Discussion: Burton City Women's Institute; Cranbrook Women's Institute; Willow Point Women's Institute.

Wednesday, October 22nd, 2 p.m.—

Voting for election of Advisory Board member.
Resolutions Committee report.
Discussion of resolutions.

APPENDIX No. 32—*Continued.*

KOOTENAY CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Wednesday, October 22nd, 8 p.m.—

Paper: "University Training for Our Young People." Mrs. Lyne, Creston. Discussion: Robson Women's Institute; Greenwood Women's Institute; and others.

Address: "Reconstruction." Mrs. Jas. Johnstone, Nelson.

"Social Unrest." Discussion.

Thursday, October 23rd, 9 a.m.—

Paper: "Rural Education." Mrs. Campbell, Arrow Park.

Discussion: "Improvement of Rural Schools." Miss Ivy Brown, Mrs. Walker, Nelson; and others.

"Consolidation of Rural Schools." Mrs. Clarke, Cranbrook.

"Child-walfare." Mrs. Hugh Ross.

List of delegates—

Arrow Park—Mrs. C. Campbell.

Boundary—Mrs. C. J. McArthur.

Burton City—Mrs. Porter.

Crawford Bay—Mrs. Lyttle, Mrs. Richardson.

Creston District—Mrs. Dow, Mrs. Lyne.

Cranbrook—Mrs. F. A. Clarke, Mrs. E. H. Leaman, Mrs. J. F. Fenton.

Harrop and District—Mr. R. McConnell.

Kaslo District—Mrs. Caldwell.

Nakusp—Mrs. E. Johnson, Mrs. Fowler, Mrs. Masters, Mrs. Powell, Mrs. Parks, Mrs. Mills, Mrs. Parent.

Nelson—Mrs. H. H. Pitts, Mrs. R. D. Hall, Mrs. J. Donaldson.

Robson—Mrs. A. F. Mitchell, Miss E. Allison.

Rock Creek—Mrs. A. D. McLennan, Mrs. Thorburn.

Kootenay Valley—Mrs. Pratt, Mrs. Powers.

Bonnington and South Slocan—

Willow Point—Mrs. H. Townsend, Mrs. P. F. Thompson.

APPENDIX No. 33.

NORTH THOMPSON AND OKANAGAN DISTRICT CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA.

(Held at Salmon Arm, B.C., Friday and Saturday, October 24th and 25th, 1919.)

Friday, October 24th, 9.30 a.m.—

"God Save the King."

Prayer.

Chairman's address.

Greetings.

Roll-call: "What Can I Do for Reconstruction?"

Report of the last Conferences: Mrs. V. S. MacLachlan, Secretary of Institutes.

Three-minute Reports of Institute Secretaries. Discussion of Reports, led by Kelowna delegate.

Appointment of Committees.

Friday, October 24th, 2.30 p.m.—

"O Canada."

Greetings: Mrs. Blackwood-Wileman, Chairman, Advisory Board.

(*a.*) "The Educational Value of Rhythm." Mrs. J. W. Thompson, Penticton. (*b.*) "The Educative Value of Play." Mrs. Butterworth, Kalamalka. Discussion led by ——, Tappen; ——, Similkameen.

Address: Mrs. Fadden, Advisory Board.

Music.

APPENDIX No. 33—*Continued.*

NORTH THOMPSON AND OKANAGAN DISTRICT CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Friday, October 24th, 8 p.m.—

Music.

Address of welcome: Mayor Clingan, Salmon Arm. Reply: Delegate from Vernon.

Address: "Dental Hygiene." Dr. K. C. MacDonald, M.L.A.

Paper: "Organizing for Health." Mrs. MacLachlan.

Address: "Legislating for Health." Mrs. Ralph Smith, M.L.A.

Saturday, October 25th, 9.30 a.m.—

Singing.

Lecture Demonstration. Miss Olive E. Hayes, Provincial Instructor of Household Science.

Questions.

"War Memorials." Mrs. Ruth Rounds, Naramata. Discussion led by Mount Ida and Barriere delegates.

Saturday, October 25th, 2.30 p.m.—

"Co-operative Buying and Selling." Mrs. Maxwell, Rutland. Discussion led by ——, Peachland delegate; Mrs. Chalmers, Advisory Board.

Address: Mrs. H. McGregor, Penticton.

Report of Resolutions Committee.

Discussion of resolutions.

Music.

Saturday, October 25th, 8 p.m.—

Address: Dr. Warnock, Superintendent of Women's Institutes.

Address: Mrs. Spofford.

Entertainment: Salmon Arm Institute.

"Auld Lang Syne."

List of delegates—

Barriere—Mrs. W. E. Betts, Mrs. J. W. Ramsay.

Kalamalka—Mrs. H. A. S. Bowsher.

Kelowna—Mrs. L. V. Rogers, Mrs. W. J. Austin.

Mount Ida—Mrs. Kernaghan, Mrs. H. Donnelly.

Naramata—Mrs. Ruth Rounds.

Okanagan Centre and Woods Lake—Mrs. I. B. Wilson.

Penticton—Mrs. H. W. L. Smith, Mrs. McGregor, Mrs. O. E. Fisher, Mrs. H. W. Mann.

Rutland—Mrs. Maxwell.

Salmon Arm—Mrs. P. Owens.

Salmon River Valley—Mrs. M. Thompson, Mrs. D. B. Butchart, Mrs. H. E. Thompson.

Silver Creek—Mrs. C. A. Elgood.

Summerland—Mrs. Bentley, Mrs. Lipsett, Mrs. Zimmerman.

Similkameen—Mrs. Newton, Mrs. Daly.

Vernon—Mrs. M. Stainton, Mrs. Richards, Mrs. Simms, Mrs. Clark, Mrs. Wilmot, Mrs. Duncan.

Peachland—

Tappen—Mrs. J. Smart.

APPENDIX No. 34.

VANCOUVER ISLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA.

(Held in the History Room of the Provincial Library, Parliament Buildings, Victoria, B.C., Monday, Tuesday, and Wednesday, October 27th, 28th, and 29th, 1919.)

Monday, October 27th, 2 p.m.—

"O Canada."
Chairman's address.
Greetings from the Kootenay Women's Institute, Mrs. Chalmers.
Greetings from the Okanagan Women's Institute, Mrs. H. McGregor.
Greetings from the Lower Mainland Women's Institute, Mrs. Fadden. Response: Mrs. Gold.
Address: Dr. Warnock, Deputy Minister of Agriculture.
Music.
Appointment of Resolutions Committee.

Monday, October 27th, 8 p.m.—

Address of welcome: Lady Barnard. Response: Mrs. S. F. Tolmie.
Music.
Address: Dean Quainton.
Music.
Social hour.

Tuesday, October 28th, 9.30 a.m.—

"God Save the King."
Paper by Mrs. Bartlett, Professor, Public Health Nursing, University of Washington.
Demonstration of Child Examination.
Paper: "Mental Hygiene of School-children." Dr. J. G. Mackay, New Westminster.
Discussion.

Tuesday, October 28th, 2 p.m.—

"State Health Insurance." Dr. Raynor, Victoria.
"The Relation of the Institute to Public Health Centres." Dr. H. E. Young, Victoria.
Discussion.

Tuesday, October 28th, 8 p.m.—

Address: Dr. the Hon. J. D. MacLean.
Films.
"Teeth." Illustrated lantern lecture, Dr. A. H. Tanner.

Wednesday, October 29th, 9.30 a.m.—

Institute Reports.
Discussion.
Address: Hon. Mr. Barrow, Minister of Agriculture.
"Goat-rearing in British Columbia." Mrs. V. S. MacLachlan.
Address: "Agricultural Education as a Moral Force in the Community." Mrs. H. E. Hallwright, V.S.A., Supervisor of School Gardens.
Discussion and Suggestions for Practical Co-operative Methods in Work and Ideas for Institutes. Led by Mrs. Watson, Mrs. McNaughton, Mrs. Brown, Mrs. Whidden, and others.

Wednesday, October 29th, 2 p.m.—

"O Canada."
Report of Resolutions Committee.
Unfinished business.
Roll-call.
Tea at Government House, by kind invitation of Lady Barnard.

Wednesday, October 29th, 8 p.m.—

"The Maple Leaf."
Address: Hon. John Oliver.
Song.
Address: Mrs. Schofield.

APPENDIX No. 34—*Continued.*

VANCOUVER ISLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Wednesday, October 29th, 8 p.m.—*Continued.*

Song.

"A Talk on Astronomy." Illustrated by lantern-slides. Dr. Plaskett, Royal Observatory, Victoria.

"God Save the King."

List of delegates—

Colwood—Mrs. Neal, Mrs. Bickford, Mrs. Peat.

Comox—

Cowichan—Mrs. R. Whidden, Mrs. Christmas.

Garden City—Mrs. F. Birkett, Mrs. M. Hall, Mrs. P. Fryatt, Mrs. F. Harrison, Mrs. Hugill, Miss Sea.

Gordon Head—Mrs. McNaughton, Mrs. Mowat.

Langford—Mrs. P. N. Welch.

Metchosin—Mrs. C. Brown, Mrs. T. F. Helgesen.

North Saanich—Mrs. M. Simister, Mrs. J. Taylor, Mrs. W. Whiting.

Oyster District—Mrs. B. Gourlay, Mrs. A. Wilson.

Shawnigan and Cobble Hill—Mrs. MacMillan, Mrs. Elford, Miss Calder, Mrs. Dyson.

Sooke and Otter—

Tillicum—Mrs. Lowery, Mrs. Carver, Mrs. E. J. Ridout, Mrs. Elliot, Dr. Helen Ryan, Mrs. J. C. Newbury, Mrs. W. Duval, Mrs. Ashe.

South Saanich—Mrs. Lawrie, Mrs. Gold.

West Saanich—Mrs. Verdier, Mrs. Murray, Mrs. Guy, Mrs. Crocker, Mrs. Osborne, Mrs. Wallace, Mrs. Walker, Miss Maber.

Parksville—Mrs. H. R. Harrison.

Lake Hill—Mrs. S. F. Tolmie, Mrs. M. E. Service, Mrs. Calvert, Mrs. Mercer.

APPENDIX No. 35.

ESTIMATED HONEY-CROP, 1919.

Vancouver Island and Gulf Islands.

District.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Comox	40	186	9,300	50
Duncan	70	280	8,000	29
Gulf Islands	40	145	3,000	20
Howe Sound	32	64	1,200	20
Nanaimo	120	480	12,000	25
Victoria	163	500	15,000	30
Totals	465	1,655	48,500	30

Greater Vancouver.

Burnaby	83	413	8,000	20
Coquitlam	16	75	1,120	15
Kerrisdale	24	88	2,080	24
South Vancouver	59	358	4,320	12
Marpole	18	68	1,520	23
North Vancouver	46	230	4,240	20
Point Grey	13	58	1,120	21
New Westminster	30	120	2,400	20
Vancouver	93	404	7,120	18
Totals	382	1,814	31,920	18

APPENDIX No. 35—*Continued.*

ESTIMATED HONEY-CROP, 1919—*Continued.*

Lower Fraser.

District.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Delta	71	439	21,180	50
Surrey	94	502	19,060	38
Langley	70	453	17,920	40
Matsqui	120	596	39,420	66
Maple Ridge	47	276	16,140	60
Richmond	47	208	4,160	20
Totals	449	2,474	117,880	50

Upper Fraser and Chilliwack.

Chilliwack	80	365	7,300	20
Kent	18	93	1,395	15
Dewdney	19	131	5,240	40
Mission	59	223	7,136	32
Sumas	45	289	11,849	41
Totals	221	1,101	32,920	30

Okanagan.

Okanagan	223	1,338	66,900	50

Kootenays.

Slocan Valley	12	50	6,100	122
Kootenay Lake and West Arm	24	72	3,845	53
Nelson	20	88	6,600	75
Arrow Lakes	21	168	10,820	65
Castlegar	6	74	2,825	40
East Kootenay	5	86	1,200	14
Boundary	11	207	6,620	32
Creston Valley	26	169	8,450	50
Totals	125	914	46,460	50

Summary.

Territory.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Vancouver Island and Gulf Islands	465	1,655	48,500	30
Greater Vancouver	382	1,814	31,920	18
Lower Fraser	449	2,474	117,880	50
Upper Fraser and Chilliwack	221	1,101	32,920	30
Okanagan	223	1,338	66,900	50
Kootenays	125	914	46,460	50
Totals	1,865	9,296	344,580	38

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