

PROVINCE OF BRITISH COLUMBIA

THIRTY-FIRST ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

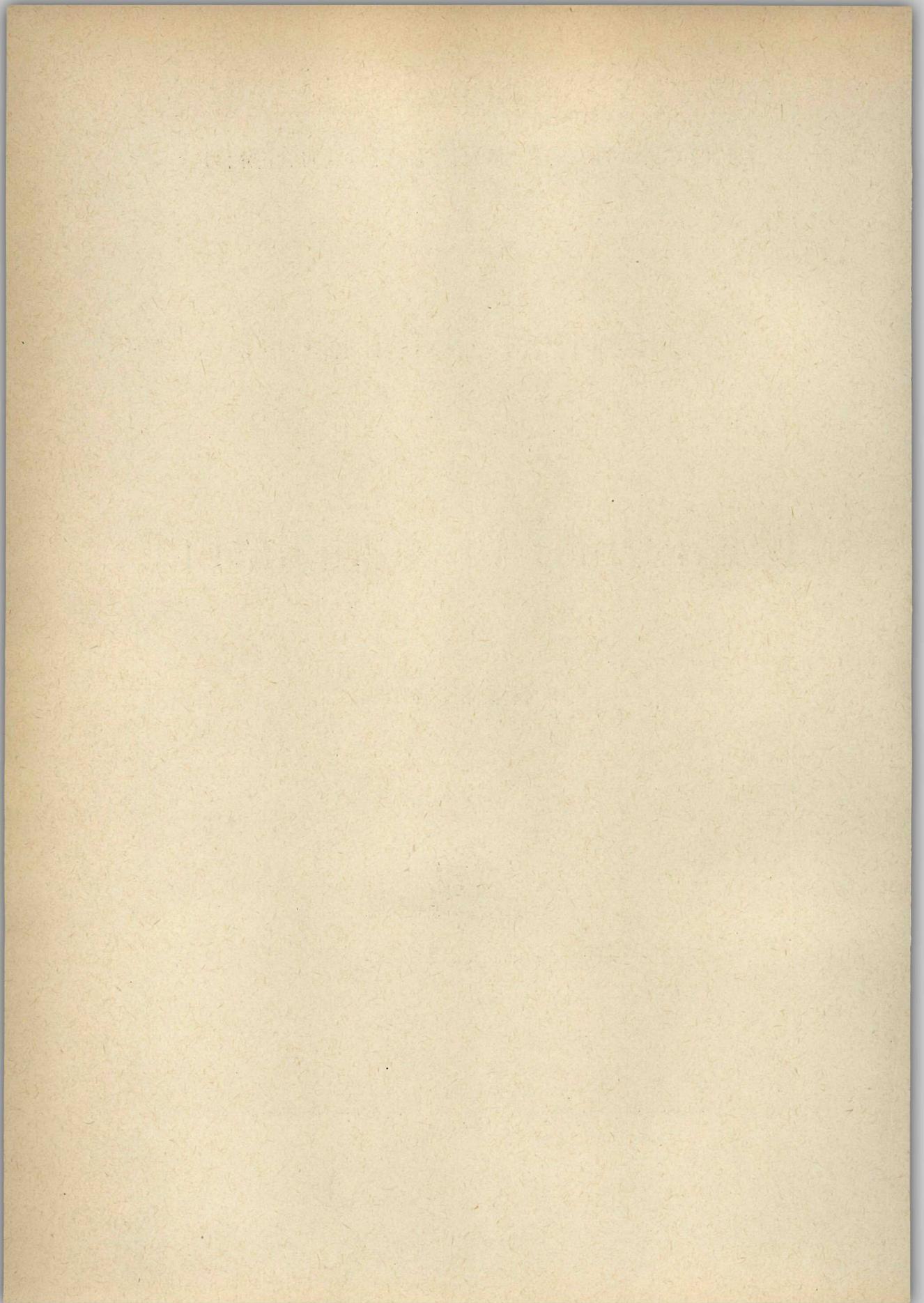
FOR THE YEAR 1936



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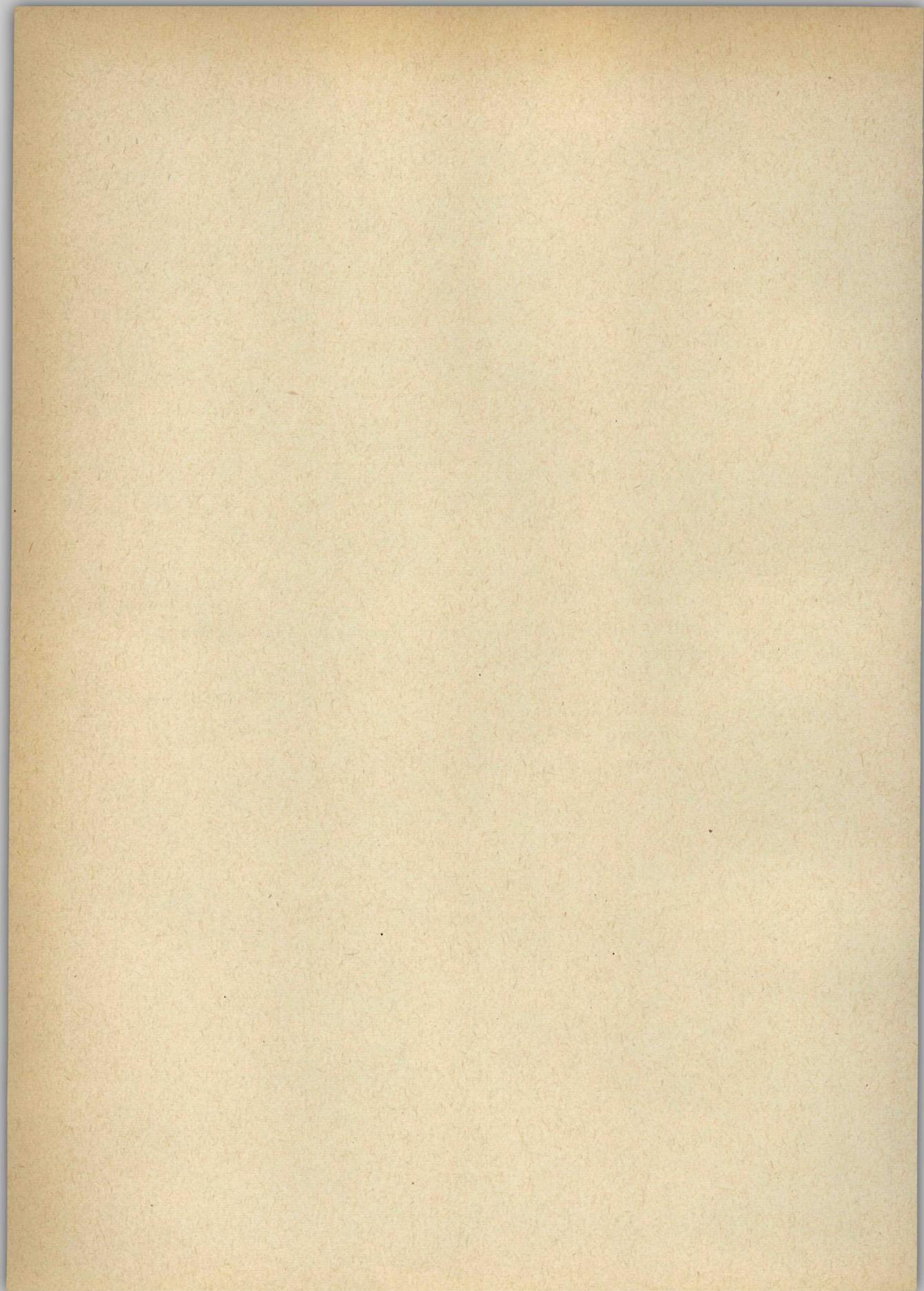
*To His Honour E. W. HAMBER,
Lieutenant-Governor of the Province of British Columbia.*

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 1936.

K. C. MACDONALD,
Minister of Agriculture.

*Department of Agriculture,
Victoria, B.C., March 31st, 1937.*



OFFICERS OF DEPARTMENT OF AGRICULTURE.

Honourable K. C. MACDONALD, Minister.

J. B. MUNRO, M.S.A., Deputy Minister.

ADMINISTRATION AND GENERAL SERVICES.

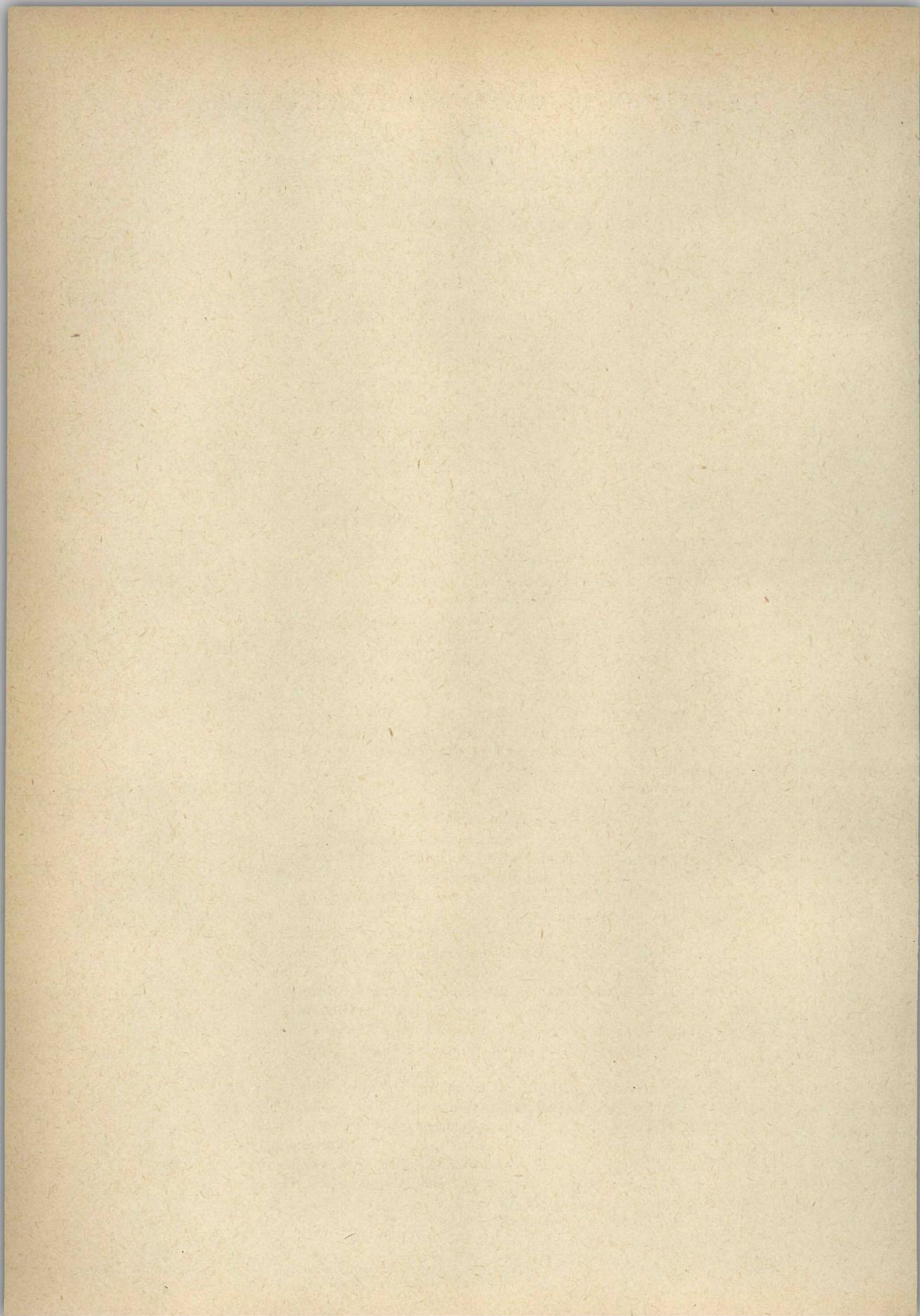
- J. A. GRANT, Markets Commissioner, Victoria, B.C.
W. H. THORNBORROW, Accountant, Victoria, B.C.
GEORGE H. STEWART, Statistician, Victoria, B.C.
C. P. L. PEARSON, Assistant Accountant, Victoria, B.C.
L. W. JOHNSON, Senior Clerk, Victoria, B.C.
A. J. HOURSTON, General Assistant, Victoria, B.C.
A. H. SHOTBOLT, Exhibition Specialist, Victoria, B.C.
C. C. KELLEY, B.S.A., in Charge of Soil Survey, Kelowna, B.C.
JAMES WELLS, Clerk, Victoria, B.C.

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R. P. MURRAY, B.S.A., District Field Inspector, Penticton, B.C.
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H. H. EVANS, District Field Inspector, Vernon, B.C.
C. R. BARLOW, District Field Inspector, Salmon Arm, B.C.
JOHN TAIT, District Field Inspector, Summerland, B.C.
G. L. FOULKES, Secretary, Horticultural Branch, Victoria, B.C.
V. TONKS, Secretary, Horticultural Branch, Vernon, B.C.
J. W. EASTHAM, B.Sc., Plant Pathologist, Vancouver, B.C.
W. R. FOSTER, M.S.A., Assistant Plant Pathologist, Saanichton, B.C.
MAX RUHMANN, B.A., Provincial Entomologist, Vernon, B.C.
A. W. FINLAY, Provincial Apiarist, New Westminster, B.C.
CECIL TICE, B.S.A., Field Crops Commissioner, Victoria, B.C.
S. S. PHILLIPS, B.S.A., Assistant Field Crops Commissioner, Victoria, B.C.
WALTER SANDALL, Field Inspector, Vancouver, B.C.

LIVE STOCK DIVISION.

- W. R. GUNN, B.S.A., B.V.Sc., V.S., Live Stock Commissioner, Victoria, B.C.
HENRY RIVE, B.S.A., Dairy Commissioner, Victoria, B.C.
F. C. WASSON, M.S.A., Dairy Instructor, Kelowna, B.C.
F. OVERLAND, Dairy Instructor, Vancouver, B.C.
G. H. THORNBERRY, Assistant (Milk Records), Victoria, B.C.
Dr. A. KNIGHT, Chief Veterinary Inspector, Victoria, B.C.
Dr. M. SPARROW, Provincial Veterinary Inspector, Vancouver, B.C.
Dr. J. D. MACDONALD, Provincial Veterinary Inspector, Victoria, B.C.
Dr. D. H. MCKAY, Provincial Veterinary Inspector, Kamloops, B.C.
J. R. TERRY, Poultry Commissioner, Victoria, B.C.
F. H. DAVEY, Secretary and Inspector, Live Stock Branch, Victoria, B.C.
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R. CAHILTY, Brand Inspector, Kamloops, B.C.
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R. G. SUTTON, B.S.A., District Agriculturist, New Westminster, B.C.
G. L. LANDON, B.S.A., District Agriculturist, Grand Forks, B.C.
G. A. LUYAT, B.S.A., District Agriculturist, Williams Lake, B.C.
SHIRLEY G. PRESTON, M.S.A., District Agriculturist, Smithers, B.C.
H. E. WABY, District Agriculturist, Salmon Arm, B.C.
JAMES TRAVIS, District Agriculturist, Prince George, B.C.
T. S. CRACK, Acting District Agriculturist, Pouce Coupe, B.C.



REPORT of the DEPARTMENT OF AGRICULTURE.

REPORT OF DEPUTY MINISTER OF AGRICULTURE.

J. B. MUNRO, M.S.A.

*Honourable Dr. K. C. MacDonald,
Minister of Agriculture, Victoria, B.C.*

SIR,—I have the honour to submit herewith the Report of the Department of Agriculture for the year ended December 31st, 1936.

AGRICULTURAL ANNIVERSARIES.

This year marks the 150th anniversary of the first attempt at farming on Vancouver Island. Although several sailing-vessels bound for the Pacific North-west Coast had carried agricultural products, and live stock which included goats, prior to the early summer of 1786, there is no record of any of the animals having been disembarked or any seeds sown in these northern latitudes until after the arrival of James Strange and his associates in 1786.

During the voyage from the Orient to Nootka the officers and men accompanying James Strange on his fur-trading enterprise suffered from the ravages of scurvy. In order to provide a change of occupation, surroundings, and diet, Mr. Strange had the suffering members of the crew put on shore at Nootka and under the supervision of the ship's surgeon, John McKay, they were given suitable treatment. As soon as they were strong enough to work they were set to clearing land, tilling the soil, and sowing seeds.

When James Strange departed from Nootka, to return to the Orient, John McKay by his own volition was permitted to remain at Nootka as the first British settler on the Pacific North-west Coast of America. With him there were left suitable implements and a wide variety of garden seeds and he was instructed to devote a part of his time and efforts to agricultural pursuits. The seeds for Nootka were brought from Europe and Asia by way of the Pacific route.

Among the very meagre records available in connection with this first settler is a statement to the effect that in addition to implements and seeds a number of goats were left in his care. As far as is known, goats were the first domestic animals brought to Vancouver Island and it is believed that they have been here continuously for 150 years. In the early days they proved valuable as a source of milk-supply for settlers and sailors, and in recent years goats have been a very important branch of animal industry in British Columbia.

The early attempts at gardening made by John McKay, who left Nootka in 1787 in company with Captain and Mrs. Chas. W. Barkley aboard the sailing-vessel "Imperial Eagle," were followed up shortly after by the Spaniards who took possession and erected fortifications at Nootka. Later on, when the establishment was relinquished by Bodega Y. Quadra, of Spain, to Captain George Vancouver, of Britain, there was a very fine garden in the vicinity of the fortification. This garden was largely the work of Don Pedro Alberni, of the Spanish command, under whose direction a creditable agricultural establishment had been developed. Besides the garden produce, the Spanish had developed a representative foundation of live stock and domestic fowls. The following extract from a Spanish record of 1792 reads:—

"The houses had all been repaired and the gardeners were busily employed in putting the gardens in order. The poultry, consisting of fowls and turkies, was in excellent condition and in abundance as were the black cattle and swine: of these Sen. Quadra said he should take only a sufficient quantity for passage to the southward, leaving the rest, with a large assortment of garden seeds, for Mr. Broughton. Senrs. Galiano and Valdez added all they had in their power to spare, amongst which were three excellent goats: I had likewise both hogs and goats to leave with him."

Nootka became the birthplace of agriculture on the North Pacific Coast a century and a half ago and in the intervening years gardens have been flourishing continuously at various places on Vancouver Island. Although Nootka has not become prominent agriculturally, it has the credit of commemorating a century and a half as a centre in which the farmers of this Province are very much interested.

At Fort St. James.—The year 1936 also marks the 125th anniversary of Daniel W. Harmon's first farming efforts on the Canadian mainland west of the Rocky Mountains. It was in the spring of 1811 that he cleared his first garden-site near Fort St. James at the foot of Stuart Lake and sowed the first seeds of agricultural crops. He experienced many difficulties and it was not until after five years had expired that his efforts, struggles, and disappointments were rewarded in 1816, when he was able to report in his journal that success had at last crowned his undertakings. His problems of 125 years ago included rabbits and other wild animals, insect pests, and late spring frosts. The seeds and potatoes for the Fort St. James garden were brought overland from Eastern Canada and from the "Old Establishment" which Peter Pond had developed in the Plains Country.

From the initial success of Daniel W. Harmon other traders and factors engaged in the fur-trading were encouraged to establish gardens around the trading-posts at Fort Fraser, Fort George, and Fort Alexandria, and other posts throughout the interior of the Province. Fort Alexandria became noted before the middle of the last century as a suitable centre for the production of cereal grains, and the milling industry developed in that vicinity, where a flour-mill with stones imported from Europe was finally established.

Kamloops, which next year intends to observe its 125th anniversary, also became an agricultural centre at an early date, and some of the best horses used in the fur brigades which carried bales of pelts from the northern and central interior down to Astoria before the establishment of Fort Victoria or the opening of a transportation route to Fort Langley, were reared in that section of the interior. Kamloops District is still noted for the excellence of its horses—both light and draught animals.

These early efforts at crop production preceded the farming ventures at Fort Langley and Fort Victoria, where agriculture was an important branch of the Fur Company's activities in the days when rental for the Alaskan lease was paid in farm products.

These remarks are not intended as a story of agricultural development in British Columbia, but are mentioned for their historical significance in view of the anniversaries being observed this year.

Victoria Exhibition.—Interest this year also centres around the fact that seventy-five years ago the British Columbia Agricultural and Industrial Association held its first fall fair in the City of Victoria. In this year's Victoria Exhibition the historical significance of the event of seventy-five years ago was fittingly observed. Of particular interest was a historical display, in which agricultural implements, farm equipment, and household effects used by the settlers on Vancouver Island three-quarters of a century ago were displayed in a special building under the supervision of a competent committee, which included representatives of this Department.

While agriculture is not usually regarded as the first among our primary industries in its annual cash returns to the people of the Province, it is readily admitted that it ranks first in its fundamental importance, and during the years in which records have been kept agricultural commodities to the total value of \$1,855,720,000 have been produced in British Columbia up to the end of the year 1936. Notable, too, is the fact that our lands are not depleted by this immense production, especially where good farm practices have been adopted. The current year's agricultural production is estimated at \$47,300,000. The detailed report of the Statistician will not be issued until market returns are received covering commodities held for sale in the coming winter.

Among other agricultural events which have been marked by anniversaries this year, it is well to recall the fact that twenty-five years ago the British Columbia Department of Agriculture and the British Columbia Poultry Association, in co-operation with the Vancouver Exhibition Association, organized the first egg-laying contest conducted on the American Continent. That contest, which was carried on in its initial stages at Hastings Park, Vancouver, and later at the Willows Park, Victoria, was discontinued when the Dominion Department of Agriculture undertook egg-laying contests at Experimental Farms as a Dominion-wide policy.

The British Columbia Poultry Association has been in existence for a quarter of a century and the Provincial Poultry Show at Vancouver this fall indicates, by its increase in entries and interest, that the organization is showing renewed vigour after several years of comparative inactivity.

NEW LEGISLATION.

At the first 1936 session of the Eighteenth Legislature amendments to a number of Acts affecting agriculture were enacted, as follows:—

Chapter 5, "*Canadian Farm Loan (British Columbia) Act Amendment Act, 1936.*"

This Statute, although not sponsored by the Department of Agriculture, is of interest to farmers, inasmuch as it terminates any indirect association of the Provincial Government with the organization and administration of the Canadian Farm Loan Board. The amending Act provides for sale to the Dominion Minister of Finance by the Minister of Finance for British Columbia of the capital stock of the Dominion Board held by the Province under the original terms of the Dominion Act.

Chapter 9, "*Codling-moth Control Act Amendment Act, 1936.*"

The amendments define the term "fruit lands" as meaning lands planted to or having thereon apple or pear trees whether for the raising of fruit commercially or otherwise, and whether or not the trees have reached a bearing age or in fact bear fruit. For repayment of the sums advanced provision is made for assessment of lands within the control area either on the basis of acreage at a uniform rate per acre or on the basis of a uniform rate per tree.

Chapter 21, "*Fruit, Vegetables, and Honey (British Columbia) Act.*"

At the request of the Dominion Department of Agriculture this Statute was re-enacted as enabling legislation to give the force of law, in British Columbia, to the Federal Statute under similar title, so far as that legislation is within the legislative competence of the Province and outside that of the Dominion.

Chapter 34, "*Natural Products Marketing (British Columbia) Act Amendment Act, 1936.*"

The amendments enacted at the first session were so materially revised by the legislation of the second session that the import of the legislation is reviewed under the Statutes enacted at the second session. The enactments of the first session, however, have particular significance because of the fact that they were precautionary, to be brought into operation by Proclamation. This step was taken in view of the reference to the Supreme Court of Canada as to whether the Dominion Statute was *ultra vires* of the Dominion. Pending the opinion of the Court, the amendments of the first session were enacted, to become law only in case the Dominion Act was found to be invalid. An adverse opinion was rendered on June 17th, 1936, and the following day, June 18th, a Proclamation was published in The British Columbia Gazette. Immediately following such Proclamation, Boards, solely under authority of Provincial legislation, were set up for operation of the following Schemes: British Columbia Tree Fruit; British Columbia Interior Vegetables; B.C. Coast Vegetables; B.C. Hothouse Tomato and Cucumber; Milk Marketing of the Lower Mainland of British Columbia.

Chapter 56, "*Sheep Protection Act Amendment Act.*"

A new section (17A) was inserted in the Act to place upon any municipality, having a by-law in force for collection of dog tax, liability for payment of losses sustained by owners of sheep, goats, and poultry destroyed within the municipality by dogs of which the owners are unknown, or for losses where the owners of the dogs are unable to satisfy judgments awarded against them.

Chapter 18, "*Dyking Assessment Adjustment Act Amendment Act.*"

Chapter 57, "*Sumas Drainage, Dyking, and Development District Act Amendment Act.*"

Provision is made for deferring for a period of years beyond the date set in the principal Act for payment of last instalment on dyking assessments.

Chapter 45, "*Obsolete Statutes Repeal Act.*" Under this legislation repeal of the "Dairy Products Sales Adjustment Act, 1929," and "Produce Marketing Act, 1926-27," is effected as these Statutes were declared *ultra vires* by the Privy Council.

At the second session of 1936, which was the fourth session of the Eighteenth Legislature, further amendments of agricultural interest were enacted. These were as follows:—

Chapter 17, "*Game Act Amendment Act, 1936 (Second Session).*" This legislation indirectly affects farmers who may be the owners of dogs, inasmuch as no person shall, between the 1st day of April and the 31st day of July, use or allow any dog to hunt or run after any game bird.

Chapter 30, "*Natural Products Marketing (British Columbia) Act Amendment Act, 1936 (Second Session).*" This legislation was enacted in two parts, the first of which became operative upon assent, and provides for the control and regulation in any or all respects of the transportation, packing, storage, and marketing of natural products within the Province, including the prohibition of such handling. The second part is to come into operation by Proclamation of the Lieutenant-Governor in Council and when in force will take the place of powers formerly intended to be vested in the Dominion Government under the "Natural Products Marketing Act" of the Dominion Parliament.

Chapter 8, "*Dewdney Dyking District Relief Act, 1929, Amendment Act, 1936 (Second Session).*"

Chapter 9, "*Drainage, Dyking, and Development Act Amendment Act, 1936 (Second Session).*"

Chapter 50, "*Sumas Drainage, Dyking, and Development Act Amendment Act, 1936 (Second Session).*"

These Statutes provide for the revision of assessment rolls so that irregularities in same may be remedied.

FARMERS' INSTITUTES.

The Farmers' Institutes which have been organized in practically all of our agricultural districts have continued to do useful work on behalf of their communities. The Department's policy of paying a flat annual grant of \$10 to each institute which complies with the departmental regulations and has ten or more members who have paid a subscription fee of at least \$1 a year appears to be satisfactory. Many communities have benefited by the departmental policies concerned with stumping-powder rebates, pure-bred sire purchase, Cyanogas purchase rebates, and seed-cleaning assistance. The Farmers' Institutes of the Central Interior have negotiated directly with one of the railway companies for the securing of railway-tie contracts on behalf of their members.

At the close of the year there were 210 Farmers' Institutes in good standing, three new institutes were incorporated, and three ceased to function. The total membership of the Farmers' Institutes is in excess of 5,000. General approval has been given to the change in regulations which now permits of Farmers' Institutes holding their annual meetings any time prior to March 31st. On account of road conditions many of the institutes in Central and Interior sections found it difficult to hold their meetings during the early part of January as had been required in former years.

District conferences were held in the ten Farmers' Institute districts and the Honourable the Minister, accompanied by his deputy, attended all of those except the conference held in the Peace River Block.

The number of agricultural subjects dealt with at the different conferences was varied and the resolutions passed totalled 102. Outstanding among the matters discussed were grazing problems in the East Kootenay, where it has been agreed that special assistance will be given in the erecting of a fence approximately 2 miles long on the International Boundary just west of Newgate. The local Farmers' Institute is to take the initiative in this fence-construction. Assurance of the continuation of the sire-purchase policy also was given to the delegates, who expressed appreciation for the assistance to the live-stock industry rendered through the Farmers' Institute policy. In the West Kootenay District the problems centred around fruit production and marketing of surplus farm products. The problem of weed-control is serious here as in other districts. In the North Okanagan and Salmon Arm Districts the high waters of the main rivers were reported to be causing serious damage to newly sown crops and the problem of land reclamation and adequate drainage in the spring were topics of chief interest. In several important areas crops had to be resown when the high waters had subsided.

In the Cariboo District general production and marketing problems related to the range cattle and sheep industry were chief among the topics considered, while in Central British Columbia the harvesting, cleaning, and marketing of timothy and clover seeds appeared to be of paramount importance. The low prices obtained for last year's timothy-seed adversely affected the farmers here. Prices obtained for the 1936 crop have been fair, and in general it appears that cereal-crops suitable for seed have been harvested in the northern area where early varieties of grains were distributed in spring.

Resolutions passed at all of these district conferences were assembled at Victoria and, at the call of the Honourable the Minister of Agriculture, the Farmers' Institute Advisory Board met in November and spent two days in dealing with the questions involved. The Advisory Board had an opportunity of meeting with the Select Standing Committee on Agriculture and laying before that Committee all questions requiring legislative consideration. Further time was spent by the Board members in dealing directly with heads of the several departments concerned with resolutions submitted by the District Institutes.

FLAG-DISTRIBUTION.

Many of the Farmers' Institutes of British Columbia have gone to the trouble and expense of acquiring properties and erecting their own institute halls. The enterprise of these institutes has been recognized by the Minister of Agriculture, who has instructed that in every case where a Farmers' or Women's Institute has built its own hall it is to receive, upon application, from the Department of Agriculture a regulation size Union Jack flag made in Canada from British wool. During the year more than fifty of these flags, which measure 4½ by 9 feet, have been supplied to Farmers' Institutes which have made application for them. The communities receiving these flags have expressed their appreciation of this form of recognition for their local endeavours.

WOMEN'S INSTITUTES.

In submitting the annual report of the Women's Institute Branch, the Superintendent, Mrs. V. S. McLachlan, presents the following statistics:—

Total number of Women's Institutes	164
Membership at June 30th, 1936	3,760
New institutes organized during year	3
Institutes in abeyance	2

The new institutes are Quick District, Woodpecker, and Main River. The two institutes which have gone into abeyance are Langley Prairie and Okanagan Mission, where difficulty has been experienced in finding new officers willing to carry on the institute-work.

The Provincial Board was called by the Honourable the Minister to meet in Victoria in February, and at that meeting arrangements were approved for a Provincial Conference of the Women's Institutes, to be held in Vancouver in August during the period of the Canadian Pacific Exhibition. The Department of Agriculture provided a grant of \$1,600 and the Women's Institutes contributed \$1,105.94 to make up a fund from which the transportation accounts for ninety-nine official delegates were paid, also the room and board of the five members of the Provincial Board and for a number of the delegates. The rent of the Conference hall and other incidental expenditures were met from this fund, which still has a balance of \$590.85 in hand.

The two major transportation companies allowed special passenger rates for the official delegates, and the officials of these railways took infinite pains to make arrangements for the convenience of the delegates.

The Conference was a success; approximately 200 delegates and members were in attendance at the sessions each day. Particularly valuable among the addresses were those delivered by the Honourable K. C. MacDonald, Minister of Agriculture, dealing with the "Marketing Act"; by Mr. H. B. King on the New Educational Curriculum; and Dr. Allon Peebles on Health Insurance.

An excellent exhibit of handicrafts, including samples of rug-work, weaving, spinning, lace-making, glove-making, pottery, etc., from various British Columbia centres was arranged by Mrs. M. A. Barber, of Hope.

Handicrafts, particularly those using local products, including wool and leather, are increasingly popular, and in many institutes demonstrations of carding, spinning, knitting, rug-making, etc., have been conducted during the year. One institute claims to have made 100 wool comforters since they introduced this handicraft.

District conferences were held in the Peace River, North Vancouver Island, South Vancouver Island, and in the Okanagan Valley. All of these except that in the Peace River District were attended by the Superintendent. South Fraser Conference was cancelled owing to serious illness of their President, and the North Fraser omitted holding their Conference but turned over their Conference funds to the Provincial Conference fund.

Fourteen Women's Institutes held fairs and each of these applied for the five prize books presented by the Department of Agriculture.

The Othoa Scott Trust Fund now has \$5,000 in Dominion Government bonds, and arrangements are under way to enable institutes to name one child to receive treatments from the interest on these bonds.

At the request of the Provincial President, Mrs. Zella McGregor, a bulletin of news and general information is stencilled in the office of the Superintendent of Women's Institutes each month and is sent out to all Women's Institutes throughout the Province.

JUNIOR CLUB PROJECTS.

During the current year in which I have served as Director on the Canadian Council of Boys' and Girls' Club Work, the secretarial duties connected therewith have been discharged by Mr. S. S. Phillips, Assistant Field Crops Commissioner, who in November accompanied our nine British Columbia contestants to the Toronto Winter Fair.

The following list, prepared by Mr. S. S. Phillips, shows the number of junior clubs organized in 1936 and their membership:—

Kind.	No. of Clubs.	Membership.
Dairy calf	24	259
Beef calf	6	62
Poultry	29	243
Swine	13	109
Potato	12	102
Totals	84	775

A tabulated list giving the names of the clubs, names and addresses of club organizers and secretaries, and number of members in each club is attached to report on file in Department at Victoria.

The rules and regulations governing clubs appear to be generally satisfactory for all clubs except potato and beef-calf clubs, and these, being new, are subject to revision.

Potato Clubs.—There is a feeling in some sections that all potato clubs should be organized as certified seed-potato clubs. The advisability of this at present is debatable, as there are possibly some sections of the Province that might be able to organize a potato club, but due to isolation may be unable to secure certified seed and take advantage of the Dominion inspection service. A temporary solution of this problem may be achieved by forming a potato-club policy of encouraging the organization of certified-seed clubs wherever possible, but still permit the organization of uncertified-seed clubs where conditions are such as to preclude the organization of certified seed-potato clubs.

Beef Calf Clubs.—There are some beef-raising areas in the Province in which spring organization of calf clubs is impossible. The beef-club policy should be widened to permit the fall organization of calf clubs in those districts and the club calves used to carry on winter-feeding projects. Club members in these clubs would be eligible to compete in the Provincial eliminations the following fall. Also beef-club members should be supplied with a book for keeping records and recording interesting events that may happen during the club-project period.

PROVINCIAL ELIMINATION CONTEST.

Prior to the final elimination contest held in Armstrong two preliminary contests were held, one at Vancouver during the Exhibition and one at Fort Fraser. As there were no potato teams eligible for Toronto in the Interior, the final for potatoes was held at the Vancouver Exhibition.

It is apparent that more special judges will be needed at both the Vancouver preliminary elimination and the final at Armstrong in order to stage these contests successfully. In the past we have depended on regular judges and usually at the time the contests are being staged they are engaged in judging regular classes. There has also been some criticism of holding the final contest every year at Armstrong. The district of Chilliwack feels that at least the final elimination in dairy cattle should be held in that district. This is a question that must be settled by those concerned with the club organizations in the several districts.

After the final contest at Armstrong the following members were chosen to represent the Province at Toronto:—

Project.	Name and Address.
Dairy Calf	Alan Nash and Noland Boss, Armstrong.
Beef Calf	Jean Brown, Hefley Creek; George McMorran, Kamloops.
Swine	Ross McLeod and John Harrower, Langley Prairie.
Seed-potato	T. Bull and John Clemens, Milner.
Public Speaking	Wilbert Brydon, Armstrong.

It was evident by the splendid standing of the British Columbia representatives at Toronto that all of our contestants had been well coached and had worked hard in their particular projects.

The seed-potato team took second place, dairy-calf team third place, beef-calf team fourth place, and swine team fifth place.

The representatives in the public-speaking contest were not placed with the exception of the first, which was won by the representative from Quebec. Wilbert Brydon, of Armstrong, had his address well prepared and made a very fine impression on the judges.

This is the first year that a public-speaking contest has been held at Toronto and it is generally felt that this should be made an annual event. It is equally important that the boys and girls be able to express themselves on agricultural topics as it is to take special training in any of the various projects.

LIME-TRANSPORTATION SUBSIDY.

The British Columbia Lime Committee, of which Mr. R. G. Sutton, District Agriculturist at New Westminster, is the Secretary, has held approximately twenty committee meetings during the year and has dealt with 365 applications for transportation subsidy on lime. Approximately 2,500 tons of agricultural lime have been transported in compliance with the regulations in 1936 and the policy has been more widely utilized this year than in 1935. Approximately 2,000 tons of the lime transported was applied on Fraser Valley farms and about 200 tons were used on Vancouver Island. The balance was shipped to various Interior and Central British Columbia points where, on account of soil-acidity, it is found advantageous to apply lime, particularly on land on which leguminous crops are to be grown.

FARM-IMPLEMENT PRICE INQUIRY.

At the request of the Select Standing Committee on Immigration and Agriculture of the Canadian House of Commons, a Farm-Implement Price Inquiry was undertaken on behalf of this Department in British Columbia by Dr. W. A. Carrothers, Chairman of the Economic Council. Dr. Carrothers and Mr. Neil Perry attended Farmers' Institute conferences in the Southern Interior, accompanied by the Minister and Deputy Minister of Agriculture, and, in addition, they made independent inquiries at distributing centres in British Columbia and in the State of Washington. The data which they assembled in this way, and with the assistance of departmental officials, have been drawn up and forwarded to Ottawa, where it has been given consideration by the Select Committee.

IMPORTED TOMATOES.

British Columbia hothouse-tomato growers have been concerned over the pin-worm infestation of Mexican tomatoes entering this Province, and the matter was discussed at Ottawa in December when the Minister of Agriculture for British Columbia and his deputy conferred with Federal authorities. We were informed that the new methyl-bromide gas treatment which can be applied to the imported tomatoes in certain storage-chambers in Vancouver would appear to afford an adequate safeguard against possible infestation in this Province. There is the further possibility that authorities of the State of California will demand methyl-bromide treatment of Mexican vegetables passing through that State, and this preventive treatment, in addition to the fact that pin-worm will not survive outside winter temperatures in Canada, may be sufficient safeguard against the possibility of a general spread of this pest within our Province.

TOMATOES IMPORTED FROM JAPAN.

A further threat of Oriental competition in the hothouse-tomato industry was encountered this year when 200 cases of greenhouse tomatoes grown in Japan were unloaded at Vancouver in January. This is the first commercial shipment and the fruit was in excellent condition, firm, and of good texture, but the flavour was not very pronounced. The value of these tomatoes was approximately 4 cents a pound.

There have been no reports of further importations from this source during the year; consequently, it is assumed that the transaction may not have proved advantageous either to the importers or to the shippers.

IMPORTED EGGS.

In compliance with the "Eggs Marks Act," chapter 74, R.S.B.C. 1924, and amendments thereto, all imported eggs and egg products into the Port of Vancouver during the year 1936 were inspected upon arrival to ascertain that the requirements of the "Eggs Marks Act" had been complied with. Imported eggs arriving into the Port of Victoria were inspected and reported to the office of the District Field Inspector, Court-house, Vancouver, B.C., through the courtesy of Mr. John Noble, Federal District Inspector.

The arrivals reported during the year are as follows:—

Port of Victoria: 7 doz. eggs for hatching purposes from U.S.A. and 108 cases of salted eggs from China.

Port of Vancouver: 4 doz. eggs for hatching purposes, 100 cases Grade B eggs, and 25 lb. dried egg-yolk from U.S.A. and 433 cases of salted eggs from China.

The salted eggs from China are used solely by Chinese residents in Canada for medicinal and flavouring purposes.

FEED-GRAIN IMPORTATIONS.

Mr. Walter Sandall, Field Inspector on the Lower Mainland, has again dealt with the importations of feed-grains, which, under Tariff 145 of the Canadian Freight Association, are transported at special reduced freight rates. During the year, 970 feed-grain certificates were issued. This represents a decrease of 216 certificates as compared with the 1,186 that were made out in 1935. The quantities of feed-grains brought to the Coast districts from Alberta under this arrangement, which permits of the producers securing reduced transportation on shipments of feed-grains that comply with the regulations, includes 28,843 tons of wheat, 5,593 tons of barley, 4,553 tons of oats, 288 tons of mixed grains, 82 tons of rye, and 63 tons of screenings. Details of these feed movements will be found in Appendix No. 6.

CHAMBER OF AGRICULTURE.

The British Columbia Chamber of Agriculture, which held its annual meeting in Vancouver in January, is a subsidiary of the Canadian Chamber of Agriculture, which was organized at Toronto in November, 1935. During the year the Canadian Chamber of Agriculture has concerned itself with watching developments connected with the "Natural Products Marketing Act"; conferring with Government officials regarding matters of general interest to agriculture; establishing national contacts for the exchange of mutually helpful information;

investigating developments connected with the renewal of Empire agreements, as these affect agriculture and exploring the advisability of promoting an Empire Producers' Conference in connection therewith.

It is difficult, at this stage, to indicate any definite or constructive work that has been accomplished by this comparatively young organization. The suggestion has been made to the Chamber that it should deal only with resolutions or problems which have a broad aspect or which refer to matters of general policy. There appears to be a general impression that unless considerable discretion is exercised the Chamber of Agriculture may become involved in matters which are already dealt with by Agricultural Departments, or through the direct negotiation of representatives of existing agricultural organizations.

HONEY INDUSTRY.

The opinion of our Provincial Apiarist, Bee Inspectors, and the representatives of Honey Producers' Associations has been expressed this year in favour of the annual registration of apiaries. Unless annual returns are received from bee-keepers so that their apiary registration may be kept up to date, it seems impossible to economically provide satisfactory inspection services. The present registration, which does not require the filing of annual returns, appears deficient and consideration of the advisability of revision of the Provincial requirements is recommended.

The bee-keeping industry has completed seventy-five years of continuous progress in this Province. The first two colonies of bees were brought to Vancouver Island in the spring of 1860, when bees were valued at \$150 a colony and honey was retailed in Victoria at \$1 a pound. Bees had been carried into the Okanagan Valley two years before they were introduced into Vancouver Island. The priests maintained several colonies at the Okanagan Mission after carrying them more than 300 miles from the United States of America in 1858. In those days flowers capable of adequate nectar-secretion were not available to the bees in the Okanagan Valley, and until orchards and alfalfa and clover meadows were established, bee-keeping was not a profitable undertaking. Production of surplus honey in the Thompson and Okanagan Valleys dates back approximately forty years. At present, however, this Province is producing approximately 1,500,000 lb. of surplus honey each year and the industry is receiving more attention from the Department. In 1936, in addition to our Provincial Apiarist, we have engaged the services of six local Bee Inspectors on temporary bases.

FIELD OFFICIALS' REPORTS.

In this Annual Report the information supplied by the several field officials of the Department will be found embodied in the reports of the various branches. Matters pertaining to live stock have been incorporated in the report of the Live Stock Commissioner, those referring to field crops have been included in the report of the Field Crops Commissioner, while the Provincial Horticulturist has assembled in his report all data pertinent to fruit- and vegetable-crop production which has been submitted by District Horticulturists and Field Inspectors.

During the summer Mr. R. G. Sutton was absent from the Lower Mainland owing to illness, and Mr. G. L. Landon is absent from the Grand Forks District during the fall. Mr. Landon is supervising the inspecting and blood-testing of 75,000 birds in Lower Mainland flocks, incidental to these flocks being approved as breeders.

PEACE RIVER BLOCK.

In view of the requests for seed-grain that have come to the Department each spring, it is encouraging to note in the report of Mr. T. S. Crack that for the coming spring there will be no shortage of seed-grain. In the spring of this year one car-load of seed-oats of an early variety was sent into the Block for distribution to competent farmers, who exchanged their own oats of later varieties suitable for green feed production, and which in turn were issued by the Relief officials to settlers on relief.

Mr. Crack states that one car-load of certified Legacy seed-oats was shipped through the Department of Agriculture into the Peace River Block, and was distributed to fifty-eight farmers for the purpose of providing them with better seed, also to enable the settlers to

provide foundation seed for themselves. This was very satisfactory in every way. The oats yielded very well, averaging approximately 80 bushels per acre of good quality when threshed.

The report further indicates that up to the end of December forty-two out of the sixty-nine threshermen operating in the Block had threshed approximately 500,000 bushels of wheat, 500,000 bushels of oats, and 100,000 bushels of barley, in addition to rye and grass seeds.

In the past the Provincial and Federal Departments of Agriculture have contributed jointly to the cost of purchasing power-operated seed-cleaning plants to be placed with organized farmers in different parts of the Province. In view of peculiar conditions in the Peace River Block, where sparse settlement makes it difficult for farmers to bring their seed together to particular centres for cleaning, both Departments have agreed to a policy of making available to Farmers' Institutes hand-operated seed-cleaners and approval has been given for the purchase of ten such cleaners or fanning-mills to be delivered in the Peace River Block this winter.

NEW PUBLICATIONS.

The Department publications distributed during the year amounted to 48,544 copies, being an increase of 7,981 copies over 1935. The following is a list of the publications printed during the year:—

Fifth List of Dairy Sires	Dairy Circ. No. 29
The Improvement of Dairy Herds	Dairy Circ. No. 30
Certified Milk and Butter-fat Records, 1935	Dairy Circ. No. 31
Anthracnose	Hort. Circ. No. 45
Cabbage-root Maggot	Hort. Circ. No. 32
Making Lime-sulphur at Home	Hort. Circ. No. 61
Soap Solutions for Spraying	Hort. Circ. No. 40
Pests of Cultivated Plants	Hort. Circ. No. 72
Diseases of Cultivated Plants	Hort. Circ. No. 73
Field Crop and Garden Spray Calendar.	
Blackberry Culture	Hort. Circ. No. 57
Celery Culture	Hort. Circ. No. 70
Currant and Gooseberry Culture	Hort. Circ. No. 56
Orchard Cover-crops	Hort. Circ. No. 51
Selection of Orchard Sites and Soils	Hort. Circ. No. 53
Rhubarb Culture	Hort. Circ. No. 67
Soiling and Annual Hay Crops	Field Crop Circ. No. 13
Farm Drainage	Field Crop Circ. No. 14
Potato Diseases	Field Crop Circ. No. 15
Goat-raising in B.C.	Bulletin No. 64
Preservation of Food	Bulletin No. 83
Management of Geese	Poultry Circ. No. 12
Poultry-house Construction	Poultry Bull. No. 63
List of Publications.	
Climate of B.C., 1935.	
Annual Report of the Department, 1935.	
Agricultural Statistics, 1935.	

BARBERRY ERADICATION.

In the Lower Mainland sections of the Province it is generally believed that some definite and drastic action must be taken for the eradication of the common barberry (*Barberis vulgaris*). Losses to oat-crops through heavy infestations of black rust (*Puccinia graminis*) have been reported through the Delta and adjacent districts, and in these districts the presence has been reported of many large bushes of the common barberry, which is a notorious host-plant for this disease. It appears that voluntary measures in connection with the removal of the common barberry are inadequate and farmers are pressing for measures that will make compulsory the eradication of the host-plant. The attention of our Plant Pathologist has been directed to this problem and his recommendations are awaited.

WHEAT PESTS.

On Vancouver Island those farmers who are endeavouring to produce enough wheat for their own requirements have faced two serious insect problems this year. The wheat-midge (*Thecodiplosis mosellana*) has been particularly prevalent in up-island sections. This pest is most destructive to the immature grain in the spring-wheat varieties, but even in some of the fall-sown wheats which mature late in the season the midge has been very prevalent. In autumn of this year several 1-acre plots of fall-wheat varieties have been sown on well-prepared and properly-fertilized soils. Records in connection with seeding dates, etc., are being kept, and it is hoped that through the securing of reliable data our farmers may be advised as to suitable varieties of wheat to grow and proper date for seeding of both fall and spring varieties.

The other insect pest which has troubled the wheat-producers mainly on Saanich Peninsula and in the Metchosin District is the Hessian fly (*Cecidomyia destructor*). Some very interesting and useful results have been achieved by Mr. W. R. Foster, Assistant Plant Pathologist, who in collaboration with Mr. C. E. Jeffries, of the Experimental Farm at Saanichton, has prepared a scientific paper entitled "Resistance of Winter Wheats to Hessian Fly." In their investigations Messrs. Foster and Jeffries have found that two of our best-known fall-wheat varieties, the Dawson Golden Chaff and the Red Rock, are practically immune to the attacks of this pest. Other varieties in the experimental plots have been seriously affected, while these two varieties remain practically 100 per cent resistant.

GOLDEN BAMBOO INFLORESCENCE.

Officials of this Department have taken a keen interest in the work that is being done by Mr. J. B. Keys, of View Royal, near Victoria, in the growing and propagating of a number of bamboos (*Bambusa* sp.). This year the golden bamboo (*Phyllostachys aurea*) showed considerable inflorescence and produced a number of viable seeds, some of which have germinated during the late autumn and early winter. According to correspondence passing between Mr. Keys and British and American authorities, the golden bamboo in other parts of the world has also produced inflorescence this year and the interesting theory with respect to the life of this species after it has bloomed is being kept in mind.

PROVINCIAL FEEDS STANDARD BOARD.

The Feeds Standard Board, which was appointed in 1934, and prepared its preliminary report in October, 1935, did not add any supplementary information for publication during 1936. It has been suggested that this Board might well take the initiative in dealing with feed-experiment recommendations for British Columbia, and also that the feasibility of recommending certain locally produced feedstuffs might be given definite consideration. These are among the matters which are before the Board for further attention.

HIGH WATERS, 1936.

A sudden rise in temperatures toward the end of May caused rapid melting of snow in the mountainous regions adjacent to a number of agricultural sections. As a result there was high water in the several main rivers of the Province and many of their tributaries. In the Skeena River Valley Indian villages and settlers' homesteads adjacent to the stream at different points between Kispiox and Terrace were inundated, and after the floods had subsided fields were left with a covering of silt, varying from a few inches to several feet in depth; a number of homes were swept away and there was much soil-erosion of a spectacular character.

In the vicinity of Prince George, at the confluence of the Nechako and Fraser Rivers, water was unusually high in early June and some limited areas were inundated. Very little damage was done in this section. In the Southern Interior the Columbia River overflowed its banks between Revelstoke and Arrowhead, causing loss to many settlers occupying land on the lower levels. Some losses also occurred at the headwaters of the Thompson River. Along the shores of the Shuswap Lake and on lands adjacent to Mara Lake and Spallumcheen River, particularly between Grindrod and Enderby, the trouble here was aggravated by heavy precipitation during the first week in June.

Nowhere in the Province was the damage to farm crops heavier than in the Hatzic-Dewdney District, where pumping facilities were inadequate to cope with the run-off from the mountains due to high temperatures and heavy rains and due to seepage through the dykes. Practically all of the dykes in the larger reclaimed areas held, but seepage-water rose and was responsible for damage in sections adjacent to Chilliwack, particularly on the lower fields. On some of the smaller areas the dykes broke and also a number of private dyking areas were inundated with resultant losses. The water receded rapidly from most of the areas, but on account of the peculiar conditions existing in the Hatzic-Dewdney District the water-levels remained sufficiently high through June and part of July as to render it impossible for farmers to produce forage, grain, and root crops sufficient for the needs of their live stock. Special assistance was rendered to settlers in this unorganized district, and it is anticipated that the feed-supplies made available will be sufficient to carry the farm animals through the winter and until pasture is available next spring.

Owing to the absence from the Fraser Valley of the District Agriculturist during the summer months, assistance was rendered to the farmers by Messrs. G. A. Luyat, District Agriculturist for the Cariboo, and Walter Sandall, District Field Inspector at Vancouver. The latter supervised the distribution of hay, oats, and other commodities. Fortunately, there was adequate hay and oats available on the reclaimed Sumas area to fill orders for necessary forage and grain for live stock in the areas under private dykes on the north side of the Fraser River.

"KNOW-MISSISSIPPI-BETTER PARTY."

In July a party of citizens from Mississippi and adjacent States visited British Columbia in the course of a trip through the United States and Canada. On their arrival in Victoria they were met by the Minister of Agriculture and other Government representatives, and through their leader, the Honourable Dennis Murphree, all members of the party were invited to visit points of interest on the Island during the brief stop-over of the ship upon which they were travelling.

The party was accompanied to Vancouver by Mr. W. H. Currie, Assistant Director of the Provincial Bureau of Information, and your Deputy Minister. Each member of the party was presented with a souvenir envelope containing several booklets descriptive of British Columbia. This gesture of welcome and good-will was very much appreciated by the 167 members of the party, many of whom have written to this Department expressing their appreciation of the kindly treatment they received while they were in this Province.

BRITISH NATIONAL UNION.

In April the British National Union Party of primary producers, returning to Britain from their New Zealand trip, arrived in Victoria and were shown about the city and peninsula by officials of the Department of Agriculture. The party was headed by Major John Duncan, distinguished military officer, who hopes to return to British Columbia next year in company with another party of members and friends of the British National Union.

STAFF CHANGES.

The changes in the staff of the Department during the past year include the following resignations, transfers, and new appointments:—

Resignation of Miss M. D. C. Doull as stenographer in the Dairy Branch, effective December 9th, 1936.

Donald Sutherland, District Agriculturist at Smithers, transferred to Kamloops as District Agriculturist to succeed G. W. Challenger, who resigned, January 1st, 1936.

H. S. French transferred from District Agriculturist at Prince George to District Field Inspector at Penticton, April 1st, 1936.

Miss I. P. McMillan appointed stenographer at Kamloops office, December 27th, 1935.

S. G. Preston appointed District Agriculturist at Smithers, January 15th, 1936.

Miss D. Anderson appointed stenographer, Vancouver office, February 24th, 1936.

T. S. Crack appointed Acting District Agriculturist at Pouce Coupe, April 1st, 1936.

Miss M. Renyard appointed stenographer in the Dairy Branch, Victoria, September 24th, 1936.

REPORT OF MARKETS COMMISSIONER.

J. A. GRANT.

The year 1936 has seen business in general make a good start towards recovery. Unemployment has been lessened and wheat and other food values increased. With this increased purchasing-power in the producers' hands, trade has been the best since 1929. The greatest increases were in the lines of necessity, which, in price and volume distributed, set a new high since the depression set in. Some lines have benefited more than others as organized, orderly marketing replaced selling under stress, thereby gradually increasing values as the demand justified and measuring the supply on a year's need instead of forcing the market at harvest-time. No doubt the unusual drought conditions, coupled with strike troubles, stimulated the increased movement to a greater extent than normal circumstances would have required in some lines, while other lines were diminished by the severe frost in November, 1935. This frost particularly reduced the crop of all stone-fruits and outside importations got the business that, under normal weather conditions, would have been produced at home. Beef prices have advanced slightly, due to drought conditions on the Canadian and northern middle-west States and partially to the trade treaty between Canada and the United States.

The production of field crops was heavy in British Columbia this year with ideal weather during the growing and harvesting season. The early crops of forced and field rhubarb were marred in their marketing by a divided deal which brought about internal competition and resulted in disaster to the growers.

FORCED AND FIELD RHUBARB.

Shipments of forced rhubarb as usual started early in January. The deal was again a split one; two factions, representing two groups of growers competing for volume outlet, brought down prices under 1935. Approximately 20,000 crates of forced rhubarb were produced and sold.

The marketing of field rhubarb was even more demoralized than the forced rhubarb, as part of the deal was controlled centrally through an agency acting for a majority of the growers, while the other part was handled by another agency acting for the minority, who shipped direct to a chain of wholesale jobbers. The first five cars rolled by the old organization netted growers \$1.11 per box, but when competition got under way there was no bottom to the deal. The old organization shipped forty-six cars which netted an average of 39¼ cents per 40-lb. case. Seventeen cars were shipped by the minority. Last year the old organization shipped ninety-three cars averaging 77½ cents per case. At least fifty cars were left on the plants as prices dropped below handling charges—some cars netting less than handling costs. This disaster was brought about by the want of harmony between growers and shippers, and the lesson it taught will, we hope, help in correcting future shipments of this commodity.

HOTOHOUSE TOMATOES AND CUCUMBERS.

Tomato prices were slightly lower than 1935 and cucumber prices slightly higher. The following table gives the quantity sold and where they were marketed:—

First crop—	Tomatoes.	Cucumbers.
	Crates.	Crates.
Vancouver jobbers	47,851	14,283
Victoria	14,644	1,524
Other points in British Columbia	2,303	329
Alberta	19,670	4,765
Saskatchewan	6,132	1,493
Manitoba	13,209	3,595
Ontario	14,400	500
Quebec	1,200	3,200
United States	150	.....

Second crop—	Tomatoes. Crates.	Cucumbers. Crates.
Vancouver jobbers	16,884	35
Victoria	1,846	51
Other points in British Columbia.....	457	25
Alberta	4,403	3
Saskatchewan	5,440	2
Manitoba	1,935	-----
Ontario	6,720	-----
United States	600	-----

STRAWBERRIES.

The main strawberry-crop was sold under 90 per cent. voluntary control. The crop was not as heavy as in 1935. Eighty-five cars were shipped to Prairie points by voluntary control and seven by independent shippers. In addition to car-lot shipments, 28,846 crates were shipped L.C.L. to Alberta points.

Car-lot shipping commenced on June 10th, six days later than in 1935 and thirty days later than 1934. Wynndel had a very small crop this season and shipped only twelve cars, compared to twenty-nine cars in 1935. In all, ninety-two cars were shipped this year and 153 cars in 1935.

Average net returns \$1.78 per crate, as against \$1.55 last year.

77 cars were shipped by C.P. express.

11 cars were shipped by C.N. express.

3 cars were shipped by C.P. freight.

1 car by truck.

Approximate express and freight charges, \$36,852.14.

RASPBERRIES.

The demand for raspberries is not as great as was the case a number of years ago, and although satisfactory returns were made this season the fact remains, for the present at least, that the prospect for increased production is not bright. Twenty-seven cars were shipped, with an average net return per crate of \$1.94, as against \$1.62 last year. The twenty-seven cars were shipped by C.P. express. Twelve cars of raspberries were also shipped to the Prairies from Kelowna, B.C., making in all thirty-seven cars compared to forty-seven in 1935. In addition to car-lot berries, 20,722 crates were shipped L.C.L. to Prairie points.

LATE-BERRY DEAL.

The late-berry deal is made up chiefly of Everbearing strawberries, with a quantity of blackberries, some loganberries, and late raspberries. Fifty-one cars were shipped this year, as against forty-four last year. Five cars were shipped to Eastern Canada—Toronto two and Montreal three. Average net returns:—

Strawberries, \$1.76 per crate.

Blackberries, \$1.16 per crate.

46 cars were shipped by C.P. express.

5 cars were shipped by C.N. express.

PROCESSED SO₂ BERRY DEAL.

	Export. Lb.	Domestic. Lb.
Strawberries—		
Lower Mainland	233,200	346,846
Vancouver Island	67,210	177,470
Okanagan Valley	16,650	3,700
Kootenay	5,232	33,150
Totals	322,292	561,166
Raspberries—		
Lower Mainland	88,800	226,026
Vancouver Island	-----	2,347
Totals	88,800	228,373

Approximate price, 6 cents per pound.

CHERRIES.

The production of cherries in the Okanagan and Kootenay Districts is now sufficient in volume to fully take care of all the local and Prairie demand. Prices in 1936 were unsatisfactory for British Columbia cherry-growers, due to unseasonable rains splitting a considerable portion of the crop. The Bing and Lambert constitute the main shipping varieties. During the season 121,421 cases were shipped to Prairie points. In addition to the fresh-cherry shipments, the following were processed in SO₂ and sold on the Canadian market:—

	Lb.
Lower Mainland	247,774
Vancouver Island	29,038
Okanagan Valley	810,250
Kootenay	14,250
Total	1,101,312

STONE-FRUITS.

Apricots.—The apricot-crop was almost a total failure, due to the late fall freeze and early spring frosts. The total shipments amounted to 2,530 suit-cases and 841 4-basket crates.

Plums and Prunes.—The demand for British Columbia Italian prunes has increased gradually since the application of seasonal tariffs and prices realized have been satisfactory to growers. Owing to adverse spring weather during blossom-time the crop has been insufficient to take care of the Prairie demand and the balance of this demand was imported from Pacific Coast points—namely, Oregon and Washington. Plums, on the other hand, are not popular and the market has difficulty in absorbing the small volume now produced.

	Cases.
Plums shipped	78,339
Prunes shipped	151,501

Peaches.—Early frosts in the spring, coupled with bud-injury through November, 1935, freeze, accounted for another bad year in peach production. The volume dropped from 273,882 boxes in 1934 to 126,969 in 1935 and this year the total amounted to only 81,007 boxes. A greater importation than usual came from Washington this year, but the British Columbia product held preference in colour and quality. The varieties mostly in favour are Rochester, Vidette, Elberta, and J. H. Hale.

PEARS.

There was a fair crop of late pears. Bartletts had rather an off-year. The demand at Prairie points for pears is not great and the supply from the Interior is usually sufficient to meet the demand. The total shipped to Prairie points this season was 185,781 boxes, with prices slightly lower than last year. Eight cars were shipped to the British market.

APPLES.

Prices have improved steadily since 1934 and each year there has been a successful clean-up of all stocks on hand. This year the trade expressed satisfaction as to quality, colour, and price and every Province in Canada has consumed more British Columbia apples this year than last, as will be shown in the following tables. Few claims for breakdown have been made this year and both export and domestic markets have shown steady improvement in prices during the season which bids fair to continue until the end of the deal.

	Boxes.
The 1935 apple-crop was estimated at	4,484,577
Less frozen fruit	1,005,407
Total	3,479,170
Apples unsold at December 24th	777,710
The 1936 crop was estimated at	4,196,492
Apples unsold at December 22nd	671,374

EXPORT AT DECEMBER 19TH.

	1936. Boxes.	1935. Boxes.
Great Britain	1,550,417	1,977,350
Egypt	17,843	21,454
South Africa	46,195	28,729
South America	47,626	25,704
Scandinavia		8,316
France	6,616	12,040
New Zealand	3,620	4,020
United States	16,573	
Other countries	16,959	11,018
Totals	1,705,849	2,088,631
Routed by Atlantic	953,114	
Routed by Pacific	752,735	

DOMESTIC SHIPMENTS BY PROVINCES TO DECEMBER 19TH.

	1936. Boxes.	1935. Boxes.
British Columbia	118,364	142,622
Alberta	464,079	454,163
Saskatchewan	462,443	435,767
Manitoba	326,244	294,026
Ontario	141,761	81,621
Quebec	207,089	79,063
Maritime Provinces	15,971	6,820
Totals	1,735,951	1,494,082

COAST POTATO-SALES.

Potatoes held over from the 1935 crop by the Coast Vegetable Marketing Board were all sold, and this condition left a keen demand for the new crop at Prairie and Western States points. From June 15th to August 21st:—

	Sacks.
Prairie Provinces took	32,566
Drought areas in United States	13,160
Seattle	10,918
Portland	3,321

Computed as cars, the Prairies took 102 cars and United States points seventy-one cars. In 1935 potatoes sold by the Board amounted to 44 tons per day and in 1936 sales averaged 47 tons per day.

It is estimated that the potato holdings in Coast areas are slightly less than in 1935 and the same condition exists in the Interior. The prospective demand gives the Potato Boards the assurance of a satisfactory clean-up of all stocks held at prices fully equal to those at present ruling. Last year's sales amounted to 325,000 sacks, while this year they will exceed 330,000 sacks. Prices this year average considerably higher than last year.

INTERIOR VEGETABLES.

Owing to the unsettled state prevailing by reason of the Supreme Court of Canada deciding that the Dominion "Produce Marketing Act" was *ultra vires* of the Dominion Government powers, the interprovincial trade was disorganized, and as the volume of outside shipments, made through the Interior Vegetable Marketing Board, are not compiled at time of submitting this report, we are giving the shipments made within the Province only. For comparison we give shipments made to Provincial points in 1935.

	1936.	1935.
Beans (lb.)	575	2,075
Cantaloupes (crates)	10,189	13,856
Cantaloupes (flats)	57	70
Tomatoes, green (boxes)	112	35
Tomatoes, semi-ripe (crates)	4,835	5,382
Tomatoes, semi-ripe (lugs)	40,291	49,115
Tomatoes, canning (tons)	16,222	12,837
Bunch vegetables (dozen)	631	1,590
Corn (dozen)	1,023	1,759
Cauliflower (dozen)	279	388
Celery (tons)	95	62
Cabbage (tons)	39	23
Carrots (tons)	96	116
Turnips (tons)	45	122
Potatoes (tons)	6,677	7,493
Onions (tons)	1,835	2,578
Silverskin onions (lb.)	5,019	31,385
Cucumbers (peach-boxes)	3,569	3,308
Lettuce (crates)	1,003	1,367
Lettuce (flat crates)	444	---

MARKETING AND CONTROL MEASURES.

The shipping season of 1936 was exceptionally hampered by upsets in method of distribution and regulation. As was expected, the Dominion Government submitted the "Produce Marketing Act" passed in 1934 to the Supreme Court for review as to its legal status. The Supreme Court ruled that this Act was *ultra vires* of Dominion powers, mainly because it trespassed on Provincial rights. While this decision has been appealed and up to the end of 1936 the Privy Council has not given a verdict, and because the submission was a reference and not a set case, those having Dominion schemes were informed they could carry on. The public and Provincial Courts acted on the assumption that any test of the Act would result in the same verdict and immediately nearly all active marketing schemes were attacked. The Provincial Legislature passed an Act at the spring session aimed at orderly marketing and control within the Province, and proclaimed this Act immediately after the decision of the Supreme Court was known. This gave the existing Boards sufficient status to carry on.

An injunction restraining the Coast Vegetable Marketing Board from inspecting trucks on the highway was secured on the grounds that Provincial authority had no control over interprovincial trade. There was no means of telling what was for export or for the home market and the powers of the Board were jeopardized. At the fall session of the Legislative Assembly additional powers were provided in a new Act controlling transportation, storing and packing in addition to marketing, thereby re-establishing the power to search in transit and control storage.

The Interior Vegetable Marketing Board was worse off than the Coast Board, inasmuch as nearly all their produce had to be shipped interprovincially. The Tree Fruit Board was similarly situated. The powers conferred by the 1936 Act (Second Session) of the Legislative Assembly gives these Boards fresh hope that some control may be exercised over interprovincial shipments while the products are still in the Province.

New schemes have been authorized to the Coast and Interior Vegetable Marketing Boards and to the Mainland Milk Board, and applications have been made for new schemes by the Tree Fruit Board and the Halibut Marketing Board. The rhubarb and small-fruit growers have presented a scheme which, they hope, will be operative for the marketing of their products in 1937.

As the year draws to a close farmer are encouraged in the belief that they have at last secured control of the sale of their products within the Province, but the means to control the distribution of products shipped to interprovincial markets is still without a satisfactory solution.

Your Markets Commissioner found Prairie jobbers anxious to co-operate in controlling irregular shipments in order to stabilize buying-prices, as stability in price is a great factor in securing a maximum of distribution. Consumers buy readily at fair prices, but if prices are irregular the tendency is to wait for a lower price, and whether they go lower or not consumption is lessened.

This office sent out over 100 Market Bulletins during 1936. They were mailed out to the press, to correspondents, and growers' organizations. We have on file many applications, mostly from dealers to be placed on the mailing-list and many offered to pay for the accommodation. However, we have been reluctantly compelled to refuse them. During 1937 there will be only one bulletin issued weekly on Tuesday of each week, except holidays.

REPORT OF PROVINCIAL HORTICULTURIST.

W. H. ROBERTSON, B.S.A.

Seasonal conditions from a horticultural standpoint have been most varied. January was mild, but was followed by a cold period in February which did considerable damage in the tree- and small-fruit sections of the Province. The spring was late in all areas, but favourable weather in the later part of this period materially improved the crop outlook, particularly in the small-fruit sections. Rains during the early part of the summer interfered with harvesting of certain crops, particularly cherries. From the middle of July onward, however, conditions were very dry, and this continued until the early winter, with the result that the situation gave indications of being serious, especially in the Dry Belt areas. A heavy fall of snow in the Interior and rain on the Coast in early December has improved the situation generally.

HORTICULTURAL CROPS.

Tree-fruits.—Some idea of the tree-fruit production in the Province for the past year may be obtained from the figures given below:—

Fruit.	1935 Production.	Estimated 1936 Production.
Apples (boxes)	5,144,700	4,448,100
Crab-apples (boxes)	139,500	117,200
Pears (boxes)	269,200	250,700
Plums and prunes (crates)	435,400	299,800
Peaches (crates)	133,700	114,600
Apricots (crates)	99,900	8,000
Cherries (crates)	159,800	147,500

The extremely low temperatures of October, 1935, followed by a cold period in February of the present year, did a great deal of damage in all of the principal tree-fruit areas. There was a heavy loss of apple, cherry, and apricot trees, as well as severe bud-injury which helped to materially shorten the crop. Where bud-injury only was caused the trees will make a satisfactory recovery, but in many cases it will be necessary to replant certain varieties of apples and apricots. Pears and peaches on the whole have made an excellent recovery and under favourable conditions the 1937 crop should be well above the average.

The quality of the fruit produced this season has been excellent, and while the size, particularly in the case of apples, has been small, the colour has been good—a combination well suited to the export trade. During the cherry season rain interfered with picking, and while the fresh-fruit market was poor, the growers were able this year to turn a fair percentage of their crop into the plants which were putting up SO₂ fruit. This as a future outlet for cherries seems to have wonderful possibilities. A great deal, however, will depend on what tariff arrangements can be made to encourage this industry.

Small Fruits.—Like the tree-fruits, the small fruits were a smaller crop than in 1935. The following figures are an estimate of the 1936 production:—

Fruit.	1935 Production.	Estimated 1936 Production.
Strawberries (crates)	620,900	409,000
Raspberries (crates)	154,900	101,800
Blackberries (crates)	39,444	43,550
Loganberries (lb.)	2,185,992	1,422,000
Gooseberries (lb.)	272,400	289,320
Red and black currants (lb.)	374,300	390,400
Grapes (lb.)	1,515,500	1,464,000

Winter-injury of small fruits was particularly severe in the Lower Mainland areas and throughout the Interior of the Province. In the case of strawberries there was difficulty in securing planting stock of certain varieties, with the result that the new plantings were heavier to "everbearers" than in any previous year. Raspberry plantings were also severely injured, as were loganberries with a resultant short crop. In the case of loganberries the price was somewhat better than in 1935, as, while wineries took a comparatively small tonnage, there was a demand for this fruit on the part of the canneries.

Grape acreage remains about the same in all areas, with a possible tendency to increase slightly in the Fraser Valley. There was considerable winter-injury to the vines, but on the whole no permanent damage was done and indications are that the 1937 crop should be above the average.

Gooseberries, red and black currants produced a normal crop, which this year was in demand. There is, however, a comparatively small demand for these crops and no extensive increase in planting is noted.

Rhubarb.—At the present time there are approximately 685 acres devoted to this crop in British Columbia. Of this total over 650 acres are grown in the Fraser Valley. In addition to the quantity shipped to the fresh market in the spring, a large tonnage is also forced and sold during the winter months. Mr. G. E. W. Clarke, District Horticulturist for the Fraser Valley, in his annual report makes the following statement regarding the growing of rhubarb in that section:—

"The margin of profit is very small in connection with forcing and handling this crop, but each year this crop represents a gross return of several thousand dollars. Growers of late years have been inclined to have supplies of this product on the market too early, as during December and January the public do not feel inclined to eat rhubarb.

"In addition to supplying local requirements, shipments amounting to over twenty-two cars went to points outside the Province during the period from January 5th to April 21st. While this is an increase over the previous year, the demand during the early part of the season was comparatively small.

"As to field rhubarb, the backward, cold spring delayed the movement of this crop, and it was not until April 21st that the first car was shipped, which was just a week later than the previous year.

"The cold winds and low temperatures during the last of March and the early part of April caused damage to the early 'pulling' in particular.

"A situation was reported towards the close of the shipping season, to the effect that a number of cars were showing a breakdown of the stalks. This situation was checked in a number of fields and no indications of disease appeared to be present.

"On account of lack of information, it was impossible to go into this matter thoroughly, any more than it appeared that the 'breakdown' of the stalks developed following removal from the field. There is the possibility that severe freezing of the crowns, just as growth was commencing in the early part of April, may have been the contributing factor.

"The high level of the Fraser River during June resulted in the flooding of a considerable acreage of the rhubarb-crop, and in some instances this will probably affect the yields of quite an acreage for 1937."

Vegetables.—There has been little change in the vegetable industry during the past year. The acreage was, if anything, smaller than in 1935, and in the case of certain crops such as lettuce and celery there was a considerable loss in some areas due largely to lack of market demand. Tomatoes were a light crop and the market for semi-ripes was poor. Canning-tomatoes were in demand and at a slightly higher price than in 1935. Onion acreage also

showed a decrease and a general decrease in yield with an upward price tendency. Asparagus acreage was somewhat higher than in the past and an increased yield is indicated. Greenhouse crops of tomatoes and cucumbers show little or no change either in production or price returns.

The following figures show the estimated acreage of the principal vegetable-crops in comparison with the 1935 acreage:—

	1935. Acres.	1936. Acres.
Tomatoes	2,890	2,707
Onions	1,370	1,173
Lettuce	315	386
Celery	227	198
Cucumbers	286	206
Cabbage	372	381
Cantaloupes	263	231

There are numerous other crops in addition to those mentioned which might be dealt with. Amongst the most important are the following:—

Peas.—This crop has been dealt with in the reports of Mr. G. E. W. Clarke, District Horticulturist, and Mr. C. R. Barlow, District Field Inspector. The following statements are from the reports in question:—

“The contracted acreage in the Fraser Valley of canning peas was about 1,900 acres, but high water, due to flooding and seepage, caused considerable reduction in acreage. Over 200 acres were lost on Barnston Island. In spite of the loss of acreage, the size of the pack was a little better than expected.

“The acreage in dried peas is now practically negligible on the Lower Mainland, due primarily to the losses caused annually by ‘pea-moth.’

“In the Salmon Arm, Tappen, and Grindrod sections approximately 200 acres of peas were grown this year. These peas were grown under contract for processing as ‘split peas,’ ‘soup-mix,’ etc., and for sale as dried peas. Contracts were signed by forty-eight growers and acreages varied from 1 to 20 acres. The varieties grown were ‘Large Yellow’ (‘Sterling’), ‘Scotch Green,’ ‘British Lion,’ ‘Idabelle,’ and ‘Prussian Blue.’ The ‘Large Yellow’ variety was grown principally on the bench lands, while the crop on the moister bottom lands was chiefly comprised of the other varieties. Before all arrangements were completed and the seed on hand the season was well advanced and the crop was seeded late, in a few instances not until the end of May. The majority of the growers were not familiar with the handling of a pea-crop, and considerable loss occurred at harvesting-time from ‘shelling-out,’ due to the crop having been allowed to become overmature. In spite of the late seeding, and in some cases the mismanagement of the crop, most of the fields were ready for harvesting by August 15th, and produced an average yield of approximately 1 ton to the acre, while yields of from 1½ to 1¾ tons per acre were secured under good conditions, and some growers report a net profit of \$30 per acre. The crop, so far as was observed during the growing season and after threshing, was entirely free from insect pests or disease.

“The outcome of the project and the quality of the crop grown has been sufficiently encouraging to induce the contracting firm to contract for a much larger acreage next year and, provided that this is accomplished, to establish a processing plant in the North Okanagan. The firm in question proposes to contract for approximately 1,000 acres of peas in the North Okanagan, and of this acreage nearly 350 acres has already been contracted for in the Salmon Arm District. Your Field Inspector has given all possible assistance to and has spent considerable time in the furthering of this project, as it was felt that the growing of peas would provide a much-needed cash crop in addition to filling a useful niche in the agricultural programme of the district.”

Tobacco.—This crop, which gave promise at one time of extensive planting, appears at the time of writing to be on the decline. In 1926, 50 acres were planted in the Okanagan and in 1927 this was increased to approximately 300 acres. This was the largest planting in any year in British Columbia. The following year the Okanagan acreage declined and plantings were started in the Fraser Valley on the Sumas Reclamation Area. This acreage eventually reached a maximum of 200 acres. Recent figures show a variable acreage, as in 1935 only twenty were planted and that in Sumas District. The planting in 1936, which was all in that district, amounted to 100 acres. The future of this crop is questionable.

Seeds and Bulbs.—There are many sections of the Province well adapted to the growing of seed, and while the production of flower-seed shows little increase, there has been a marked increase in vegetable-seed production. In support of the above statement the following figures are interesting:—

	1927.	1935.
Flower-seed (value)	\$25,500.00	\$28,673.00
Vegetable-seed (value)	15,800.00	62,315.00

Gradually the Canadian seed trade is realizing that satisfactory vegetable-seed may be obtained in British Columbia, and while the demand at present is not large, each year shows an increase which is promising.

Bulbs such as narcissi, tulips, iris, etc., are being grown in increasing quantities, particularly in the Coast areas. Excellent markets are being developed in Eastern Canada, with the result that a number of growers are extending their plantings. The 1935 recorded acreage of bulbs in the Province was 209 acres.

HORTICULTURAL SURVEYS.

Small-fruit Survey.—A survey of the small-fruit and rhubarb acreage was made this year. The figures secured as a result of this survey show a remarkable increase in planting of small fruit in the last four years. This is particularly true of the strawberry plantings, which are the highest on record. Of the 3,300 acres planted to this crop, approximately 340 acres are "everbearers." A table showing the approximate plantings of each crop since 1920 has been prepared and is submitted as Appendix No. 1.

Asparagus Survey.—In conjunction with the small-fruit survey, the acreage devoted to asparagus was also secured. The following figures show the present plantings:—

District.	1936.	1935.	Previous.	Total.
	Acres.	Acres.	Acres.	Acres.
Vancouver Island.....	2	3½	29¾	35¼
Fraser Valley.....	11¼	7¾	144	162½
Salmon Arm.....	—	15½	10	25½
Clearwater.....	—	—	1¼	1¼
North Okanagan.....	2½	8¼	226	236¾
Kootenay and Boundary.....	3¼	½	9¾	13½
Totals.....	19	35	420¾	474¾

Tree-fruit Survey.—In the report of this Branch for 1935 mention is made of this survey. The field-work was completed last year and the compilation of the figures obtained was made in 1936. The survey in question covers only the Okanagan and Kootenay Horticultural Districts as they are the principal tree-fruit areas in the Province. A table showing a comparison of the total number of fruit-trees in these two districts for the years 1920, 1925, 1930, and 1935 is given below:—

Okanagan.

	1920.	1925.	1930.	1935.
Apples.....	1,103,550	1,147,511	1,137,851	1,130,554
Pears.....	61,819	70,254	84,589	106,438
Plums.....	21,981	20,874	16,689	16,395
Prunes.....	44,940	33,420	31,029	56,883
Cherries (sweet).....	23,629	28,854	30,686	43,603
Cherries (sour).....	9,091	7,152	4,571	2,452
Apricots.....	31,991	51,107	43,770	56,640
Peaches.....	47,378	52,425	47,157	132,297

Kootenay.

	1920.	1925.	1930.	1935.
Apples.....	483,312	378,096	289,546	244,557
Pears.....	30,445	21,820	18,254	25,914
Plums }.....	50,170	25,031	13,792	17,339
Prunes }.....				
Cherries (sweet).....	21,566	22,822	30,086	38,762
Cherries (sour).....	8,196	4,942	2,784	2,123
Apricots.....	204	712	983	2,613
Peaches.....	2,189	1,505	2,142	6,143

Acreage may be computed on the basis of number of trees per acre as follows: Apples, 60; cherries, 60; pears, 70; plums, prunes, peaches, and apricots, 100.

INSPECTION AND PEST-CONTROL WORK.

Potato-beetle Control.—This work was again under the supervision of Mr. F. A. Marsack. The following statement from his report gives briefly the present situation in so far as this pest is concerned:—

“The potato-beetle control-work for the three months of June, July, and August, 1936, has again been carried out by the British Columbia Provincial Department of Agriculture, and distributions of calcium-arsenate dust has been made free to all potato-growers in the areas of potato-beetle infestation.

“While control has been good generally, there has been a tendency on the part of some growers, who had only a few bugs and beetles to contend with, to neglect to use the proper precautions at the proper time. It has not always been possible to locate these neglects until too late, the larvæ having already gone to ground to eventually become a menace next year. There have been no cases of refusal to dust when the necessity has been pointed out.

“The area of infestation has been considerably reduced this year, although two small infestations were found beyond last year’s limit, one at Natal in the east and one a few miles north of Kuskonook in the West. These two were well looked after at the start and are in the hands of competent growers.”

Fire-blight Control.—In many sections of the Okanagan and Kootenay Districts fire-blight is reported to have been more prevalent than for a number of years. The usual spring inspections were made and carried out as effectively as possible with the staff available. A general summary of the situation in the Southern Okanagan is given by Mr. R. P. Murray, District Field Inspector at Penticton:—

“All sections of the district, except Keremeos and Cawston, had more fire-blight this year than for several years. The wet, cool spring was ideal for its development, and quite a lot of damage resulted. Bosc and Bartlett pears were most seriously affected, while Flemish Beauty, that are usually quite susceptible, were almost free of the disease. A careful winter inspection should be made at Oliver, Kaleden, and Penticton to check any further increase. Should this be done, assistance will be necessary if a thorough clean-up is to be accomplished.

“Zinc chloride 43 per cent. was used as a demonstration on a badly infested block of Bosc, Bartlett, and Winter Nellis at Oliver, with very satisfactory results. This treatment is new to most of the Oliver growers and a good deal of interest is being taken in the use of this material by the pear-growers of this district.”

It is hoped that this year it will be possible to give this work in all districts the attention required. The table given below shows the results of the 1936 inspection in the Okanagan:—

Fire-blight Inspection, 1936.

District.	Total Acres inspected.	Total Acres inspected and passed.	Not passed.
Salmon Arm.....	338	333	5
Vernon.....	3,640	3,103	537
Kelowna.....	5,000	4,533	467
Summerland.....	3,298	3,118	180
Kaleden.....	45	45	-----
Totals.....	12,321	11,132	1,189

San Jose Scale.—At the present time San Jose scale is found at several points in both the Okanagan and Kootenay Horticultural Districts. The heaviest infestation is in the Keremeos-Cawston District. The infested orchards here, as well as in other areas, have been sprayed with either lime-sulphur 1-9 or a dormant oil spray. Necessary pruning has also been done and quarantines covering the movement of fruit rigorously enforced. Further sprays will be applied in all areas during the present winter and every attempt made to eradicate this pest.

Codling-moth Control Areas.—Protection spraying zones, seven in number, located in different sections of the Okanagan and Kootenay Districts, were again in operation this year. No new zones were constituted.

In the Vernon area codling-moth sprays were applied in both the city area and the adjacent fruit-growing areas. In this adjacent territory the finding of further moth-infested areas raised the acreage sprayed in 1936, of approximately 350 acres, to a possible 900 acres which would have to be sprayed in 1937. As the cost of this work would materially raise the assessment, the committee in charge decided to put the question to a vote of the growers. Of the 188 ballots sent out, eighty-seven were returned, with fifty-three voting against the Government continuing the work. As the matter stands the work in the commercial areas will in the future be undertaken by the growers.

Nursery Inspection.—Under the "Plant Protection Act" it is required that all nurserymen, either principals or agents, shall take out a nursery licence before they are permitted to sell nursery stock in the Province. For the present year there were eighty-seven licences issued, sixty-five to nurseries and twenty-two to agents.

The inspection of nursery stock is also carried out by your officials, particular attention being paid to the inspection of fruit stocks. The records for the present season show that over thirty nurseries were inspected. Of a total of 92,169 trees inspected, 3,718, or 4.3 per cent., were destroyed.

PRUNING DEMONSTRATIONS.

Pruning demonstrations were held this year in different sections of the Province. In some sections there are more applications than can be handled by the field officials. During the past season fifty-six demonstrations were held, with a total attendance of 758. The attendance at these demonstrations is most satisfactory and warrants a continuance of this work.

HORTICULTURAL DEMONSTRATION-WORK.

In order to obtain first-hand information to supplement the recommendations made by officials of this Branch, it is often necessary to undertake a certain amount of demonstration-work. This will naturally vary according to the needs of the district. Some idea of the varying nature of such work may be obtained from the following list of projects:—

District Location.	Project.
Vancouver Island	Strawberry Plant Selection; Strawberry Variety Trials; Raspberry Variety Trials; Boysenberry Trials; Lettuce Variety Trials; Sprays for Anthracnose-control; Sprays for Strawberry-scorch.
Lower Mainland	Lettuce Variety Trials; Boysenberry Trials; Strawberry Plant Selection; Raspberry-mulching Work; Sprays for Brown-rot.

District Location.	Project.
Okanagan.....	Raspberry Variety Trials; Boysenberry Trials; Apple-scab Control-work; Pea Variety Tests; Tomato Variety Tests; Lettuce Variety Tests; Lettuce-fertilizer Tests; Orchard-fertilizer Tests; Fruit-storage Records; Codling-moth Spray Trials; Cover-crop Work; European Red-mite Sprays; Apple Powdery-mildew Sprays.
Kootenay.....	Orchard-fertilizer Work; Mealy-bug Control; Apple-scab Control; Orchard-fertilizer Work; Corn Variety Tests; Raspberry Variety Tests.

While the above list gives a general indication of various lines of horticultural demonstration-work that are being carried out in different sections of the Province, it is thought advisable to mention specifically a few of the major projects.

Anthracnose Sprays.—This project, which is under the supervision of Mr. E. W. White, District Horticulturist, has been running since 1933 and was continued in 1936:—

“Three different strengths of Bouisol were tested in comparison with Bordeaux mixture.

“*Tanner Bros.’ Orchard, Keating, B.C.*—The spraying done in 1934 and 1935 was continued in 1936. The sprays were applied on August 17th, compared with August 8th in 1935 and August 17th in 1934. The weather was fine and warm. Bouisol in strength of 1½, 3, and 4½ pints to 100 gallons of water and 4-4-40 Bordeaux mixture were tested out in comparison with a check.

“*W. J. Jennings’ Orchard, Duncan, B.C.*—The same plots were used in 1936 as in 1935 and 1934. The spraying with Bouisol was done on July 30th, compared with August 5th in 1935 and August 23rd in 1934. Owing to trouble with the spray-machine it was necessary to postpone the spraying with Bordeaux until a few days later. The weather was fine and very warm. The same mixtures were used as in Tanner Bros.’ orchard. On October 23rd half of each plot was sprayed with 4-4-40 Bordeaux as an added preventive.

“In conjunction with Mr. W. R. Foster, Assistant Provincial Plant Pathologist, counts were made in Tanner Bros.’ orchard on May 11th and 12th and in W. J. Jennings’ orchard on May 14th. Mr. Foster has submitted the following tables showing the progressively good results from the check or no spraying through the different strengths of Bouisol to the Bordeaux mixture:—

“Table 1.—Result of spraying King of Tompkins Apples with Bordeaux and Different Strengths of Bouisol on the Number of Anthracnose Lesions at Tanner Bros., Keating, 1936.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*		
	Tree 1.	Tree 2.	Total.
Check.....	31	24	55
Bouisol, 1.5 pints.....	15	14	29
Bouisol, 3.0 pints.....	8	11	19
Bouisol, 4.5 pints.....	8	7	15
Bordeaux.....	5	2	7

* Lesions on 25 twigs were counted on each tree.

"Table 2.—Result of spraying Belle de Boskoop Apples with Bordeaux and Different Strengths of Bouisol on the Number of Anthracnose Lesions at Tanner Bros., Keating.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*		
	Plot 1.†	Plot 2.	Total.
Check.....	122	122	244
Bouisol, 1.5 pints.....	88	93	181
Bouisol, 3.0 pints.....	37	38	75
Bouisol, 4.5 pints.....	31	21	52
Bordeaux.....	9	12	21

* Lesions on 25 twigs on each tree were counted.

† A plot consists of five trees.

"Table 3.—Result of spraying Northern Spy with Bordeaux and Different Strengths of Bouisol at W. J. Jennings, Duncan.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*			
	Tree 1.	Tree 2.	Tree 3.	Average.
Check.....	90	126	.....	108.0
Bouisol, 1.5 pints.....	25	91	100	72.0
Bouisol, 3.0 pints.....	33	48	.....	40.5
Bouisol, 4.5 pints.....	5	16	.....	10.5
Bordeaux.....	7	18	.....	12.5

* Lesions on 25 twigs on each tree were counted.

"Table 4.—Result of spraying Ontario with Bordeaux and Different Strengths of Bouisol at W. J. Jennings, Duncan.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*			
	Tree 1.	Tree 2.	Tree 3.	Total.
Check.....	183	223	173	579
Bouisol, 1.5 pints.....	164	160	87	407
Bouisol, 3.0 pints.....	118	74	110	302
Bouisol, 4.5 pints.....	48	62	45	155
Bordeaux.....	19	12	20	51

* Lesions on 25 twigs on each tree were counted."

Raspberry Variety Tests.—For a number of years this Branch, through its district offices, has been trying out various varieties of raspberries in order to ascertain the variety best suited to any particular district. While it is impossible to deal with all the reports submitted, the following will give a fair outline of the work in hand. Mr. C. R. Barlow, District Field Inspector for Salmon Arm, submits the following:—

"Following up the variety tests conducted at Salmon Arm during the past three years, when six varieties were under trial nine more have been placed under test this year in the hope of improving upon the 'Newman 23' variety, which, though lacking in quality, was found to be the most valuable, under local conditions, of the varieties already tried. This spring the following varieties were planted on the farm of Mr. W. J. Honey at Salmon Arm: 'Ohta,' Newman 20, Adams 87, Preussen, Antwerp, June, Chief, Ontario, and Newburgh. Twenty-five canes of each variety were planted, this being all that the Dominion Experimental Station at Agassiz, from whom the plants were obtained, could supply at that time. This number, though small, should give some indication of their respective varietal merits. The canes arrived rather early and it was necessary to keep them 'heeled in' for more than two weeks, until the ground

was fit for planting. However, while they have not made strong growth, the majority have lived, and should make fair growth next year, but not until the 1938 season can a crop sufficient to base comparisons upon be expected.

"It may here be noted that a few plants of Boysenberry were also planted this spring on the same farm. These plants have made good growth and should produce a few berries next year."

Dealing with this same subject, Mr. H. H. Evans, District Field Inspector for Vernon, outlines the work as carried on in that area:—

"This series is a continuation of tests begun in 1932 in an effort to obtain varieties carrying improvement in qualities over our present commercial varieties.

"The past winter, with the severe October freeze and the long sub-zero spell of February, provided ideal conditions for proving the factor of hardiness in all varieties of raspberries, especially those under irrigated conditions of culture. The following observations were made on April 28th:—

"*Count*.—Wintered well; slight tip-injury; canes breaking well.

"*Brighton*.—Practically same conditions as *Count*.

"*Latham*.—Best of all plots; no injury; buds breaking well to the tips.

"*Newman 23*.—Not quite as good as *Latham*; more weak buds and slight tip-kill.

"*Lloyd George*.—Upper 3 feet of cane severely killed; lower 4 feet very good.

"*Newburgh*.—Slight bud-kill; canes came through very well.

"*Adams 87*.—Very good condition; odd canes showing injury.

"*Chief*.—Excellent condition; buds breaking well to the tip.

"*Jones Berry*.—Upper half of canes severely killed; lower half coming good.

"*Viking*.—Upper one-third of canes severely hurt; considerable bud-injury.

"*Cuthbert*.—About 75 per cent. complete cane-kill; hardest hit of all varieties. Patch destroyed.

"Powdery mildew was almost absent from the plots. *Latham* only showed slight infection.

"All varieties made excellent cane-growth during the season.

"*Newman 23* was again severely attacked by the raspberry fruit-worm.

"The following varieties have been discarded this fall as not measuring up to requirements: *Jones Berry*, *Newman 23*, *Count*, *Brighton*, and *Adams 87*.

"Following is the table of yields for 1936. *Chief*, *Newburgh*, and *Jones Berry* are two years younger than the balance of varieties. Plots contain twenty-five plants each.

"*Raspberry Yields, 1936.*

Variety.	First Picking.	Peak Picking.	Final Picking.	Yield in Pints per Plant.	Remarks.
<i>Count</i>	June 25.....	June 30.....	July 16.....	2.7	These two varieties very similar in all respects; good quality, but berry too small.
<i>Brighton</i>	June 25.....	June 30.....	July 16.....	2.7	
<i>Latham</i>	July 3.....	July 15.....	July 24.....	1.2	
<i>Newman 23</i>	July 9.....	July 20.....	July 25.....	0.8	Shy bearing. Quality, colour, and size of berry good, inclined to crumble.
<i>Lloyd George</i>	June 27.....	July 8.....	July 22.....	2.8	Yield very poor. Wormy fruit caused loss. Quality and colour fair.
<i>Newburgh</i>	July 6.....	July 16.....	July 22.....	0.5	Good yield. Quality and colour good. Too soft for distant markets.
<i>Adams 87</i>	June 27.....	July 8.....	July 22.....	0.9	Plants young. Yield promising. Quality, size, and colour good.
<i>Chief</i>	June 29.....	July 4.....	July 16.....	0.3	Quality and size good. Colour poor. Sun-scald very bad.
<i>Jones Berry</i>	June 29.....	July 5.....	July 14.....	0.2	Plants young. Quality, size, and colour only fair. Hard to rate at present.
<i>Viking</i>	June 24.....	July 18.....	July 28.....	2.8	Plants young. Quality fair; colour poor; size fair. Quality, size, and colour very good. Winter-injury reduced crop heavily.

"*Cuthbert* all winter-killed. Winter-injury and hot, dry summer reduced yields of all plots."

Apple-scab Control.—This work has been carried on at various points throughout the Province. In the Kootenay District the spraying necessary was carried out by Mr. E. C. Hunt, District Horticulturist. His report follows:—

“Apple-scab control has been one of the major lines of work carried on in the Kootenay Horticultural District by your District Horticulturist for a number of years. Many different kinds of spray materials and combination mixtures have been under test for the control of this disease. Some of these materials were dropped after a one-year test, while others that gave promise of a successful spray either alone or in combination have been given several years’ test. At the present time reliable information can be obtained by growers on the control of this disease in their orchards.

“The following results cover in detail the tests made this season in the control of apple-scab:—

Plot No.	Spray Periods.	Material and Proportion used.	No. of Apples counted.	Clean.	Scabbed.
<i>Sunshine Bay District.</i>					
1	Pink	Lime-sulphur 1-40	1,905	96.6	3.4
	Calyx	Lime-sulphur 1-40			
	1st cover	Lime-sulphur 1-40			
	2nd cover	Lime-sulphur 1-40			
2	Pink	Lime-sulphur 1-60, plus 4 lb. Calcium Arsenate to 100	2,420	98.5	1.5
	Calyx	Lime-sulphur 1-60, plus 3 lb. Calcium Arsenate to 100			
	1st cover	Same as calyx			
	2nd cover	Same as calyx			
3	Pink	Iron Sulphate Mixture, modified strength for all sprays (Iron Sulphate 6 lb., L.S. 1½ gals., Calcium Arsenate 3 and 4 lb. to 100 gals. of water)	1,318	95.1	4.9
	Calyx				
	1st cover				
<i>Willow Point District.</i>					
4	Pink	Lime-sulphur 1-40	924	92.5	7.5
	Calyx	Lime-sulphur 1-40			
	1st cover	Lime-sulphur 1-40			
	2nd cover	Lime-sulphur 1-40			
5	Pink	Lime-sulphur 1-60, plus 4 lb. Calcium Arsenate to 100	999	98.4	1.6
	Calyx	Lime-sulphur 1-60, plus 3 lb. Calcium Arsenate to 100			
	1st cover	Same as calyx			
	2nd cover	Same as calyx			
6	Check	Unsprayed (Sunshine Bay District)	947	19.2	80.8

“The variety used in the above experiment was McIntosh Red and all trees of full bearing age. The spraying dates were as follows: Pink, May 11th and 15th; calyx, June 1st and 2nd; 1st cover, June 15th and 16th; 2nd cover, July 2nd. All the apples on one tree in each plot were picked and counted and carefully examined for scab-infection. Picking dates were September 22nd and 23rd this year, as compared with October 1st, 1935. The season on the whole was not so favourable for the spread and development of apple-scab as in some other years, but it must be said that without control sprays being used the apple-crop would have been very scabby even under this year’s favourable weather conditions, as may be seen from the check-plot in the above experiment. From the results listed above and general observations in the orchards as to fruit and foliage injuries, etc., and general appearance of the fruit at picking-time, the lime-sulphur and calcium-arsenate combination gave the best results when all points are considered. This combination spray not only gave the best control of apple-scab, but also gave excellent control of a number of insects injurious to both the fruit and foliage.”

In the Vernon District Mr. H. H. Evans was in charge of this work. The following is an extract from his report:—

“In co-operation with the Dominion Pathological Laboratory at Summerland, the past season’s work constitutes the sixth consecutive year on apple-scab control in the Vernon District.

"The disease was very general, though not as severe as in 1935. For the past season the lapse of time between applications was shortened. This may have had beneficial results in reducing infection, as there is not the variation of results on the check-plot for the two seasons as is noticeable in the records of the sprayed plots.

"Standard lime-sulphur, either alone or in combination, still stands out as the most satisfactory base for scab-control. Foliage-injury from spray-burn was not serious in 1936. Details of the work are covered in the table submitted as Appendix No. 2."

Codling-moth Control.—Codling-moth is now so wide-spread that it is necessary to ascertain the most effective means of control. Points to be considered are the kind of spray to use, as well as the time and thoroughness of application. All of the demonstration spraying-work for the control of codling-moth has been centred in Kelowna and under the supervision of Mr. B. Hoy, District Field Inspector. While it is not possible in this report to publish in detail the results which he obtained in this year's work, a general statement from his report is worth noting and is herewith submitted:—

"Again the winter destroyed many of the over-wintering worms and assisted considerably in the control of codling-moth. The kill was not as complete as in the winter of 1934 and 1935, but the first brood emergence was much below normal. As was the case last year, bad weather prevailed during the time first brood sprays were being applied in 1936. Bad weather, coupled with a shortage of equipment, makes efficient spraying impossible. In spite of these handicaps, only in a few instances were losses heavy in the Kelowna District.

"Moth-emergence records were taken as usual by this office for the Kelowna District and reports were received from other districts in the valley. Radio announcements were made on Wednesday and Saturday of each week over station CKOV to keep the growers informed as to the movements of moths and spray dates. This service is very satisfactory and the station is to be commended for their co-operation. Seventeen announcements were made during the summer. More extensive spray tests were conducted than ever before. Records were taken from three varieties sprayed throughout the season and sprayed on the first brood only. The materials used were:—

"Arsenate of lead, 8 lb. to 240 gallons of water, plus ½ lb. of Fluxit.

"Arsenate of lead, 8 lb. to 240 gallons of water, plus 5 quarts summer oil emulsion.

"Arsenate of lead, 8 lb. to 240 gallons of water, plus 1¼ pints Lethatate Wetting Fluid.

"Arsenate of lead, 8 lb. to 240 gallons of water, plus 5 pints Colloidal Lead Arsenate.

"Arsenate of lead, 8 lb. to 240 gallons of water, plus 1 pint herring-oil with 5 per cent. Oleic acid added.

"Kaylo, 10 lb. to 240 gallons of water, plus 2½ quarts summer oil emulsion.

"Each material was used on Jonathan, Stayman, and McIntosh in two, three, and four cover-sprays, and in the instance of arsenate of lead and Fluxit, a calyx-spray was also used on one plot. All sprays with lead and Fluxit were duplicated so as to avoid error as much as possible. Lack of space prevented duplication of all plots.

"The results of these tests show that there is little to choose in the control from any of the above combinations and that excellent control was obtained from first brood sprays only. The worms usually outnumber stings where only the first brood was applied.

"An effort is being made to get away from late sprays and cut down arsenical residue without sacrificing control. Results this year indicate that this can be done providing the work is done thoroughly and on time. Next year, if the equipment and assistance is available, we hope to take on part of another heavily infested orchard and see what can be accomplished with a minimum number of sprays.

"The orchard referred to is situated at Okanagan Mission and counts revealed the infestation to be as follows:—

Tree.	Apples.	Clean.	Wormy.
No. 1	385	100	282
No. 2	810	440	370
No. 3	704	264	444
Totals	1,899	804	1,096

"From the above figures it will be seen that there was about 57 per cent. worm-damage in this orchard. When making the counts, trees were selected from different parts of the orchard, so that a reliable average could be obtained."

Mealy-bug Control.—This insect is found only in certain sections of the Kootenay District. As the major portion of the experimental control-work has been under the supervision of Mr. E. C. Hunt, District Horticulturist, the following statement from his report gives briefly the findings of the work as undertaken:—

"This is a very troublesome insect pest of the Kootenay fruit-growing sections which has become very widely distributed, causing considerable damage to the fruit-crops, but chiefly to the apple-crop. Hardly found in any other fruit-growing area of the Province, the control-work has been carried on in the Willow Point area of the Kootenay District for about four years. Last year the work was extended to the Boswell and Creston sections. Satisfactory control can now be secured by the use of an oil spray applied in the early spring when the trees are dormant. At Boswell several different strengths of the oil spray was tested out, ranging from a 3-per-cent. to a 6-per-cent. oil content. This work was under the supervision of Mr. A. Dennys, of the Dominion Department of Agriculture, and his work in the Boswell area demonstrated (one-year test) that the mealy bug could be quite satisfactorily controlled with a 6-per-cent. oil spray. Good results were even obtained with a 4-per-cent. oil spray, but it is not thought advisable to recommend this weaker dilution at the present time. At Creston and in the Willow Point sections only a 6-per-cent. oil or stronger mixture was used. Growers spraying on a commercial scale and using the 6-per-cent. oil secured excellent control. Lime-sulphur 1-9 gave only fair control and is not recommended. Summer sprays with Black Leaf 40, using 1 pint to 100 gallons of water and applied when all the young are hatched out and are feeding on the leaves (usually the middle of July), gave fair control of this pest. This spray is only recommended when growers have not been able to apply a dormant oil spray. A short circular has now been prepared on the control of the mealy bug, based on the work carried out in the Kootenay District, and is ready for distribution."

European Red-mite.—While this insect is found in many parts of the various fruit-growing districts, it was in the Penticton District that the work referred to in Mr. R. P. Murray's report was undertaken. The following is quoted from the report in question:—

"Some work was done on the control of this insect with lime-sulphur, dormant-oil combination, with a follow-up of lime-sulphur. Work that had already been done with European red-mite had been confined to dormant spraying, with later sprays during the summer when the insect had again become numerous. Your Inspector felt that if controls could be obtained in the early part of the season, the damage caused by this pest could be practically eliminated. From observations, dormant spraying at the best would only control 85 or 90 per cent., with the result that a heavy infestation was built up again in early summer. It was also observed that after the mites emerged from the winter eggs a period of several days elapsed before any fresh eggs were laid, and if these mites were controlled before egg-laying commenced, better control measures would result.

"A small block of Flemish Beauty pears that were badly infested was selected. These were sprayed with dormant oil 4 per cent., lime-sulphur 1-12½, in the late dormant stage, but well before any green colour was showing. This spray was followed by a lime-sulphur 1-40 in the cluster-bud stage. Results were very encouraging. The first examination was made on May 24th, the second on June 6th. No live mites were found on either occasion, and the trees remained free for the rest of the season, although the season has been favourable for their development. Whether other factors unaccounted for were responsible for some measure of control is hard to say, but from the results obtained it is hoped to continue this work during the next season on a larger scale."

Lettuce Variety Tests.—As the yearly production of lettuce in British Columbia has a value of approximately \$100,000, it is important that the type of lettuce best suited to each locality be ascertained in so far as possible. With this in mind, the Horticultural Branch officials in the Fraser Valley and the Okanagan have for a number of years been trying out different lettuce varieties and strains. The work is by no means finished, but certain conclusions have been arrived at which have been a benefit to producers of this crop. Mr. H. H. Evans, District Field Inspector in charge of the Okanagan trials, reports as follows:—

" This project is a continuation of previous season's work in variety-testing for improvement of commercial production of spring and fall crops of lettuce.

" Spring plots are run for performance on resistance to tip-burn, bolting, quality, earliness of maturity, and suitability for distance shipments. Fall plots are run for hardiness in frost-resistance, earliness of maturity, and keeping qualities.

" Sixteen plots were run in each period for 1936.

" Our sincere appreciation for the interest and close co-operation in conducting the trials is extended to Mr. W. C. Boss, Armstrong, B.C., on whose property the trials were conducted.

" *Spring Series.*—Field planted from beds, April 20th; plants per plot, 35; examinations made, May 13th, June 6th, and June 26th.

" *Varieties and Strains under Test.*—Imperial No. 847, Iceberg Type No. 1, New York Type No. 515; Imperial No. 615, Iceberg Type No. 2, New York Type T.B.R.; Imperial No. 152, White Boston Type No. 43; Imperial No. D, Stock No. 5213 Cornell; Imperial No. C, White Boston Type No. 2088.

" New York No. 12 in the commercial planting was used as a check.

" Examination of May 13th showed all plots making rapid growth, but no information for recording.

" *Seed-house No. 1.*

" *Plot 1, Imperial No. 847.*—June 6th: All heads filling, 14 per cent. fit to cut; stand uneven in growth. June 26th: Plot uneven; heads filled were solid and 70 per cent. cutting-heads, medium size; quality good, inclined to be slightly bitter; 75 per cent. showing tip-burn; slime-rot quite severe. (Promising.)

" *Plot 2, Iceberg Type No. 1.*—June 6th: All heads filling, 11 per cent. fit to cut; heads medium firm; leaf-edges pink-tinted. June 26th: Cutting-heads 15 per cent.; heads filled but very slack; quality good; heads too loose and soft-textured to make good No. 1 shipping stock; tip-burn 100 per cent. and slime-rot slight.

" *Plot 3, Iceberg Type No. 2.*—June 6th: Heads filling and firming faster than Plot 2; 34 per cent. fit to cut. June 26th: 60 per cent. heads fit to cut; 95 per cent. tip-burn; other remarks as for Plot 2.

" *Plot 4, Imperial No. 615.*—June 6th: All heads filling and firming fast, none fit to cut; large plant, heavy green foliage. June 26th: Cutting-heads 95 per cent.; heads large, good type, solid, coarse-textured, quality good; tip-burn slight; no slime-rot. (Very promising.)

" *Plot 5, Imperial D.*—Not planted; no germination in seed-bed.

" *Seed-house No. 2.*

" *Plot 10, Imperial No. 615.*—June 6th: Performance similar to Plots 4 and 7. June 26th: Cutting-heads 98 per cent.; no tip-burn or slime-rot; other remarks as for Plots 4 and 7.

" *Plot 11, Imperial No. D.*—June 6th: Remarks as for Plot 9. June 26th: Cutting-heads 98 per cent.; tip-burn 50 per cent.; slime-rot slight; other remarks similar to Plot 9.

" *Plot 12, Imperial No. 152.*—June 6th: Heads filling and firming unevenly, 14 per cent. fit to cut; large plant, good type. June 26th: Cutting-heads 80 per cent.; heads medium to large, excellent type, quality and texture very good; tip-burn 75 per cent.; slime-rot slight.

" *Plot 13, White Boston No. 2088.*—June 6th: Heads filling, small and compact; 14 per cent. fit to cut; very soft texture. June 26th: Cutting-heads 70 per cent., small size, compact, medium firm, good texture, quality fair, bitter; tip-burn 20 per cent.; no slime-rot; excellent for home use; too soft-textured for long shipping.

" *Plot 14, White Boston-Cornell No. 43.*—June 6th: Heads not as compact or filling as fast as Plot 13; none fit to cut. June 26th: Cutting-heads 15 per cent., heads do not firm up; type does not compare with Plot 13; tip-burn 75 per cent.; no slime-rot.

" *Plot 15, New York No. 515.*—June 6th: Heads filling fast, medium size, compact; 20 per cent. fit to cut; good type. June 26th: Cutting-heads 80 per cent., medium size, good type, compact; texture and quality very good; no tip-burn or slime-rot. (Excellent.)

" *Seed-house No. 3.*

" *Plot 6, Imperial No. 847.*—June 6th: Heads filling and firming fast; cutting-heads 31 per cent.; medium to large, compact, and good type. June 26th: Cutting-heads 100 per cent.;

heads large, solid, compact, and good type; quality good, inclined to be slightly bitter; tip-burn 75 per cent.; slime-rot slight to medium. (Very promising.)

"*Plot 7, Imperial No. 615.*—June 6th: Performance duplicates Plot 4. June 26th: Cutting-heads 90 per cent.; all other remarks as for Plot 4.

"*Plot 8, Imperial No. C.*—June 6th: Heads filling fast; 26 per cent. fit to cut; large heads, heavy growth. June 26th: Cutting-heads 40 per cent., balance filled but very slack; not good No. 1 heads, coarse-textured, quality poor, quite bitter; tip-burn 85 per cent.; slime-rot slight.

"*Plot 9, Imperial No. D.*—June 6th: Heads filling well but firming slowly; heavy deep-green growth. June 26th: Cutting-heads 90 per cent.; size medium to large, very firm, good type, coarse texture, quality fair, bitter flavour; tip-burn 25 per cent.; slime-rot medium.

" Summerland Stock.

"*Plot 16, New York T.B.R.*—June 6th: Heads filling fast, but maturing slower than Plot 15; medium to large size; 9 per cent. fit to cut. June 26th: Cutting-heads 90 per cent.; size medium to large, good type, texture and quality very good; similar in type to New York No. 12, but coarser growth; tip-burn 30 per cent.; no slime-rot.

"*Check, New York No. 12, Commercial Crop.*—June 6th: Heads filling and firming fast; 20 per cent. fit to cut. June 26th: Cutting-heads 89 per cent.; size medium, good type, good quality and texture; tip-burn 30 per cent.; slime-rot slight. (General crop variety.)

"For the spring crop the following varieties are worthy of further testing: Imperial Nos. 847, 615, and 515, and New York T.B.R. The New York No. 12 is still the main commercial crop variety for spring use.

"*Fall Series.*—Duplication of the spring plots. Field seeded, July 28th; plants per plot, 35; examinations made, September 28th and October 24th.

"The first killing frost period of the season occurred October 17th to 19th, inclusive, with 18° of frost registered on the 18th at Armstrong.

"Seeding of the varieties was made over one week later than the commercial crop, the object being to ensure the plots being subjected to a frost period prior to overmaturity, in order to test frost-resistance.

" Seed-house No. 1.

"*Plot 1, Imperial No. 847.*—September 28th: Heads making rapid growth and filling fast. October 24th: Cutting-heads 95 per cent.; size medium to large, good type; quality good but slightly bitter, texture good, solid; frost-damage slight, all on cover-leaves. (Very promising.)

"*Plot 2, Iceberg Type No. 1.*—September 28th: Remarks as for Plot 1. October 24th: Cutting-heads 20 per cent.; heads well formed but very loose; size medium, type poor, quality good; frost-damage heavy with deep penetration.

"*Plot 3, Iceberg Type No. 2.*—September 28th: Remarks as for Plot 2. October 24th: Cutting-heads 20 per cent.; other remarks as for Plot 2.

"*Plot 4, Imperial No. 615.*—September 28th: Heads large and growing rapidly but filling very slowly. October 24th: Cutting-heads 15 per cent.; heads large, well formed, but very slack, quality good; frost-damage medium; penetration not severe.

"*Plot 5, Imperial D.*—Heads large, growing rapidly but filling slowly. October 24th: Cutting-heads 25 per cent.; size medium to large, heads well formed, but firming slowly, quality good, texture coarse; frost-damage medium; penetration not severe.

" Seed-house No. 2.

"*Plot 6, Imperial No. 847.*—September 28th: Remarks as for Plot 1. October 24th: Cutting-heads 85 per cent.; size medium to large; other remarks as for Plot 1.

"*Plot 7, Imperial No. 615.*—September 28th, October 24th: Performance of plot and remarks is a duplicate of Plot 4.

"*Plot 8, Imperial C.*—September 28th: Heads growing rapidly but filling slowly. October 24th: No cutting-heads; size large, well formed, but very loose, quality fair, texture coarse; frost-damage light to medium, mostly on cover-leaves.

"*Plot 9, Imperial D.*—September 28th, October 24th: Performance of plot and remarks for both periods are a duplicate of Plot 5.

“Seed-house No. 3.

“Plot 10, *Imperial No. 615*.—September 28th: Remarks as for Plots 4 and 7. October 24th: Cutting-heads none; size large, very loose; frost-damage medium to heavy. The difference in performance at this date from Plots 4 and 7 is unexplainable.

“Plot 11, *Imperial D*.—September 28th, October 24th: Performance of plot and remarks for both periods are a duplicate of Plots 5 and 9. This variety consistent in performance.

“Plot 12, *Imperial No. 152*.—September 28th: Heads growing and filling rapidly. October 24th: Cutting-heads 90 per cent.; size medium to large, good type and solid; quality very good; frost-damage light, mostly on cover-leaves.

“Plot 13, *White Boston No. 2088*.—September 28th: Heads small, filled, and compact; 25 per cent. ready to cut; quality good, texture fine but soft. October 24th: Heads filled and solid, bursting from overmaturity; frost-damage very heavy.

“Plot 14, *White Boston-Cornell No. 43*.—September 28th, October 24th: Heads not quite as solid as Plot 13; other remarks similar.

“Plot 15, *New York No. 515*.—September 28th: Heads growing fast and filling good. October 24th: Cutting-heads 55 per cent.; size medium, solid, type good; quality fair to good, slight bitter flavour; frost-damage medium to heavy; fairly deep penetration.

“Plot 16, *New York T.B.R.*—September 28th: Heads growing fast and filling fairly well. October 24th: Cutting-heads 70 per cent.; size medium to large, type good, texture and quality good; frost-damage heavy; fairly deep penetration. This strain appears very promising for early fall crop, but too subject to frost-damage for very late cutting.

“For further testing of the present strains, *Imperial Nos. 847 and 615, New York No. 515 and T.B.R.* are worthy of further work with a view to different dates of seeding.

“The *White Boston* types, especially *No. 2088*, on account of their early developing habit and fine texture, are worthy of consideration for the home-garden and local market. The fine, soft texture of the head makes it doubtful for standing the rough handling incidental to distant-market shipping.

“As the main object of the fall tests is for resistance to frost, seeding the plots much later than the commercial plants is intentional. On this account the heading performance of several of the strains cannot be censured offhand. Once the frost-resistance characteristics have been established, varying dates of seeding should be carried on with a view to establishing other development factors.

“These tests are much appreciated by the lettuce-producers who are in touch with the work, and are proving of considerable value in establishing quality of the crop and extension of cutting season.”

In the Fraser Valley the lettuce-testing work was in charge of Mr. G. E. W. Clarke. A report by him on the work as undertaken is herewith submitted:—

“The following trials were conducted on Mr. J. Kennedy’s farm at Cloverdale.

“These tests were made under field conditions similar to the treatment given the commercial acreage plantings. The soil is a black mulch soil. An application of about 10 tons of manure to the acre was well worked into the soil, and an additional application of a 3-10-8 fertilizer at the rate of 800 lb. was given.

“A seeding was made on May 31st and the following report was made on July 31st:—

“Duplicate rows were seeded and the plants thinned to a distance of 16 inches.

“The plantings made at this time on this area showed satisfactory development and tip-burn and slime-rot did not occur.

“Seed-house No. 1.

“*Imperial No. 615*.—Inclined to loose leafy heads and very soft.

“*Imperial D, U.S.D.A.*—Good growth, medium to large heads, uniformly firm.

“*Imperial No. 847, U.S.D.A. 12/9/35*.—Medium to large, flat type, light green, very attractive. This variety heads uniformly about a week earlier than *Imperial D*. The heads are firm to very firm.

“*Green Iceberg Special No. 2*.—This variety is inclined to be a soft leafy head. The reddish-tip leaf is not desirable.

"Seed-house No. 2.

"Imperial D, Lot No. 4098.—Good growth and heading uniformly; very firm to hard.

"Imperial No. 615, Lot No. 4141.—Good growth but not heading uniformly; no firm heads; inclined to be soft and leafy.

"New York No. 515, Lot No. 5205.—Large soft, leafy head.

"Imperial No. 152, Lot No. 3200.—Small- to medium-sized heads, maturing about three days earlier than Imperial D; heads are fairly firm to firm.

"White Boston-Cornell No. 43, Lot No. 5213.—This variety heads well and forms a firm head, but this type is not desirable in this market.

"White Boston, Lot No. 2068.—This variety is similar type; the heads are a little smaller, but not quite so firm as Cornell No. 43.

"Remarks.—According to the trials this season, Imperial D is the leading variety for mid-season and late plantings. Imperial No. 152 is an attractive, medium-sized head-lettuce and is worthy of further trial. Imperial No. 847, U.S.D.A. 12/9/35, grown for the first time this season, seems to be a very desirable variety."

REPORT OF PROVINCIAL PLANT PATHOLOGIST.

J. W. EASTHAM, B.Sc.

A change was made during the year in the regulations for direct shipment, to meet the convenience of nurserymen. Instead of each individual purchaser being required to obtain a permit and shipping-tag, batches of printed tags serially numbered are supplied to responsible nurserymen. For each tag a return is made, including consignee's name and address and the nature and quantity of plants shipped under it.

The following are the figures for shipments into British Columbia from the three Prairie Provinces for the eleven months ended December 1st, 1936:—

Ornamental trees and shrubs	3,146
Fruit and nut trees	1,016
Cane and bush fruits	1,332
Roses	175
Herbaceous plants	1,718
Asparagus-plants	858
Strawberry-plants	1,190
Bulbs	10,110

(This last does not include certain large shipments of forced narcissus bulbs brought in by a grower on Vancouver Island under special arrangement, including treatment for nematodes before planting.)

The Dominion Inspection Service inspected during the twelve months from April 1st, 1935, to March 31st, 1936, 164 shipments originating east of Manitoba. These included:—

Fruit-trees	275
Small fruits	3,416
Rose-bushes	389
Other ornamentals	377
Fruit seedlings	551
Miscellaneous plants	3,623
Bulbs	8,317

ASPARAGUS-BEETLE (*Crioceris asparagi*).

In the spring, with the assistance of the Vancouver press, attention was drawn to the finding of this pest in Vancouver and a request made that any suspected insect should be brought to this office. The first report was made on May 11th, at which date egg-laying was in active progress. Altogether about thirty premises were reported infested. These were widely scattered through the area of Greater Vancouver—namely, University Area, West

Point Grey, Kerrisdale, South Vancouver, Marpole, and Burnaby. A number of the largest commercial plantings in the Delta District and Lower Fraser Valley, however, were inspected and no sign of the pest found. Most of the reported cases were in response to the press notices and it is probable that only a certain proportion were so reported. Also, inquiry elicited the information that the pest had been present for three years in one case. These facts seemed to indicate that the insect was established beyond hope of eradication and all that could be done would be to delay its spread to commercial areas. All reported infestations were visited and full instructions given on control measures, special attention being paid to the Burnaby infestations as these are nearest to commercial plantings.

CHERRY-DISEASES.

Last year definite proof was obtained by Dr. McLarty that a chlorotic disease of sweet cherries in the Kootenays was of virus nature. A number of affected trees were taken out on the advice of the departmental officers. It was noticeable, however, that diagnosis of the disease might be rendered unsatisfactory or impossible in the summer-time through the presence of powdery mildew, which may produce somewhat similar symptoms. Spring or early summer would seem to be the best time for making an inspection for this disease. The situation is further complicated by the presence of another trouble in cherries, in which there is comparatively little chlorosis, but much deformation of the leaves, which become deeply indented or lacinate and in some cases narrowed to a mere ribbon. The symptoms suggest a virus disease and investigation will be undertaken by Dr. Newton. There is another condition found in Lambert cherries, chiefly in the Willow Point District, which has caused much loss. Affected trees show no appreciable foliage or growth symptoms. They set a heavy crop of fruit, but this does not mature normally. No matter how long it is left on the tree, it remains small, changes to a peculiar brick-red colour, and has no flavour. The condition suggests malnutrition rather than disease, but irrigation and ordinary fertilizers applied have not been of much help. This fall, soil applications of boric acid, copper sulphate, and magnesium sulphate were made to selected trees in a badly affected Lambert block at Willow Point, and in the spring other trees in the block will be sprayed with a zinc-sulphate combination spray. An arrangement has been made through Dr. Gussow, the Dominion Botanist, for a comprehensive survey of cherry-diseases, in which the Saanichton Laboratory will conduct investigations on suspected virus diseases and the Summerland Laboratory on those suspected of being nutritional in character.

IRIS-DISEASES UNDER GREENHOUSE CONDITIONS.

In conjunction with Mr. Olds, of the Dominion Inspection Service, a survey was made in December and January of irises being forced for bloom. It was observed that a small percentage of eelsorm infestation (up to 5 per cent.) in the planted bulbs did not appreciably reduce the crop of bloom if the temperature was not allowed to go above 55° F. In one case bulbs known to be 25 per cent. infested gave a 90-per-cent. cut of bloom. This house, however, was held at little above outside temperatures. A noticeable feature was the high percentage of what appears to be mosaic in the Wedgewood variety. Few plantings showed less than 50 per cent., while in others it ran as high as 90 per cent. While there may be no marked stunting of growth, there is a reduction in vigour and bloom. Some growers state that it is often necessary to release the bloom from the enveloping spathe by hand, otherwise it would be too weak to emerge.

BLACK RUST OF OATS.

Black rust (*Puccinia graminis*) was unusually severe on oats this season in the Delta and adjacent districts and caused serious reduction in yield. In one section, where losses were severe last year as well, inquiry showed the presence of large bushes of common barberry (*Barberis vulgaris*) on an abandoned railway-track immediately adjacent to the affected fields. These bushes were heavily infected with the æcial stage of the fungus. At present the Province has no legislation in force for compulsory eradication of barberries.

NEW DISEASES.

A number of pathogens new to the Province were recorded, chiefly on ornamentals.

Glæosporium Mezerei Cke.—A severe defoliation of *Daphne Mezereum* in a Vancouver nursery in June was found to be due to this fungus. Further investigation showed it to be present elsewhere in Vancouver and in at least one nursery in Victoria. *Daphne Cneorum* in close proximity to affected *Daphne Mezereum* showed no signs of infection. This fungus does not appear to have been previously recorded in North America. Its introduction is unfortunate, as *Daphne Mezereum* has been a valuable ornamental shrub, very free from pests or diseases.

Coleosporium Campanulæ (Pers.) Lév.—This was found at two places in Vancouver on *Campanula persicifolia*. Although this fungus is recorded from a large number of species of *Campanula* and related genera, in this case only the peach-leaved *Campanula* was attacked. In one garden where affected plants were found, a considerable number of other species of *Campanula* were present but none were found infected.

Septoria Chrysanthemi Allesh. was found causing a severe leaf-blight on certain new strains of Shasta daisy (*Chrysanthemum maximum*). It has previously been recorded in greenhouse chrysanthemums in British Columbia.

Cytospora Chrysosperma (Pers.) Fr.—Portions of young Lombardy poplar trees, 6 to 8 years old, which had died were sent in from Trail. These showed numerous fruiting-bodies of the fungus.

Pseudomonas Delphinii (E. F. S.) Stapp.—Tar-spot or delphinium-blight was quite generally present in one Vancouver nursery, but the amount of injury appeared to be slight. This has been previously recorded from British Columbia, but does not as yet seem as prevalent as in Eastern Canada.

RESEARCH PROJECTS.

The report of Mr. W. R. Foster, Assistant Plant Pathologist, located at the Dominion Pathological Laboratory, Saanichton, follows.

(1.) *Stinking Smut or Bunt Problem*.—Table 1 shows the resistance of a number of new varieties of winter wheat obtained from Dr. E. F. Gaines, Cerealist, Washington Agricultural College, Pullman, Washington.

Table 2 shows the effect of different seed-treatments on the percentage of seedling emergence and of bunt from soil-borne infection at Saanichton, 1936. Ceresan ½ oz. and 4 oz. per bushel and methyl mercury oleate 4 grams per bushel were about equal in value in increasing seedling emergence. Ceresan 4 oz. per bushel of wheat treated on the same day as seeded reduced soil-borne infection of bunt from 37.4 per cent. in the check to 13.7 per cent.

The organic mercurials, ethyl mercury phosphate (Ceresan), methyl mercury phosphate (Leytosan), and methyl mercury oleate, protected the wheat in damp cold soil much better than copper carbonate, copper resinate, and copper sulphate.

Table 1.—The Resistance of Different Varieties of Winter Wheat to Okanogan Bunt Inoculum at Saanichton, 1936.

Variety.	Average Percentage of Bunt.
Jones Fife	81.0
Albit x Hohenheimer	4.0
White Odessa x Hohenheimer	1.0
Hohenheimer x White Odessa (130)	0.0
White Odessa x Heilz Dickkopf	0.5
Hybrid 128 x Hard Federation (M-1)	0.0
Triplet x White Odessa	0.0
Reo	1.0
Relief	83.5
Ridit x Utah Kanred	5.5
Rex	0.0
Hymer	0.0
Hohenheimer x White Odessa (135)	0.0

Table 2.—The Effect of Different Seed-treatments on the Percentage of Seedling Emergence and of Bunt from Soil-borne Infection at Saanichton, 1936.

Treatment.	Seedling Emergence. Per Cent.	Bunt. Per Cent.
Check—no treatment	59.7	37.4
Ceresan ½ oz. per bu.	73.5	26.5
*Ceresan 4 oz. per bu.	72.0	13.7
Copper carbonate 2 oz. per bu.	55.7	25.1
Copper resinate 2 oz. per bu.	49.7	17.7
Copper sulphate .002 Molar	50.0	21.9
Creosol .0125 Molar	59.0	21.3
Flotation sulphur 4 oz. per bu.	44.0	17.0
Leytosan 1 oz. per bu.	73.7	31.2
Malachite Green 0.25 per cent.	19.2	13.9
Mercury Copper 2 oz. per bu.	56.5	18.9
Mercury Copper 4 oz. per bu.	56.7	19.3
Methyl mercury oleate 4 gms. per bu.	74.2	24.2
Methyl Violet 0.25 per cent.	48.0	26.3

* Ceresan 4 oz. applied on day of seeding.

The wheat was soaked in the solutions of copper sulphate, cresol, malachite green, and methyl violet for twenty-four hours. It was then dried at room temperature for twenty-four hours and seeded.

(2.) *Snapdragon-rust Control for Seed-growers.*—Table 3 shows the effect of different sprays on the control of snapdragon-rust. Our results substantiate those of D. E. Green, Wisley, England (*Journal of the Royal Horticultural Society*, 61: 64-76, 1936), in that copper sprays are more effective than sulphur sprays. We found further that Bordeaux was much more effective with a good spreader than without. The results were so definite that I hardly think that it will be necessary to conduct this project next year.

Number and time of applications of the spray depends upon weather conditions and the growth of the plants. Cool damp weather appears to favour the disease. When the weather is at all favourable for infection, and leaf-growth is taking place, it is probably advisable to spray every ten to fourteen days. Very little leaf-growth took place after seed-pods began to form.

The snapdragons at George Robinson's place were sprayed on July 7th and 17th. All the leaves sprayed with Bordeaux and a spreader either on the 7th or 17th were practically free from rust.

Table 3.—The Results of Different Sprays on the Control of Snapdragon-rust (*Puccinia Antirrhini*).

(Sprays applied July 7th and 17th.)

Treatment.	Plants infected. Per Cent.	Amount of Rust.* Per Cent.
Check—no treatment	100.0	62.5
K.S. Resin	100.0	49.6
Lime-sulphur and penetrol	100.0	45.7
Lime-sulphur and lethalate	100.0	65.0
Bordeaux	67.0	13.4
Bordeaux and penetrol	7.0	00.7
Bordeaux and lethalate	8.5	00.8
Bouisol and penetrol	59.0	23.4

* Estimated percentage of the area of the leaves covered with rust.

Penetrol applied at rate of 2 quarts per 100 gallons; lethalate applied at rate of 1 pint per 100 gallons.

(3.) *Cracking of Cherries.*—During the sweet-cherry season of 1936 on Vancouver Island, ideal conditions for cracking and brown-rot of cherries prevailed. With brown-rot increasing at an alarming rate, we advised our largest grower to spray with Bordeaux 2-3-40 on June 8th, about five to six weeks before picking. On July 9th over 90 per cent. of the Bing cherries had cracked on the Experimental Station, Saanichton, while the grower who had sprayed had less than 4 per cent. With wet weather continuing until July 14th, cracking increased on the Experimental Station from 90 to 99 per cent. and from 4 to less than 25 per cent. in the orchard sprayed with Bordeaux. All the other growers visited by Mr. E. W. White, District Horticulturist, or myself from Victoria to Nanaimo had more than 90 per cent. of their Bings cracked.

Results shown in Tables 4 and 5 indicate that Bordeaux 2-3-40 tends to reduce the percentage of cracking in sweet cherries. The results are so significant that further investigations are considered worth while.

Bordeaux 2-3-40 has a decided disadvantage, in that it left far too heavy a deposit on the fruit even five weeks after spraying.

Table 4.—*The Estimated Percentage of Cracking of Bing Cherries on Vancouver Island in 1936.*

Date.	Name.	Address.	Treatment.	Cracking.
July 9.....	H. Thompson.....	Royal Oak.....	Bordeaux 2-3-40, June 8.....	Per Cent. 4.0
July 9.....	Experimental Farm.....	Saanichton.....	No treatment.....	90.0
July 9.....	Growers.....	Royal Oak.....	No treatment.....	80.0
July 14.....	H. Thompson.....	Royal Oak.....	Bordeaux 2-3-40, June 8.....	25.0
July 14.....	Experimental Farm.....	Saanichton.....	No treatment.....	99.0
July 15.....	Growers.....	Vancouver Island to Nanaimo.....	No treatment.....	90.0

Table 5.—*The Percentage of Cracking of Lambert Cherries sprayed with Bordeaux 2-3-40 and then immersed in Water for Various Periods of Time.*

Treatment.	SAMPLE.						Average.
	1.	2.	3.	4.	5.	6.	
Check, unsprayed.....	60.0	93.9	50.0	80.0	84.4	79.5	74.6
Bordeaux 2-3-40.....	19.2	64.5	12.1	28.5	65.2	55.3	40.8

(4.) *Experimental Work on Control of Pear-scab (Venturia pirina).*

Table 6.—*The Resistance of Different Varieties of Pears at Saanichton, 1936.*

Variety.	Scab-free.	SCABBED.		
		Slight.	Severe.	Total.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Anjou.....	33.5	32.7	33.8	66.5
Bartlett.....	93.1	5.1	1.8	6.9
Bosc.....	74.9	24.3	1.8	25.1
Boussock.....	96.6	1.8	1.6	3.4
Clairgeau.....	78.6	19.4	2.0	21.4
Dr. Jules Guyot.....	96.2	2.4	1.4	3.8

Table 7.—The Efficiency of Different Sprays upon the Control of Scab in Anjou Pears at Saanichton, 1936.

Treatment.	Scab-free.	SCABBED.		
		Slight.	Severe.	Total.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Check.....	33.5	32.7	33.8	66.5
Bouisol.....	87.4	9.6	3.6	12.6
Lime-sulphur.....	56.4	25.9	17.7	43.6
Colloidal sulphur.....	55.3	30.2	14.5	44.7

Table 8.—Percentage Scab in Varieties.

Treatment.	BARTLETT.		BOSC.		BOUSSOCK.		CLAIRGEAU.		DR. GUYOT.	
	Slight.	Severe.	Slight.	Severe.	Slight.	Severe.	Slight.	Severe.	Slight.	Severe.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.						
Check.....	5.1	1.8	24.3	1.8	1.8	1.6	19.4	1.4	2.4	1.4
Bouisol.....	0.2	0.0	4.9	0.0	2.1	0.0	1.5	0.0	0.5	0.0
Lime-sulphur.....	1.5	0.0	8.2	0.3	2.9	0.8	7.1	0.5	1.1	0.0
Colloidal sulphur.....	1.4	0.6	11.7	0.6	3.4	0.2	4.6	0.5	0.3	0.0

In all the above tests three sprays were given—namely, April 23rd (pink), May 8th calyx, and May 23rd.

Table 9.—Average Percentage of Scab on Check-trees in Table 8.

Slight.	Severe.	Total Scab.
Per Cent.	Per Cent.	Per Cent.
10.6	1.7	11.7
1.8	0.0	1.8
4.1	0.3	4.4
4.3	0.4	4.7

(5.) *Apple-anthraxose (Neofabræa malicorticis)*.—The following experiments on anthracnose of apples were conducted in co-operation with Mr. E. W. White to test the efficiency of Bouisol as compared with Bordeaux, the standard spray. Spraying was done during the first week of August.

The results, Tables 10, 11, 12, and 13, substantiate last season's work, in that:—

- Bordeaux is slightly more effective than Bouisol at the rate of 4.5 pints in 100 gallons of water.
- Bordeaux should be used as heretofore as the main spray in commercial apple-orchards.
- Bouisol, 4.5 pints, could be recommended to owners of a few trees.

Table 10.—Result of spraying King of Tompkins Apples with Bordeaux and Different Strengths of Bouisol on the Number of Anthracnose Lesions at Tanner Bros., Keating, 1936.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*		
	Tree 1.	Tree 2.	Tree 3.
Check.....	31	24	55
Bouisol, 1.5 pints.....	15	14	29
Bouisol, 3.0 pints.....	8	11	19
Bouisol, 4.5 pints.....	8	7	15
Bordeaux.....	5	2	7

* Lesions on 25 twigs were counted on each tree.

Table 11.—Result of spraying Belle de Boskoop Apples with Bordeaux and Different Strengths of Bouisol on the Number of Anthracnose Lesions at Tanner Bros., Keating.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*		
	Plot 1.†	Plot 2.	Plot 3.
Check.....	122	122	244
Bouisol, 1.5 pints.....	88	93	181
Bouisol, 3.0 pints.....	37	38	75
Bouisol, 4.5 pints.....	9	12	21

* Lesions on 25 twigs on each tree were counted.

† A plot consists of five trees.

Table 12.—The Result of spraying Northern Spy Apples with Bordeaux and Different Strengths of Bouisol at W. J. Jennings, Duncan.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*		
	Tree 1.	Tree 2.	Average.
Check.....	90	126	108.0
Bouisol, 1.5 pints.....	25	91	58.0
Bouisol, 3.0 pints.....	33	48	40.5
Bouisol, 4.5 pints.....	5	16	10.5
Bordeaux.....	7	18	12.5

* Lesions on 25 twigs on each tree were counted.

Table 13.—The Result of spraying Ontario Apples with Bordeaux and Different Strengths of Bouisol at W. J. Jennings, Duncan.

Treatment.	NO. OF ANTHRACNOSE LESIONS.*			
	Tree 1.	Tree 2.	Tree 3.	Total.
Check.....	183	223	173	579
Bouisol, 1.5 pints.....	164	160	87	407
Bouisol, 3.0 pints.....	118	74	110	302
Bouisol, 4.5 pints.....	48	62	45	155
Bordeaux.....	19	12	20	51

* Lesions on 25 twigs on each tree were counted.

OTHER WORK.

The following popular articles were published during 1936:—

“Diseases of Greatest Economic Importance to Berry, Tree, and Vegetable Growers of Coast Districts.”

“Control of Bunt in Northern Okanagan.”

The following scientific papers have been prepared and are ready for the press:—

“Resistance of Winter Wheats to Hessian Fly,” by W. R. Foster and C. E. Jeffries.

“Progress Report on Bunt in British Columbia.”

“Overwintering of Certain Cereal Pathogens.”

Attention was again given to educational work in genetics and two addresses were given, as follows:—

“Heredity in Plants, Animals, and Humans.” Round Table, Victoria, March, 1936.

“Heredity and Environment.” Kinsmen’s Club, Empress Hotel, October 14th, 1936.

There has been the usual miscellaneous work of identifying grasses, weeds, and wild plants for correspondents and others.

REPORT OF PROVINCIAL ENTOMOLOGIST.

MAX H. RUHMANN, B.A.

We regret to report that the codling-moth (*Carpocapsa pomonella*) has made its appearance in the Coldstream section of the Okanagan Valley.

The infestation appears to be light, and, although only a small acreage is known to be infested, the fact that this is scattered through the length of the district and not in a small section makes it impossible to isolate the infestation for intensive treatment with a view to eradication. The fact that the growers of the Coldstream District, by a majority vote, have refused the offer of the Department of Agriculture to undertake the control-work in the infested area on a small per acre tax basis has relieved the Department of Agriculture of a great responsibility.

Control of the codling-moth in the older-infested areas of the Okanagan Valley is being effectively conducted by a majority of the growers in these districts. It took a number of years of heavy losses and demonstration spraying by the Department of Agriculture to impress upon them the necessity of timeliness and thoroughness of the application of sprays to obtain satisfactory control.

Lesser Apple-worm (Laspeyresia prunivora).—The lesser apple-worm was unusually severe in the Coldstream District, and the fact that so many specimens were submitted for identification was the means by which the presence of the codling-moth was eventually revealed.

The Pear-thrips (Tainiothrips inconsequens).—This insect was first recorded in America at San Jose, California, in the year 1902. From there it appears to have drifted east and north, being recorded in the State of New York in 1920 and appeared at Victoria, B.C., in the year 1912.

In the Interior of the Province it has been occasionally seen in orchards for at least ten years. This year it occurred in outbreak form at Kelowna, where a pear-orchard of approximately 10 acres was attacked, with an estimated loss of at least 1,000 boxes of pears. Lighter infestation was noted in surrounding orchards.

The important host-plants of this insect are the pear, prune, cherry, and plum. Other plants on which they are known to occur are peach, apple, grape, and the English walnut.

Particular attention will be given to the control and distribution of this insect in the Interior in the spring of 1937.

San Jose Scale (Aspidiotus perniciosus).—The outbreak of this scale in the Keremeos, Cawston, and Osoyoos Districts has been practically cleaned up. A thorough inspection of these districts was made during September, when in no instances were live San Jose scales found in these districts. This speaks highly of the thoroughness with which the growers carried out the control measures recommended.

The infestation in the Chapaka Indian Reserve still persists and will be difficult to clean up unless more effective co-operation of the Indian Department is obtained. This area will remain a source of reinfestation for the Cawston-Keremeos Districts until the infestation is cleaned up.

Mealy Bug (Pseudococcus sp.)—The mealy-bug infestation which has been a serious problem in the Kootenays for some years has been checked.

Early in 1935 a 6-per-cent. dormant oil emulsion spray was used (actual oil content 4½ per cent.). This was applied by Mr. Earl Hunt, District Horticulturist of Nelson. At Boswell, where a severe outbreak had appeared, the Mackie orchard was sprayed at the same time with the same formula. This spray was applied by Mr. Mackie, the owner of the orchard. The result of the application at Boswell was not satisfactory. At Willow Point, however, the control obtained was excellent and indicated that a stronger spray might give perfect control.

In the 1936 spray programme at Willow Point an 8-per-cent. dormant oil emulsion spray was applied (this equals a 6-per cent. actual oil spray) by Mr. Hunt. At Boswell, through the co-operation of the Dominion Entomological Branch, dormant oil sprays ranging from 4 per cent. to 6 per cent. actual oil were applied by Mr. A. A. Dennys, of the Dominion Entomological staff. At Creston, where a slight outbreak occurred in 1935, a 5¼-per-cent. actual oil spray was applied by Mr. C. B. Twigg, the local District Field Inspector of the Department.

An examination of the sprayed plot at Willow Point in May showed that excellent results had been obtained and a control of approximately 100 per cent. obtained. No oil-injury was evident either on cherry or apple. Plots sprayed in this district in 1935 with a dormant oil

spray were still almost entirely free of mealy bug. These plots were again examined in August. At this time the Boswell and Creston plots were also examined. All plots which had received a spray of 5 per cent. or over of actual oil showed excellent control with no reinfestation.

As a result of these tests we can confidently recommend the use of a 6-per-cent. actual oil spray as a dormant application. The essentials for the success of this spray are:—

(1.) Scrape all loose and scaly bark from the trunk and main limbs of the trees before applying the spray.

(2.) Apply the spray before the buds break. Make a thorough application and use a pressure of not less than 350 lb.

(3.) Use an actual 6 per cent. of oil in your dormant spray.

(4.) Summer sprays are not satisfactory.

Apple-leaf Roller (Cacœcia argyrospila).—This insect, which first made its appearance in the Okanagan Valley in 1922 and at that time promised to be a serious pest, but was practically eradicated by 1924 through the use of dormant oil sprays, is again coming into evidence and may shortly need serious attention from the fruit-growers.

Grasshoppers (Locustidæ).—All present evidence indicates that grasshoppers will occur in epidemic numbers during 1937 and will be fairly general in the Interior.

Wheat-midge (Thecodiplosis mosellana).—This midge severely injured a wheat-field in the Lumby District. This is the first occasion that we have recorded this insect in an Okanagan District. In some of the Coast districts and on Vancouver Island the damage caused by wheat-midge has been very severe. Not in fifteen years has this insect appeared as abundant as it was in 1936 in many of our wheat-fields.

Tarnished Plant-bug (Lygus pratensis).—The tarnished plant-bug was particularly destructive in the early summer in the Interior orchards.

Dipterous Larva.—A dipterous larva has been observed for several years destroying columbines in local gardens by attacking the roots. The identity of this fly has not yet been determined.

REPORT OF PROVINCIAL APIARIST.

A. W. FINLAY.

The severe winter of 1935–36, followed by a very late spring, resulted in death from starvation of about 40 per cent. of all bees in the Province. This was the heaviest winter loss on record and was most severely felt in the Interior districts, especially in the East Kootenays, where many apiaries were completely winter-killed. The normal winter losses of from 15 to 20 per cent. are usually balanced by natural increase from swarming, or, in commercial apiaries, by the importation of package bees, but the winter losses were so severe in some districts that the owners were unable to completely restock, which resulted in a corresponding decrease in the number of colonies that were in good condition for the honey-flow this season.

On the Coast and Lower Mainland winter mortality of bees was not much greater than usual, and a fine warm spell during dandelion and maple bloom helped the bees to build up rapidly and store considerable surplus honey from these sources by the middle of May. Cool and wet weather for the last half of the month made swarming conditions general and filled many empty hives with new colonies. Unfortunately, this cool, unfavourable weather continued with very little opportunity for the bees to work in the fields until as late as mid-July, by which time all previously gathered stores were used up. Brood-rearing had almost ceased and older field bees were about worn out, so that with the advent of more favourable weather later, most colonies were not in the best condition to take advantage of the honey-flow from clover and fireweed, which was very light and slow. The honey-crop in the Fraser Valley and Vancouver Island was, therefore, very light, with the exception of a few of the best locations in these districts.

In the Interior, although the honey-flow did not start until very late in the season, about July 7th, it was intense, rapid, and prolonged, resulting in an average surplus per colony in the Okanagan greatly in excess of that of many previous years.

The total honey-crop for the Province was estimated at 1,129,725 lb., a decrease of 161,517 lb. from that of 1935.

FIELD-WORK.

District Inspectors commenced work in March, when, weather permitting, the policy of checking over apiaries and districts where disease had appeared the previous season was continued. This early work again proved of special value in eliminating potential sources of infection by destroying odd diseased colonies that had died during winter. The addition of two seasonal Inspectors to the staff greatly facilitated the work, and their services were appreciated in the districts that had previously been inadequately serviced.

The number of apiaries examined during the season was correspondingly greater, by this addition to the staff, than in 1935, and although the summary of the field-work also shows a proportionate increase in the number of colonies destroyed on account of disease, this does not indicate an increase in the percentage of disease in the Province, as a considerable number of apiaries were cleaned up in areas that had not received proper attention for some years. Yet the percentage of disease was slightly less in proportion to the total number of colonies examined. The following is a summary of the field work done:—

Inspector.	District.	EXAMINED.		A.F.B.	E.F.B.
		Apiaries.	Colonies.		
A. W. Finlay	General	157	1,094	21	31
J. F. Roberts	Okanagan	297	2,502	169	---
H. L. Johnson	Chilliwack	227	1,010	27	35
E. R. Freeman	Lower Fraser	385	2,008	159	15
W. J. H. Dicks	Greater Vancouver	153	512	28	2
J. Gillespie	Victoria	57	207	9	10
J. A. Smith	Vancouver Island	139	727	49	12
A. S. Homersham	Kootenays	40	350	20	---
Totals, 1936		1,455	8,410	482	105
Totals, 1935		1,090	6,658	429	72

A greater number of field-days and other meetings were held by the various bee-keepers' organizations this season than usual, and the Apiary Inspectors were instructed to attend the meetings in their respective districts, where they had the opportunity to demonstrate hive manipulation, disease diagnosis, and to address the bee-keepers on the necessity for co-operation with them in their work. This proved generally beneficial, and the fact that no prosecutions for violations of the "Apiaries Act" were recorded this season was an indication of the value of this policy.

The annual visit of your Provincial Apiarist to districts where no resident Field Inspector was employed was carried out in co-operation with District Agriculturist H. E. Waby in East Kootenay and District Inspector C. B. Twigg in the Creston area. Very little disease was found, but addresses given at various Farmers' Institutes were appreciated by local bee-keepers, especially in the Fernie District, where instruction was given in the prevention of the heavy winter losses that had occurred in that area.

OFFICE-WORK.

The office of the Provincial Apiarist at the Court-house, New Westminster, was attended each Monday and Friday as regular office-days for visiting bee-keepers, and as frequently, in addition, as field-work permitted, for the purpose of handling correspondence, Inspectors' reports, and bacterial analysis of brood samples sent in for diagnosis.

Microscopic examination of 126 smears and samples of diseased brood-combs were made and reports sent out with instructions for treatment where necessary. Applications for registration of apiaries totalling 294 were received and twenty-four were cancelled. Annual statistics of apiaries, hives, and honey-crop are based largely on reports received from registered bee-keepers and observations of Inspectors in the field.

EXHIBITIONS AND FALL FAIRS.

Again we have to report a remarkable improvement in the exhibits of honey and apiary products displayed this season at the Vancouver Exhibition. The total number of competitive entries, 110, compared with forty-five last year, was an increase of sixty-five, and the necessary

crowding of the many commercial displays owing to lack of space detracted somewhat from the artistic arrangement of these. The quality was generally excellent but varied greatly in density. Trade exhibits of bee-keeping equipment were absent through lack of space. The total weight of honey and containers on display was estimated to exceed 5 tons.

Daily demonstrations of handling live bees in a screen-wire cage at Vancouver by Bee-master John W. Wood was an attraction to thousands of visitors, and when continued by Mr. Wood at the Victoria Fair was equally as effective in drawing the attention of the public to the fine honey display there also. The number of entries in honey and apiary products at Victoria was less than last season, due, no doubt, to the unfavourable season on Vancouver Island. Most of the honey was from the Cowichan Lake District and was of excellent quality.

REPORT OF LIVE STOCK COMMISSIONER.

WALLACE R. GUNN, V.S., B.S.A., B.V.Sc.

The year 1936 again saw somewhat unusual weather conditions throughout most parts of the Province. During January the weather was mild, but was followed in February by over three weeks of severe weather with temperatures ranging down to below 40° in the Dry Belt. For the most part the snowfall was heavier than usual. The severe weather in February, when calving and lambing was beginning, contributed to a somewhat lower calf and lamb crop. A spell of mild weather came along during the latter part of March and early April, but was followed by a cold, late spring which prevented the grass from starting up on the ranges, and cattle as a result got a poor start in the spring, seriously affecting the run of early grass beef. The alternative freezing and thawing in many parts of the country during the early part of the year was responsible for considerable winter-killing of alfalfa and clover.

The months of May, June, and early July saw more than the usual amount of rainfall, which made haying difficult and in some sections seeding was delayed. The Fraser Valley experienced one of the most severe floods in years due to a sudden warm spell. A very dry period hit the country in midsummer, resulting in very poor range. The early part of the season being somewhat cold, it prevented the grass getting the usual start, and the subsequent dry, hot season gave poor grazing conditions, and this situation was further aggravated by an unusually severe attack of grasshoppers throughout the range country. In many instances the hoppers were found in unusual numbers, even into the timber country adjacent to the range lands.

On the whole, the autumn was open and ranges quite good, which helped to bring cattle back somewhat, but a very heavy fall of snow coming during the first week of December made grazing impossible and worried many ranchers who were somewhat short on feed. Weather conditions on the whole up to the first of the year have not been hard on cattle.

LIVE-STOCK CONDITIONS.

British Columbia cattle-producers as well as Canadian cattlemen are coming into very keen competition from other countries and must of necessity get cheap production in order to stay in the business. The heavy overhead charges against beef leaves but a small margin to carry on business. The tendency on the whole has been for cattlemen to cut their expenses in every way possible, and they have been carrying over a lot of breeding stock through the period of low prices in the hopes that there would be an advance in price, with the result that we have in the range country of British Columbia from ten to twelve thousand head more cattle than were being carried on this range four or five years ago. In addition, sheepmen have added to the load on the range by holding back some additional stock in the hope of hitting a better market.

As mentioned above, calf and lamb crops were somewhat reduced this year on account of the abnormal weather conditions which occurred during the calving and lambing season. Mr. Donald Sutherland, District Agriculturist, Kamloops, reports that in his district lamb-crops dropped from around 130 per cent. for 1935 to 109 per cent. He also reports further

that cattle in the district, on account of the poor range, went into the winter quarters in lower fit than usual. He reports that with feed, especially grain, scarcer, fewer cattle will be put into the feed-lot. Mr. G. A. Luyat, District Agriculturist, Williams Lake, reports that the bull situation in the Cariboo is acute. With low prices of beef obtaining for the last few years, ranchers have been unable to purchase bulls and are now compelled to use grade bulls and to retain their old sires. He also reports a lowered percentage calf-crop.

Mr. R. G. Sutton, District Agriculturist, New Westminster, reports that the early lamb-crop dropped prior to the severe cold spell was quite good, but lambs dropped during the month of February and early March were considerably reduced. Mr. Sutton further reports a high mortality in young pigs during the early spring. The pigs seemed to lack vigour and thrift and shortly after weaning began to die off. Litters arriving late in the spring during March and April came through normally. Mr. Sutton also reports increased interest in horse-breeding throughout his district.

Mr. S. G. Preston, District Agriculturist, Smithers, reports that the severe weather in February and March caused all cattle to fail considerably. He also reports that, with pasture and range good, cattle were going into the winter in fair condition.

Mr. James Travis, District Agriculturist, Prince George, reports that owing to one of the severest winters on record for his district stock received a set-back, with lower calf and lamb crops, and was further aggravated by a late spring with poor pastures, but that an open fall with good feed in their district put stock into the winter in quite good condition.

RANGE AND FEED CONDITIONS.

Generally speaking, throughout the entire Province there was a late spring which contributed to late seeding, poor pasture and hay-crops. The hay-crops in the Prince George, McBride, and Strathnaver Districts were greatly reduced, requiring many cattlemen to reduce their herds. Hay-crops on Vancouver and the Gulf Islands were somewhat short also. Grain-crops in the range country were somewhat short and cattle in the range country had a difficult season. There will be fewer cattle go into the feed-lots this year as a whole, although reports coming through from Mr. Luyat, Williams Lake, would indicate that some ranchers were buying feeders to put into the feed-lot.

Large areas of the range country, particularly in the Cariboo, are now in very bad condition. We have passed through a series of dry years up until two or three years ago which played havoc with the range, and now with the additional cattle being carried the range is getting even worse, although the last two or three years helped considerably with better rainfall. This is a problem that cannot be faced by any single cattleman, but is one for all the cattlemen running on a particular range to deal with as a body. There must be a reduction in the number of animals running on the range and there must be proper rotating of the range.

In sections of the Cariboo some stockmen insist on keeping their cattle on the lower ranges instead of making use of the higher ranges, and as a consequence the grass is kept down and there is no natural reseeding possible, and the carrying capacity of this range is now down to the danger-point. Very fortunately, in some of the ranges in the Nicola, Douglas Lake, and Merritt country, we had quite good co-operation amongst the cattlemen and a real endeavour to improve the range. It is true that rotated and deferred grazing would be of material assistance in correcting many of these range troubles, but if this has to be carried out by fencing it will be, generally speaking, impossible for cattlemen. The consequence is that, with range conditions as they are, an abundance of good bulls cannot possibly produce top cattle. Cattlemen cannot possibly produce the desirable type of animal on this class of range. Many are trying to help the situation by the purchase of better bulls, but since nutrition is one of the most important factors there can be little hope of an improvement in the situation until more consideration is given to the improvement of the range and a better nutrition.

The alsike-crop was hit quite badly in and around the Prince George country. The late spring somewhat reduced the hay-crop on the Lower Mainland and more particularly the Gulf Islands. In the irrigated areas of the range country where alfalfa is grown winter-killing continues to be a problem and ranchers have to carry over large hay reserves, and since a good feed-supply is so necessary to the success of the live-stock industry your

Commissioner has been working with a number of ranchers and co-operating with the Field Crops Commissioner and the Field Crop Union in trying to solve this problem. Since very encouraging results have been secured with new varieties, it is hoped that additional work can be commenced this year on the use of water, fertilizers, and rare mineral fertilizers.

In the farming districts of this Province, where dairying, swine-raising, and farm flocks of sheep form the basis, improvement in crop production is necessary. Pastures are lacking in quality, quantity, and feeding value. The use of commercial fertilizers, stimulants, and lime is evident. Here again prices of agricultural products have made it impossible for the farmers to purchase these materials.

HORSES.

The year 1936 saw continued interest in horse-breeding. Farmers all over the Province bred more mares again this year. The lack of sufficient stallions to give service to all communities still applies, and of course there is not a sufficient number of outstanding Class A horses in the Province.

Your Commissioner again took care of the inspections for the Provincial Department of Agriculture and Mr. Wm. McKirdy acted for the Federal Department of Agriculture under the Federal-Provincial premium policy of assistance to stallion-owners. This policy is very much appreciated by the stallion-owners and is doing a great deal towards the development of the industry. In this Province the above policy gives support to two classes of horses, "A" and "B." In some Provinces only one class is supported—namely, "A" class—and as a result no encouragement is given to the owner of a stallion which falls just below the Grade "A" classification. With Class "B" horses getting proportional support, some very good horses, lacking perhaps in scale or in breed type or character, are included. These horses of course are required to be sound, since your Inspector feels hereditary diseases are most dangerous conditions to get established in the horse population.

During the year fourteen stallions were inspected under the above policy and in all there are seventeen stallions supported under the policy. Not all horses are required to be inspected each year. There are nine Clydesdale stallions, five Percheron stallions, and three Belgian stallions. There are eight Class "A" and nine Class "B" horses supported under the policy. The Provincial Department of Agriculture paid \$500 in premiums for the year and the Dominion Department of Agriculture paid a like amount.

Mr. James Travis, District Agriculturist, Prince George, reports a shortage of farm teams weighing around 2,400 lb. a team, with prices being offered of \$200 a team.

Mr. R. G. Sutton, District Agriculturist, New Westminster, reports that there has been a good market throughout the year for young draughts of quality. There has been some publicity given to the idea of encouraging the breeding of a smaller horse for use on the land. Your Commissioner thinks that this is not a policy that should be supported by this Department, since it is very easy to get too many of the small horses, and by continuing to aim at breeding a big horse there will be sufficient of the smaller ones produced to take care of the needs of any farmers wanting this smaller type of horse. So long as there are light range-bred mares there will be an abundance of horses in the 1,300-, 1,400-, and 1,500-lb. class being produced even from good-sized draught stallions. Many of these are sufficiently clean of limb and upstanding to take care of the needs of the city trade for light delivery-work.

There is a general feeling amongst horsemen that something should be done to prevent the use of the inferior and especially the unsound stallion. Horses carrying hereditary diseases such as side-bone, string-halt, and laryngeal hemiplegia (roaring) should be prevented from standing at public service. While it is definitely a short-sighted practice on the part of any horseman to use an inferior stallion when a good one is available, since a matter of \$5 or even \$10 in service fee is a small item in comparison to the increased value of the foal produced by the better horse, nevertheless it would be much better to even use a grade sire that is sound rather than a pure-bred carrying hereditary diseases.

BEEF CATTLE.

British Columbia continues to be an importer of beef, with some 40,000 head being brought in from the Prairie Provinces, largely from Alberta. Cattlemen in the Province are compelled to adjust their production and time of marketing to fit the changing picture of Prairie production. Crop production on the Prairies has been so uncertain that it has greatly affected the type and class of cattle coming on to our market. The market for British Columbia beef has been for early grassers in June and early July, but this market is being invaded to a limited extent. Until control of the situation is gained, buyers will continue to play the Prairie producer against the British Columbia cattleman, to the detriment of both. Without a doubt there are too many inferior cattle in Western Canada and the British Columbia markets get, of course, all the local product and a good lot of the plain and inferior stuff from the Prairies. With our packing-houses widely distributed over Greater Vancouver and beyond, a centralized stockyard is not immediately possible and can only become possible by definite agreement or intervention. With this situation, organized yards with the regular stockyard representative in charge are impossible, and as a result our Coast market offers a fine dumping-ground for organized Prairie markets to slough off in their periodic clean-ups stock that is not moving.

Mr. G. A. Luyat, District Agriculturist, Williams Lake, reports for his district as follows:—

“Beef prices on the whole have been very disappointing for the year, but some cattle moved out during August and September at fair prices ranging from \$4 to \$4.50 per hundredweight. The majority of these cattle went to the United States. Well over 2,000 head were bought by American packers.”

Mr. Luyat reports the spring market for grain cattle poor, which I might say was a general experience over the Province. Prices were quite low until the American buyer came into the picture. Mr. Luyat reports that prices at Williams Lake continued to go down, with steers selling in the autumn at \$3 and cows at \$1.50, but December prices at Williams Lake strengthened to \$3.50 and tops at \$4. Mr. Luyat reports some demand for feeder-cattle, which no doubt is to supply local demands in Barkerville and other mining districts.

He reports the auction sale in connection with the fall fair at Williams Lake saw 290 head of grass cattle sold. The champion car-load of fifteen head from the Chilco Ranch sold for \$5.95. The reserve champion car entered by Wynn-Johnson brought \$4.90. The champion steer entered by Ray Pigeon sold for \$7.25. The average for the sale was about \$4.30. Buyers from Vancouver and Seattle were present.

Prices in Vancouver for choice steers during the week of July 6th, 1935, was \$6.75 and during the same week, 1936, was \$5.37½. During the week of September 7th, 1935, choice steers brought \$4.25, and at the same date in 1936 these cattle were quoted at \$5.12½ per hundredweight.

Mr. H. E. Waby, District Agriculturist, Salmon Arm, reports a tendency on the part of beef-cattle men in his district to unload, feeling that prices for beef does not warrant the carrying-over of cattle for any great period with the improved prices for hay and grain.

Mr. S. G. Preston, District Agriculturist, Smithers, reports that the poorer beef cattle are being replaced by good dual-purpose or beef cattle. He reports better bulls being used. The winter-feed situation is at present the limiting factor to the extension of further development of the live-stock industry. Mr. Preston reports twenty-seven cars of cattle and sheep shipped to Vancouver during the year from his district, with eight cars from Telkwa, twelve from Burns Lake, two from Endako, and five from Vanderhoof. He also reports twenty-five cars going to Prince Rupert, Telkwa shipping six cars, Houston three cars, Barrett, Topley, and Endako each shipping one car, Burns Lake five cars, Fort Fraser two cars, and Vanderhoof six cars.

Mr. James Travis, District Agriculturist, Prince George, reports additional shipments of stock, with thirteen cars going to Vancouver from the territory east of Endako. He reports also a ready market at Edmonton or Vancouver for good-quality stock, with Vancouver paying better prices.

Mr. T. S. Crack, Assistant District Agriculturist, Pouce Coupe, reports 1,475 cattle being shipped out of the Block.

BRANDS.

Mr. George Pilmer, Recorder of Brands, reports as follows:—

Shipments.—Last year's total shipments of over 28,000 head (which was exceptional) were almost duplicated, decrease being only 560. Williams Lake dropped only 207 to 6,983. Nicola dropped 1,004, from 6,179 to 5,175. Kamloops was down about 600 and Ashcroft nearly the same.

Shipments of hides show a slight increase. There was considerable activity shown by hide-buyers, but there was little surplus stock to be picked up. Licensed hide-buyers increased from thirty-six to fifty-six.

Inspection Service.—The organization remained the same, the only changes being resignation of Mr. J. Bishop, Clinton, and appointment of Mr. T. Pollard in his place. Mr. W. F. Pinchbeck, Williams Lake, was put on a salary basis all the year round. Mr. Wilfred Pinchbeck, Williams Lake, was appointed Deputy Inspector to assist when necessary.

Prosecutions.—Convictions were secured as follows:—Illegal branding: Two, at Keremeos and Clinton. Unlawful killing: One, at Keremeos. Moving stock and hides illegally: Two, at Oliver and Vernon. Not keeping hides three weeks: One, at Keremeos.

Brand Commissioners.—No meetings were held.

Registrations, etc.—The number of brands recorded, renewed, etc., during 1936 was as follows:—

	Recorded.	Renewed.	Reissued.	Transferred.	Total.
Cattle-brands.....	182	272	57	13	524
Horse-brands.....	101	114	29	4	248
Totals.....	283	386	86	17	772

The number of licences issued was: Hide-dealers, 56; slaughter-house, 50; beef-peddlers, 5.

DAIRY CATTLE.

It can scarcely be said that the dairy industry has come back on to a fully profitable basis, yet decided improvement is recorded. The report of the B.C. Lower Mainland Dairy Products Board would indicate that considerably more money had been paid to farmers in that area during the year 1936.

During the year several very good shipments of dairy cattle have left the Province for the Orient, and it would seem as though the work being done by the field organization of the different breeds is getting results. The officers of these associations are aiming to supply the buyers with exactly the kind of cattle they wish. Where quality is asked for, they are trying to supply good-type cattle with good records and free from disease. These officers deserve a great deal of credit for the sound basis on which they are trying to establish the outside markets for British Columbia cattle. The United States took a good number of pure-bred cattle again this year and American buyers report that they are entirely satisfied with their purchases.

Mr. Donald Sutherland, District Agriculturist, Kamloops, reports butter-fat bringing about 2 cents a pound more in his district than last year.

Mr. S. G. Preston, District Agriculturist, Smithers, reports a slow but steady increase in dairying in his district, a few more herds being established and more attention to cow-testing work through the activities of the local Cow-testing Association.

SHEEP.

Speaking generally, lamb prices have been above last year. The Vancouver prices for good lambs from early January to the end of April remained steady at \$7.75, increasing to \$8.12½ during the week of April 17th, the last week of April and the first week of May \$8.50. The weeks of May 8th, 15th, and 22nd saw the price jump to \$9.50 and spring lamb during

the week of May 29th averaged about \$11.50, dropping down during the week of June 19th, when the influx of the earliest range lambs began, to 10 cents. The week of June 26th saw \$9.75 and the week of July 3rd \$9.25; the weeks of July 9th and 17th, \$8.50; the week of July 23rd, \$8.25; and the week of July 30th down to \$7.50. The week of August 7th, \$7.00; August 14th, 21st, and 28th, \$6.50; the week of September 4th prices had firmed somewhat, with \$6.75 being quoted. The weeks of September 11th, 18th, and 25th and October 16th prices held at \$6.85, dropping down to \$6.25 for the weeks of October 2nd, 16th, 23rd, and 30th. For the week of November 6th prices went up to \$6.52; November 13th, \$6 to \$7; November 20th, \$6.50 to \$7.50; December 4th, \$7.50 to \$8, which price continued towards the end of December.

Mr. G. A. Luyat, District Agriculturist, Williams Lake, quotes that the local feeling was that there was an upward swing in the market as it applied locally, lambs netting \$6 locally, coming off the range at probably the lowest point in the market. Some lambs from the district brought 8 to 9 cents in Vancouver. Mr. Luyat quotes that the sheep population is decreasing in his district, many small flocks being dispersed and others to be broken up. Mr. Luyat points out that coyotes are still doing their full share of damage and are responsible for many flock-owners selling out, with bear doing a certain amount of damage. This situation applies to practically every part of the range country. Mr. Luyat reports that the annual auction sale at the Williams Lake Fair 391 head of lambs saw an average of about \$5.50 being paid locally. Some rather plain lambs were entered, he reports, which tends to bring the price down.

Another thing that is seriously handicapping the situation in the Cariboo is the fact that small breeders have too few lambs to make car-load shipments, and since there are no other establishments close by cannot make up a co-operative car. The annual auction is about their only opportunity to get rid of their stuff, and the sheepmen generally feel the Fat Lamb Show in connection with the Williams Lake Fair to be of great assistance to them.

Mr. Luyat reports further that Oxford still continues to be the dominant breed in the country, with some Hampshire, Suffolk, and Shropshire rams being used. He reports that there is a keener demand for pure-bred rams each year.

Your Commissioner would like to point out that, despite the fact that there is a lowering of the sheep population, the work being done by the Williams Lake Fair in the development of the industry is educating the sheepmen to the necessity for using better rams. They see year after year coming to the top in all the classes and selling for the most money those flocks that are headed by good-quality pure-bred rams.

The year 1936 has been one of the worst on record for sheep being killed by dogs. The trouble has centred as usual around Indian reserves and smaller towns, where dogs are not being kept under control. During the year compensation was paid on 356 sheep, while last year the loss was 202 sheep. Compensation was paid this year on 434 chickens and last year on 193 chickens; this year on forty-nine turkeys and last year on six; this year on four goats and last year on two. The total compensation for 1934 amounted to \$1,315.15; for 1935, \$1,096.15; and for 1936, \$2,692.05. The increased cost of this policy, as can be seen, is due to an increased number of killings, but in addition sheep prices have advanced considerably and of course a higher valuation had to be paid.

Mr. T. S. Crack, Acting District Agriculturist, Pouce Coupe, reports a number of pure-bred rams coming into the Block to head small flocks.

SWINE.

The first nine months of 1936 we saw conditions in the swine industry reasonably normal. Starting off in January killing hogs ungraded at Vancouver at \$7.75 to \$7.87½. Through February until March 20th prices stayed even at \$8, going up at the end of March to the middle of April to \$8.25, dropping down for the last week of April and the first week of May to \$8.37½, and then dropped down to the end of May to \$8.12½ and for the week of June 19th were quoted at \$8.25. From then until the middle of August prices stayed even at \$8.50. The peak of the season was reached during the last two weeks of August at a price of \$8.87½. The week of September 4th saw prices down to \$8.12½, with a temporary rise to \$8.37½ for the weeks of September 11th and 18th, to drop to \$7 for the weeks of October 2nd and 16th,

with an uprise in prices for the last two weeks in October of \$7.25 and the first two weeks of November \$7.87. For the week of November 27th the price was down again to \$7.25 and for the weeks of December 10th and 17th \$7 to \$7.75.

The cause of the present lowering in prices is twofold. There has been a decided increase in production all over the Dominion, and with the feed-supply short, generally speaking, and some districts decidedly short of feed, pigs are being rushed to the market in numbers too large for the needs of the trade. This of course resulted in a lowering of price, since the packers were not in a position to take care of this sudden increase; in fact, over twice the number of pigs were placed on the market during some weeks this fall over a similar period of the year previous. Well on to 100,000 head were being put on the market in a single week throughout the Dominion. Increased production on the Prairies naturally means more hogs of the type only suited to the fresh-pork trade, resulting in a flood of our British Columbia markets.

While prices are not so attractive and may continue somewhat lower for some time, and while feed is higher and scarcer, it remains to be seen whether our swine-breeders will follow their usual practice of reducing their herds to the point of sacrificing their breeding stock, or whether they will profit by previous experiences in the difficulty of securing good breeding stock and decide to retain a good sound foundation of choice breeding stock on which to go forward when market forecasts indicate possible profit. The policy of this Branch has been to advise against a short-sighted policy of sacrificing breeding stock. One of the greatest obstacles in the way of the development of the swine industry in this Province has been the lack of good breeding stock, and the result has been that for years British Columbia has imported well on to 150,000 hogs yearly, which definitely means large amounts of money going out of the Province.

Generally speaking, the policy of swine-development carried on by this Branch has been to more or less establish breeding and production centres throughout the Province, with the idea of making it possible for car-load lot shipments being sent out of the particular district. To quote a specific case in the Salmon Arm District some three years ago, this Branch placed a small group of sows in the district under the attention of Mr. H. E. Waby. This group of sows was placed with young men who felt that they wished to identify themselves with practical farming. Mr. Waby reports this year that coming from that foundation some twelve car-loads of market-hogs were shipped out of the district, which brought back in the way of revenue well on to \$18,000. Many of these hogs were produced on farms where the feed that they consumed cost comparatively little, and at best it would have had but very little value on any other market—material such as cull potatoes, cheap grain, cull peas, etc., being utilized.

Mr. Waby has been most successful in his work in this particular field. His supervision and his advice has been of material value in the establishing of these centres. Several other centres have since been started and it is hoped to extend this work considerably in the future. The advantages of placing breeding stock in units is that it takes care of the weakness in the local marketing of agricultural products. With these units car-load shipping is possible, and it is the belief of your Commissioner that if many farmers who now find it impossible to carry on and take care of their obligations were to include one or two breeding sows in their farm programme they could become self-supporting. To the regular excuse made by some that they are not in a position to finish hogs for market, not having sufficient grain, the answer is this: The market for feeder hogs in and around Vancouver and on Vancouver Island is equally as attractive as the best market for finished hogs. There are swine-feeders adjacent to the larger centres of Victoria, Vancouver, and New Westminster who find it impossible to get sufficient feeder hogs for their needs and they are ready to pay a premium for British Columbia raised feeders. There are but very few farmers who are not in a position to produce at least feeder hogs, since but a minimum of grain along with some milk and good pasture will develop really good feeder hogs.

The B.C. Swine-breeders' Association is co-operating very closely with this Branch in extension of the work in hand. Their policy is at all times in line with the policy of this Department.

Mr. G. A. Luyat, District Agriculturist, Williams Lake, reports that prices were not quite so good in his district during 1936, but that the demand is still good in the mining areas. He also reports there is a slight increase in the number of pigs being kept. He reports that the Bridge River District is taking quite a volume of pork from the farming sections of the

Cariboo. He reports that, since many farmers wish to put their hogs out to pasture, they rather favour coloured hogs such as Tamworths or Berkshires, since they do not blister so easily as the white hogs.

(NOTE.—I might suggest that if sufficient shade is provided for hogs, and if there are no mud-holes or water-holes available for the pigs to wallow in, there will be but a minimum of sun-scald.)

Mr. Donald Sutherland, District Agriculturist, Kamloops, reports that the market for hogs has been on the whole satisfactory, but with the shortage of grain and the higher price of feed in general farmers are beginning to unload.

Mr. T. S. Crack, Assistant District Agriculturist, Pouce Coupe, reports 6,900 hogs being shipped out of the Block and a number of pure-bred boars and a few gilts going into the area.

NUTRITION AND ANIMAL HEALTH.

Some five years ago your Commissioner in making a general survey of the Province was struck by the complexity of disease and disease-like conditions affecting the live-stock industry in general. To follow the usual line and suggest definite disease-treatment, particularly from a medicinal or biological nature, seemed scarcely to include a complete programme. In searching around for one or more definite reasons for this state of affairs, it was forced upon me that some observations should be made in the field of nutrition as a possible place to begin correcting and preventing these diseases. After some four years' work I am definitely convinced that, if it were possible to properly nourish the live stock of this Province at all times of the year, our losses from disease and disease-like conditions would be very materially reduced.

My first work was carried on in the range country, with the very able assistance of Mr. G. A. Luyat, District Agriculturist, Williams Lake. The data that Mr. Luyat secured and the trials and tests that he made for this Branch were all of very great value. The first work dealt more specifically with minerals and more particularly with the place played by calcium and phosphorus. A circular was prepared on "Mineral and Vitamin Deficiency" and hundreds of copies distributed throughout the Province. No circular that has gone out from this office has met with the response that this circular on malnutrition in live stock has received. It is now ready for a revision coming out of additional work done by your Commissioner. Definite field observations at different seasons of the year have enabled me to lay foundation for the control and elimination of certain conditions which have become almost established on the range to the place where ranchers thought they could not be controlled. It is my opinion that as a result of this work calf- and lamb-crop percentages will be materially increased and that annual losses of breeding stock will be decidedly reduced. Your Commissioner has under way work in closely associated fields of nutrition that should do a very great deal to still further reduce these annual losses. In trying to apply these pieces of scientific findings, one great difficulty is to have them sufficiently practical for application under field conditions.

One rancher reporting on the results obtained stated that, unlike previous years, he had not a single bit of trouble with heifers dropping their first calves, that all calves came normal, with no monstrosities or weaklings, not a single abortion or any of the troubles with placentas, etc., that usually follow these mishaps. In addition, his late calves, unlike previous years, grew along well and stood up to winter conditions as well as calves born earlier, and the older and weaker breeding cows came through in good condition and did not become pot-bellied during spells of cold weather.

In this particular field of work it is hoped that very definite information will be available for next year's report or in the form of a circular during the coming summer. Control of summer-range problems such as plant-poisoning and its sequelæ are receiving definite consideration, and it is hoped that the experiments now under way in the control of this condition will be of practical value to the cattlemen.

Very excellent co-operation is being received from particular ranchers at all times in the way of making field observations and taking on experimental programmes suggested by your Commissioner. Very good assistance is also being received from Mr. G. A. Luyat, D.A., Williams Lake; Mr. Shirley Preston, D.A., Smithers; and Mr. James Travis, D.A., Prince George. It is hoped that work will shortly be under way in several of the other districts, including the Okanagan and Boundary country, as well as the Fraser Valley. Some observations done in the field of sheep-diseases are getting very good results. Special attention should

be drawn to a condition known as twin-lamb pregnancy disease which occurs in ewes in all the sheep-raising districts throughout the Province. Field observations made by your Commissioner on the Islands during the last few years, as well as observations in the range country personally made for the last several years, have resulted in the diagnosis of the trouble and practical suggestions on control. Newspaper publicity has been given to the control of this trouble and most favourable comments received from the sheepmen on the work done. It is hoped that a circular can be made available immediately for use of sheepmen. If not, further newspaper publicity will be given to this so as to be of assistance to the sheepmen before this spring-lambing season. The losses from this condition have been quite extensive in certain sections.

In the field of swine-disease your Commissioner has been working consistently for several years in trying to find a practical control for some of the swine problems. No class of animal seems to require closer attention to general management and nutrition, and with losses occurring almost up to 100 per cent. in litters at certain seasons of the year, it looked as though many swinemen would be driven out of the business, or that fall litters would be next thing to impossible to raise. It is hoped that during the coming season definite advice will be available to all swinemen on how to control these complex diseases and disease-like conditions that have been making such heavy inroads into the swine industry.

Your Commissioner particularly appreciates the co-operation received from swinemen and from the B.C. Swine-breeders' Association in the matter of experimental work. In swine herds where disease was running rampant for the last several years almost complete control has been secured this year, and it is hoped that these practices applied in other herds will get similar results. Hogs of unknown origin being shipped into the Province still continue to be an active source of disease-spread, and of course it is impossible to reach every individual swineman to warn him against the folly of buying hogs of unknown source; consequently all that can be expected is to educate those who wish to be educated and place them in a position to so manage their business that they will not have these losses.

In the field of breeding-diseases of cattle almost the same thing applies. Extensive observations have been made throughout the Province amongst cattlemen, and while extensive sweeping programmes are being advocated all over the continent dealing with particular diseases such as Bang's disease, your Commissioner is convinced that, although the agglutination test for Bang's disease plays a very prominent and important part in the eradication and control of this disease, consideration must be given to other very definitely modifying factors, and that before any definite Province-wide or Dominion-wide programme be put into effect all these factors should be carefully reviewed. Any such programme must intimately interest the man on the land and his welfare must be given every consideration.

WARBLE-FLY AND TICK CONTROL-WORK.

I have to again report satisfactory progress in the warble-control work being done under the area plan by this Branch under the direct supervision of different district officers.

Mr. Donald Sutherland, District Agriculturist, Kamloops, reports the Upper Louis Creek area, established in 1934, being treated again this last year. The area was established in 1934 with 467 head of cattle and the average number of warbles was 7.4. The area has been somewhat reduced this year and includes some 206 head of cattle, the number of warbles having been reduced to 1.4. This, I might say, includes but a single treatment yearly.

Work still continues around the Kamloops District but has never been definitely organized, but rather has been used for purely experimental purposes and no detailed reports have been received. It is hoped that this year a move can be made to organize this area as a definite control area.

In the Pine View-Prince George area, under the direction of Mr. James Travis, District Agriculturist, Prince George, excellent results have been secured and Mr. Travis reports a 100-per-cent. co-operation from all those within the controlled area and most excellent support from the committee appointed by the Farmers' Institute to carry out this work. The first treatment applied on April 6th gives 360 head of cattle, with an average of 1.7 warbles per head. The second application on May 1st to the same cattle showed an average of 1.92 warbles per head. The third application on June 1st to 249 head of cattle in the area showed 0.164 warbles per animal. The total cost per animal for the three treatments was approximately 1 cent per head.

Mr. R. G. Sutton, District Agriculturist, New Westminster, started off this year with two new areas, one in the Hatzic District including 603 head of cattle and an area on Barnston Island which included some 360 head of cattle. At the first application on April 8th in the Hatzic area there were 603 head treated, with an average of 2.2 warbles per animal. A second application to the Hatzic District showed again an average of 2.2 warbles per animal. The first treatment on the Barnston Island area on March 23rd showed 360 animals treated, with an average of 3.2 warbles per animal. The second treatment in the Barnston Island District on April 17th showed an average of 1.5 warbles per animal. Mr. Sutton is to be commended for the attention he gave to this work in endeavouring to ascertain just when the first treatment should be applied in these areas, and with the information coming out of his observations we will be in a position to begin treatments at exactly the right time in future.

Mr. H. E. Waby, who pioneered in this work by having the first areas in the Province, reports that our first area, which was established in the Deep Creek District, is found to be free from warbles again this year. He reports that the area around Salmon Arm is about cleaned up and that little will require to be done in that district excepting to check the odd herd where warbles were found last year.

In the Grindrod-Enderby-Mara Districts the report of the Inspectors shows an average of 576 warbles in 1,594 head of cattle for the one treatment that was applied in the district, which was an average of 0.36 warble per animal. This is the second year that these districts have been under control and definite progress can be reported.

Another area that was organized by Mr. Waby in the Windermere District, supported by the local Farmers' Institute, came through with very nice reports. This was handled in two sections and supervised by the secretary of the institute, Mr. T. W. Turner. One application was made on March 5th, in which 220 cattle were treated in the two sections and 1,280 warbles reported, which would be an average of about 5.9 warbles per animal.

Under the direction of Major A. D. Macdonald, who took complete charge of the work, an area was established on the north end of the Saanich Peninsula. One application was made on March 8th, when 785 warbles were reported in 143 head of cattle, or an average of 5.48 per animal.

It is expected that additional new areas will be started this year, and after some further extension it is expected that a drive will be made to make a clean-up of entire valleys and eventually take in the major part of the Province. It is expected that a beginning will be made this year in one of the ranching districts and an endeavour will be made to treat cattle by the use of dust-guns and putting them through chutes. This work will likely aim to treat both for warbles and ticks (*Dermacentor andersoni*).

The two ticks, known as the wood-tick (*Dermacentor andersoni*) and the winter tick (*Dermacentor albapictus*) have been causing a great deal of trouble in certain sections of the Province. From observations made by your Commissioner it has been established that the winter tick until recently was confined to quite small sections of the Province, but it is gradually extending out from these areas and will shortly be found probably over a large part of the range country. This tick seems to be particularly hard on horses, and while it does not seem to produce any paralysis as does the wood-tick, yet it depletes the strength of the animal to the place where no amount of feeding will bring them back before midsummer. Your Commissioner has felt that there should be some treatment that would control and possibly eradicate this tick and with the co-operation of a number of ranchers began some work some three years ago. The results of these experiments have led me to believe that a very good measure of control can be secured by the use of a standardized Derris root applied in the form of dust, either with a dust-gun or by hand; and, furthermore, best results have been obtained when this dust treatment could be put on sufficiently early before the females become mature. One hundred per cent. kills have been secured, however, in many cases even when the ticks had attained some considerable size.

Some work is going forward this year in the treatment of groups of animals for the control of the wood-tick. Some small experiments tried over the last few years have given very encouraging results on the use of standardized Derris in the control of the *Dermacentor andersoni*, and it is expected that this year a sufficiently large experiment can be carried out to put us in a position to speak more definitely. As stated previously, it is hoped to do this work at a time when both warbles and ticks can be treated for. It is the opinion of your

Commissioner that by the proper use of Derris a protection can be given to animals for sufficient length of time to carry them over the period of danger from paralysis.

GENERAL.

Your Commissioner again this year did a large amount of field-work in different parts of the Province in connection with the improvement of live stock and general live-stock-disease work. A good deal of investigational work was carried on by personal observation on Vancouver and the Gulf Islands. Material has been secured for the publication of further circulars and for the revision of bulletins and circulars now up for revision.

As a member of the B.C. Feeds Standards Board, some work is being done on the revision of Circular 53, "Feeding of Farm Live Stock in British Columbia." As a member of the Provincial Marketing Board, your Commissioner was called upon to do some additional work.

Very good support has been received from the officers in the field, especially in the way of investigational work and observations on experiments being conducted. I want to also thank the office staff and those attached to this Branch who made it possible for us to carry on the work in hand. My work in this Branch has been heavy, but at all times a pleasure.

REPORT OF DAIRY COMMISSIONER.

HENRY RIVE, B.S.A.

The season has not been particularly favourable for dairy production and the total yield will not exceed that of 1935. Much inclement weather was experienced early in the year, with intense heat in the late spring. Later, drought was general. Of dairy crops, silo mixtures, corn and field roots gave fair returns only. Hay, throughout, yielded well. Prices for mill-feeds remained high enough, with, latterly, an upward trend. Prices paid for butter-fat have improved slightly with the rises in price of butter and other dairy products.

DAIRY-FACTORIES.

Twenty-eight butter-factories, three cheese-factories, two condenseries, one milk-powder plant, and one casein plant have been in operation during the year. All dairy-factories have been called on regularly. Storage, sanitation, grading, and testing of milk and cream supplies and methods employed in general are inspected and checked. In addition, many milk plants and several separate ice-cream establishments are subject to periodical scrutiny.

CREAMERIES.

The average quantity of butter manufactured per factory may be calculated to be 216,406 lb., but in actual size of operations extreme differences are to be found. The creameries of the Interior increase slowly in total of butter manufactured. Those of the Islands are dropping since the war. On the Lower Mainland a large increase has been experienced, in a small part due to reaching out further beyond the district for cream. A slight improvement in average price of wholesale butter is gradually occurring, but since the drop from 41 cents per pound in 1929 to 35 cents in 1930 very low prices have been the rule—1931, 27¼ cents; 1932, 22 cents; 1933, 23 cents; 1934, 22¾ cents; 1935, 24½ cents. About 6,000,000 lb. of creamery butter will be the final total of manufacture during 1936, rather less than half the butter consumed annually in British Columbia. The average amount of butter available annually in British Columbia from all sources for the past ten years is 16,610,044 lb. Roughly, the proportion contributed by imports, foreign and from other Provinces, is 46 per cent.; of local production, creamery and dairy, 54 per cent.

CHEESE.

The amount of cheese manufactured fluctuates greatly with the market for other dairy products. Less has been made in 1936 than during the previous year. One large factory exists making Cheddar, two small ones making, respectively, Roman and Italian varieties and Kingston and Monterey. Several farm dairies are steadily making and marketing Stilton,

Cheshire, Swiss Brick, and modifications of Cheddar. It is to be regretted that, during this period of low butter prices favourable to cheese still being experienced, no expansion of cheese-making has taken place. There is room on the British Columbia market for a quick-curing cheese of Cheddar type.

CONDENSED MILK.

The two condenseries of the Lower Mainland, Fraser Valley Milk Producers' Association at Delair and Borden's at South Sumas, continued to turn out evaporated milk. Prices are recovering slowly. Milk-powder from skim-milk is produced in one establishment, which also produces casein.

ICE-CREAM.

A very fair season for ice-cream has been experienced. Competition on the part of wholesalers has increased greatly of late.

HERD IMPROVEMENT.

Totals of cows on test continue to increase steadily if somewhat slowly. The reasonable necessity of recording cows of unproved production, when the means for such is within reach of all cow-owners, is not patent to the majority. The lack of a national policy in this regard assisting, by reiterated statement and widespread propaganda, is largely the cause of this apathy towards milk recording.

There continue in operation twelve Cow-testing Associations with fourteen supervisors. All of these are in very fair shape in point of members and finances. Three hundred and twenty herds have been on test, with approximately 5,500 cows.

The annual list of dairy sires published each winter grows in popularity. The opportunity afforded to weigh the breeding capabilities of a sire through the performance of progeny is now of interest to many. The sixth list will appear early next year.

CREAM-GRADERS' LICENCE COURSE.

The course for 1936 was held March 2nd to 19th, inclusive, at Almond's Block, Pender Street East, Vancouver. Seventeen applicants registered, two for testing only. The course in 1937 will be held in the fall (November-December), not in the spring as usual.

LICENCES ISSUED.

During the year sixteen applicants for testers' licences were examined. Sixty-seven licences were issued. Fifty licences to cream-graders were issued. One was a single licence; forty-nine were combined cream-graders' and milk-testers' licences. To fifty-four persons, firms, companies, or associations buying milk or cream on the basis of the butter-fat content, licences were issued.

VERIFICATION TEST.

No applications for verification tests were received during the year.

MEETINGS.

Meetings at New Westminster, Edgewood, Quesnel, Kelowna, Roe Lake, North Saanich (2), Saanichton, Victoria, Cloverdale, Chilliwack, Vancouver, Saltair, Harewood, Notch Hill, Deep Creek, Mount Ida, Grindrod, and Lumby were attended by members of the staff.

Two radio talks on dairy subjects were delivered over the Kelowna station.

DEMONSTRATIONS.

Demonstrations in the manufacture of a simple type of farm cheese were given at Edgewood (2), Crofton (2), Southbank, Winfield, and Silver Creek. Butter-making demonstrations were given at Edgewood (2).

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION.

Through lack of funds, activities remain curtailed. The annual meeting was held in New Westminster in February.

PUBLICATIONS.

Dairy Circulars No. 29, "The Fifth List of Dairy Sires"; No. 30, "The Improvement of Dairy Herds"; and No. 31, "Annual List of Milk and Butter-fat Records," were the publications of the year.

LEGISLATION.

Nothing directly demanding Provincial administration in relation to dairying was enacted in 1936.

GENERAL.

Co-operation with the Dominion Bureau of Statistics in making available month by month the dairy-manufacturing returns of the Province has added materially to the clerical work of the Branch.

The work of factory and dairy-plant inspection was carried out as in the past several years by Messrs. F. C. Wasson and F. Overland, Dairy Inspectors and Instructors.

Supervision of Cow-testing Associations with responsibility for dairy-sire compilations and indexing has remained with Mr. G. H. Thornbery, Assistant in Charge, Herd-improvement Work in British Columbia.

A large volume of inquiries, applications, reports, etc., in relation to general dairy-work, cream-grading, testing, licences, Cow-testing Associations, and herd sires continues to be received.

REPORT OF CHIEF VETERINARY INSPECTOR.

ANSON KNIGHT, V.S.

Although the main activities of your Veterinary Branch have been devoted to the T.B. testing of cattle and the inspection and grading of dairy-farms, considerable time has been devoted to the control and suppression of the more serious live-stock diseases. In the out-lying districts advice to stock-owners as to the treatment of non-contagious diseases has been given when requested by the stock-owners. Meetings called by various Farmers' Institutes and Fair Boards have been addressed by members of your staff on the subject of live-stock diseases and their treatment.

It is very pleasing to note the small number of reactors to the tuberculin test. Out of 9,686 cattle tested, only twenty-nine reactors were found. The general condition of live stock throughout the Province may be classed as good. Crops for feeding purposes are quite up to the average and every indication points to plenty of feed for the coming winter.

Throughout Central British Columbia and Peace River there is a tendency to increase the live-stock population, more especially along beef lines. Owing to the large number of work-horses employed on the farms throughout the Peace River, it offers an excellent opportunity to increase the horse population, especially if good sires were provided. A number of buyers have been in the area in the past two years purchasing heavy horses, and probably it is to be regretted that a number of the best heavy mares have been shipped out of the district. However, there still remains quite a number of good foundation mares, and these, with the use of good stallions, will no doubt bring an added revenue to the farmers of the district.

Indications are that the number of swine have also increased, and I believe the general percentage of selects would be on a par with the general average throughout Canada. If present prices are maintained for swine, no doubt it will be a stimulus to increase the swine population, and as there is a premium paid for selects it is to be hoped that the farmers of the district will secure good sires.

The sheep population does not show the same tendency to increase, although the numbers are maintained, there being about 500 breeding ewes in the Peace River Block. The Dominion Government has seen fit to give cheap rates on Hampshire rams and a number of this breed are now being used. The Dominion Government has also put into the district a number of beef bulls, chiefly of the Shorthorn breed.

Your Inspectors in visiting the farms have from time to time given considerable information and instruction as to the control of parasites amongst sheep and swine, and as the farmers become conversant with the control of these parasites there is less call on the Veterinary staff.

Indications are that there is a slight increase in the number of cows in the Fraser Valley and prices have advanced from 15 to 20 per cent. A number of American buyers have been in the area and have taken out some 200 head of good cows. The Dominion Government veterinarians have been covering the Lower Fraser T.B. Restricted Area and the work is about complete. We have no definite figures at the present time as to the percentage of reactors, but I understand this will be very low.

The various diseases dealt with by your staff are listed below.

BLACKLEG.

Small sporadic outbreaks of this disease have been reported from various localities, more especially south of the C.P.R. line. A number of our cattlemen make a practice of vaccinating their young stock, which has resulted in the suppression of this disease on those farms. The outbreaks this year have been confined to a number of small ranches. There were twenty-three head died of this disease. The remaining young stock on these farms were vaccinated with blackleg aggressin, which proves highly efficacious in controlling the disease. Carcasses of animals that died were either buried or burned.

HÆMORRHAGIC SEPTICÆMIA.

Outbreaks of this disease have occurred from time to time, involving a few deaths in each case, but the disease has nowhere assumed serious proportions. As a prophylactic measure a number of farmers make use of some of the anti-hæmorrhagic products which have proved useful in the prevention of this disease.

An outbreak of lung-disease was reported from the Upper Heffley Creek and on examination this was found to be a bovine pulmonary disease. This was also treated with the bovine pulmonary mixed bacterin.

COCCIDIOSIS.

Two outbreaks of this trouble occurred, one at Chinook Cove and the other at Barnhart Vale. Instructions were left by your Inspector as to the care and treatment of affected stock.

KERATITIS (PINKEYE).

This disease as affecting cattle occurred in two localized areas, one in the Interior and the other at Pitt Meadows. This disease occurring at Pitt Meadows last year was of rather a serious nature, covering a considerable number of cattle, but was of a mild or localized type this year. Although the fatalities in this disease are practically *nil*, it affects the general condition of the animal and therefore proves to be somewhat of an economic loss. We find that treating with keratitis bacterin has proved very helpful when used in the control of this disease.

The disease amongst horses reported from Monte Creek was investigated and diagnosed as swamp-fever, for which there is no permanent cure.

JOHNE'S DISEASE.

None reported.

RED-WATER.

Red-water is very prevalent in certain areas, especially through the Langley Municipality, Mount Lehman, and a few cases are to be found in Haney and Hammond. This disease has been known in these localities for many years. Many treatments have been advised, but apparently no permanent cure has been established. The Dominion Government has a farm now under lease for the investigation of this disease, but to date no information as to the exact cause or treatment has been forthcoming.

Minor diseases such as ringworm, mammitis, garget, etc., have been brought to the attention of your staff in the general round of their inspection-work. Advice as to the care and treatment of these diseases has been readily given and, I believe, with satisfactory

results. This is more especially true in the outlying areas where there are no veterinary practitioners. In those areas where practising veterinarians are located the owner is advised to refer such diseases to his local man.

FOOT-ROT.

This disease has been practically under the control or supervision of Dr. D. H. McKay, who is stationed at Kamloops, and the disease has confined itself very largely to the Okanagan and surrounding districts. Dr. McKay has examined some 38,540 sheep. The disease apparently is centred on two ranges—Malakwa and Hunter's Range. Hunter's Range was closed for two years and about 1,500 head of sheep have been allowed to graze on this area, whereas in former years some 4,000 head were taken up during the summer months.

Foot-rot when once established is very difficult to eradicate as the soil becomes contaminated through diseased sheep. Other sheep travelling over such areas pick up the infection. Heavy frost tends to keep the disease in check, but where the ground is covered with a heavy coating of snow previous to a freeze-up the contagious matter is not affected, and therefore the trouble may exist on certain grounds year after year. It is a matter of attempting to keep healthy sheep off of contaminated ground.

The deaths occurring from this disease are practically negligible, but owing to the severity of the disease when once established it has a tendency to pull the animals down in condition and therefore affects the selling-price. In practically every country where we have sheep this disease exists. Purchasers of sheep are well advised to examine all sheep before purchase to see that they are in a healthy condition. This disease was introduced into British Columbia owing to the active purchase of sheep in the stockyards of the Prairie Provinces. At that time the disease was not listed under the "Contagious Diseases (Animals) Act" and therefore no check was made on animals affected with this disease, until at the present time we are having more or less trouble in attempting to eradicate the infection. However, progress has been made, and it is to be hoped that in time we will be able to have this disease to a large extent under control. It is a matter of attempting to keep the healthy sheep from becoming infected by preventing them access to contaminated ground, and if new trails could be opened up so that the sheep can have access to the ranges without travelling over the old trails, I believe it would be a step in the right direction. This is a matter, I believe, for arrangement between your Department and the Department of Lands.

SWINE-PLAGUE.

A reported case of swine-plague was sent in from the South Thompson, but on investigation the trouble was found to be due to faulty feeding and not of a contagious or infectious nature.

INSPECTION AND GRADING OF DAIRY-FARMS.

From the attached summary (*see* Appendix No. 5) you will note that your Inspectors have covered practically all the settled areas throughout the Province, and those herds from which the milk supplied to the various towns and cities is drawn have been inspected. There has been a marked improvement in the sanitary conditions of the stables and dairies and also better facilities for the care of the milk after it is produced. Practically all our centres of population now demand a grade certificate before a licence is issued for the purpose of selling milk, and the inspection of the dairies in the various localities is entailing more work for your staff each year.

During the past year your staff has inspected 4,182 premises and 59,693 cattle, of which 37,995 were milking cows. We have in the Province 476 Grade A premises, 3,115 Grade B, 212 Grade C, and 385 ungraded. I may point out that those in the ungraded class are made up largely of parties keeping a cow for family use. Where milk from such premises is sold it goes into the manufactured class. We have found it necessary from time to time to check up on a number of dairymen where we find the bacteria runs somewhat over the limit as set out by the "Milk Act." This is a decided check on such dairymen to keep them up to the standard of their classification, the Cities of Vancouver and Victoria co-operating with your staff in this respect.

REPORT OF FIELD CROPS COMMISSIONER.

CECIL TICE, B.S.A.

The year 1936 was on the whole a favourable one for field-crop production. There was a good supply of moisture early in the season and this, coupled with warm weather, resulted in crops getting off to a good start in most districts.

Hay was generally a heavy crop, although on the Lower Mainland and on Vancouver Island the crop was lighter, due to the fact that considerable winter-killing took place in the clover. Some difficulty was experienced in curing the first crop of alfalfa in the Interior, whilst difficulty was experienced in curing the second crop of alfalfa in the Cariboo.

Pastures in the Fraser Valley, in particular, suffered severely through winter-killing of grasses and clover, which necessitated many of them being ploughed up and reseeded.

Grain-crops were generally good and better prices prevailed. The absence of smut in the wheat-crop of the Interior raised the quality considerably. In the drier sections of the Province grain-crops yielded below average.

Roots and silage crops were only fair, due to insufficient moisture during the latter part of the season.

Potato yields varied considerably in different parts of the Province. According to Mr. G. E. W. Clarke, District Horticulturist at Abbotsford, the early plantings were small, due to the backward weather during the period of early planting and also on account of the early-sprouted tubers being frozen in the racks. However, the yield in a number of instances was as high as 10 to 12 tons per acre, which is considerably above the average. It is worthy of mention that the new potato-crop was handled in small lug-boxes, weighing about 50 lb. This type of new package and the general appearance of the potatoes was very acceptable to the trade. However, some slight changes may be made in the type of package for next season.

Mr. R. G. Sutton, District Agriculturist at New Westminster, makes the following statement regarding the potato crop: "Through most of July the weather remained warm and moist, bringing on one of the worst outbreaks of late blight in potatoes that has been experienced. In practically every potato-growing area in the district the disease appeared. Growers have reported a loss of from 25 to 60 per cent., due to growth being retarded because the tops were killed down about mid-season. Examination of the tubers on several farms showed 5 per cent. affected and later investigations indicate this figure will be increased."

Weather conditions also brought on a rather severe outbreak of stem-rust in oats in the Fraser Valley and yields were accordingly reduced in varying degrees. It should be stated here that rust in grain-crops was quite prevalent in many sections of the Province during the year.

Seed-crops varied considerably. A heavy crop of timothy-seed was harvested in Central British Columbia, whilst the production of red- and alsike-clover seed was below normal, due to winter-killing. Conditions for the successful harvesting and threshing of the seed-crops were not very satisfactory in many sections. Present prospects are that there will be a much larger alsike-seed crop during 1937, as increased acreage was sown in 1936 and climatic conditions have been satisfactory so far.

According to Mr. S. G. Preston, District Agriculturist at Smithers, it is estimated that there is over 700 tons of timothy-seed in the Bulkley Valley and Lakes District with a carry-over of more than 200 tons from last year. Indications are that prices will be better than for the 1935 crop, which netted slightly over 3 cents a pound to the growers. This price was only possible through a reduction in freight rates to Eastern Canada from \$1.87½ to \$1 per hundred. The rate to Eastern Canada for the 1936 crop has been set at \$1.25 per hundred.

In his report, Mr. Thomas Crack, Acting District Agriculturist at Pouce Coupe, states: "There will be plenty of seed wheat, oats, and barley in the Peace River Block for the coming spring. Feed has been plentiful this winter and stock are wintering in good shape; the weather so far being ideal. A lot of summer fallowing and fall ploughing was done as the land did not freeze up until late in November."

Mr. James Travis, District Agriculturist, Prince George, states that there will be about 15 tons of alsike-seed in the Prince George area and about 5 tons at Vanderhoof.

Crop production in the Fraser Valley was severely curtailed, due to the floods in the late spring. Practically all the dykes in the larger reclaimed areas held, but seepage-water rose

and was responsible for damage on the lower fields. On some of the smaller areas the dykes broke and also a number of private dyking areas were inundated, with resultant losses. With the coming of summer the weather improved and a wet spring emerged into hot, dry weather later on. Good weather continued throughout the fall, permitting of harvesting under excellent conditions and enabling fall ploughing to be carried on into December.

With regard to ranges, Mr. D. Sutherland, District Agriculturist at Kamloops, makes the following observations in commenting on low ranges: "The fruitful promise of the early season was checked by the prolonged period of heat and drought in midsummer which dried up most of the vegetation. Rains in September brought on good fall growth of most grasses. In general, fodder production on the lower ranges was a little below that of 1935."

In respect to timber ranges, Mr. Sutherland makes the following statement: "Growth started fairly late, but development was rapid in May and June. The midsummer dry spell resulted in rather early curing of most plants. Second growth followed the fall rains, but this was of little importance for grazing. As one would expect, fodder production was lower than in the previous year. In the Kamloops District the fall rains brought the ranges into fairly good condition, but in the Nicola-Merritt area the rains did not occur and there was little fall growth."

Mr. G. A. Luyat, District Agriculturist for the Cariboo, refers to ranges as follows: "The grazing season on the open range particularly was a dry one, drier than has been seen for a number of years. This condition was ideal for grasshopper outbreaks."

CROP PRODUCTION.

It is both interesting and encouraging to report that crop production in its various phases is steadily on the increase. Farmers are realizing more and more that live-stock and field-crop production go hand in hand and that it is not in accordance with the best methods of farming to overstock and purchase feed. From the type of letters received and questions asked at meetings, it is becoming increasingly evident that farmers are giving more study and thought to their farming operations than ever before. Greater interest is being shown in such matters as soil-fertility, improvement of pastures, the growing of legumes, and the use of good seed. It is such factors as those mentioned which are having an effect on crop production, but there are also other factors responsible for the increased production of field crops. In this connection reference should be made to the new fertile areas being brought under cultivation, the most noticeable of which are the British Columbia section of the Peace River District and the Creston Flats.

Mr. C. B. Twigg, District Field Inspector at Creston, makes the following statement: "This year there were 9,800 acres in wheat (largely spring wheat) in the reclaimed area. The crop averaged 24 bushels to the acre. In addition, there were 200 acres in oats and a small amount of barley. The quality of the wheat that was combined and delivered before the September break in the weather came was excellent, grading No. 1 Hard, which is remarkable for a mountain climate."

On account of pea-moth and other pests the dried-pea industry of the Fraser Valley has been severely curtailed and interest in this industry has been transferred to Vancouver Island and to the Salmon Arm-Grindrod District of the Interior. Approximately 260 acres of peas for the dried-pea trade were grown in this latter district this year. The results seem to have been so satisfactory that an effort is being made to secure 1,000 acres for 1937. Special attachments for threshing peas have been secured by several threshermen in the Interior in order to avoid splitting the peas.

B.C. FIELD CROP UNION.

The work of the B.C. Field Crop Union continues to show progress and some very interesting and useful information is being obtained as a result of the various tests conducted by its members. Your Commissioner is secretary-treasurer of the union. There were 135 paid-up members during the year 1936. The following statement gives an idea of the location of the members:—

Northern British Columbia	1
Central British Columbia	30
Interior	27

Vancouver Island	21
Lower Mainland	19
Boundary	4
Cariboo	19
East Kootenay	6
West Kootenay	2
Peace River	6

The same number of experiments were available to members of the union this year as last—namely, thirty. In addition to this, there were several miscellaneous tests conducted with such plants as English Wild White Clover, Regal Barley (a smooth-awned type), Early Blue Peas, Ladak Alfalfa, and Crested Wheat Grass. A large proportion of the samples required for the tests were made available by Dr. L. E. Kirk, Dominion Agrostologist, and Dr. L. H. Newman, Dominion Cerealist. The co-operation of these two Federal officials is greatly appreciated.

Altogether 186 district tests were conducted. In addition to this, a number of tests started in 1935 with perennial plants were continued. The number of tests of the various classes of crops was as follows: Forage and pasture, 110 tests; cereal, 56 tests; and potatoes, 20 tests.

The third annual meeting of the association was held at the time of the British Columbia Winter Fair in Vancouver, December 8th.

The first field-day to be held by the union took place during the late spring at the Dominion Experimental Farm, Agassiz. In spite of the inclement weather, there was a good turnout of farmers and the gathering was very successful.

WEEDS.

Increased interest is being shown in the weed problem throughout the entire Province. One of the chief difficulties in connection with the matter is the lack of sufficient funds for the enforcement of the Act, together with the fact that there is a great deal of wild or semi-wild land in the Province. There appears to be a real desire on the part of certain land-owners to control weeds, whilst others show no interest whatever. Weeds have become a decided menace in certain areas, the seeds having been brought in through feed-grain, screenings, etc.

The Department again devoted special attention to the Peace River District by reappointing Messrs. Cushway and Hingley as Weed Inspectors and much good work was accomplished by these officials.

District Agriculturists and Provincial Police have co-operated in handling the various weed problems from time to time.

Considerable attention has been given by Department officials to the use of weed chemicals, and various demonstrations have been conducted with such chemicals as atlacide and sodium chlorate. Limited quantities of both of these chemicals have been purchased by the Department for demonstration-work, the larger part of which has been used in the Interior under the supervision of District Agriculturists Waby, Middleton, Evans, and Sutherland.

Mr. H. E. Waby in his report makes the following statement: "Tests with sodium chlorate were made in the fall of 1935, and whilst no one experiment can be considered conclusive, the success of these tests was such that further investigation has been considered fully justified.

"Numerous experiments were therefore again instituted in 1936 and the weeds treated were couch-grass, morning-glory, sow-thistle, and hoary pepper-grass. This latter weed, which is a very pernicious one, has become well established around Armstrong and the tests in that area are being carried on in conjunction with H. H. Evans, District Field Inspector, Vernon.

"Several orchard plots have also been established, in co-operation with C. R. Barlow, District Field Inspector, in the Salmon Arm District, to determine the effect of sodium chlorate on fruit-trees and berries."

In the majority of cases the chemical is being applied in the dry form in the fall of the year and the quantity varies from 75 to 180 lb. per acre. In a few instances atlacide is being tested out alongside of sodium chlorate to ascertain if there is any difference between these two chemicals as far as weed eradication is concerned.

Next spring all plots will be ploughed under and farmers have agreed to grow various crops on them, including roots, corn, grain, peas, and other legumes.

Another weed chemical has recently been brought to our attention—namely, activated carbon bisulphide—and it is hoped to carry on some definite tests with this chemical during the year 1937.

RANGE AND PASTURE IMPROVEMENT.

Considerable interest has been shown during recent years in the matter of reseeding ranges. The plots which were set out on Guichon's ranch at Quilchenna in 1933 are furnishing much useful information as to what are the best grasses to use in reseeding ranges. Crested wheat is the most outstanding so far. Mr. Donald Sutherland reports that the Nicola Livestock Breeders' Association are showing considerable interest in range reseeding.

Seed of crested-wheat grass and other dry-land grasses has been distributed by both the Field Crops Branch and the B.C. Field Crop Union working together in various areas. Encouragement has also been given by both of these organizations to the improvement of pastures. Articles have been written drawing attention to the importance of this subject and demonstration plots have been laid out with two kinds of mixtures. For soils containing a fair amount of moisture the following mixtures have been used: English wild white clover, creeping red fescue, orchard-grass, timothy, and perennial rye. For the drier soils a mixture of alfalfa and brome is being tested. In addition to this, the "Elliot Mixture" as used in some parts of England is being tried out.

CROP-TESTING.

The lack of information with respect to the suitability of varieties for various sections of the Province has been evident for some years. In a Province such as this, with such a wide variety of soils and climatic conditions, it is difficult to obtain definite information other than by local tests. Realizing the importance of this, the Dominion Cerealists kindly consented to co-operate in having such tests conducted. As a result samples of seed of various varieties were supplied by the Dominion Cerealists for test purposes in the following districts: Agassiz, Ladner, Telkwa, and Vanderhoof, oats; Woodpecker, barley.

In addition to the samples supplied by the Dominion Cerealists, samples of local oats (both commercial and registered seed) were included in the test-plots in all of the districts. Two methods of testing were followed—namely, randomized test-plots and single rod row plots (three rows 16½ feet long to the plot).

Some difficulty was experienced in connection with these tests, as practically all those who supplied the land had had no previous experience with work of this nature and the facilities for conducting the tests were not always the best. The grain from the various plots was threshed at the Dominion Experimental Farm, Agassiz, and those who had supervision of the plots were: James Travis, District Agriculturist, Prince George; S. G. Preston, District Agriculturist, Smithers; and W. Sandall, Field Inspector, Vancouver. The farmers who co-operated were: C. Prout, Vanderhoof; Kolling and Pauli, Woodpecker; M. Davie, Ladner; and A. Howell, Telkwa. The co-operation of all these people is greatly appreciated. The results of these tests are all on file in the Field Crops Office.

FIELD-CROP SEED PRODUCTION.

Encouragement continues to be given to the production of various field-crop seeds in those districts considered suitable for the production of such seeds. Figures showing the production of field-crop seeds for the year 1936 are not yet available. The following statement shows the amount of seed produced in 1935:—

	Lb.
Mangel	5,075
Sugar-beet	2,180
Swede turnip	3,200
Carrot (field)	500
Alfalfa	56,000
Clover, alsike	100,000
Clover, red	150,000
Timothy	1,200,000
Timothy and alsike (mixed)	40,000
Meadow-fescue	8,000

In view of the fact that crested wheat appears to have a definite place in the agriculture of certain districts, some attention is being given to the production of seed. During the past year small quantities of seed have been produced by several farmers.

Increased interest is being shown in swede-turnip seed production. In 1935 two varieties of swede turnips were sent into the Smithers District—namely, Ditmars Bronze Top and U.B.C. Cylindrical—for trial purposes. These turned out very satisfactorily and the Department was asked to send in a further supply of seed in 1936 to enable those who had tried them to produce their own seed. Mr. S. G. Preston, District Agriculturist at Smithers, reports that the second year's trial met with equally as good results and it is hoped to establish a uniform crop for market.

Efforts are also being made in the Kersley District to grow U.B.C. Cylindrical turnip-seed. Mr. G. A. Luyat, District Agriculturist at Williams Lake, reports that in the fall of 1935 roots were selected from a number of different fields for the purpose of seed production. About 40 lb. of seed were grown and this amount will more than supply the district. Seed-roots were again selected last fall and the project will be continued.

In the Okanagan, through the co-operation of Messrs. Middleton and Evans, a limited quantity of Ladak alfalfa-seed has been produced.

DISTRICT SEED FAIRS.

Three district seed fairs were held, one in conjunction with the Interior Exhibition at Armstrong and the others at Prince George and Dawson Creek. Considerable interest is shown in these fairs and they are proving of value not only in encouraging the production of seed in local areas, but also in raising the standard of the seed used for sowing. The best exhibits are forwarded to the annual Provincial Seed Fair.

SOIL ANALYTICAL WORK.

A large number of soil examples have been submitted to the Provincial Analyst for examination, and the results have been interpreted by Mr. Paul C. Black, who has been handling this phase of the work. In addition to this, thirty-four samples of soil were analysed by Mr. S. S. Phillips, Assistant Field Crops Commissioner, by means of the Spurway method. These reports, which have been carefully recorded, are all on file in the Field Crops Office.

SEED-CLEANING MACHINERY.

The Provincial and Federal Departments' policy in giving assistance in the purchase of seed-cleaning machinery is still in operation. A number of small hand-machines were supplied to isolated districts in the Peace River Block, where conditions are such that power-machines are not advisable at the present time.

A new Monitor power-cleaner was installed at Francois Lake to replace the Clipper power-machine which has been located there for several years. This latter machine was transferred to Houston. Also, a new and larger power-machine was installed at Telkwa and the Clipper machine which was located there for several years was transferred to the Woodpecker District, where considerable enthusiasm is being displayed in the production of alsike-seed.

CHICAGO INTERNATIONAL AND TORONTO ROYAL.

British Columbia exhibitors participated in the grain and seed sections of the Chicago International and Toronto Royal Shows again this year and made creditable showing. Mr. C. W. Stirling, of Sidney, captured first prize in the large-pea class at Toronto and was named "Grand Champion" for all the pea classes. At Chicago Mr. Stirling was again first in the large-pea class and was named "Reserve Grand Champion." The variety was "Stirling." It is interesting to note that this variety has taken high honours at the Chicago for a number of years.

Mr. Stirling also exhibited at Chicago another new pea originated by himself which captured first place in the "Any other colour" field-pea class. Attached to this report is a complete list of British Columbia winnings at Toronto and Chicago.

ANNUAL SEED FAIR.

The annual Seed Fair was held in conjunction with the Winter Fair at Hastings Park, Vancouver, December 7th to 9th. The number of entries was below those of 1935, but the general quality of the exhibits was high. Officials of the Dominion Seed Branch and of the Vancouver Exhibition Association co-operated with this Department in the staging of the Fair.

THRESHING-MACHINES.

In accordance with the requirements of the "Noxious Weeds Act," threshermen are required to submit statements of the amount of grain and seed threshed annually by them. As all reports have not yet been received, it is impossible to submit a complete statement of the number of threshing-machines in operation and the amount of grain and seed threshed in the various areas.

PEACE RIVER CO-OPERATIVE SEED-GROWERS' ASSOCIATION.

At a meeting held in Dawson Creek on November 7th the farmers in the Peace River Block decided to link up with the Peace River Co-operative Seed-growers' Association, with headquarters at Grande Prairie.

Mr. Thomas Crack, Acting District Agriculturist at Pouce Coupe, makes the following statement in his report in reference to this matter: "The directors of the association were present at the meeting and agreed that if twenty new shareholders could be obtained from the Block at \$25 per share they would send in an up-to-date power cleaning-machine, with a man to operate it." It has since been learned that the required number of shareholders have been secured and that the association will be sending in the cleaning-machine early in February.

HAY AND GRASS DRYING.

Some correspondence has been received during the year regarding hay and grass driers and the practicability of farmers installing such machines on their farms. The loss which occurs in some districts with the first crop of alfalfa, clover, etc., is the reason no doubt for inquiries being made on this subject. Furthermore, considerable publicity has been given in the press to the system of drying grass as practised in some European countries.

Your Commissioner has made some investigations in this respect, and finds that hay-driers range in price from \$5,000 to \$50,000, although a machine designed by Professor Wm. Aitkenhead, of Purdue University, Lafayette, Indiana, is quoted at \$1,200. A satisfactory grass-drier can be purchased for \$2,500.

It is interesting to note that about 6,000 tons of dried grass were produced in England in 1936. Already the output could have been sold many times over. Experimental work in England suggests that grass cut between 11 a.m. and 4 p.m. contained less moisture than when cut at other times. The cost per ton of producing dried grass varied from £3 13s. 4d. to £5 7s. 11d.

At the Rowett Institute it was found that 10 lb. of dried grass was more effective for sustaining milk yield than was 15 lb. swede turnips, 4 lb. straw, and 4 lb. concentrates. The naked eye was sufficient for one to see that milk from cows getting dried grass was of a better colour than was that from those not receiving such grass.

WHEAT-MIDGE.

Several bad infestations of wheat-midge, particularly in spring wheat, were reported during the year. In this connection the co-operation of Mr. W. Downes, Dominion Entomologist, was sought and a meeting of farmers in the Cedar District, Nanaimo, was held. This district was subject to one of the worst infestations of wheat-midge. As a result of this meeting a demonstration plot was established in the district under the supervision of Mr. S. S. Phillips, Assistant Field Crops Commissioner. Two varieties of fall wheat—namely, Sun and Dawson's Golden Chaff—were sown last fall on a 4-acre plot. The reason fall varieties were selected is because, from observations made elsewhere, fall varieties are less susceptible to attacks from this pest. At the present time very little fall wheat is grown in the Nanaimo-Cedar District, probably due to the fact that drainage conditions on many farms are not satisfactory.

SOY-BEANS.

The production of soy-beans has been receiving some attention in various parts of the Province during recent years, and more particularly in the Chilliwack District during the past year. This has been due, in part, to the work of the B.C. Field Crop Union and a feed company of Chilliwack. About 100 acres were planted to soy-beans in the Chilliwack District. It would appear from results obtained so far that early-maturing varieties can be successfully ripened on most of the soils in the Fraser Valley; whilst the later varieties show some promise as hay or fodder plants.

The Chilliwack company has in mind putting on the market soy-bean hay meal. The soy-bean is a very valuable plant which has many uses. Large acreages are grown in various parts of the United States. At the present time our soy-bean supplies are imported.

OLLI BARLEY.

Experiments conducted at the Federal Experimental Station at Beaverlodge, Alberta, during recent years have shown Olli barley to be an early-maturing high-yield variety. The original seed was obtained by the Dominion Cerealists from Finland.

Your Commissioner contacted the Dominion Cerealists, and as a result was successful in obtaining a small quantity of seed for distribution in Central British Columbia. The seed was duly planted by several farmers, but at the time of preparing this report the results are not available. It is felt, however, that this barley may have a definite place in Central British Columbia agriculture.

A quantity of seed of this same variety of barley was also distributed in the Peace River Block through the medium of the Federal Experimental Station at Beaverlodge. That grown by Mr. Norman Dow, of Pouce Coupe, yielded 65 bushels to the acre; that by Mr. Corry, of Sunset Prairie, yielded 77 bushels per acre; and that by Mr. J. W. Abbott, of Baldonnel, yielded 74 bushels per acre.

GRAIN SCREENINGS.

The District Field Inspector at Vancouver, Mr. Walter Sandall, reports that twenty-seven permits for the removal of grain screenings—that is, elevator and refuse screenings—have been issued to feed merchants or dealers, and that under these permits approximately 265 car-loads of screenings were consumed in the Province. During the same period seventeen feeders' permits were issued to seven applicants.

The total quantity of screenings removed from British Columbia grain-elevators during the year for use in the Province was approximately as follows: No. 1 and No. 2 feed screenings, 1,191 tons; elevator and refuse screenings, 7,960 tons. In addition, there were approximately 8,072 tons of screenings exported to the United States.

SOCIETY OF AGRONOMISTS.

During the year the B.C. Society of Agronomists was reorganized. This organization was started several years ago and accomplished much useful work. For various reasons it has been inactive during recent years. The society is made up of representatives of the University of British Columbia and Federal and Provincial Departments of Agriculture. Two meetings of the executive were held during the year and your Commissioner attended both meetings.

NATIONAL BARLEY COMMITTEE.

The National Barley Committee held a meeting in March in Toronto. Your Commissioner was in attendance and gave a report on the barley situation in this Province. A report of this meeting has already been filed in the Department.

CROP COMPETITIONS.

Three standing-crop competitions were held during the year, but no combined field-crop and cleaned-seed competitions. The districts in which the standing-crop competitions took place were as follows: Stewart Flats and Progress, in the Peace River Block, and Armstrong. The two referred to first were green oats and the latter field corn.

B.C. WINNINGS AT INTERNATIONAL HAY AND GRAIN SHOW, CHICAGO, 1936.

- Field Peas, Large Yellow.*—1, C. W. Stirling, Sidney; 2, J. Decker, Pemberton.
Field Peas, Small Yellow.—5, B. Young, Koksilah.
Field Peas, Any Other Colour.—1, C. W. Stirling, Sidney.
Reserve Champion, Field Peas.—C. W. Stirling, Sidney.
Red-clover Seed.—20, E. J. Down, Woodpecker.
Hard Red Spring Wheat.—2, W. G. Gibson, Ladner; 12, Mrs. A. Kelsey, Erickson;
 13, William Rogers, Tappen.
White Winter Wheat.—7, B. Young, Koksilah.

B.C. WINNINGS AT TORONTO ROYAL WINTER FAIR, 1936.

A. GRAIN IN SACKS.

- (a.) *Winter Wheat.*—6, B. Young, Koksilah.
 (b.) *Spring Wheat.*—4, William Rogers, Tappen; 6, G. K. Landon, Armstrong.
 (c.) *Six-rowed Barley.*—10, B. Young, Koksilah.
 (d.) *Field Peas.*—1, C. W. Stirling, Sidney; 2, John Decker, Pemberton; 3, B. Young, Koksilah.
 (e.) *Flint Corn (Any Yellow Variety).*—6, Mrs. A. Kelsey, Erickson.
 (f.) *Sweet Corn (8-rowed).*—2, Mattock Bros., Raleigh Mount.

B. REGISTERED OR CERTIFIED SEED.

- (a.) *Oats (Medium or Late).*—3, B. Young, Koksilah.

C. POTATOES.

- (a.) *Green Mountain Group (Extra No. 1).*—5, J. Decker, Pemberton.
 (b.) *Irish Cobbler Group (Extra No. 1).*—1, J. Decker, Pemberton.
 (c.) *Any Other Variety (Extra No. 1).*—6, J. H. Avent, Courtenay; 7, J. Decker, Pemberton.
Field-pea Championship.—C. W. Stirling, Sidney.

D. BOYS' AND GIRLS' CLASSES.

- (a.) *Green Mountain Potatoes.*—7, Gordon Davis, Milner; 11, E. L. Bull, Milner.
 (b.) *Any Other Variety of Potatoes.*—14, A. Schindler, Grindrod.

REPORT ON SOIL-SURVEYS.

C. C. KELLEY, B.S.A.

Accurate figures for the total area mapped by the soil-survey in 1936 are not yet available. Approximately, the area surveyed covers over 500,000 acres. The total is made up from surveys in three areas, the largest being the Lower Fraser Valley, which was mapped from the Chilliwack-Agassiz District to the Coast.

The next largest area mapped was the Kootenay Flats, near Creston, where about 30,000 acres of the Kootenay River Delta Flats were examined between the International Boundary and Kootenay Landing.

Finally, about 4,000 acres were mapped on a large scale in the Okanagan Valley at Kelowna.

Field-work for the year commenced on April 20th and was continuous until November 25th. The time between December 1st and March 31st will be devoted to the preparation of maps and reports on areas surveyed, a short enough period considering the great mass of material still in the rough form of field-notes.

LOWER FRASER VALLEY.

Problems related to soil-fertility and plant-growth in the Lower Fraser Valley have for years taxed the ingenuity of Government and University investigators to a point where a more systematic method of approach was deemed necessary. The final decision came in

the form of a request from the Raspberry Committee that soils in the areas in which raspberries are grown be mapped and classified into types. This proposal was then enlarged to include the whole region.

The objective of this soil-survey was to define and map the main soil divisions of the Lower Fraser Valley, so that the soils and agriculture of these various divisions might stand out for comparison with one another. With this work accomplished, it would then be possible to study the weaknesses and strength of each different type of soil as a separate problem, in this way systematizing soils research.

In the Lower Fraser Valley the climate is humid. Precipitation is greater than evaporation. Therefore the movement of water is a downward percolation, dissolving plant-food elements, and washing them out into the streams and rivers and finally into the sea. Soil-leaching leads to deficiency of compounds necessary for the normal growth of plants, which in turn affects the nutrition of both man and animals. While the climate has a blanket effect over all types of soil, it must be emphasized that each kind of soil influences crop production in one way or another, and hence the need of defining all important distinctions so that research can be carried on under favourable conditions.

The Lower Fraser Valley is the most important agricultural region in British Columbia. It still contains comparatively large areas suitable for agricultural development. It also contains smaller areas where the clearing and cultivating of land should certainly be discouraged. The use of soil-survey data is therefore of real importance from the standpoint of scientific land-use in the region as a whole.

Twelve soil divisions were mapped and described. The soils of the Lower Fraser Valley were related to the soils of Washington State by the use of maps and data from the Reconnaissance Survey of the Eastern Part of the Puget Sound Basin, undertaken in 1909. This relationship will make possible a comparison of Washington and Fraser Valley agriculture on the same soil types, and will also make available any research results achieved by the University of Washington on the soil types crossing the International Boundary.

The product of this survey will be a soil map of the Lower Fraser Valley and a descriptive report, which will be prepared in due course for publication in bulletin form.

SOIL SURVEY OF KOOTENAY RIVER FLATS.

For three weeks in the latter part of July and early August, field-work in the Lower Fraser Valley was stopped in order to undertake a reconnaissance soil-survey of the Kootenay River Delta, known as the Kootenay River Flats, which extend from Kootenay Landing up-stream to the International Boundary and into Idaho for a distance of about 20 miles to Bonners Ferry.

On the Idaho side Dyking District No. 1, at Bonners Ferry, was organized in 1920. It has been cropped since 1921. Since that time a total of thirteen separate areas have been dyked between Bonners Ferry and the International Boundary. For the past fifteen years these dyked areas have been used for grain-growing, with small acreages of other crops. Notable yields of wheat have been obtained. It is natural, therefore, that some development should take place on the Canadian side.

In British Columbia certain dykes were constructed near the Border on the area known as Kootenay Reclamation Farm as far back as 1892. In 1932 application was made for permission to repair these works and drain some 7,700 acres for cultivation.

In 1927 application was made for permission to dyke an area defined as Creston Reclamation Project, Unit No. 1, covering about 7,300 acres. In both areas the total of about 15,000 acres is now dyked and cultivated for wheat. This is roughly about half of the land available for reclamation.

As yet this land has produced only from one to several crops and the growers are naturally interested in its relationship to the Idaho side, where there is a fifteen-year period of cropping experience, and also in the possibilities for crops other than wheat.

The soil type was examined on both sides of the International Border. Field data for a suitable map and report have been secured, which will be prepared and submitted in due course.

SOIL-SURVEY OF BENVOLIN FLATS, KELOWNA.

After completion of the Fraser Valley field-work a soil-survey of the Benvoulin Flats at Kelowna was undertaken in November in order to complete the Okanagan field-work of 1935. About 4,000 acres were mapped in detail and alkali and water-table conditions were examined.

In this area annual precipitation is 11.32 inches and evaporation is greater than precipitation. There is an upward movement of water causing the deposition of lime and alkali salts near the surface. The tendency in the southern part of the Okanagan Valley is for soils to accumulate lime and other salts, especially where drainage is poor, and the reaction is alkaline.

In contrast to this, the annual precipitation in the Lower Fraser Valley is 40 to 60 inches, and salts including lime are leached from the soil. The result is an acid reaction, in some cases injurious to plant-life. Because of this climatic effect lime must be added to the soil to neutralize acid, and crops may not have the same nutritional value as those grown in the semi-arid Okanagan Valley, unless fertilization is very complete.

OTHER WORK.

In the Fraser Valley seventeen test-plots were laid out with trace elements at Hatzic, B.C., to determine whether or not certain root-diseases affecting Cuthbert raspberries are related to soil deficiencies. Any results from these plots will be noted next year.

A detailed soil-survey was made of test-plots under Cuthbert raspberries at Hatzic, which are supervised by the Dominion Experimental Farm, Agassiz.

A detailed soil-survey was made of the Dominion Experimental Farm at Agassiz, from which a special map and report will be prepared.

Following successful experiments with underdrainage in the Okanagan Valley in 1935, consulting-work has been done in connection with seepage and drainage problems in the Okanagan fruit areas.

REPORT OF POULTRY COMMISSIONER.

J. R. TERRY.

The past year has been, on the whole, a little more profitable for breeders and those engaged in the industry than for a few years past. A late winter and spring weather conditions were inimical to the best results, both in hatching and production records, but, as is generally the case, later hatching results were appreciably benefited by the enforced rest occasioned the birds. Spring was abnormally late, with the result that egg prices did not sag so quickly as in normal weather. The annual forced sale of hens and pullets by breeders hard pressed financially was again in evidence. It has been repeatedly pointed out by this Branch that those breeders who gamble each year by hatching too many pullets are taking too many risks. By selling some of the pullets in late fall, when there is generally a demand, they are enabled to buy feed for the birds kept. As it is, the first cold snap which may affect the egg yield, accompanied by a demand from the feed merchant for payments for feed long overdue, forces the breeder to dump the pullets on the market at a time when they should shortly begin to repay for their raising.

Egg prices for the past ten years were:—

	Cents.		Cents.
1926	30	1932	15
1927	29	1933	15
1928	29	1934	15
1929	30	1935	16
1930	24½	1936	21
1931	20		

MARKET DEMANDS.

With the exception of the months from November to January, during which time the demand is for heavy fowls, the rest of the year only medium-sized birds are in demand. From 3 to 4½ lb. seem to be the popular fancy. To supply this requirement, more and more breeders who cater principally to this class of trade are utilizing game male birds for crossing purposes. A word of warning is again uttered for the benefit of those thinking of trying out this work. Unless one is what may be termed a natural feeder, it will most likely prove unprofitable. Chicks hatched for this purpose have to be fed entirely different to those hatched for laying. A system whereby 90 per cent. of the feeds used should be fed in the form of a wet or moist mash is necessary. The danger of unrestricted importation of live fowls from the East should always be reckoned with before launching out heavily. The winter holiday season is the period when importations may be expected.

BREEDING OPERATIONS.

Breeding results were very similar to those of the preceding year. The very late spring and severe cold snaps held up full production for a period well on to the end of March. The production of very early chicks was not so heavy as usual, but later on hatcheries and breeders got into full swing, with the result that past totals were possibly topped for the past three or four years.

Unfortunately, feed prices raced away from egg prices and this would naturally deter some from expanding as desired.

The demand for sexed chicks or day-old pullets was again strong, and the work of selection was practically all done by Orientals specially permitted to enter the country for this purpose. As mentioned in last report, many breeders also took advantage of the sex-linked method of crossing two breeds the progeny of which show by colour of plumage or down the nature of the sexes at birth.

In the past few years quite a number of breeding fowls has been imported from this Province by Great Britain. Further restrictions have now been placed on all fowls entering the British Isles. Clean bills of health must be provided with all birds forwarded. Certificates will only be accepted if signed by Dominion Live Stock Health officials.

BOYS' AND GIRLS' CLUBS.

A slight increase in clubs has to be recorded, thirty being formed. The Central British Columbia portion has dropped out of the picture as far as clubs are concerned. One club only, that at Giscome, was organized in the North this year.

Rhode Island Reds were again the favourite breed, with Barred Rocks, Wyandottes, and Leghorns following. Possibly this has been the best year recorded for uniformly good hatching results. One or two clubs decided to purchase day-old chicks. This procedure in the immediate past has been out of the question for the majority of clubs, as where chicks are purchased it is difficult to get broody hens to take the chicks, and this would necessitate the laborious work of utilizing hot-water bottles or fireless brooders. Again, many might have to buy small brooders.

The Okanagan, Kootenay, Boundary, and Vancouver Island Districts were the locations for the majority of the clubs. Many of the officials of the local Poultry Associations were very energetic in organizing clubs. Farmers' and Women's Institutes were also active in the good work.

Poultry-judging classes were again held at Vancouver, Victoria, and Armstrong. At the last-mentioned point elimination trials were held for contestants to the "Royal" Dominion Judging Competitions at Toronto. At Vancouver the judging classes are open to all comers, but owing to expense there were no club members from Vancouver Island or Interior.

POULTRY-DISEASES.

Breeders are slowly beginning to realize the importance of continuous culling the year round if they wish to avoid the heavy mortality which seems to be becoming general. There have been losses of nearly 30 per cent. reported to the Department this year amongst flocks which were not culled or selected in any way. Too many beginners and a few experienced breeders seem to be devoid of sufficient courage or far-sightedness to cull out any females

from flocks under their care that are not up to par. Not much difficulty has ever been experienced in getting them to throw out males not fit for breeding.

There have been fewer reports of outbreaks this past year, and losses through these outbreaks appear to have been lighter also.

Coccidiosis and paralysis made up a majority of the complaints received. Infectious bronchitis was reported several times. More and more rearers are making use of the raised platform or sun-porch for young stock from hatching until 8 or 10 weeks of age. Where chicks are kept off the soil for this length of time many outbreaks of disease are avoided, especially where the soil has been heavily stocked for years. Too much caution cannot be exercised in selecting the site for rearing young stock if the chicks are to be put out on the soil. The run of an orchard or a cornfield is amongst the best sites for complete success with rearing. The more range the better, as it also reduces the cost of feed per chick, gets the birds matured quicker, and also makes a great difference in the mortality.

TURKEYS.

An average crop was grown this year, and it is pleasing to note that better prices were the rule. This is as it should be, as the feed costs have been much higher than last year. Interior breeders have an advantage over coastal raisers, inasmuch as the lessened rainfall and added sunlight period makes the rearing-work much cheaper and easier.

Far too many breeders, however, on general mixed farms allow their turkey flocks to mingle with their ordinary fowls on the range. This should not be allowed, especially in the case of young stock. The spread of "blackhead" is greatly facilitated by this means. Overstocking also takes its toll.

The demand by consumers for a medium-sized turkey is causing breeders to veer from the larger heavy type of birds. Females about 12 lb. and males up to about 16 lb. are now in general demand as breeders.

Complaints were again heard *re* depredations of wild animals among the flocks. This trouble is confined principally to points east of Hope.

Several breeders again exported valuable breeding stock to United States and Eastern Canadian points at lucrative prices.

WATER-FOWL.

An average crop is to be recorded, principally in general-purpose ducks kept for egg production, and in geese, Toulouse particularly. Khaki-Campbell ducks and Indian Runners are kept for excellent egg production. At many points now duck-eggs are regularly offered for sale at prices equal or higher than Grade A large fowl-eggs. Many flocks average well over 16 dozen yearly. Pekins, a white-plumaged, medium- to large-sized duck, are still the most popular general-purpose water-fowl. Many breeders, however, fail to receive the profits possibly obtainable, by faulty methods in feeding and dilatoriness in marketing. Table-ducklings should be disposed of before they are twelve weeks, preferably at nine to ten weeks, by which time properly fed ducks should have attained a weight of from 5½ to 6½ lb. The feeding of a moist mash three times daily, with plenty of grit and greenstuffs, is advised.

In the case of geese, these may be grass-fed or mash-fed for market purposes. If grass-fed, a much longer period is necessary, and also an addition of grain or mash fed for the last month or three weeks. Where a mash of moistened ground grains are fed about twice daily, the young goslings will be much larger and growth attained in much less time, especially if access can be had to greenstuffs daily. Whilst there isn't much call for "green" geese or goslings, yet a sufficient demand for them may be stimulated amongst the Hebrew race if the supply is available.

BLOOD-TESTING.

This (the second year) work was again undertaken by the Department working by arrangement with the U.B.C., which supplied laboratory and equipment; the Dominion Department, which provided laboratory officials under the supervision of Dr. E. A. Bruce, of the Pathological Branch; and the culling, banding, assembling, material, and inspection work delegated to our Department officials, with Mr. G. L. Landon assisted by Mr. John Smith. Both Inspectors far surpassed last year's efforts. The above handled well over 70,000 birds,

being nearly twice as many as last year. Three flocks on the Island were handled by the writer. The weather was similar to that experienced last year—fog, rain, and frost—which somewhat handicapped our Department staff.

The test this year reveals a much lower quota of reactors, and it is very encouraging to note that the Inspectors met far less cases of disease of various forms than last year. Breeders have again shown appreciation of the rigid culling-work of our Inspectors. In some of the flocks last year quite a percentage of the fowls were found suffering with roup, catarrhal colds, and allied ailments. This year the same breeders' flocks have but a tittle of this trouble. Many breeders admit that they have practised more systematic culling than ever before.

APPENDICES.

APPENDIX No. 1.

B. C. SMALL-FRUIT AND RHUBARB ACREAGE, 1920 TO 1936.

	1920.	1922.	1924.	1926.	1928.	1930.	1932.	1934.	1936.
Strawberries.....	1,796 $\frac{1}{2}$	2,886 $\frac{2}{3}$	2,331 $\frac{1}{2}$	2,042 $\frac{1}{24}$	3,005 $\frac{1}{2}$	2,197 $\frac{1}{4}$	2,264	2,944	3,311 $\frac{3}{4}$
Raspberries.....	967 $\frac{1}{2}$	2,105 $\frac{1}{6}$	2,386 $\frac{2}{3}$	1,640 $\frac{3}{4}$	1,257 $\frac{2}{3}$	1,060 $\frac{1}{6}$	1,076 $\frac{3}{4}$	1,371 $\frac{1}{4}$	1,438 $\frac{1}{4}$
Loganberries.....	209 $\frac{1}{4}$	506 $\frac{5}{8}$	764 $\frac{2}{3}$	802 $\frac{1}{3}$	712 $\frac{2}{3}$	820 $\frac{5}{16}$	844 $\frac{1}{8}$	697 $\frac{2}{3}$	627 $\frac{1}{2}$
Blackberries.....	210 $\frac{1}{2}$	328 $\frac{7}{12}$	251 $\frac{1}{2}$	178 $\frac{2}{3}$	169 $\frac{2}{3}$	120 $\frac{1}{8}$	158 $\frac{3}{16}$	155 $\frac{2}{3}$	140 $\frac{1}{4}$
Red currants.....	23 $\frac{1}{4}$	42	58 $\frac{1}{10}$	34 $\frac{1}{20}$	41 $\frac{1}{12}$	22	20 $\frac{3}{16}$	35 $\frac{1}{2}$	42 $\frac{1}{4}$
Black currants.....	61 $\frac{1}{2}$	138 $\frac{1}{4}$	238 $\frac{3}{4}$	191 $\frac{1}{8}$	179 $\frac{1}{4}$	148 $\frac{1}{16}$	158 $\frac{9}{16}$	272 $\frac{1}{2}$	326 $\frac{1}{2}$
Gooseberries.....	55 $\frac{3}{4}$	85 $\frac{1}{2}$	96 $\frac{1}{6}$	67 $\frac{1}{24}$	68 $\frac{2}{3}$	61 $\frac{5}{8}$	71 $\frac{1}{16}$	112 $\frac{1}{8}$	112
Rhubarb.....	91	110 $\frac{7}{8}$	132 $\frac{1}{4}$	243 $\frac{7}{8}$	320 $\frac{2}{3}$	332 $\frac{5}{8}$	396 $\frac{1}{16}$	571 $\frac{1}{8}$	685
Totals.....	3,414	6,202	6,310	5,201	5,756	4,813	4,989	6,159 $\frac{3}{4}$	6,683 $\frac{1}{2}$

APPENDIX No. 2.

FORMULÆ AND RESULTS IN APPLE-SCAB EXPERIMENTS AT A. W. JACKSON'S, LAVINGTON, 1936.

Liquid lime-sulphur used and quoted on gallonage basis. All dry materials quoted on poundage basis. Fruit in "Light Scab" column could be marketed unwrapped. "Severe" column represents culls.

Plot No.	No. of Trees.	Spray Periods.	Materials and Proportions used.	Spray-injury observed on Tree and Fruit.	No. of Apples counted.	Scab		
						Free.	Light Scab.	Severe Scab.
1	6	Pink Calyx Cover	Lime-sulphur 1-35 Lime-sulphur 1-40 Lime-sulphur 1-40	Light marginal and spot burn of foliage; medium slough of primary cluster-leaves; foliage off-colour and size of crop good	3,236	86.2	12.2	1.6
2	6	Pink Calyx Cover	Lime-sulphur 1-35 Lime-sulphur 1-40, plus Cal. Arsenate 3 1/2 lb.-100 gals. Lime-sulphur 1-40	Slight marginal and spot burn of foliage; slight drop of primary cluster-leaves; foliage good size and colour; crop good	2,842	97.2	2.5	0.3
3	6	Pink Calyx Cover	Lime-sulphur 1-35 Lime-sulphur 1-40, plus Lead Arsenate 2 1/2 lb.-100 gals. Lime-sulphur 1-40	Foliage-burn slightly heavier than above plots; foliage good size but off-colour; leaf-drop slight; good crop	2,705	95.0	4.7	0.3
4	6	Pink Calyx Cover	Lime-sulphur 1-35 Lime-sulphur 1-60 Lime-sulphur 1-60	Very slight marginal and leaf-spot burn, also leaf-drop; foliage good size, slightly off-colour; good crop	2,153	92.8	6.2	1.0
5	6	Pink Calyx Cover	Lime-sulphur 1-35 Lime-sulphur 1-60, plus Cal. Arsenate 3 lb.-100 gals. Lime-sulphur 1-60	Foliage-burn and drop practically nil; foliage good size and colour; crop medium	1,823	97.0	2.8	0.2
6	6	Pink Calyx Cover	Lime-sulphur 1-35 Lime-sulphur 1-60, plus Lead Arsenate 2 1/2 lb.-100 gals. Lime-sulphur 1-60	Foliage-burn and drop very slight; foliage good size, slightly off-colour; crop good	2,320	96.4	2.9	0.7
7	6	Pink Calyx Cover	Lime-sulphur 1-35, plus Cal. Arsenate 3 lb. per 100 gals. Koppers Flootation Sulphur 2 1/2 lb. per 40 gals., plus Cal. Arsenate 1-40 Same as Calyx spray	Foliage-burn and drop practically nil; foliage good size and colour; crop medium	1,726	96.9	2.7	0.4

8	Pink Calyx Cover	6	Lime-sulphur 1-35, plus Koppers Flotation 2 lb., plus Cal. Arsenate 1 lb.-40 gals. Lime-sulphur ½ gal. to 40, plus Koppers Flotation 1¼ lb., plus Cal. Arsenate 1 lb. per 40 gals. Same as Calyx spray	1,553	92.4	7.0	0.6
9	Pink Calyx Cover	6	Koppers Flotation 4 lb., plus Cal. Arsenate 1 lb. per 40 gals. Koppers Flotation 2½ lb., plus Cal. Arsenate 1 lb. per 40 gals. Repetition of Calyx	1,522	91.3	8.3	0.4
10	-----	3	Check-plot	1,664	10.5	32.7	56.8
11	Pink Calyx Cover	6	Kolofog 6 lb., Hydrated Lime 8 lb. per 80 gals. Calyx and Cover repetition of Pink	1,957	37.8	34.9	27.3

All burn and drop of foliage took place following calyx-spray.

APPENDIX No. 3.

COW-TESTING ASSOCIATIONS IN BRITISH COLUMBIA, 1936.

Name.	Instituted.	Secretary.	Supervisor.	Departmental Grant.
Bulkley Valley.....	Oct., 1926	W. Billeter, Smithers.....	A. H. R. Howell.....	\$900.00
Chilliwack, Route 1.....	March, 1913	W. S. Annis, R.R. 1, Chilliwack.....	J. J. Andrews.....	620.00
Chilliwack, Route 2.....	Nov., 1928	W. S. Annis, R.R. 1, Chilliwack.....	J. E. Manning.....	620.00
Chilliwack, Route 3.....	April, 1927	W. S. Annis, R.R. 1, Chilliwack.....	J. E. Wingrove.....	545.00
Comox Valley.....	April, 1914	W. E. Mantle, Sandwick.....	T. G. M. Clarke..... Leslie McKinnon.....	600.00
Dewdney-Deroche.....	Oct., 1930	Father A. M. D. Gillen, Mission.....	H. C. Clark.....	620.00
Langley.....	June, 1914	B. J. A. Campbell, Murrayville.....	Wm. Rose.....	620.00
North Okanagan.....	July, 1929	B. H. Morris, Enderby.....	Alf. Johnson.....	620.00
Okanagan.....	April, 1920	J. Spall, Kelowna.....	Wm. Hooson.....	620.00
Pitt Meadows-Maple Ridge.....	Nov., 1925	S. T. Rippington, Pitt Meadows.....	W. E. Hawthorne.....	620.00
Richmond-Ladner.....	March, 1919	S. H. Gilmore, Steveston.....	D. S. Heelas.....	620.00
Sumas-Matsqui.....	Nov., 1923	B. Stewart, Abbotsford.....	R. A. Wilson.....	620.00
Surrey.....	Nov., 1924	F. McKinnon, Box 11, Cloverdale.....	Geddes Jess.....	620.00
Vancouver Island (South).....	April, 1929	R. Rendle, 1118 Johnson Street, Victoria.....	G. G. Grimes..... T. G. M. Clarke.....	620.00

APPENDIX No. 4.

LIVE-STOCK SURVEY IN BRITISH COLUMBIA, JUNE, 1936.

	1935.	1936.
Total horses	59,537	58,470
Cattle—		
Bulls, 1 year old and over	7,200	7,700
Cows and heifers, 2 years and over—		
(a.) For milk purposes	106,100	117,800
(b.) For beef purposes	58,100	57,100
Yearling heifers—		
(a.) For milk purposes	25,200	28,200
(b.) For beef purposes	21,200	21,900
Heifer calves	33,700	33,000
Bull calves	17,800	14,500
Steers, 2 years old and over	16,300	20,400
Yearling steers	18,400	19,500
Steer calves	8,700	8,200
Total cattle	312,700	328,300
Swine over 6 months old	14,900	15,000
Swine under 6 months old	33,600	36,000
Total swine	48,500	51,000
Sheep and lambs—		
Over 1 year—		
(a.) Ewes	86,100	87,500
(b.) Rams	2,800	2,900
Under 1 year—		
(a.) Ewes	47,400	48,000
(b.) Wethers	34,900	36,000
(c.) Rams	4,200	3,500
Total sheep	175,400	177,900

APPENDIX No. 5.
SUMMARY OF PREMISES INSPECTED AND GRADED.

District.	No. of Premises	No. of Cattle.	No. of Cows.	CLASS.			Ungraded.
				A.	B.	C.	
Vancouver Island.....	418	5,293	4,240	234	95	8	81
Lower Fraser Valley.....	3,265	48,951	28,899	177	2,857	187	44
East Kootenay.....	145	1,903	1,503	43	44	---	58
Interior.....	76	1,069	1,069	3	54	---	25
West Kootenay.....	41	492	492	2	17	2	20
Okanagan.....	43	790	790	4	30	---	9
Coast Points.....	39	159	130	---	5	4	30
Central B.C. and Peace River.....	155	1,036	872	13	13	11	118
Totals.....	4,182	59,693	37,995	476	3,115	212	385

SUMMARY OF PREMISES VISITED AND CATTLE T.B.-TESTED.

District.	No. of Premises.	No. of Cattle.	No. of Cows.	No. of Reactors.
Central B.C. and Interior Districts.....	192	1,195	1,002	9
Vancouver Island.....	378	4,659	3,702	12
East Kootenay.....	145	1,903	1,503	7
Interior.....	84	1,008	1,008	1
West Kootenay.....	49	492	492	---
Okanagan.....	50	429	429	---
Totals.....	898	9,686	8,136	29

APPENDIX No. 6.
SUMMARY OF IMPORTATIONS OF FEED-GRAINS BROUGHT FROM ALBERTA TO COAST DISTRICTS UNDER PROVISIONS OF TARIFF 145.

Month.	WHEAT.		OATS.		BARLEY.		MIXED GRAIN.		RYE.		SCREENINGS.		Total Certificates issued.
	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	
1936.													
January.....	1,980	250	278	100	931	680	33	.....	43	1,440	33	.....	89
February.....	2,269	330	290	86	677	.....	.....	.....	.....	.....	.....	.....	89
March.....	1,423	1,780	182	.....	239	338	.....	.....	.....	.....	.....	.....	50
April.....	2,171	680	739	390	100	950	55	480	.....	.....	30	.....	87
May.....	2,206	121	700	480	513	90	48	.....	.....	.....	.....	.....	89
June.....	2,725	1,870	585	1,395	431	610	15	.....	32	830	.....	.....	99
July.....	3,224	1,515	744	354	682	690	98	.....	.....	.....	.....	.....	117
August.....	2,407	.....	501	1,530	283	690	9	40	5	.....	.....	.....	85
September.....	3,752	750	77	830	587	680	.....	.....	.....	.....	.....	.....	87
October.....	2,761	782	100	479	512	1,230	30	.....	1	.....	.....	.....	76
November.....	1,285	465	.....	.....	364	800	.....	.....	.....	.....	.....	.....	40
December.....	2,636	110	354	100	270	640	.....	.....	.....	.....	.....	.....	62
Totals.....	28,843	653	4,552	1,744	5,592	1,398	288	520	82	270	63	.....	970

APPENDIX No. 7.
CATTLE AND HIDE SHIPMENTS, 1936.

Cariboo.

	Cattle.	Hides.
Williams Lake	6,983	634
Lac la Hache, Soda Creek, and Quesnel	1,253	1,159
Clinton, Lone Butte, and 100-Mile House, Lillooet	3,356	964
Totals	11,592	2,757

Kamloops, Nicola, etc.

Kamloops and Chase	3,291	2,497
Nicola	5,175	1,228
Ashcroft and Lytton	1,246	470
Salmon Arm	87	1,425
Totals	9,799	5,620

Okanagan.

Vernon and Lumby	589	3,078
Armstrong and Enderby	180	763
Kelowna	256	2,039
Penticton	200	764
Totals	1,225	6,644

Similkameen.

Princeton	285	438
Coalmont	-----	179
Keremeos and Hedley	-----	519
Oliver	859	854
Totals	1,144	1,990

South-east British Columbia.

Grand Forks and Greenwood	378	975
Nelson, Creston, etc.	1	1,956
Cranbrook, Fernie, etc.	115	2,045
Invermere, Golden, etc.	158	1,485
Totals	652	6,461

Central British Columbia.

Prince George, Vanderhoof, etc.	417	602
Smithers, Telkwa, etc.	511	176
Burns Lake	676	107
Totals	1,604	885

Peace River.

Pouce Coupe, Fort St. John, Dawson Creek, and Rolla....	1,963	564
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APPENDIX No. 7—Continued.
 CATTLE AND HIDE SHIPMENTS, 1936—Continued.

Totals compared.

District.	1936.		1935.		1934.	
	Cattle.	Hides.	Cattle.	Hides.	Cattle.	Hides.
Cariboo and South.....	11,592	2,757	11,340	1,713	10,103	1,806
Kamloops and Nicola.....	9,799	5,620	11,979	4,901	9,781	4,250
Okanagan and Similkameen.....	2,369	8,634	2,222	7,853	1,628	6,068
South-east British Columbia.....	652	6,461	493	6,368	273	4,214
Central British Columbia and Peace River.....	3,567	1,449	2,505	1,058	1,838	715
Totals.....	27,979	24,921	28,539	21,893	23,623	17,053

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