PROVINCE OF BRITISH COLUMBIA

THIRTY-SECOND ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1937

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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1938.

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 1937.

K. C. MACDONALD,
Minister of Agriculture.

Department of Agriculture,
Victoria, B.C., February 10th, 1938.

APPLES GROWN IN OKANAGAN DISTRICT, B.C.

DEPARTMENT OF AGRICULTURE OFFICERS.

Honourable K. C. MacDonald, Minister.
J. B. Munro, M.S.A., Deputy Minister.

ADMINISTRATION AND GENERAL.

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., Soil Survey, Kelowna, B.C.
James Wells, Clerk, Victoria, B.C.

PLANT INDUSTRY DIVISION.

W. H. Robertson, B.S.A., Provincial Horticulturist, Victoria, B.C.
E. W. White, B.S.A., District Horticulturist, Victoria, B.C.
E. C. Hunt, B.S.A., District Horticulturist, Nelson, B.C.
M. S. Middleton, B.S.A., District Horticulturist, Vernon, B.C.
G. E. W. Clarke, B.S.A., District Horticulturist, Abbotsford, B.C.
Ben Hoy, B.S.A., District Field Inspector, Kelowna, B.C.
R. P. Murray, B.S.A., District Field Inspector, Penticton, B.C.
C. B. Twigg, B.S.A., District Field Inspector, Creston, B.C.
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.
George Pilmer, Brand Recorder, Victoria, B.C.
R. Cahilty, Brand Inspector, Kamloops, B.C.
Donald Sutherland, B.S.A., District Agriculturist, Kamloops, B.C.
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, District Agriculturist, Pouce Coupe, B.C.

REPORT *of the* DEPARTMENT OF AGRICULTURE.

REPORT OF THE DEPUTY MINISTER.

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

Honourable 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, 1937.

NEW LEGISLATION.

At the first session of the Nineteenth Legislature an amendment was passed to the "Grasshopper-control Act" and two new Acts of particular interest to agriculture were passed.

"*Grasshopper-control Act Amendment Act, 1937.*"—The effect of this minor amendment to the Act is to remove the limit for the aggregate amount to be advanced to all Grasshopper-control Committees. This formerly was $20,000 in any one year, but with the increase in the number of areas where control committees are operating and the liability of serious infestations it was found that serious loss might incur if funds were not available at the critical time.

Money advanced from year to year is levied in the following year against the lands in the Grasshopper-control Area.

"*Fruit, Vegetables, and Honey Grades Act.*"—The principle involved in this legislation is not new and has been in force for some years as enabling legislation for the Federal "Fruit, Vegetables, and Honey Act."

The Dominion legislation provides for the inspection and grading of fruit, vegetables, and honey for export, and the Provincial legislation is intended to provide for similar inspection and grading of these products for consumption within the Province.

To that end the Lieutenant-Governor in Council is given authority to establish grades and to provide for inspection, and authority is given the Minister to appoint inspectors to enforce the regulations. It is anticipated that officials of the Dominion Fruit Branch will carry out this work for the Province.

Penalties of not less than $10 and not more than $50 for a first offence are provided for misrepresenting the variety, class, or origin of any fruit, vegetables, or honey offered for sale.

"*Beef Grading Act.*"—The aim of this legislation is to ensure to consumers information regarding the class of beef purchased. This will be done by establishment of grades and marking of beef prepared for food for consumption in the Province.

Penalties are provided of not less than $50 and not more than $100 for advertising, displaying, or offering for sale any beef carcass which has not been inspected and graded. The same penalties apply for any one who misrepresents the grade or origin of any beef carcass.

Inspectors appointed under the Act are to be given authority to enter premises where bovine animals are killed or where beef carcasses are cut, handled, or advertised for sale. They are also to have authority to stop for inspection conveyances which contain beef carcasses.

The closing section of the Act limits its application to parts of the Province to be defined by the Lieutenant-Governor in Council, who also will have authority to prescribe regulations for the establishment of grades and inspection of beef carcasses.

For the present it is the intention to confine the operation of the Act to such portions of the Province as desire to benefit by the inspection and grading of meat. It is anticipated that this work will be carried on at first in Vancouver, Victoria, and New Westminster, where Inspectors under the "Dominion Live Stock and Live Stock Products Act" are now operating. These officials will also act as Inspectors under the Provincial Act.

OTHER ENACTMENTS.

In addition to the three Acts mentioned above, several Acts were amended in such a way as to be of peculiar interest to farmers. These amendments are as follows:—

"*Land Act.*"—Amended to create a third classification of land to sell at $1 per acre. This third class of land is defined as "mountainous and rocky tracts of land which are wholly unfit for agricultural purposes, which cannot be brought under cultivation, and which do not contain hay-meadows."

"*Motor-vehicle Act.*"—Section 5 (*a*) enacts that a $10 licence may be issued for any motor-vehicle such as a tractor, grader, loader, shovel, roller, or mixer when used exclusively for constructing, surfacing, paving, improving, extending, widening, repairing, or altering any highway, or carrying out any works upon a highway, or for performing any work in or upon any farm, etc.

"*Land Settlement and Development Act.*"—An amending clause provides, in the case of any property which has been surrendered or taken over by the Board on account of an unsatisfied loan, for the Board to write off the loss, close the account, and revalue the property; also where land values have decreased the Board may fix a reduced price for any such property in conformity with recent valuations so as to facilitate lease, sale, or exchange of the property.

"*Sales on Consignment Act.*"—Section 2 of this Act was amended by inserting in the definition of "products" the word "poultry."

AGRICULTURAL ANNIVERSARIES.

During the year Kamloops celebrated its 125th anniversary. The first fur-trading post was established there in 1812, and the importance of this centre for shipping and distributing has long been recognized. However, Kamloops has claim to importance agriculturally as well. This year local residents have made an effort towards the organization of a Light-horse Breeders' Association, and it is generally conceded that the light horses produced in this district are of finer bone and better muscle than those produced elsewhere in western Canada.

Horse-breeding has been an important agricultural undertaking ever since the first trading-post was established. In the early days horses were reared for use in the fur brigades which brought the pelts from the north down to the seaport at Vancouver, near the mouth of the Columbia River, and annually this post could be depended upon to supply 200 or 300 horses for the overland trips. In later years splendid horses were produced here for use on the trails leading to the placer camps of Cariboo and the Southern Interior. More recently polo ponies, hunters, and other mounts have found a ready market for export. Consequently, Kamloops lays claim to importance in connection with this phase of live-stock production.

The beef-cattle producers and the sheep-breeders of the Southern Interior have ably supported live-stock shows and sales at Kamloops for a number of years, and this year special efforts have been made to improve the grounds and buildings in which the annual fat-stock show and bull-sale is held in March. The success of the show and sale held here in March last indicates that stability and confidence have returned to this section of the range country which for several years has laboured under the handicap of inadequate prices for well-finished cattle.

FARMERS' INSTITUTES.

The year 1937 marked the fortieth year of steady progress and solid achievement of the Farmers' Institute organization in this Province. It was in 1897 that the Farmers' Institute movement was started, the underlying idea being that the many scattered agricultural communities in the Province might be linked together by an organization for their common good, which, whilst under the supervision of the Department with regard to educational, demonstration, and routine work, might at the same time give the farmers corporate life with all the attendant advantages of co-operation, including the buying of many of the necessities of agricultural life, and also in some cases enabling them to market their produce.

The co-operative side of the question was recognized to be, even in early days, of the greatest importance to agriculturists, who were handicapped by lack of transportation facilities and good markets, a condition which has since been remedied very largely.

The first Statute under which the institute movement was organized was known as the "Farmers' Institute and Co-operation Act" of 1897. With amendments this Act stood

until the year 1911, when the "Agricultural Associations Act" was passed, dealing not only with institutes but with agricultural and horticultural associations, all existing institutes being reincorporated or brought under this Act. This in turn has been superseded by the "Agricultural Act" of 1915, and in 1920 by the "Societies Act." In 1936 the "Agricultural Act" was superseded by the "Farmers' and Women's Institutes Act." The growth of the institute movement has been steady, as will be seen from the following figures:—

	No. of Institutes.	Membership.
1897	2	73
1900	20	1,031
1910	49	5,226
1920	130	5,772
1930	185	7,000
1937	210	------

During the present year the organized farmers of British Columbia through their Farmers' Institutes have continued to promote the interests of the settlers and the farmers. Their purchases of pure-bred sires have been maintained at a satisfactory level, and a number of the institutes which had been finding difficulty in meeting their obligations to the Department for sires purchased in former years have paid off their debts during 1937.

In business transactions many Farmers' Institutes are ably serving their members, particularly in the purchase of fertilizers, seeds, and stumping-powder, also a number of the institutes are active in arranging for the assembling and selling of the farm products of their members. Approximately 100 of the Farmers' Institutes in 1936, the last year for which complete figures are available, purchased seeds, feeds, and fertilizers to the value of $122,943.10, as compared with $93,136.05 for the previous year. This indicates an increase of 32 per cent. in co-operative purchases of these commodities over the purchases of 1935. Stumping-powder purchases exceeded $33,000, and on miscellaneous supplies the expenditure was over $31,000.

In several districts the Farmers' Institute members contributed vegetables and fruits for shipment to prairie settlements where crops had again failed on account of drought.

Seedling Oaks.

In more than 200 centres the Farmers' Institutes and other rural organizations have commemorated the Coronation of Their Majesties King George and Queen Elizabeth by planting in each of their communities a seedling oak (*Quercus robur*). These young oaks were secured from the Windsor Forests in England and were distributed by this Department free of charge to the interested organizations. In many of the rural centres the trees were planted on Coronation Day and fitting ceremonies were observed on that occasion.

Assistance in securing the seedling oaks was given by the well-known association "The Men of the Trees," which not only co-operated in making the seedlings available and in sending out planting instructions but which gave practical suggestions which were used by the Farmers' Institutes and other organizations in the preparation of their Coronation Day programmes.

Particular efforts have been made to interest the school-children and the young people of the various communities in the Coronation oaks and it is expected that these young trees will be given every necessary care.

District Conferences.

The ten District Farmers' Institutes held their annual meetings at suitable times; in practically all cases the dates were arranged to suit the convenience of the Superintendent, who was able to attend all of the conventions with the exception of the one held in October in the East Kootenay District. There were 102 resolutions sent in from the ten District Farmers' Institutes. These resolutions were considered by the Advisory Board of Farmers' Institutes when they met in Victoria, November 8th to 10th. Certain of the resolutions were referred by the Board to the Select Standing Committee on Agriculture and others were taken up direct with the departments concerned.

In addition to the regular monthly meetings, many of the Farmers' Institutes this year had the privilege of hearing outside speakers at special gatherings. The University of British Columbia co-operated with the Department of Agriculture in making available members of their staff. Among those who were specially featured on the Farmers' Institute convention programmes were: Professor P. A. Boving, who spent a month in the Peace River Block attending institute meetings and fall fairs and his addresses were appreciated by the settlers throughout that large prairie section of British Columbia; Professor E. A. Lloyd visited certain Farmers' Institutes in the West Kootenay District and addressed the delegates at their annual meeting in Grand Forks; Professor A. F. Barss spoke at the district conventions at Revelstoke and Quesnel; Professor G. G. Moe attended the annual conventions at Telkwa and Vanderhoof, in Central British Columbia, and other representatives of the Agricultural Faculty of the University have from time to time participated in various local Farmers' Institute meetings.

On Vancouver Island a promising contact has been formed between Professor H. T. Logan, Principal of the Fairbridge Farm School near Duncan, and the Farmers' Institutes of District " A." Professor Logan attended the annual convention at Nanaimo and addressed the delegates, outlining to them the aims and objects of the Fairbridge Farm School, at which approximately 140 British boys and girls are receiving their education.

Rodent-control.

Several Farmers' Institutes of the Southern Interior have continued their active campaign against Columbia ground-squirrels, gophers, marmots, and other burrowing rodents. The Department has maintained its policy of rebating to the Farmers' Institutes 50 per cent. of the cost of the Cyanogas and other poison materials used for the eradication of these pests. In some sections the decrease in these farm-pests is quite noticeable, but in others, where the farmers have shown less interest in their problem, the burrowing rodents are still quite numerous. However, advance information is being sent out to those institutes whose plans are already being made for further work during the coming spring. Special low prices on Cyanogas and dusters with which to apply it have been quoted, and now the cost to the Farmers' Institutes is within the reach of practically all members who find it necessary to reduce rodents on their properties.

Grasshopper-control.

In the Boundary District, mainly in the vicinity of Bridesville, Midway, and Rock Creek, the Farmers' Institutes have taken an active part in the control of grasshoppers which were numerous this year. The farmers contributed their labour for the mixing and distributing of poison-bait. The Department of Agriculture paid for the ingredients and the representative of the Federal Entomological Branch visited the district and gave useful advice and information to the settlers. Arrangements are now under way in the Boundary District for the formation of a control area within which it is expected that the grasshopper menace will be suitably controlled in future years.

IMPORTED EGGS.

In accordance with the " Eggs Marks Act," chapter 82, R.S.B.C. 1936, and amendments thereto, imported eggs and egg products entering the Port of Vancouver during the year 1937 were submitted to the usual inspection upon arrival to ascertain that the requirements of the " Eggs Marks Act " had been complied with. Imported eggs and egg products entering the Port of Victoria are inspected and reported to Walter Sandall, District Field Inspector, Court-house, Vancouver, B.C., through the courtesy of Mr. John Noble, Federal District Inspector at that Port.

The arrivals reported during the year total as follows:—

Port of Victoria: 23 dozen eggs for hatching purposes from U.S.A. and 167 cases of salted eggs from China.

Port of Vancouver: 3 dozen eggs for hatching purposes from U.S.A. and 475 cases of salted eggs from China.

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

FEED-GRAIN IMPORTATIONS.

In comparison with former years, the total importations of feed-grain from the Province of Alberta show a marked decrease for the year 1937, which is no doubt largely due to the adverse crop conditions that have been attendant in that Province during the past crop-year. Feed-grain for local consumption has been supplemented to some extent from stocks carried over from the previous year in Vancouver grain elevators, a small portion was also shipped from the State of Washington.

Under Tariff 145 of the Canadian Freight Association a total of 616 feed-grain certificates have been issued from the office of the Department of Agriculture, Court-house, Vancouver, during the year 1937, as against 970 issued during the year 1936, showing a decrease of 354. In addition to these reported to Mr. Walter Sandall, there were five certificates issued from the Victoria office, as compared with sixteen issued in 1936.

The certificates are numbered and issued in duplicate and a third copy is kept on file at this office. This special tariff extends to only specified grades of feed-grain in bulk or in sacks, i.e.:—

Wheat.—Nos. 4, 5, 6, and Feed.
Barley.—C.W.; Nos. 3, 4, 5, and 6.
Oats.—Special Feed; Extra No. 1; Nos. 1, 2, 3, and Mixed Feed.
Screenings.—Nos. 1 and 2 Feed.

These certificates, which may be made to cover quantities from 1 ton to several carloads, are available free upon application. They enable the purchaser to secure reduced transportation rates upon their shipments.

Nearly all grain shipments covered by the special tariff have originated from various districts in the Province of Alberta and have been transported over Canadian Pacific and Canadian National Railways to British Columbia. Six cars containing a total of 284.75 tons of Nos. 5 and 6 wheat were recorded in from Creston, B.C. Details of these feed-grain movements will be found in the summary shown in the Appendix.

BRITISH FARM VISITORS.

During the last week in September and the first week in October a British Farmers' Union party visited this Province and gained considerable information regarding agricultural conditions in the Okanagan Valley, the Fraser Valley, and on Vancouver Island. The trip through the Okanagan Valley was so arranged as to enable the visitors to get first-hand information regarding the types of farming carried on in the Salmon Arm, Vernon, Kelowna, and Penticton Districts. The visitors were taken by car from Salmon Arm to Kelowna, where luncheon was provided by the Kelowna Board of Trade. They were taken thence to Summerland, where they were given an opportunity of seeing the experimental work being conducted on the Experimental Farm and in the pathological laboratory.

The Australian party which visited British Columbia in late August travelled through the Lower Fraser Valley and got an insight into farming conditions there. A number of the party crossed over to Vancouver Island and visited seed-farms and small-fruit growers. As a result of the visit of this party a contact has been established with jam-makers in Adelaide and already one trial shipment of processed strawberries has gone forward for manufacture in that country. It is hoped that this contact may result in the development of profitable trade between our Province and Australia in strawberries. Already the New Zealand jam-makers have sent repeat orders for strawberries produced and processed in the Fraser Valley.

SEED LABORATORY AT VANCOUVER.

Prior to this year farmers in British Columbia wishing to have their seed tested for germination and purity have had to send their seed samples to Calgary for analysis and grade. During the past summer the Dominion Government has established in Vancouver an office and laboratory which will handle the seeds submitted and the inquiries received from all sections of British Columbia except the Peace River Block. From that section north-west of Edmonton the seed samples will continue to go to Calgary for examination.

IMPORTED HORTICULTURAL PRODUCTS.

As Vancouver is Canada's western gateway, it holds an important position in the movement of both imported and exported plants and plant products with which the work of this Department is closely associated.

All imported nursery stock arriving by boat, rail, express, mail, and passengers' baggage is subjected to a rigid inspection for insect pests and disease. With the exception of citrus fruits and a few other products of minor importance from the United States of America, all plant products are subject to the same inspection. Any item of the above-mentioned products from America which is at present on our observation list may be immediately placed on our regular inspection list should it become necessary.

One of the most important features of the work of this office is the inspection and certification of plants and plant products for export which are now shipped to nearly all parts of the world. Practically all countries of importance have their own regulations governing the entry of agricultural products, and as these regulations are continually being revised we must ever be on the qui vive to meet their requirements. In this work the officers of the Dominion Fruit Branch co-operate by inspecting fruit and vegetables and issuing health certificates on such products in the Okanagan, these officers being appointed Inspectors under the Division of Foreign Pests Suppression.

Special mention may be made of the nematode situation in Dutch iris bulbs grown for export. Much experimental work has been done by the Pathological Laboratory at Saanichton to find a satisfactory control of this pest in the Lower Mainland and Island District. The interceptions of *Ditylenchus dipsaci* in imported Dutch iris have been fairly heavy this year and at present there seems very little improvement in the situation.

Southern-grown bulbs from Japan arrived in good condition, and those grown in the northern part of the country were practically equal in size and quality to the Dutch, with little, if any, evidence of *Botrytis*, and at a much lower cost to the importer.

An interesting feature was the arrival from Japan at the end of November of a shipment of celery for Vancouver, which was not to be compared to that grown in Armstrong or Kelowna Districts. This celery was held for investigation and ultimately was destroyed by the Dominion Department of Public Health.

In May a trial shipment of five boxes of tomatoes arrived from Australia, but as they were infected with *Microsporium* rot the importer returned them.

During the last two months of the year several shipments of apples grown in Japan passed through British Columbia en route to importers in Great Britain. The last shipment of the year consisted of 1,398 boxes of Jonathan apples. There was nothing on the boxes to indicate the place of origin.

During the year 1937, 2,201 deep-sea and coast-wise boats docked at Vancouver. Sixty-two brought nursery stock and 443 had plant products as part of their cargo, shipped and transhipped from many parts of the world. An inspector attends all boats with passengers aboard and the majority of freighters.

IMPORTED NURSERY STOCK.

There were 3,377,182 assorted fruit-trees, ornamental shrubs, plants, etc., in 4,733 containers, valued at $82,580.56, inspected in Vancouver and district, and are listed under the following headings:—

Assorted fruit-trees	48,552
Assorted small fruits	28,587
Assorted ornamental shrubs	41,181
Roses	40,826
Fruit seedlings	141,300
Ornamental seedlings	6,094
Plants	65,654
Roots	77,627
Assorted bulbs	2,925,030
Scions (various)	2,331
Peach-pits (lb.)	1,325

The countries of origin being chiefly the British Isles, Europe, New Zealand, Australia, Japan, and the United States.

INTERPROVINCIAL.

Nursery stock imported into British Columbia from Provinces east of Manitoba and inspected by this Department:—

Assorted fruit-trees	211
Assorted small fruits	18,121
Assorted ornamental shrubs	1,425
Rose-bushes	711
Ornamental seedlings	46
Assorted plants	1,693
Assorted roots (perennial)	9,208
Assorted bulbs	50,340
Assorted scions	8,144
Spruce-cones (lb.)	1,368

There were 307 individual shipments and 372 containers, the total value of the stock being $3,696.86. This year's records show a considerable increase over the imports received for the previous year.

Authorization was granted by Ottawa to Messrs. H. M. Eddie & Sons to allow them to import 300 peach scions from Ontario.

The nursery stock imported into British Columbia from Manitoba and points west of that Province is inspected by Mr. Eastham or Mr. Sandall.

INTERCEPTIONS OF PROVINCIAL NURSERY STOCK.

Eighteen peach-trees from Ontario prohibited entry under Reg. No. 6, Domestic.

Pear-trees condemned for San Jose scale	2
Rhus shrub condemned for unidentified borer	1
Iris bulbs condemned for eel-worm, *Botrytis*, and bacterial rot	222
Lily bulbs condemned for *Rhizopus necans*	2
Tulip bulbs condemned for *Botrytis* and mite	3
Assorted fruit-trees condemned for San Jose scale, *Lecanium hesperidum*, *Aspidiotus ostreæformis*, peach root-borer, woolly aphis, bud-mite, root-gall, anthracnose, walnut-canker, gummosis, and bud-blight	478
Ornamental trees and shrubs infected with *Gymnosporangium haræanum*, *Aspidiotus forbesii*, and *Diaspis carueli*	201
Tubers (gloxinia and begonia), *Fusarium* rot	405
Assorted bulbs condemned for *Rhizopus necans*, *Mystrosporium adustum*, nematode, narcissus bulb-fly, mites, *Botrytis*, hyacinth-yellows, bacterial yeast, *Penicillium* mould, and various bacterial, hard, and soft rots	18,063

INTERCEPTED PLANT PRODUCTS.

One oz. Mexican jumping beans, infested with *Carpocapsa saltitans*, and seven sacks sweet potatoes for *Ceratostomella fimbriala*.

Many shipments of plant products such as rice, beans, dried fruits, nuts, etc., arrive infested with various stored product insects. These items are all subject to fumigation and second inspection before release.

HONEY-MARKETING.

Honey prices in British Columbia have remained fairly stable this year, although earlier in the season it was feared that importations of honey from the Prairie Provinces might be detrimental to our industry.

This year it was reported to us that the Board of Railway Commissioners had granted to Prairie bee-keepers, effective February 2nd, 1937, a special rate on their honey of 90 cents per hundredweight on minimum car-lots of 50,000 lb. The old rate from Winnipeg to Vancouver was reported as being $1.17 per hundredweight on minimum cars of 24,000 lb.

It is believed that the new rates were given in order to move the surplus honey in volume from Manitoba. It is doubtful, however, that honey from Manitoba which may be inferior to the graded product of Ontario can successfully find a place in the British Columbia market even at lower prices. Our consumers appear to be willing to pay a premium for honey of good quality such as can now be bought according to grade and is produced either in Ontario or in our own Province.

It is estimated that British Columbia's 1937 honey-crop is 20 per cent. above normal, while that of the Prairie Provinces, Ontario, and Quebec is at least 20 per cent. below normal. This situation has had its effect on the local market, which has maintained a fair demand for British Columbia honey at 10 cents per pound wholesale. Although the present situation is satisfactory, bee-keepers are apprehensive over the possibility of the reduction in freight rates on honey from Manitoba adversely affecting our industry in future years.

STAFF CHANGES.

There have been very few changes in the staff of the Department during the past year. Upon the request of Mr. F. H. Davey, of the Live Stock Branch, he was granted superannuation, effective April 1st. Appointments of stenographers already on the temporary staff were confirmed and their appointments made permanent as follows:—

Miss D. Anderson, permanent appointment April 1st, 1937.

Miss M. Renyard, permanent appointment April 1st, 1937.

Miss M. McMillan, appointed to office of District Agriculturist, Kamloops, March 8th, 1937.

Miss I. P. McMillan, resigned as stenographer to District Agriculturist, Kamloops, March 6th, 1937.

Mr. F. W. Laing, B.A., Secretary to the Minister of Agriculture since 1918, retired on superannuation on December 31st.

It is with regret that we record the death of the Honourable Simon Fraser Tolmie, late President of the British Columbia Agricultural Association, who, in addition to important posts connected with government and agriculture extending over a number of years, held the portfolio of agriculture for this Province from the end of May to the beginning of November in 1933.

On September 15th the Honourable S. F. Tolmie, who was rapidly failing in health, viewed the live-stock parade at the Willows fair-grounds. This was his last appearance in public and it indicates his keen interest in good live stock. He died at "Cloverdale," Victoria, just four weeks later, on October 13th, and was accorded a State funeral.

WOMEN'S INSTITUTES.

The Women's Institute display of handicrafts which was exhibited at the Toronto Royal Winter Fair was returned to Victoria before the end of November and was placed on view in the Provincial Library at the Parliament Buildings. Many residents of Victoria as well as the wives of the members of the Legislature had an opportunity of seeing and examining the excellent exhibition pieces before they were returned to their respective owners. A particularly interesting view in connection with our Women's Institute handicraft display at Toronto was the holly decoration which accompanied it. Holly from this Province made a very strong appeal to visitors from Eastern Canada attending the Toronto Royal.

The following report has been submitted by Mrs. V. S. McLachlan, Superintendent of Women's Institutes:—

"The outstanding work of the institutes during the past year has been along the lines of health and handicrafts.

"In 1936, the Slocan Valley Institute obtained looms and spinning-wheels and are now spinning and weaving blankets and tweeds from local wool. They are gradually building up a craft which is profitable to the workers and useful to the purchasers.

"Through the influence of the Women's Institute, Lone Butte established a craft centre for spinning, weaving, and other crafts, and though the institute has gone into abeyance their work continues. This community has seized the opportunity to learn the crafts brought from their old homes by new Canadians, and the result is satisfactory to all concerned.

" Pender Island Institute reports that near-by summer resorts purchase all the materials they can spin and weave.

" The Weavers' Guild, organized by the Victoria Institute, continues to do good work, using both sheep wool and Angora rabbit wool. The institute also conducts weekly handicraft meetings at which glove-making, basketry, weaving, spinning, and other crafts are practised.

" Up and down the Province institutes have purchased Spinwell carding-machines and either hold bees to card wool and make comforters as institute ventures or lend the machine to members to make comforters for their own families. Where nights are cold, bedding scarce but local wool is available, these comforters are in constant demand and two or three institutes make a regular income from their sale. At the major fairs in the Province wool comforters are always represented in the competitive classes, many of them things of beauty with fine stitchery.

" Rugs made with home-dyed and roughly spun hooked wool or hooked rags are also popular. For several years this Branch has been working to raise the standard both of workmanship and of art in this craft. A number of patterns has now been obtained in conventional designs adapted from old Arabian and Persian saddle-bags. These have been worked out in rags carefully selected for their soft warm colourings and the resulting rugs arouse great interest wherever they are shown.

"An exhibit and demonstration of handicrafts, particularly spinning, weaving, and rug-making, was held at Duncan in the fall and aroused a good deal of local interest. Several Duncan residents are learning to spin and weave as a result.

" The Branch also arranged an exhibit of handicrafts for the Federated Women's Institute section at the Royal Winter Fair at Toronto. Exhibits included hooked wool and rag rugs from Victoria, homespun material from Mayne Island, homespun and dyed Angora rabbit yarn from Lakehill, Angora rabbit woven scarves from Victoria, pottery from Summerland and Victoria, crystallized fruit from the Okanagan, leather gloves from Okanagan Mission, and hand-made jewellery from Courtenay.

" Along the lines of community betterment and health all institutes are active and the outstanding work during the past two years has been the organization of dental clinics. These clinics are being held throughout the Province, along lines first initiated by the Dental Association. By co-operation and good organization, districts where no dentist is available have been enabled to bring in qualified men to treat the teeth of all pre-school and school children at an average cost of about $3 per head. In some of the more remote settlements it has also been possible to have the teeth of adults receive much-needed attention at the same time, with a marked improvement in the general health.

" The Peace River District has held clinics under this scheme for the past two years and now reports that the teeth of the children need very little attention. Fraser Lake and Pender Island have conducted similar clinics for several years, so that now the annual cost is very small. Last year the institutes in the Fraser Valley started a similar scheme. At first it was presumed that the teeth of children in the Fraser Valley could not possibly need as much attention as those in the Peace River. But the initial survey revealed an amazingly bad condition. In every case but one, every child was in urgent need of a great deal of treatment, so the scheme developed into a really great achievement. School Boards and municipalities all took their share of responsibility. Funds were raised by public subscription and entertainments, and in the end much-needed treatment was provided for over 1,800 school-children.

" In several communities, now that the teeth problem is under control, plans are being made for tonsil and eye clinics. By their self-sacrificing devotion and energy institutes have made a name for themselves as economical and good organizers, so that School Boards and municipalities gladly co-operate in their welfare-work. The Agassiz Institute is always entrusted with this work by the municipality and through their Provincial Board member the Kootenay Institutes have received a high compliment. An appreciative man handed to Mrs. Pitts, the Provincial Board member for Kootenay, a cheque for $1,000 with the request that she form a committee and expend the money on eye treatment for children in the district. This work is now going on with good results.

Total number of Women's Institutes	165
Membership as at June 30th, 1937	3,690
New institutes organized in 1937	4
Old institutes revived	2
Institutes disbanded or gone into temporary abeyance	5
Total income received by institutes	$39,709.26
Total moneys expended by institutes	33,407.78

"The new institutes are Craigflower, Little Fort, Triangle at Flagstone, and Coleman Creek in the Peace River. The resuscitated institutes are Valdes Island and Langley Prairie.

"A number of the institutes are undertaking special work for the young people. Prince George, Grand Forks, Westbank, and South Saanich have particularly successful junior institutes, while many others sponsor Girl Guides and Boy Scouts.

"The monthly bulletin of items of interest to Women's Institutes sent out each month by this Branch appears to meet with continued approval.

"So far this year 146 institutes have complied with the regulations and received the grant of $5 each as authorized by the Honourable the Minister. It is expected that the few remaining will have completed their returns shortly."

BOYS' AND GIRLS' CLUBS.

Activities of boys and girls interested in live-stock and crop production in the rural sections of British Columbia have been reported upon by Mr. S. S. Phillips. He shows the following as the number of clubs organized, the projects, and the membership:—

Project.	No. of Clubs.	Membership.
Dairy calf	26	293
Beef calf	8	87
Poultry	34	316
Swine	11	98
Potato	15	128
Grain	1	7
Totals	95	929

"A tabulated list giving the names of clubs, names and addresses of club organizers and secretaries, and the number of members in each club is on file in this Department.

"The number of projects increased this year in every case except swine, which dropped from 13 to 11. The dairy projects increased from 24 to 26. Beef calf clubs increased from 6 to 8, poultry from 29 to 34, potatoes from 12 to 15, and the total membership from 775 to 929. One new project was started—namely, a grain-club project. There was only one club in this project this year, a registered seed-oat club organized in the Telkwa District of Central British Columbia. It is expected that next year more interest will be shown in this project.

New Projects for 1938.

"There seems to be a desire in some sections of the Province for a sheep-club project policy. Regulations for this policy have been drafted and submitted to the Superintendent of Boys' and Girls' Clubs for approval.

"For some years the Victoria Rotary Club have been sponsoring a seed-growing club and they now feel that they could accomplish more if a definite seed-growing project was listed among the various Provincial projects and the district work organized along more advanced lines than has been the case to date. This project is also receiving consideration.

Changes in Club Regulations.

"In view of the fact that the project regulations appear generally satisfactory very little change was made this year. On account of the price of seed-potatoes last spring the Department assisted in the purchase of certified seed by making a grant of $1 per club member. This amount was later deducted from the prize awards made to members of certified seed clubs. The beef calf club regulations were amended to permit the organization of fall clubs. This change was made to assist club organization in districts suitable for carrying on winter-feeding projects.

"The method of keeping club records was changed from books to cards. Supplying each club member with a book to keep feeding records was thought unnecessarily expensive so record cards were supplied which appear to be quite satisfactory."

Three-way Policy for Assistance to Live-stock Clubs.

Last year Mr. Phillips had the privilege of attending the Royal Winter Fair in charge of the British Columbia contestants. Information was obtained by him that the Dominion Government assisted all live-stock clubs in some Provinces by contributing a share of the prize-money. In British Columbia they only contributed a share of the prize-money for the swine clubs. This matter was brought to the attention of the Superintendent of Boys' and Girls' Clubs with the result that an agreement was entered with the Dominion Live Stock Branch whereby the Dominion Government, the Provincial Government, and the local organization each contribute one-third of the prize awards. This policy now compares with that adopted in many of the other Provinces and will result in substantial encouragement to club progress.

Judging Competitions.

Dealing with the work of the current year Mr. Phillips says:—

"The programme of judging events at the Vancouver Exhibition was very heavy this year. Three judging competitions were held on August 30th with more than 100 boys and girls competing.

"In the team-judging competitions six teams entered, each with three members. There were forty-three entries in the junior individual competition and seven in the senior individual competition. In addition about fifty boys from Washington took part in the junior individual competition. Tabulated results of these competitions are on file in this office.

"Due to illness, Mr. R. G. Sutton, District Agriculturist, New Westminster, was unable to take charge of the junior programme at the Vancouver Exhibition this year, consequently judging arrangements and supervision of the competitions were looked after by your secretary.

"The junior judging competitions at Victoria Exhibition were in charge of A. J. Hourston. The results of these competitions are also on file in this office.

Elimination Contests.

"A preliminary elimination contest was held at the Vancouver Exhibition to select project judging teams for Armstrong. The detailed results attached to this report shows the standing of the contestants. The final elimination contest for the potato-club project was also held at this time in Vancouver.

"The final elimination contest to select judging teams to go to Toronto was held at Armstrong, September 14th. The following club members were selected to compete at Toronto:—

Dairy Calf Project: Bruce Richardson, Chilliwack, and Don Richardson, Chilliwack.
Beef Calf Project: R. Lawrence, Heffley Creek, and W. Wilson, Vinsulla.
Swine Project: A. Frolek, Kamloops, and A. Blackwell, Kamloops.
Potato Project: Roy Green, Poplar, and Robert Hazlett, Poplar.

"The result of the contest showed that the contestants had all worked hard at their various projects and had received exceptionally good coaching. The contest results were announced at a banquet given by the Armstrong Exhibition Association, September 15th, in honour of junior farmers attending the exhibition. The winners of the contest were congratulated by the Honourable K. C. MacDonald, Minister of Agriculture, and the importance of junior farmers taking an active part in agriculture was stressed by Mr. M. Hassen, manager of the Armstrong Exhibition."

The Toronto Contest.

Mr. Donald Sutherland, District Agriculturist, Kamloops, escorted the judging teams to Toronto this year and has submitted a special report covering the contest. A copy of his report has been sent to each club organizer and Farmers' Institute secretary. The British Columbia teams made a splendid showing this year. The potato-judging team came first with a score of 1,054 out of a possible 1,200. The dairy-judging team came second with a score of 963 out of a possible 1,200. The dairy team was only four points behind the winning

team, and the thoroughness of their training was evident by the fact that they were considerably higher in the oral examination than the winning team. The swine-judging team came fourth, and the beef-judging team fifth, both teams making a good score.

Marketing Potatoes.

This year the Richmond and Delta Potato Clubs organized by Chas. Bradbury contracted with a chain store to market their potatoes. The results of this contract were very satisfactory. The sale of potatoes netted approximately $1,100 to the five clubs. The club members formed a business contact and actually assisted in the sale of the potatoes. The manager of the chain store stated that they are prepared to handle all the potatoes produced by Lower Mainland clubs next year if desired by the clubs. They have also indicated that they would be interested in making contracts with beef-club and sheep-club members to market their club exhibits.

In conclusion, Mr. Phillips remarks: "It is gratifying to report a very successful year for Boys' and Girls' Clubs. The agreement with the Dominion Live Stock Branch to support all live-stock clubs will result in a saving of money by the Provincial Department of Agriculture and also ensure support to the club projects of Dominion Agricultural representatives. The activity and progress of the clubs is indicated by the results of the Toronto competition and the potato-marketing projects. The interest in the junior club movement is shown by the requests for two more Provincial projects—namely, sheep clubs and seed-growing clubs. The support and assistance to the junior club programme by our Provincial and Dominion agricultural representatives, the management of the Vancouver, Armstrong, Victoria, and Chilliwack Fair Associations, as well as other fairs where club exhibits have been shown, is very much appreciated."

FALL FAIRS.

In addition to the winter fair held at Vancouver and the fat-stock show and bull-sale held at Kamloops, there were two Class A Exhibitions, three Class B Fairs, and forty-eight other fall fairs held in British Columbia during the year. This is an increase of four over 1936. In line with the practice of recent years one or more members of the staff of this Department were assigned to officiate as judges at these events.

According to the report of the sixteenth annual meeting of the B.C. Fairs Association the receipts of the Agricultural Associations for 1936 showed an upward trend with a total of $286,403.31 for 1936, as against $253,041.82 for 1935. Prize-moneys paid out also indicate encouraging progress, the grand total being approximately $61,389.50, as compared with $56,568.80 for 1935. The figures for the year 1937 will not be available in time for inclusion in this report.

AGRICULTURAL STATISTICS.

The production of farm crops and live-stock products has shown a consistent increase in quantity together with steady improvement in prices during the past five years. Figures dealing with the present year's production and returns will not be available until the end of March, when they will be published in the Agricultural Statistics Report. It is estimated, however, that the value of the current year's production of agricultural commodities will be approximately $53,000,000 in value. This figure is considerably in advance of the 1936 production of $46,669,735 and that of 1935, which was worth $42,419,992.

Prices for live stock and live-stock products have been decidedly encouraging, and this year the movement of beef cattle and of hides has reached an all-time high. The report of the Brand Inspector, shown in Appendix 10, gives the details as reported to the Department by our several Brand Inspectors.

WEATHER CONDITIONS, 1937.

References to climatic conditions have been deleted from the reports of the several branch heads because this Department publishes annually a complete report on British Columbia's climate. This report is available in the Department and it covers temperatures and precipitation for all of the agricultural districts of the Province where rain-gauges, thermometers, and other recording equipment is maintained under arrangement with the Federal Meteorological Observatory.

Within recent years the Federal Department has aided our orchardists by maintaining a frost-warning service during certain seasons in our most important fruit-growing sections.

PUBLICATIONS.

According to the report of L. W. Johnson, Senior Clerk, the Department publications distributed in 1937 amounted to 35,877 copies. The following is a list of the publications printed during the year:—

Butter-making on the Farm	Bulletin No. 71
Sixth List of Dairy Sires	Dairy Circ. No. 32
Certified Milk and Butter-fat Records, 1936	Dairy Circ. No. 33
Apple-scab	Hort. Circ. No. 44
Onion-thrips	Hort. Circ. No. 36
Fruit Spray Calendar.	
Cereal Smuts	Field Crop Circ. No. 10
Field Corn	Field Crop Circ. No. 8
Soil Fertility	Field Crop Circ. No. 11
Planting Plans and Distances	Hort. Circ. No. 62
Raspberry Culture	Hort. Circ. No. 55
Top-working of Fruit-trees and Propagation	Hort. Circ. No. 42
Varieties of Fruit recommended for Planting in B.C.	Hort. Circ. No. 64
Use of Feathers	Poultry Circ. No. 35
Market Poultry	Poultry Bulletin No. 49
Practical Poultry-raising	Poultry Bulletin No. 26
Fur-bearing Wool and Market Rabbits	Bulletin No. 80
Green Feed Deficiency Disease in Fowls	Poultry Circ. No. 36
Exhibition Standards of Perfection	Agric. Dept. Circ. No. 50
Judging Home Economics and Women's Work	Agric. Dept. Circ. No. 45
List of Publications.	
Clearing Bush Lands	Bulletin No. 85
Annual Report of the Department, 1936.	
Climate of British Columbia, 1936.	
Agricultural Statistics, 1936.	

REPORT OF MARKETS BRANCH.

J. A. GRANT, COMMISSIONER.

The buying-power of the public, especially in large centres, showed a considerable improvement over any year since 1929, and with the exception of the "drought-stricken areas" in Saskatchewan and Alberta country business was almost equal in improvement to the city trade.

In spite of the curtailment in regulating marketing outside of the Province the voluntary efforts of about 98 per cent. of the shippers of tree-fruits made orderly marketing possible. In their efforts they had the support of the legitimate wholesale trade and price-cutting was reduced to a minimum.

While distribution was greatly increased the wholesale trade worked on a very narrow margin of profit and their returns were not as satisfactory as average years. The distribution system is undergoing a decided change, causing the disappearance of individual wholesalers. Nearly all fruit distribution is now in the hands of wholesalers who have one or more houses in each distributing centre. This system enables their head office to buy in large quantities; by this means they receive a quantity discount thereby enabling them to undersell their smaller-buying competitors. Another new and disturbing factor is a threat by large chain-store operators in Canada and the United States to create a cash-and-carry wholesale establishment at each distributing centre. This new departure would no doubt cheapen distribution in populous centres, but if they do not cater to country trade, which is

about half of the whole distribution, it may mean an entire change in the present wholesale set-up, as they could not compete against the cash-and-carry city trade and the country trade would not be profitable to handle alone.

FORCED AND FIELD RHUBARB.

The forced-rhubarb season opened in January. The output was handled by two agencies and rivalry to obtain an "edge" on each other in volume kept prices at a low point. The greatest detriment to the Coast market is the shipping of No. 2 hothouse rhubarb, which was the principal reason for the low prices in Vancouver this year, as low prices for No. 2 forces down the price of No. 1.

The following figures represent the number of boxes shipped and the average price:—

Pacific Co-op. Association—

5,268 boxes No. 1 to Prairies; average price, $2.02 per box.

8,226 boxes No. 1 and 1,446 boxes No. 2 to Vancouver; average price, $1.01 per box.

Fraser Valley Hothouse Association—

3,000 boxes No. 1 to Prairies; average price, $2.02 per box.

5,000 boxes No. 2 to Vancouver.

The field-rhubarb crop was mainly handled by the Federated Association of the Lower Mainland and Vancouver Island, with a small quantity handled by the Independent Shippers. The Federation executive set quotas for each association, and growers and their agents strictly enforced these quotas thereby regulating pulling to conform with car-loading requirements. The Federation shipped sixty-seven cars with an average price of 87½ cents per box to the Association and the Independents shipped a total of ten cars.

HOTHOUSE TOMATOES AND CUCUMBERS.

The hothouse-tomato deal was not as satisfactory as the previous year. The crop was sold under control, but owing to the uncertainty of the powers of the Board, caused by injunctions preventing commodity boards from exercising their powers, much bootlegging was indulged in. Growers who obeyed the Board's orders were dissatisfied with results, and when the election for personnel on the Board took place both the old members on Vancouver Island were defeated. The Mainland returned their old member. This was followed by a change of agency, and as the Board had no jurisdiction over export or interprovincial trade the old agency continued to do a portion of the interprovincial shipping. There is little doubt but that the dual-shipping arrangement had a depressing influence on interprovincial sales. The following figures show the number of crates sold and the average price in comparison with 1936:—

First Crop.	No. Crates sold.	Net Sales.	Average Price.
Tomatoes, 1937	117,037	$245,524.59	$2.10 crate
Tomatoes, 1936	121,956	264,445.97	2.17 crate
Cucumbers, 1937	26,269	34,150.86	1.30 crate
Cucumbers, 1936	27,181	39,692.04	1.46 crate

The second crop of tomatoes was handled by the Board's agency within the Province and the interprovincial exports were about evenly divided between the Board's agency and the Hothouse Sales Agency. Prices averaged a little better than last year's second crop. The total second crop marketed by the agency was 23,304 crates of tomatoes and 339 crates of cucumbers, of which 15,622 crates were consumed in British Columbia and 8,817 crates were shipped to Ontario, Saskatchewan, Alberta, and Manitoba; added to these figures about 8,000 crates were shipped by the Hothouse Sales Agency to Eastern Canada and Prairie points.

EARLY VEGETABLES.

The demand for early vegetables was good, but as the British Columbia season was late and the Prairie season normal the Prairie-grown vegetables came in competition with British Columbia importations and resulted in very low average returns to British Columbia shippers.

SMALL FRUITS.

The small-fruit crop promised a heavy one, but weather conditions upset selling prospects of strawberries. Raspberries fared better, only the demand for them at Prairie points is on the decline. Loganberries were a fair crop and prices were better than in 1936. Later in the season blackberries were shipped with Everbearing strawberries and raspberries and fair prices were realized for them. The field-rhubarb marketing plan was used in selling all berries. The figures submitted do not include berries sold to fill local jam and canning contracts and do not include the British Columbia consumption of fresh berries.

Strawberries.—Rain fell during most of the shipping season and berries arrived at destination in a partial mouldy condition—many rotted on the field. In all, 107 cars were shipped—ninety-seven by the Federation and ten by the Independents. The average price to Federated Shippers was $1.64 per crate. In addition to car-lots, 7,500 crates of strawberries—equal nine cars—were shipped L.C.L. to Edmonton, and 8,577 crates of strawberries—equal eleven cars—were shipped L.C.L. to Calgary.

Processed strawberries were as follows:—

	SO_2.	Frozen.	3 Plus 1.	2 Plus 1.	Pulp.
	Lb.	Lb.	Lb.	Lb.	Lb.
Vancouver Island	409,453	8,890	11,540	.....	.....
Lower Mainland	609,025	.....	431,201	574,800	43,879
Interior points	100,900	.....	.....	.....	.....

Raspberries.—The raspberry-shipping season met with favourable weather and condition of arrival at Prairie points was reported as good. Shipments were made by the same agents as handled strawberries. The Independents shipped three cars and the Federation shipped forty-two cars, averaging $1.85 per crate to growers. In addition, 11,222 crates were shipped L.C.L. to Edmonton and 15,707 crates were shipped L.C.L. to Calgary.

Processed raspberries were as follows:—

	SO_2.	Frozen.	Pulp.
	Lb.	Lb.	Lb.
Vancouver Island	13,845	.....	.....
Lower Mainland	123,341	186,320	24,733
Interior	93,320	.....	.....

Loganberries.—There was approximately 10 per cent. loganberries included in raspberry cars from Lower Mainland points and none were shipped to the Prairies from Vancouver Island. In addition to supplying the needs of local canners the following were processed:—

	SO_2.	Frozen.	Dehydrated.	Pulp.
	Lb.	Lb.	Lb.	Lb.
Vancouver Island	11,407	122,638	4,236	.....
Lower Mainland	70,824	30,655	.....	1,019
Interior	1,500	.....	.....	.....

The following figures on canned loganberry exports to Britain will be found interesting:—

	1934.	1935.	1936.	1937.
	Cases.	Cases.	Cases.	Cases.
Canada	72,386	25,533	30,598	55,427
U.S.A.	97,739	157,467	108,110	33,320

It may be noted here that all loganberry exports from Canada originate in British Columbia. The above figures are taken from the weekly report, Imperial Economic Committee, London, and are only to the end of November.

Miscellaneous shipments of late strawberries, raspberries, and blackberries continued until October. The Federation shipped forty-five cars—six of which were sent to Eastern Canada and thirty-nine to Prairie points. The average price to the Association was $1.47½ per crate. In addition to these cars, L.C.L. shipments were made to Alberta points as follows: Everbearing strawberries, 3,747 crates; raspberries, 4,413 crates; blackberries, 6,471 crates.

STONE-FRUITS.

In all stone-fruits production averaged higher than usual, except cherries, and all exceeded the estimates made by shippers earlier in the season.

Cherries.—Heavy rains in May cut down the volume of commercial cherries about 25 per cent. Cherry-trees have not fully recovered from the severe frost of 1934. Prices were about average.

The movement of cherries to the fresh-fruit market was as follows:—

	Bings.	Lamberts.	Other Varieties.
	Crates.	Crates.	Crates.
Okanagan	29,470	27,625	4,090
Nelson District	2,469	5,602	1,489
Creston District	1,643	3,787	1,369

707,200 lb. cherries were processed in the Interior and 101,074 lb. at the Coast.

Peaches.—Peaches were a bumper crop, but owing to frost-damage to trees three years ago and partly to lack of thinning they ran far below the usual size, and while the demand for commercial sizes was above the supply jobbers complained about the slow movement of the smaller sizes. Prices were satisfactory.

British Columbia and Prairie markets absorbed 364,965 crates; processed, 34,541 crates; estimated production, 374,129 crates; sold, 399,506 crates.

Apricots.—The canning varieties such as Royal and Blenheim had an off-season. Moorpark variety produced heavily and good prices were realized. The fresh-fruit market absorbed 131,641 crates and 12,650 crates were processed; estimated production, 128,606 crates; sold, 144,291 crates.

Plums.—The plum-crop was fair but market sluggish. Okanagan shipped 74,860 crates; Nelson shipped 806 crates; Creston shipped 2,961 crates. Estimated production, 61,135 crates; sold, 77,727 crates.

Italian Prunes.—Italian prunes are still a favourite on the Prairie market and there was a satisfactory demand at fair prices. Okanagan fresh-fruit shipments, 216,799 boxes; Grand Forks shipments, 8,492 boxes; Creston shipments, 3,077 boxes; Nelson shipments, 507 boxes. Estimated production, 198,829; sold, 228,875 boxes.

CRAB-APPLES.

Crab-apples have been difficult to sell during the past few years, and while this year's movement has been heavy prices have not been encouraging. Some curtailment in the volume produced would strengthen the average price. Sales were as follows:—

Okanagan Valley: Domestic, 131,260 boxes; Eastern Canada, 6,681 boxes; export, 4,101 boxes; cannery, 5,380 boxes; total, 147,422 boxes.

Nelson produced 366 boxes; Creston, 4,610 boxes; Grand Forks, 764 boxes; total, 5,740 boxes.

PEARS.

The yield in pears was above average, but several varieties produced a light crop. Satisfactory prices were realized. The estimated crop was 231,233 boxes and sales made up to November 1st were 278,433 boxes.

APPLES.

The Interior apple-crop of 1937 was the largest on record. This is due to the natural increase in production of young trees and not because of the heavy yield of any variety. The continued increase from year to year must be anticipated for some years to come whether planting is increased or not. The demand of the domestic market remains about the same and any increase in production must be sold as export.

Estimated production, 5,254,375 boxes; sales to December 18th, 3,871,748 boxes; unsold, December 18th, 1,382,609 boxes.

Comparative Table of Distribution.

	1937.	1936.	1935.	1934.
	Boxes.	Boxes.	Boxes.	Boxes.
British Columbia	188,503	118,364	142,622	127,425
Alberta	439,084	464,079	454,163	312,609
Saskatchewan	472,466	462,433	435,767	409,813
Manitoba	322,565	326,244	294,026	340,383
Ontario	82,942	141,761	81,621	351,493
Quebec	175,023	207,089	79,063	.....
Maritimes	9,577	15,971	6,820	.....
Totals	1,700,160	1,735,951	1,494,082	1,541,723

Export to December 18th.

	1937.	1936.	1935.	1934.
Great Britain	1,980,464	1,550,417	1,977,350	1,488,173
Egypt	3,028	17,843	21,454	92,004
Africa	46,508	46,195	28,729	20,151
South America	24,948	47,626	25,704	40,268
France	3,024	6,616	12,040	16,181
Scandinavia	500	.....	8,316	.....
New Zealand	5,120	3,620	4,020	.....
United States	2,250	16,573	.....	.....
Others	13,122	16,959	11,018	31,167

Total sold for export at December 18th: 1937, 2,078,964 boxes; 1936, 1,705,849 boxes; 1935, 2,088,631 boxes; 1934, 1,687,944 boxes.

Balance unsold at December 18th: 1937, 1,382,609 boxes; 1936, 710,132 boxes; 1935, 973,609 boxes; 1934, 1,150,815 boxes.

POTATOES.

The early potato-crop of 1937 was not marketed under the direction of the Coast Vegetable Board owing to a Supreme Court judgment handed down in May that the "Natural Produce Marketing Act" was invalid. Largely on account of this judgment prices ruled much lower than the previous year when sales were controlled. In July the Appeal Court ruled that the Act was valid. The main potato-crop was marketed by the Vegetable Boards of the Coast and the Interior. Conditions this year confines the main British Columbia potato-crop to home needs as all competitive points have large surpluses and the only export available this year is the Oriental market.

The crop is slightly less than in 1936 and at present the Coast Vegetable Board estimates that there may be a small surplus over the demand at the end of the season. Prices have been fairly well maintained at $1.10 per hundredweight compared with $1.35 per hundredweight last year. In order to reduce the expected surplus at end of the season the Vegetable Board has ordered higher grades for Canada No. 2 whereby the percentage of small sizes has been reduced.

MARKETS BULLETIN.

A Markets Bulletin giving Prairie and British Columbia prices and the trend of the the market on agricultural commodities is issued weekly from this office. Its circulation is confined to the Provincial press, correspondents to the Bulletin, and growers' co-operative selling organizations in British Columbia.

No final decision has been reached during 1937 as to the scope of Provincial powers to regulate marketing within the Province. Several attacks on the validity of the "Natural Products Marketing (British Columbia) Act" have been made during the year. The British Columbia Supreme Court's decision holding the Act *ultra vires* was reversed by the Appeal Court of British Columbia and at present an appeal to the Privy Council from this verdict is pending.

REPORT OF HORTICULTURAL BRANCH.

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

British Columbia has during the past year experienced the usual variable climatic conditions characteristic of a country having the topography and location of this Province. In practically all districts low temperatures and heavy falls of snow were recorded during the winter period. Fruit-trees and vines, however, suffered little, if any, injury from the low temperatures, as the wood was well ripened before winter set in and the blanket of snow served to protect the roots. The spring was late and cold with abundant rainfall, particularly at the beginning of the strawberry-picking. A cool, dry summer was recorded in all areas and it was not until about the first week in September that high temperatures were recorded. During the first half of September extremely high temperatures for that time of the year were experienced and in some areas the temperature was higher than at any time during the summer. Fall conditions were excellent in all districts for the harvesting of fruits and vegetables. About the middle of November heavy snows fell in all districts. This was followed by mild weather with heavy precipitation. The comparatively mild weather has continued up to the present.

TREE-FRUITS.

The production of tree-fruit this year has been light in the Coast sections of Vancouver Island and the Lower Mainland. In the Okanagan and Kootenay the crop of practically all tree-fruits, with the exception of cherries, has been the heaviest on record. While it is impossible at this date to give definite figures, some idea of the possible production for 1937 may be obtained from the table showing the 1936 production and the estimated production for this year.

Fruit.	1936 Production.	Estimated 1937 Production.
Apples (boxes)	4,323,431	5,145,510
Crab-apples (boxes)	134,326	142,610
Pears (boxes)	267,264	277,150
Plums and Prunes (crates)	307,402	393,000
Peaches (crates)	82,889	378,700
Apricots (crates)	3,853	191,670
Cherries (crates)	186,005	170,090

Apples.—As noted above, the apple production is over five million boxes, and with a possible increased production should in a few years reach six million. In view of this possible increase, market extension is essential if the grower is to get a satisfactory return for his product. Attention should also be paid to future plantings and only varieties planted that are particularly suited to the area concerned. Furthermore, the elimination of odd varieties, either by top-working or removal, should be continued. The apple-crop this year was of excellent quality, although in many orchards there were heavy losses due to codling-moth.

Pears.—Pears in the Coast sections were light. In the Interior districts this crop was a little heavier than last year and of good quality.

Cherries.—Cherries were a light crop in all districts, with the prices ruling somewhat higher than in 1936. This crop shortage was unfortunate, as it was hoped that there would be sufficient to supply the total requirements of the SO_2 plants, and particularly as previous representations to the Tariff Board at Ottawa had advanced the possibility of British Columbia production taking care of all Western Canadian requirements in so far as SO_2 products were concerned. In a normal crop-year this could be done.

Peaches.—The 1936 crop was very light, due to adverse winter conditions. The 1937 crop was extremely heavy, showing an increase of approximately 350 per cent. over the crop of the previous year. Unfortunately, due to the fact that growers had not pruned or thinned as heavily as they should, many of the varieties were of rather low quality and small in size.

Apricots.—The crop this year was the heaviest on record, after a practical failure in 1936. Where this fruit can be grown successfully there will always be a demand for a quality product. Heavy planting, however, is not recommended.

Plums and Prunes.—While there has been a general increase in the planting of prunes, further plantings should be largely confined to the southern part of the Okanagan Valley, with a view to having an early-ripening fruit to meet the competition of the imported product. As to plums, the returns from this fruit for a number of years have been most unsatisfactory. The market possibilities should be studied carefully before further plantings are made.

Stone-fruit Maturity.—Before concluding this section of the report dealing with tree-fruits, your Horticulturist wishes to draw your attention to the work which has been carried out by the " Stone-fruit Maturity Committee " in the Okanagan. This committee is composed of Provincial and Dominion Agricultural Department officials, as well as representatives of different fruit-growers' organizations. The following report on the work of this committee is submitted by the Chairman, Mr. R. P. Murray, District Field Inspector at Penticton:—

" There has been no change in the personnel of the committee. Meetings were held at Oliver, Osoyoos, and Penticton, with the various packing-house managers, sales staffs, and Fruit Branch officials, during the movement of the various stone-fruits. This was done to acquaint these people with the work the Maturity Committee has been doing, and to show the proper stages of maturity for harvesting the various fruits. The meetings were well attended, and considerable interest shown by the discussions and suggestions offered. The Secretary was again able to visit the Prairie markets during the shipping season, contacting jobbers and wholesalers, and getting their views on what the Prairie markets want, both in maturity and kind of package best suited to the trade. This work is being continued. It is expected that recommendations will be made to the Grades Committee of the B.C.F.G.A. at the annual convention, respecting maturity of cherries, prunes, and peaches, based on the work of the Committee during the past four seasons."

SMALL FRUITS.

While the total acreage devoted to small fruits was much larger than in 1936, the actual tonnage harvested was considerably smaller than was expected at the beginning of the season. The following figures show the quantity of the principal small fruits produced last year in comparison with the estimated production for 1937:—

	1936 Production.	Estimated 1937 Production.
Strawberries (crates)	328,281	471,300
Raspberries (crates)	118,852	147,671
Blackberries (crates)	39,985	47,850
Loganberries (lb.)	1,247,380	1,836,000
Gooseberries (lb.)	288,104	347,370
Red and black currants (lb.)	508,684	592,350
Grapes (lb.)	1,275,378	1,685,600

Strawberries.—On the whole the strawberry-plants came through the winter in all sections in very good condition. Heavy rains in the Coast areas reduced the shipping tonnage considerably and forced the growers to take care of a major portion of their crop either through the jam-factory or with the SO_2 process. In some sections of the Kootenay there was a certain amount of loss due to the shutting of the jam plants before the total

tonnage had been picked. Plantings for next year's crop have made excellent development and present indications are for a good crop in 1938.

Raspberries.—On Vancouver Island the raspberry production shows a slight increase. In the Fraser Valley, which is the largest producing area in the Province, there was some damage to raspberry plantings, particularly of the Cuthbert variety. This variety is the best from the standpoint of shipping and canning, and no variety to equal it has yet been found. Numerous varieties are being tried in the hope that a hardy variety equal in quality to the Cuthbert may be secured. In the eastern section of British Columbia the production was a little better than in 1936.

Loganberries.—Some winter-injury was apparent in certain districts. The crop prospects last spring were for a heavy crop. Dry weather conditions later in the season materially shortened the crop, and while the production was heavier than in 1936 it did not come up to early estimates. There was a strong market demand for this fruit and the price was better than for a number of years.

Other Small Fruits.—There has been little change in the situation in so far as blackberries, currants, gooseberries, and similar small fruits are concerned. The demand for these fruits is not heavy and the yearly production usually meets the market requirements. The cultivation of blueberries is being undertaken in a small way on Lulu Island, with apparently satisfactory results. New introductions such as the Boysenberry and Youngberry are being tried out in different sections of the Province. It is impossible to forecast the future of these berries. At the present time they appear to have possibilities for the local market and home-garden. Commercial plantings on a large scale should be considered carefully before being carried out.

VEGETABLES.

Vegetable production shows very little change during the past year over the recorded production of previous years. The acreage of the principal vegetable crops is as follows:—

	1936 Estimated Acreage.	1937 Estimated Acreage.
Tomatoes	2,707	3,184
Onions	1,173	999
Lettuce	386	435
Celery	198	268
Cucumbers	206	165
Cabbage	381	382
Cantaloupes	231	168

While the tomato acreage shows a slight increase, the ripening of the fruit was delayed by cool summer weather. Hot weather in September and an open fall permitted the canneries to operate later than usual, with the result that the acreage yield was high. Asparagus continues to show increased production, with an increased demand both on the fresh market and by the canneries. Onions, while not a heavy crop, were harvested under most satisfactory conditions, with the result that an excellent bulb went into storage. The price is somewhat higher than last year.

The acreage of field peas for cannery and dried purposes is variable. In the Fraser Valley, G. E. W. Clarke, District Horticulturist, advises that "the canning-pea crop was approximately 2,500 acres this season, but while production in some places was good there was considerable loss of crop, due to flooding on the low-lying fields. The backward spring resulted in a late start and in many instances seeding was done with very little seed-bed preparation.

"The acreage in dry peas for culinary purposes is practically negligible in the district, due to the prevalence of the pea-moth. The growing of annual acreage of 2,000 acres has had to be discontinued for a while at least."

Pea acreage is also being extended in the Salmon Arm District. C. R. Barlow, District Field Inspector for that area, reports as follows:—

"The acreage of field peas grown under contract for processing purposes in the Salmon Arm District was increased by 35 per cent. to 270 acres this year. This acreage was divided among forty-one growers and the varieties grown were principally Stirling, Bluebell, Harri-

son's Glory, and Idabell. Yields averaged about 1 ton per acre and the quality was excellent. At the prices paid, which were substantially better than those of last year, most of the growers showed a nice profit on their operations, and there is every prospect that there will be a further increase in the acreage planted to this crop next year and that the growing of peas will become an important and permanent phase of the district's agricultural programme.

"A contracting firm has this year established a cleaning and processing plant at Armstrong, and has drawn its supplies from over 1,000 acres of peas contracted for in the Armstrong, Salmon Arm, Vernon, and Grindrod Districts. About 70 acres of canning-pea seed were also grown in the Ashcroft District."

In so far as pea-growing in the Okanagan is concerned, the following statement from the report of H. H. Evans, District Field Inspector, is worth noting:—

"In the Vernon-Armstrong Districts a new venture developed under the initiative of the British Columbia Pea-growers' Association on a fairly large scale. Approximately 860 acres were devoted to the production of peas for the dried-pea trade and some seed of canning strains. The acreage was distributed among eighty-five growers in many sections and embracing various soil-types and climatic variations. Quality of the product in general appears to be very satisfactory, but yields per acre were extremely variable. Owing to lack of knowledge and information as to the production possibilities of the various sections, the 1937 season can only be considered as a preliminary test period for the industry. It is quite possible that pea production may prove a very acceptable rotation crop in the mixed-farm schedule."

The early lettuce and celery crop in all districts was of excellent quality and moved freely. The late crop of these vegetables met a fair market demand, although the lettuce-growers took some loss owing to the variable demand and low prices.

OTHER HORTICULTURAL CROPS.

Tobacco.—The principal tobacco acreage in the Province at the present time is in the Fraser Valley. This year over 400 acres of tobacco were grown and harvested in the Sumas Reclamation Area, as compared with approximately 125 acres in 1936. In spite of the cool weather in June the yield was over 400,000 lb.

Mushrooms.—Mushroom-growing is undertaken principally in and around Vancouver. The production is mounting each year and it is estimated that there will be at least 175 tons sold in 1937.

Grapes.—The principal grape acreage is in the Okanagan around Kelowna. This section will show an increased production over 1936. While the crop was late, due to cool summer conditions, the hot weather of September was a factor in ripening the fruit satisfactorily. In other sections the acreage remains about the same as in the past with no increase in production. A large portion of the crop is used for wine-making, the wineries preferring the green varieties such as Niagara and Portland to the blue grapes which are the most extensively grown.

Rhubarb.—The principal acreage is in the Fraser Valley, and it is from this area that the car-load shipments of both forced and field rhubarb are made to the local and eastern markets. The 1937 season was late in starting and the first car of the field crop did not roll until April 13th. Shipments were made by agreement between the growers on an acreage basis, with the result that there was no overloading of any market and a reasonable price was maintained.

Shipments of forced rhubarb were lighter than last year. While the margin of profit is small on this crop, it produces a cash return which is most desirable at that time of the year. The pack generally shows improvement and a favourable market is being built up on the Prairies.

Seeds and Bulbs.—The past season was excellent for all kinds of seed production. While the summer was cool with slow growth of plants the fall was all that could be desired from a harvesting standpoint. There was little, if any, increase in acreage in either flower or vegetable seed.

Bulb plantings show a decided increase, and while the growth is not rapid it is most encouraging. A survey of the industry was made this year. The following table shows the 1937 acreage in comparison with that of previous years:—

Bulbs.	1929.	1931.	1933.	1935.	1937.
	Acres.	Acres.	Acres.	Acres.	Acres.
Narcissi	66⅛	84¾	84½	92⅝	92
Tulips (early)	5	7⅛	3	4⅞	3¼
Tulips (Darwin)	20⅛	22½	24¾	25⅛	37
Gladioli	39¼	58¼	48 9/16	46	66¾
Iris (bearded)	6⅞	4⅝	6⅝	5⅛	5¼
Iris (other)	5⅛	4⅛	8½	5⅜	19¼
Other bulbs	16 9/10	18½	27½	30½	26
Total bulb acreage	159⅓	200	203½	209⅝	249½

GREENHOUSE SURVEY.

Since 1923 a survey of the greenhouse acreage in the Province has been made every two years. The first survey made in 1923 shows an area of 1,905,180 square feet in glass and 120 growers. The 1937 survey shows that there are 4,896,865 square feet in glass and 564 growers, an increase of 157 per cent. in glass and 370 per cent. increase in number of growers. For full details *see* Appendix No. 1.

HORTICULTURAL DEMONSTRATION-WORK.

Pruning Demonstrations.—Pruning demonstrations similar to those held in the past were again conducted in various parts of the Province. These are held only on request of the growers and are well attended, particularly in the Coast sections. During the past year there were sixty-three demonstrations with a total attendance of 686 growers. Plans have already been made for a continuance of the work during the coming winter.

Anthracnose Control.—This disease of apples, which is found principally in the Coast sections, can be controlled satisfactorily by spraying with Bordeaux mixture at the right time. In order to ascertain whether other sprays could be used with equally satisfactory results, a project was started under the supervision of Mr. E. W. White, District Horticulturist, and Mr. W. R. Foster, Assistant Plant Pathologist. Mr. White summarizes the work undertaken as follows:—

"This project which has been running since 1933 was completed this spring with the making of the counts on the 1936 spraying. After three years' work it was considered that further spraying with the same materials would not give added information.

"In conjunction with W. R. Foster, Assistant Provincial Plant Pathologist, counts were made in Tanner Bros.' orchard on April 27th and in W. J. Jennings' orchard on May 7th. The following tables, showing the control secured with different strengths of Bouisol and Bordeaux mixture, have been prepared by Mr. Foster:—

"*Table 1.—Result of spraying King and Tompkins Apples with Bordeaux and Different Strengths of Bouisol on the Number of Anthracnose Lesions at Tanner Bros., Keating, April 27th, 1937.*

Treatment.	No. of Anthracnose Lesions.*		
	Tree 1.	Tree 2.	Total.
Check	13	35	48
Bouisol, 1.5 pints	10	15	25
Bouisol, 3.0 pints	---	5	5
Bouisol, 4.5 pints	2	3	5
Bordeaux	---	---	---

* Lesions on 25 twigs on each tree were counted.

" 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	204	208	412
Bouisol, 1.5 pints	101	108	209
Bouisol, 3.0 pints	38	37	75
Bouisol, 4.5 pints	33	24	57
Bordeaux	6	9	15

* Lesions on 25 twigs on each tree were counted.
† A plot consists of 5 trees.

" Table 3.—Result of spraying Northern Spy with Bordeaux and Different Strengths of Bouisol at W. J. Jennings, Duncan, May 7th, 1937.

Treatment.	No. of Anthracnose Lesions.*		
	Tree 1.	Tree 2.	Total.
Check	21	30	51
Bouisol, 1.5 pints	2	31	33
Bouisol, 3.0 pints	10	18	28
Bouisol, 4.5 pints	5	3	8
Bordeaux	2	2	4

* Lesions on 25 twigs on each tree were counted.

" Table 4.—Results 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	10	13	9	32
Bouisol, 1.5 pints	6	4	13	23
Bouisol, 3.0 pints	6	4	----	10
Bouisol, 4.5 pints	1	3	3	7
Bordeaux	1	5	----	6

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

Lettuce Variety Trials.—While the lettuce producers in different sections of the Province are growing various varieties that from a commercial standpoint appear satisfactory, it is essential that new varieties be tried out in order to ascertain their commercial value. Lettuce trials have for a number of years been carried out in the Okanagan and Lower Mainland areas, which are the principal lettuce sections of British Columbia. Trials were undertaken again this year, and the following is a summary of the findings of the trials conducted in the Armstrong District by Mr. H. H. Evans, District Field Inspector:—

" This project is a continuation of previous years' work in variety testing for improvement in commercial production of lettuce-crops.

" Spring-crop tests are run for tip-burn resistance, quality, earliness of maturity, and suitablity for distance shipping. Fall plots for hardiness in frost-resistance, earliness of maturity, and keeping qualities.

" Our sincere appreciation for the close co-operation in conducting the trials is extended to W. C. Boss, Armstrong, on whose property the work was undertaken.

"*Spring Series.*—Twenty-three plots; field planted from cold-frames April 21st; plants per plot, 25; examinations made, June 6th and June 20th.

"*Varieties and Strains under Test.*—Imperial No. 847, New York No. 2: Imperial No. 515, New York No. 12, four strains; Imperial No. 850, Crisp as Ice; Imperial No. 615, Green Iceberg; Imperial No. 152, T.B.R.; Imperial F, D, and C.

"*Seed-house No. 1.*

"*Plot 14, Imperial No. 615.*—June 6th: Performance duplicates Plot 8. June 20th: Fit to cut 12 per cent.; will cut 80 per cent.; culls 8 per cent. Other remarks as for Plot 8. (Promising.)

"*Plot 15, Imperial No. 847.*—June 6th: Performance as for Plot 0. Heads fit to cut, four. June 20th: Fit to cut 56 per cent.; will cut 40 per cent.; culls 4 per cent. Other remarks as for Plot 0. (Very good.)

"*Plot 16, Imperial D.*—June 6th: Performance as for Plot 12, but firming faster. June 20th: Plot fairly uniform, heads filled and firming, large and coarse, good type, flavour bitter, texture coarse, tip-burn medium; fit to cut 54 per cent.; will cut 40 per cent.; culls 6 per cent. (Cannot explain difference in performance at cutting stage, with similar strain, Plot 12.)

"*Plot 17, Green Iceberg.*—June 6th: Heads growing fast but slack, soft-textured. June 20th: Plot uniform, all heads filled but very slack and bursting, soft-textured, flavour and quality very good, tip-burn medium; no heads fit to cut. (Not suitable for Okanagan conditions.)

"*Plot 18, T.B.R.*—June 6th: Heads filling and firming fast, uniform, four heads fit to cut. June 20th: Plot very uniform, heads solid, very good type, no tip-burn, flavour and texture excellent; fit to cut 65 per cent.; will cut 31 per cent.; culls 4 per cent. (Very good.)

"*Seed-house No. 2.*

"*Plot 19, Imperial No. 615.*—June 6th: Performance as for Plots 8 and 14. June 20th: Fit to cut 20 per cent.; will cut 65 per cent.; culls 15 per cent. Other remarks as for Plots 8 and 14.

"*Plot 20, Imperial No. 152.*—June 6th: Heads filling fast and firming, three fit to cut. June 20th: Plot uniform; heads solid, good type; plant large, slight tip-burn, flavour good, texture slightly coarse; fit to cut 56 per cent.; will cut 44 per cent.; no culls. (Note variation with Plot 9.) (Very good.)

"*Plot 21, Imperial No. 847.*—June 6th: Performance as for Plots 0 and 15; heads fit to cut, three. June 20th: Fit to cut 48 per cent.; will cut 47 per cent.; culls 5 per cent.; slight tip-burn. All other remarks as for Plots 0 and 15. (Very good.)

"*Plot 22, Imperial No. 515.*—June 6th: Performance as for Plot 6; heads fit to cut, four. June 20th: Fit to cut 87 per cent.; will cut 13 per cent.; no culls; tip-burn slight. Other remarks as for Plot 6. (Very good.)

"*Seed-house No. 3.*

"*Plot 0, Imperial No. 847.*—June 6th: All heads filling, uniform, three heads quite firm. June 20th: Plot uniform, head solid, good type; 70 per cent. fit to cut; 25 per cent. will cut; culls 5 per cent.; no tip-burn, texture good, flavour mild. (Very good.)

"*Plot 1, New York No. 12, Strain P.C. 3593.*—June 6th: Heads filling, but plot uneven, inclined to slackness. June 20th: Plot fairly uniform, heads compact, good type; fit to cut 60 per cent.; will cut 30 per cent.; culls 10 per cent.; no tip-burn, texture good, flavour mild. (Fair.)

"*Plot 2, New York No. 12, Strain P.C. 3580.*—June 6th: Heads filling well but uneven, good type. June 20th: Plot not uniform, heads solid, good type, no tip-burn; texture very good, flavour excellent; fit to cut 45 per cent.; will cut 45 per cent.; culls 10 per cent. (Very good.)

"*Plot 3, New York No. 12, Strain P.C. 3578.*—June 6th: Heads filling but even and slow. June 20th: Plot fairly uniform, heads solid, very good type, no tip-burn; flavour and texture excellent; fit to cut 43 per cent.; will cut 50 per cent.; culls 7 per cent. (Very good.)

"*Plot 4, New York No. 12, Strain P.C. 3576.*—June 6th: Heads filling and firming fast, uniform, good type. June 20th: Plot quite uniform, heads solid, very good type, no tip-burn; flavour fair (slightly bitter), texture excellent; fit to cut 75 per cent.; will cut 19 per cent.; culls 6 per cent. (Very good.)

"*Plot 5, New York No. 2.*—This strain failed to germinate a seed in the cold-frames.

"*Plot 6, Imperial No. 515.*—June 6th: Heads filling and firming fast, uniform, odd heads fit to cut, heavier growth than No. 12. June 20th: Plot very uniform, heads compact, good type, no tip-burn; flavour and texture very good; fit to cut 84 per cent.; will cut 10 per cent.; culls 6 per cent. (Very good.)

"*Plot 7, Imperial No. 850.*—June 6th: Heads filling well but not uniform, very good type. June 20th: Plot fairly uniform, heads very solid, very good type, no tip-burn, flavour and texture very good; fit to cut 64 per cent.; will cut 21 per cent.; culls 15 per cent. (Very good.)

Plot 8, Imperial No. 615.—June 6th: Heads filling slowly, large and loose. June 20th: Plot not uniform, heads slack, good type, variety late, no tip-burn; flavour very good, texture coarse; fit to cut 16 per cent.; will cut 65 per cent.; culls 19 per cent. (Promising.)

"*Plot 9, Imperial No. 152.*—June 6th: Heads filling unevenly, plant large, type good. June 20th: Plot not uniform, slow developing, good type, flavour very good, texture slightly coarse, no tip-burn; fit to cut 25 per cent.; will cut 60 per cent.; culls 15 per cent. (Fair.)

"*Plot 10, Crisp as Ice.*—June 6th: Heads filling fast but not firming, uniform, type poor, red-leaved variety. June 20th: Plot uniform, heads not firming, flavour bitter, texture soft, slight tip-burn; fit to cut 12 per cent.; will cut 35 per cent.; culls 53 per cent. (Not suitable for Okanagan conditions.)

"*Plot 11, Imperial F.*—June 6th: Heads growing fast, large and very loose. June 20th: Plot uniform, very slow developing, late; large and slack, flavour and texture good, no tip-burn; fit to cut 12 per cent.; will cut 48 per cent.; culls 40 per cent. (Not suitable for spring crop.)

"*Plot 12, Imperial D.*—June 6th: Heads growing fast but slow developing. June 20th: Plot very slow firming, late; large and coarse, flavour bitter, texture coarse, good type; fit to cut 10 per cent.; will cut 65 per cent.; culls 25 per cent.; no tip-burn. (Not suited to spring crop.)

"*Plot 13, Imperial C.*—June 6th: Heads large, filling but not firming, coarse growth. June 20th: Plot not uniform, heads filled but slack, large, flavour fair, texture coarse, slight tip-burn; fit to cut 8 per cent.; will cut 60 per cent.; culls 32 per cent. (Not suitable for spring crop.)

"*Fall Series.*—Duplication of spring plots. Field seeded, July 29th; plants per plot, 50; examinations made, September 28th, October 26th, and November 10th.

"Seeding of the plots was made nine days later than the last of the commercial crop. This is done with the object of having the plots in full development through any severe frost periods to obtain resistance records.

"The first frost period was September 24th and 28th, when 8° of frost was registered. This slightly singed the outer leaves of mature crops, but caused no damage; no frost-injury in any plot. The next period was from October 3rd to 9th, with one night registering 12° frost. Slight injury occurred in the plots to some varieties and overmature field crops received slight injury to the top fold leaves. A sharp frost period, October 31st to November 7th, gave two nights with 14° and 16° frost, and created good conditions for proving frost-resistance.

"*Seed-house No. 1.*

"*Plot 14, Imperial No. 615.*—September 28th and October 26th: This plot comparable in all respects and both periods to Plot 8.

"*Plot 15, Imperial No. 847.*—September 28th: Heads filling fast, good type, no frost-injury. October 26th: Plot uniform, heads filled and firm, not as solid as Plot 0, some heads bursting, good type, no frost-injury; fit to cut 40 per cent.; will cut 30 per cent.; culls 30 per cent.

"*Plot 16, Imperial D.*—September 28th: Heads growing fast, filling but firming slowly, no frost-injury. October 26th: Plot fairly uniform, heads well filled and compact, good

type, frost-injury slight; cutting-heads 50 per cent.; will cut 27 per cent.; culls 23 per cent.

"*Plot 17, Green Iceberg.*—September 28th: Heads growing fast, filling but very slack, slight frost-injury. October 26th: Plot not uniform, heads large but very loose, frost-injury heavy. (Not suitable for fall crop.)

"*Plot 18, T.B.R.*—September 28th: Heads filling and firming fast, good type, frost-injury medium. October 26th: Plot uniform, heads filled and compact, some bursting, frost-injury heavy, good cutting-heads but not sufficiently frost resistant.

"*Seed-house No. 2.*

"*Plot 19, Imperial No. 615.*—September 28th and October 26th: This plot comparable in all respects with Plots 8 and 14.

"*Plot 20, Imperial No. 152.*—September 28th and October 26th: This plot comparable in all respects with Plot 9. Over 90 per cent. cutting-heads. (Very good.)

"*Plot 21, Imperial No. 847.*—September 28th and October 26th: This plot comparable to Plots 0 and 15; fit to cut 87 per cent.; will cut 13 per cent. (Very good.)

"*Plot 22, New York No. 515.*—September 28th: Condition comparable to Plot 6. October 26th: Remarks for Plot 6 apply here, with the exception that in this plot heads were not as solid and some were bursting. (Promising.)

"*Seed-house No. 3.*

"*Plot 0, Imperial No. 847.*—September 28th: Heads filling and firming fast, good type, no frost-injury. October 26th: Plot uniform, heads solid, excellent type, medium size, no frost-injury, 100 per cent. heads fit to cut. (Very good.)

"*Plot 1, New York No. 12, Stock P.C. 3593.*—September 28th: Heads filling and firming fair, good type, frost-injury medium. October 26th: Plot not uniform, filling but going slack, good type, frost-injury medium heavy; a few heads fit to cut, but would not make No. 1 grade.

"*Plot 2, New York No. 12, Stock P.C. 3580; Plot 3, New York No. 12, Stock P.C. 3578; and Plot 4, New York No. 12, Stock P.C. 3576.*—These plots comparable to Plot 1 in all features. These strains possibly seeded too late for fall cropping, and too subject to frost-injury for late crops.

"*Plot 5, New York No. 2.*—No germination of seed in this plot.

"*Plot 6, Imperial No. 515.*—September 28th: Heads filling and firming fair, good type, frost-injury light on outer leaves. October 26th: Plot uniform, heads compact, over-mature, good type, frost-injury medium; fit to cut 85 per cent.; culls 15 per cent. This plot fit to cut 10 days earlier. (Promising.)

"*Plot 7, Imperial No. 850.*—September 28th: Heads filling and firming fair, good type, frost-injury very slight. October 26th: Plot uniform, filling well, heads fairly firm, good type, frost-injury slight; fit to cut 70 per cent.; will cut 10 per cent.; culls 20 per cent. (Promising.)

"*Plot 8, Imperial No. 615.*—September 28th: Heads large, growing fast but not filling, no frost-injury. October 26th: Head large but too slack, no frost-injury, no heads fit to cut. (Not adapted to fall work here.)

"*Plot 9, Imperial No. 152.*—September 28th: Heads growing and filling fast, slack, no frost-injury. October 26th: Plot uniform, heads solid, medium size, good type, no frost-injury; fit to cut 90 per cent.; will cut 5 per cent.; culls 5 per cent. (Very good.)

Plot 10, Crisp as Ice.—September 28th: Heads filling and firming fast, no frost-injury. October 26th: Plot uniform, well filled but heads breaking, frost-injury slight; red-leaved variety. Head too soft for shipping purposes. (Not suitable for this district.)

"*Plot 11, Imperial F.*—September 28th: Heads large, filling but not firming, no frost-injury. October 26th: Plot not uniform, heads very slack, no cutting heads, no frost-injury. (Not suitable for fall crop.)

"*Plot 12, Imperial D.*—September 28th: Heads large, filling but not firming, no frost-injury. October 26th: Plot not uniform, heads filling and fairly compact; cutting-heads 15 per cent.; will cut 25 per cent.; balance not firming; frost-injury light.

"*Plot 13, Imperial C.*—September 28th: Heads filling fast, good type, frost-injury slight. October 26th: Plot uniform, well filled but slack and bursting, no heads fit for market, frost-injury medium. (Doubtful.)

"A final check of all plots was made on November 10th. Plots 9 and 20 still in good condition with only light frost-injury. All other plots were worthless at this date.

"Strains worthy of further tests are Imperial Nos. 847, 515, 850, and 615, the T.B.R., New York No. 2, and the four strains of No. 12.

"In 1937 information of satisfactory results obtained with No. 152 was passed on to the growers, and a considerable number had small acreages this year. Results have been gratifying."

Mr. G. E. W. Clarke, District Horticulturist, was in charge of the lettuce trials in the Fraser Valley. His report on this work is as follows:—

"Lettuce trials were conducted again this season and seed was supplied by two seed firms.

"The trials this season were conducted on the farm of Mr. D. G. MacLellan, Fraser Arm, Burnaby. The soil in this area is representative of a large area along the Fraser River, where a great deal of the commercial lettuce is grown.

"The peat-muck was well worked, and manure at the rate of about 8 tons to the acre was applied. An additional application of a 3–10–8 fertilizer at the rate of 700 lb. an acre was applied immediately prior to seeding.

"Seeding was made on April 8th, and the rows under test were duplicated in the planting. The plants were thinned to a distance of 15 inches.

"The germination was very good and the development very uniform. In calculating percentages twenty plants were used from a representative row of the plots.

"*Seed-house No. 1.*

	Date inspected.	Remarks.
Imperial No. 847	July 3rd	Seven large, uniform, firm heads. Quality good.
	July 9th	Twelve large, uniform, firm heads; one head loose and fluffy.
Imperial No. 615	July 3rd	Good growth. Slight amount of tip-burn.
	July 18th	Eight heads firm; three fairly firm; nine large and loose.
Green Iceberg No. 35FF	July 3rd	Strong leaf growth, but not heading. Practically 100 per cent. tip-burn.
Imperial D	July 3rd	Strong growth. Three heads firm and of good quality.
	July 9th	Sixteen heads very firm, good size, and excellent quality; one fairly firm.

"*Seed-house No. 2.*

	Date inspected.	Remarks.
Imperial No. 152	July 3rd	Good development.
	July 18th	Medium size; quality good. Fifteen firm; five loose.
Imperial No. 847	July 3rd	Good growth. Slight trace of tip-burn.
	July 18th	Medium to large. Quality good. Seventeen firm; three soft.
Imperial No. 615	July 3rd	Fair growth.
	July 18th	All heads very loose.

	Date inspected.	Remarks.
Imperial No. 515	July 3rd	Commencing to head. Six firm. ready to cut. Good quality.
	July 9th	Twelve heads large and firm, cut July 9th. Two heads bolting to seed.

"*Remarks.*—Imperial No. 847, a new variety tried in 1936 for the first time, seems the most promising new variety, and is apparently satisfactory for recommendation along with New York No. 12, Imperial F, Imperial D, and Imperial No. 152. Varieties Imperial No. 515 and Imperial No. 615 are fairly satisfactory under certain favourable conditions, but are not likely to prove as reliable from a production view-point as the first-named varieties."

Raspberry Variety Trials.—In the following areas the raspberry trial-work is a continuation of the work started in previous years and which is again reported on by the officials in charge of the various plots. For Salmon Arm Mr. C. R. Barlow, District Field Inspector, reports as follows:—

"All of the nine varieties of raspberries (twenty-five canes each) planted for comparative test purposes at Mr. W. J. Honey's farm at Salmon Arm in the spring of 1936 have made very fair growth this year, and a crop may be expected next year of sufficient size to permit of making up at least part crates for shipping tests and to furnish some idea of their respective varietal merits as to yields, quality, etc. All varieties came through last winter without injury. From the standpoint of growth 'Preussen' stands first, but this may in part be due to the fact that only about fifteen plants out of the original twenty-five grew, and the surviving plants, being farther apart, have an advantage over the other varieties insomuch that competition for moisture and plant-food may not be so keen. 'Ontario,' 'June,' 'Ohta,' 'Antwerp,' 'Chief,' 'Adams 87,' 'Newburg,' and 'Newman 20' follow 'Preussen' in the order named in point of growth. All varieties are well matured. Winter weather conditions will, of course, be the chief factor in determining whether or not information can be secured as regards their respective hardiness next year.

"The few Boysenberry plants which were planted last year at the same time as the raspberries wintered well and have made heavy growth this year, and next year it should be possible to form some conclusions as to its value under local conditions."

For the Vernon area the following statement, taken from the report of Mr. H. H. Evans, District Field Inspector, gives a brief outline of the trial-work conducted:—

"This work, carried out on the farm of W. H. Baumbrough, continues the series begun in 1932 to prove adaptability to climatic conditions, yield and quality comparisons with present commercial varieties. Several varieties were discarded this season as having proven unsuitable either from lack of hardiness, yield, or quality.

"The winter of 1936–37 was not severe excepting for three short sub-zero spells in January.

"The Viking had about 20 per cent. bud-kill and slight tip-kill. All other varieties came through the winter in excellent condition. No mildew was in evidence in 1937. The Viking was attacked by the raspberry fruit-worm.

"The following table indicates yields and quality (twenty-five plants per plot):—

Variety.	First Picking.	Final Picking.	Yield in Pints per Plant.	Remarks.
Lloyd George	June 30	July 28	5.8	Yield heavy; colour, size, and quality excellent. Berry too soft for shipping.
Viking	July 4	Aug. 8	2.4	Winter-injury and fruit-worm reduced crop. Colour, size, and quality excellent. Good shipper.
Lathan	July 12	Aug. 2	2.5	Habit of bearing improving. Colour, size, and quality good. Inclined to crumble.
Newburg	July 6	July 25	1.4	Yielding qualities not yet indicated. Size, colour, and quality good; slightly crumbly.
Chief	July 8	July 23	0.7	Yield not promising. Size only fair. Colour and quality not promising. Shipping quality not known.

Apple-scab Control.—There is no necessity to comment on the need for satisfactory sprays to control apple and pear scab in areas where these tree-fruits are grown. As a matter of record and for the information of those interested in the control of scab your Horticulturist considers it advisable to outline briefly the work along this line which was undertaken during the past season.

In Salmon Arm Mr. C. R. Barlow, District Field Inspector, co-operated with the Dominion Entomological and Pathological officials in scab-control work. It is impossible to go into detail regarding the sprays used and the results. A general idea of the work may be obtained from the following paragraph from Mr. Barlow's report:—

" Lime-sulphur, both alone and in combination with lead arsenate, as used in the commonly adopted spray programme for scab-control in this district is undoubtedly detrimental to the normal functioning of the foliage of the trees. While satisfactory commercial control can be obtained by the use of these materials, considerable burning, crinkling, and stunting of the foliage frequently takes place, and this injury, occurring as it does year after year, has a cumulative effect detrimental to the vigour of the trees. The principal object of these experiments was to eliminate or minimize this injury, either by the substitution of some other material for lime-sulphur or by a combination of other materials with lime-sulphur."

The work in the Vernon District was under the supervision of Mr. H. H. Evans, District Field Inspector. The following, taken from his report, summarizes briefly the work done and results obtained:—

" The Dominion Pathological Laboratory being unable to assist in the apple-scab control project, the Provincial Horticultural Branch decided to continue in order to ensure continuity. Size of the project was slightly reduced in number of materials used.

" The disease, though general, was less severe than for several years.

"The following table illustrates the project and results:—

Plot.	Trees.	Spray Periods.	Materials and Proportions used.	Remarks on Tree and Fruit Injury.	Scab Free.	Light Scab.	Severe Scab.
					Per Cent.	Per Cent.	Per Cent.
1	18	Prepink Calyx Cover	L.S. 1–35 L.S. 1–60 L.S. 1–60 + C.A. 4 lb. to 80 in all sprays	Very light leaf-spot burn after calyx spray. Foliage slightly off-colour	98.4	1.4	0.2
2	18	Prepink Calyx and Cover	L.S. 1–35 L.S. 1–60 + L.A. 3 lb. to 80 in all sprays	Remarks as for Plot 1	91.6	7.3	1.1
3	6	Prepink Calyx and Cover	L.S. 1–35 M.S. 5 lb. to 100 + C.A. 4 lb. to 80 in all sprays	No sign of spray-injury. Trees show good foliage development and colour	85.0	15.0	.....
4	6	Prepink Calyx and Cover	L.S. 1–35 M.S. 5 lb. to 100 + L.A. 3 lb. to 80 in all sprays	Remarks as for Plot 3	91.5	7.5	1.0
5	6	Prepink Calyx and Cover	L.S. 1–35 C.S. 1–500. No arsenicals added	No sign of spray-injury to foliage or fruit. Trees showed very good foliage development and colour	58.0	34.8	7.2
6	6	Prepink Calyx and Cover	L.S. 1–35 C.S. 1–400. No arsenicals added	Remarks as for Plot 5	55.0	43.0	2.0
7	10	Prepink Calyx and Cover	L.S. 1–35 L.S. 1–100 ÷ K. 6 lb. to 80 + H.L. 8 lb. to 80 C.A. 4 lb. to 80 all sprays	Very slight leaf-spot burn after calyx spray. Foliage good, development and colour	94.0	5.0	1.0
8*	1	.....	.....	.....	38.0	48.0	14.0
9	3	Pin-point Spray, July 23	M.S. 5 lb. to 100 gal. + L.A. 3 lb. to 80	Half of Plot 5 treated. No sign of spray-burn	86.0	14.0	.....
10	3	Pin-point Spray, July 23	C.S. 1–500	Half of Plot 6 treated. No sign of spray-burn	70.0	29.0	1.0

* Check-plot.

Definitions.—L.S., lime-sulphur; M.S., micronised sulphur; C.S., cosmic sulphur; K., Kolofog; C.A., calcium arsenate; L.A., lead arsenate; H.L., hydrated lime.

Sprays Applied.—Prepink, May 14th; calyx, May 31st; cover, June 14th; pin-point, July 23rd. Machine, Hardie Mogul No. 16, 450-lb. pressure and double gun. Average amount per tree, 12 gallons.

"As pin-point scab developed freely after mid-July on Plots 5 and 6, it was decided to take half of each plot and spray one with cosmic sulphur and the other with micronized sulphur for pin-point control in an effort to reduce to a minimum possible loss to the crop of these plots from late scab-infection. Results as indicated on the chart appear to have justified the work.

"Examinations of plots were made: May 31st, June 13th, June 30th, and July 21st. The check-plot showed scab-infection by June 13th, and Plots 3, 4, 5, and 6 by June 30th. Pin-point scab had developed on Plots 5 and 6 around mid-July. All fruit under the heading 'light scab' could be marketed in the lower grades."

Demonstration-work in apple-scab control in the Kootenays has also been carried on for a number of years by Mr. E. C. Hunt, District Horticulturist. The general comments and details of results obtained by Mr. Hunt are quoted from his 1937 report:—

"This disease throughout the Kootenay and Arrow Lake sections was not so prevalent as in some other year. However, in orchards that were not sprayed for the control of apple-scab the disease was quite bad on the fruit and as a result a much lower grade of fruit was harvested than in the sprayed orchards.

"Growers can get and have been given very reliable information on the control of apple-scab, and although a lot of different spray materials have been tested out with the work carried on in the Kootenay District in the control of this disease, standard lime-sulphur, either alone or in combination, still stands out as the most satisfactory base for scab-control. The combination used in the Kootenay and Arrow Lake sections is either the iron-sulphate mixture of 6 lb. of iron sulphate, 1½ gallons of lime-sulphur, and 4 lb. of calcium arsenate to 100 gallons of water, or lime-sulphur, 1 gallon to 60 of water plus 4 lb. of calcium arsenate to 100 gallons. Both these mixtures have given excellent control of apple-scab and under some of the worst scab conditions that could be found in any fruit-growing section. Lime-sulphur alone used at the rate of 1 gallon to 40 gallons of water is still giving good control, but in some seasons other injuries occur that are not always found with the combination sprays. The recommended number of sprays required to control the disease is four, starting with the pink and followed up every two weeks until four have been applied.

"Very little experimental or demonstration spraying for the control of apple-scab was carried out by your assistant this year. A further test was made with the lime-sulphur and calcium-arsenate combination and the results obtained were again very satisfactory as to scab-control, as well as to general condition of foliage and fruit-injury. Little, if any, burning to the foliage and the fruit was of good finish at harvesting-time. All the apples on one tree were counted and gone over for scab-infection with the following results: Total apples on tree, 1,749; clean, 1,747; scabby, 2; per cent. of clean fruit, 99.88; per cent. of scabby fruit, 0.12. Check on unsprayed tree: Total apples, 822; scabby, 756; clean, 66; scabby, 92 per cent.; clean, 8 per cent. Four sprays were applied in this test, starting with the pink on May 13th, calyx May 28th, first cover June 14th, and second cover June 29th. Variety McIntosh Red, sixteen trees in the sprayed plot, one check, and all of full bearing age."

Codling-moth Control.—Codling-moth is one of the worst insect pests with which fruit-growers have to contend. Efficient spraying is necessary if control is to be secured. In order to demonstrate the results of efficient spraying, as well as to ascertain the possibilities of various sprays, Mr. B. Hoy, District Field Inspector at Kelowna, has for a number of years carried out codling-moth demonstration spraying-work in the Kelowna District. This work forms the basis for the recommendations which are made to the growers from time to time. As this work was continued during the past season it would seem advisable that Mr. Hoy's findings for the current year be included in this report. The following briefly outlines the work done in 1937 in the Kelowna area:—

"More worms over-wintered last year than in the previous two years. The weather during the period when the first brood was active was not favourable to good spraying. There were few days without wind or showers. These conditions, coupled with the shortage of sprayers, resulted in late spraying and much work poorly done.

"Emergence of moths throughout the season was greater than last year. The second brood extended to past the middle of September. The cool weather in August followed by hot September weather was abnormal and resulted in very late egg-laying and consequently late infestations of worms. With normal weather conditions many of the late moths would not have deposited eggs.

"Radio announcements were made every Wednesday and Saturday during the spraying season. Eighteen of these radio bulletins were given out during the summer. Reports were received at this office from Penticton, Summerland, Peachland, Winfield, Oyama, and Vernon, so that growers could be accurately informed of the moth activities throughout the Valley. The growers who took records and phoned them to this office, and radio station CKOV, who handled the announcements free of charge, are to be commended for co-operating in this important work.

"Control in different orchards varied a great deal. Generally there were more worms than last year; yet there are many instances where by using improved equipment and more care in applying spray the infestation was much smaller than in many years.

" Experimental spraying was again carried out at Kelowna, Mr. A. Dennys, of the Dominion Entomological Branch, assisted in this work in Mr. R. M. Hart's orchard at East Kelowna and at Mr. Ramsay's at Okanagan Mission. In the Hart orchard the following materials were used:—

" Lead arsenate, 8 lb. to 240 gallons water, plus ½ lb. of Fluxit.

" Colloidal lead arsenate, 5 pints to 240 gallons water.

" Phenothiazine, 5 lb. to 240 gallons water.

" Calcium arsenate, 12 lb. to 240 gallons water, plus ¾ lb. zinc sulphate, ¾ lb. of lime, and 3 oz. blood albumen.

" Lead arsenate, 8 lb. to 240 gallons water, plus (2½ quarts fish-oil with 5 per cent. oleic acid added).

" In the Ramsay orchard arsenate of lead, calcium arsenate, and Phenothiazine were used, and with the exception of Phenothiazine the strengths were the same as in the Hart orchard. The strength of Phenothiazine in this test was 3 lb. to 100 gallons.

" Besides the different spray mixtures, various numbers of sprays were applied, and on some plots the second-brood sprays were omitted entirely. The omission of second-brood sprays in 1936 made little difference in control, but this year very large increase in infestation was noted on these plots. This was undoubtedly due to wet weather during the first-brood period reducing the coverage and to the prolonged activities of the second brood.

" Further details of the spraying-work undertaken may be found in Appendices No. 2 and No. 3.

" Chemically-treated corrugated bands were again used by many growers. These were supplied by Shanahan's and Buckerfield's. Last year growers were not satisfied with Buckerfield's and this company stepped up the quantity of Beta Napthol in their bands. Preliminary checks would indicate both makes effective this year. However, some growers have promised to notify this office when they are removing the bands and a more detailed check will be made at that time."

Codling-moth demonstration-work was also undertaken in the Penticton and Keremeos Districts under the supervision of Mr. R. P. Murray, District Field Inspector. An outline of the work carried out is herewith submitted:—

" With the increase in codling-moth throughout this district, it was thought advisable to do some demonstration control-work. Two orchards, one at Penticton and one at Keremeos, that were heavily infested in 1936, were chosen and plots laid out. The trees were all about twenty-five years old. At Penticton they were McIntosh, well pruned and well spaced, while at Keremeos they were Delicious, planted closely with branches interlacing, and, in addition, had a barn on one side and a packing-house on another. It was intended to make counts in both these districts, but due to delay in the mail the apples at Keremeos were picked before word was received. However, the apples were examined shortly before harvesting, and were apparently quite free of codling-moth. The owner was quite pleased with the results. No difference was observed at picking-time between the two plots, both showing excellent control.

" One plot received three covers for the first brood; the other three covers for the first brood and one for the second. These were applied May 31st, June 11th, June 18th, and July 28th. Spraying was done at Keremeos with a Hardie 12, using one gun and 400 lb. pressure. In both districts arsenate of lead, 1½ lb. per 40 gallons, and Fluxit spreader, ½ lb. to 160 gallons, were used, except for part of one plot in Penticton, where a sheep-dip was used, 1 pint to 100 gallons, in place of Fluxit. This was done to find out if this material had any advantages over other spreaders. From the results this season sheep-dip did not give any better coverage and was much more expensive. No burning was observed with this material. The Penticton plots were sprayed with a Friend, using one gun at 375 lb., and as the trees were quite large it took more time to get good coverage over the tops than it would with a larger machine. However, it did demonstrate that good control can be obtained with the smaller machines when sufficient time is taken. Spray dates at Penticton were as follows: Calyx, May 19th; cover sprays, June 8th and 26th and July 31st.

"*Plot No. 1.*—Calyx and two covers for first brood; one cover for second.

"*Plot No. 2.*—Three covers for first two broods.

"*Plot No. 3.*—Two covers for first brood.

"When checking the results, approximately ten loose boxes from each plot were counted, including windfalls. From the following table it will be seen there was no appreciable difference in control, particularly between Plots 1 and 2, although Plot 3 shows approximately 3 per cent. more stings than the other two plots. It may appear that the residue could have been higher on these plots, but as samples were not taken for some time after the spray was applied it is possible these amounts were considerably higher immediately after spraying.

Plot No.	Worms.	Stings.	Total.	Coverage, First Brood.	Coverage, Second Brood.	Owner's Coverage.	
						First.	Second.
				*	*	*	*
1	1.518	3.836	4.354	14.4	16.6	11.3	10.9
2	0.753	4.104	4.857	14.4	16.6	------	------
3	0.533	6.844	7.377	14.4	2.1	------	------

* Micrograms of lead arsenate per square inch.

"Bait traps were again used this year at Osoyoos, Oliver, Kaleden, and Penticton. First captures of moths were made as follows: Osoyoos, May 21st; Oliver, May 23rd; Kaleden, May 22nd; and Penticton, May 24th.

"From these dates it will be seen that emergence is fairly uniform throughout this district. Pine-tar oil has been recommended by some as an attractant, added to the ordinary bait. Two different kinds, dark and light coloured, were tried this season. A few drops were added to a pot, and it was hung alongside untreated pots. This work was done in the Penticton and Kaleden Districts. In all cases the pots without the pine-tar oil caught more moths than the pots with it. Several days after the pine-tar oil was added these pots again caught about the same numbers as the untreated pots."

Drought-spot Control.—The use of boric acid in the control of drought-spot was first recognized in 1935 as having commercial possibilities. The work was started by Dr. McLarty, of the Dominion Plant Pathological Service, and since it was first recommended many tons of boric acid have been used by growers with outstanding results. Provincial officials in all sections have co-operated in furthering this work. Mr. B. Hoy in his annual report outlines what has been done through his office. As this is a fair indication of the various phases of the work in all sections, it is considered worth repeating in this report:—

"The work done by boric acid in eliminating drought-spot from our orchards is remarkable. There is little trouble from this disease now.

"The experiment laid out and started by this office in the Willits orchard in January, 1936, is still being continued. This is considered the most important test in the Valley by Dr. McLarty, Dominion Pathologist at Summerland. No drought-spot has appeared in any of these trees since treatment commenced; nor is there any injury showing where treatments from ½ to 2 lb. per tree have been repeated for two years. It is the intention to carry on this plot until injury shows up where annual applications are made, or until the disease appears where only one light application was made. This work is one year in advance of any ground-treatments by growers. The plan of this experiment is as follows:—

"There are six rows of trees with four trees in each row. Each year one row is eliminated from treatment and on the balance the treatment is continued. This is intended to give us the length of time the treatment will last and how long before we reach a toxic condition of the soil. The trees are all McIntosh."

European Red-mite Control.—The control-work as carried out and reported on by Mr. R. P. Murray is of interest to all fruit-growers in the Okanagan, as this pest is to be found in practically all areas. Further work will be necessary, but the following gives some idea of the work undertaken during the past season:—

"As this pest has assumed quite serious proportions during the past two or three seasons, any spray material that promised better control has been given a trial. This year a cosmic-sulphur compound was tried in the early part of the season at Kaleden on Yellow Newtown,

and at Penticton in August on Golden Delicious and Newtown. At Keleden it was alongside a 1-per-cent. summer oil and gave about the same degree of control. In order to test its reaction with summer oil, a large Yellow Newtown was sprayed with the usual 1-per-cent. summer oil and the next day it was sprayed with cosmic sulphur. No burning of any kind was in evidence, although day temperatures were 84° F. It is hoped that further trials with cosmic sulphur can be made next season, extending it to include mildew of peaches, pears, and apples. The material has one rather serious drawback, the manufacturers do not recommend its use with arsenate of lead, though no trouble was observed when it was sprayed directly on a heavy deposit of lead arsenate. Unlike many sulphur compounds, it does no apparent damage to foliage at high temperatures, and for this reason may have a place in the summer spray programme."

Mealy-bug Control.—This insect is found widely distributed in the Kootenay sections and demonstration-work to ascertain a satisfactory control has been undertaken in that section. The Provincial work has been under the supervision of Mr. E. C. Hunt, District Horticulturist. His comments on the work carried out during the past season are as follows:—

"A very bad insect to control and causing considerable damage to the fruit-crops, but mostly to the apple-crop. Control-work has been carried out for a number of years in the Willow Point area, and for one year at Boswell and Creston. The results of the experiments carried out indicated that satisfactory control of the mealy bugs could now be obtained by the use of an oil spray applied early in the spring and when the trees are dormant. Different strengths of the dormant oil sprays were tested out, but the results seemed to be the best where a 6-per-cent. dormant oil spray was used or slightly stronger. Growers were advised to use this spray in the control of the mealy bugs in 1937, and although some control was secured the results were far from satisfactory. Whether this was due to the kinds of oils used or in the making-up of the emulsion it was hard to say, but the control was not nearly as good as in other years with the same strength of oil sprays. Further work in the control of this insect will need to be undertaken next year, as our recommendation did not give the control that was expected."

Fertilizer Trials.—The building-up of soils and the maintaining of soil-fertility is an important function wherever plants are grown for commercial purposes. With this object in mind your officials have for a number of years maintained trial plots with the object of demonstrating the use of fertilizers in production of both fruits and vegetables. While it is impossible to go into detail regarding these various trials, it is considered advisable as a matter of record to list briefly the various fertilizer plots throughout the Province:—

Apples: Okanagan Centre, Kelowna, Penticton, Nelson, and Creston.
Lettuce: Armstrong.
Celery: Armstrong.
Onions: Vernon.
Tulips: Vernon.

While it is not feasible to report in detail on all demonstration-work that is being undertaken, it is thought advisable to at least tabulate all such work in the various districts. By doing this a reference is created and the details may be secured at any time by interested parties upon reference to individual reports.

District Location.	Project.
Vancouver Island	Strawberry Plant Selection; Strawberry Variety Trials; Boysenberry Trials; Grape Variety Trials; Rhubarb Trials; Lettuce Trials; Sprays for Anthracnose-control.
Lower Mainland	Lettuce Variety Trials; Boysenberry Trials; Raspberry-mulch Trials; Brown-rot Sprays; Yellow-rust Dusts; Boron Treatment for Tulips; Strawberry Red-spider Control.
Okanagan	Boron Trials; Fertilizer Trials with Fruits and Vegetables; Small-fruit Variety Trials; Lettuce Variety Trials; Onion Variety Trials; Tomato Variety Trials; Orchard Cover-crop Work; Spraying Trials for Codling-moth, Red-mite, and Apple-scab; Rarer Elements Test on Onion and Celery.

District Location.	Project.
Kootenay	Mealy-bug Sprays; Apple-scab Sprays; Orchard Fertilizer Trials; Rarer Element Test on Cherries; Raspberry Variety Trials.

INSPECTION AND PEST-CONTROL WORK.

Nursery Inspection.—During the past year eighty-eight nursery licences were issued, sixty-five of which were taken out by nurseries and twenty-three by agents. Inspection-work was undertaken in all nurseries. The details of inspection for 1937 are shown in the following table:—

	Number inspected.	Number passed.	Number condemned.
Apples and crabs	51,223	50,208	1,015
Pears	16,639	16,489	150
Plums and prunes	21,887	21,556	331
Cherries	9,297	9,099	198
Peaches and apricots	31,037	30,412	625
Miscellaneous	6,514	6,513	1
Totals	136,597	134,277	2,320

Twenty-five nurseries inspected; thirty-two inspections made; 1.7 per cent. of the inspected stock was condemned.

Fire-blight Control.—The usual fire-blight inspections were made during the past winter. A general improvement in the amount of fire-blight was noticed during the growing season. This disease requires constant attention on the part of the growers and inspectors are constantly noting badly blighted orchards with a view to giving such orchards particular attention during the dormant period. The inspections as carried out in the Okanagan are detailed in the accompanying table:—

Fire-blight Inspection Report, 1937.

District.	Total Acres inspected.	Inspected and passed.	Not passed.
Salmon Arm	317	309	8
Vernon	5,850	5,614	236
Kelowna	4,000	3,800	200
Summerland	3,382	3,345	37
Penticton	690	690	----
Totals	14,239	13,758	481

Potato-beetle Control.—Potato-beetle has up until this year been found only in the East Kootenay districts. This year new outbreaks occurred at Grand Forks, Salmo, and Thrums.

The work in the East Kootenay area was this year under the supervision of Mr. A. McMeans, who was employed during the months of June, July, and August. Mr. McMeans took charge of beetle-dust distribution, as well as inspecting growing crops and checking dust applications that were made from time to time by the growers. The general opinion of the growers is that the beetles have not been as numerous during the past season as in 1936.

At Grand Forks the control-work was in charge of Mr. M. H. Ruhmann, Provincial Entomologist. A full report has been submitted, and on the basis of recommendations made the work in this area will be continued next year.

Arrangements will also be made in 1938 to carry out the necessary control-work in the Salmo and Thrums areas, and it is hoped that complete eradication in these districts will be possible.

San Jose Scale Control.—As pointed out in the last report, San Jose scale is found at various points in the Okanagan and Kootenay Horticultural Districts. The necessary control-work was carried out during the past winter and will be continued in 1938.

A concession was made this year whereby the Keremeos-Cawston growers were permitted to store packed fruit from the quarantine area in the Kaleden Co-operative Packing House. This was much appreciated by both growers and shippers.

In the Keremeos-Cawston area a handicap to eradication-work has been the adjacent Indian orchards. The Provincial regulations dealing with San Jose scale control do not apply to such areas as they are under the supervision of the Dominion Department of Indian Affairs. An amendment to the Dominion Act made during the last session indicates that possibly something may be done to improve pest-control methods on Indian lands.

Codling-moth Control.—All spray zones in both the Okanagan and Kootenay were operative again this year with the exception of the Naramata zone. Work in this zone was discontinued due to the fact that satisfactory spraying arrangements could not be made.

In the Vernon section the spraying in the city area was continued on the same basis as in past years. Work in the adjacent commercial areas was discontinued following the results of a ballot, details of which are given in the 1936 report.

RECOMMENDED FRUIT PLANTINGS.

During the past year "Varieties of Fruit Recommended for Planting in British Columbia" (Horticultural Circular No. 64) was revised and reissued. This circular is compiled from the recommendations of our various district officials, as well as other groups interested in fruit-growing throughout the Province. In the Okanagan particularly the recommendations are based on the figures obtained through our orchard survey and agreed upon by a committee composed of Provincial and Dominion officials and representatives of different horticultural bodies in that area. A brief outline of this committee's work is given in the report of Mr. M. S. Middleton, District Horticulturist for the Okanagan, and which reads as follows:—

"In 1927 your Branch officials, in co-operation with growers, shippers, and others, took up the question of the establishment of a commercial variety list of fruits for the Okanagan, with special reference to those varieties best adapted to the various sections. This year your officials thought it opportune to again review the situation as it stood after ten years of readjustment. This was further apropros following as it did the completion of the orchard survey records in 1936. After a good deal of preliminary work by way of preparing tabulations and charts showing the trend of the industry over the ten-year period, a committee meeting was called under the British Columbia Fruit-growers' Association at Kelowna, on March 18th, 1937, consisting of representatives from the B.C.F.G.A., the Federated Shippers, the Tree Fruit Board, the Canners, the Dominion Fruit Inspection Branch, the Dominion Experimental Farm, and the Provincial Horticultural Branch.

"The object of the committee was to thoroughly study the whole fruit industry and endeavour to arrive at the best commercial variety list, the best proportional percentage plantings of each in order to fully meet the market demands, and at the same time fit such recommendations into our production adaptabilities. The findings and recommendations have been incorporated in Circular No. 64."

LECTURES AND SHORT COURSES.

Lectures on horticultural subjects were given as requested at numerous centres throughout the Province. Your district officials are always available for lectures when such requests are presented by any group interested in horticulture. A feature of the winter work was the outstanding success of the short course held in the Oliver District. This short course was arranged for by Mr. R. P. Murray, District Field Inspector, who makes the following statement regarding it in his annual report:—

"At the request of the Oliver-Osoyoos growers your Inspector drew up a three-day programme of lectures during February. Nine subjects were presented, three for each afternoon. Speakers from both the Dominion and Provincial services were called on, and their talks were very much appreciated by the growers. In spite of the weather, which was unusually bad, cold with deep snow, there was a wonderful attendance at all the lectures, never less than 128, and up to 141. These three-day courses were so popular the district has asked for them again during the coming winter. At Keremeos an afternoon and evening

meeting was held. Some of the speakers from the Oliver meeting attended. These two sessions were also well attended, and plans are now being made to hold these meetings in the near future. Penticton and Kaleden have also asked that a programme along the same lines be presented in the near future. This will be attended to."

PUBLICATIONS.

A fairly complete list of printed publications has been prepared by your Branch and this is revised and reissued as necessity demands. Mimeographed circulars on horticultural subjects are also issued from time to time and help to meet the requests for information which reach this office daily. As in the past, the Horticultural News-letter was issued during the summer season from May 22nd to September 11th. At the same time your Branch also issued crop estimates dealing with small and tree fruits and vegetables.

REPORT OF PROVINCIAL PLANT PATHOLOGIST.

J. W. EASTHAM, B.Sc., PLANT PATHOLOGIST.

Since the beginning of 1937 there were 830 direct-delivery tags issued in batches of 10 to 100 to commercial nurserymen on the Prairies, in addition to 105 for greenhouse plants; of the 830, returns have been made on 689. In these returns an itemized duplicate of the order filled has not been insisted on, but only a statement of the different kinds of plants included. Sixty-six orders contained bulbs; 330 other ornamentals; 165 asparagus, rhubarb, or other vegetables; 145 small fruits; and 105 tree-fruits. An individual order might, of course, consist in part of plants from two or more of these categories. In addition to the above, thirty-eight shipments not provided with the special tags were inspected at Vancouver. With the exception of a few fairly large orders of bulbs and one of 1,000 strawberry-plants, these were mostly private sendings of ornamentals—alpines, native plants, house plants, and cuttings.

NEW DISEASES.

The only new disease of any importance recorded during the past year is the downy mildew of roses (*Peronospora sparsa* Berk.). Specimens were brought in first by an amateur rose-grower from West Vancouver. Further inquiry showed the disease to be present also in commercial nurseries in the Fraser Valley. In Great Britain this disease is reported only as attacking roses grown under glass. While it is known to occur in a number of States in the United States of America, from New York to California, it is apparently considered of only minor importance, publications on rose diseases either omitting it entirely or merely referring to it in passing. The disease causes a blotching of the leaves and stems much like that due to the familiar black-spot (*Diplocarpon rosæ*) with which it might be confused. The spots are, however, not so dark in colour or so well defined. The petals may also show a paler spotting. The characteristic sporophores and spores are produced freely from the under-side of the affected areas on both leaves and petals. Varieties of roses appear to differ considerably in susceptibility.

BARBERRY SURVEY.

During the past two seasons black or stem rust of oats (*Puccinia graminis*) has been severe in the Delta and adjacent districts and it seemed desirable to make some inquiry into the prevalence of susceptible species of barberry in this area. Our native species, *Berberis nervosa* and *B. aquifolium*, are fortunately so nearly immune as to be of no importance in the spread of the disease, but the highly susceptible *B. vulgaris* is widely grown as an ornamental in and around Vancouver and other cities. The first conclusion to be drawn from our scouting during the past season is that *B. vulgaris* has only in very rare instances escaped from cultivation. The only specimens found occurring spontaneously were on the abandoned Great Northern tracks at Ladner, where a few bushes were found. One or two of these were very large, 8 feet high by several in diameter, and had evidently been heavily

infected with the æcia of grain-rust. Moreover, they were only just across the road from oat-fields. These bushes had been cut down this spring but not grubbed out, and the question of authority to carry on eradication-work seems in doubt.

The second conclusion is that there is still a good deal of ignorance or lack of a sense of responsibility, or both, in regard to barberry planting. The barberry-bushes on the railway-tracks were seedlings in all probability from a 300-foot barberry hedge which we were informed had been planted on an adjacent farm and finally taken out some years ago on representations of neighbours. We found another case at Ladner where a farmer has his front garden fenced with a hedge of purple-leaved *B. vulgaris*. This hedge has been in for fifteen years in spite of objections raised by neighbours. Furthermore, the Ladner High School is completely surrounded by a hedge of barberry. Only about twenty bushes of this are *B. vulgaris*, the rest being *B. Bealei* (*B. Japonica*). This latter species is generally regarded as a susceptible one and is excluded from importation into Canada under the regulations of the "Destructive Insect and Pest Act," and from interstate movement into "protected" States in the United States of America. At the same time, in this particular case, while we were able to find an abundance of infection on the *B. vulgaris*, æcia were very scarce on the *B. Bealei*. It is possible, therefore, that it would be sufficient to take out the former species until, at least, the latter gave more obvious indications of being a source of danger.

While eradication of susceptible barberries must not be expected to solve the rust problem, it is the general experience where this has been done that injury from rust is much reduced. It has also been generally recognized that educational methods to this end need to be supplemented by legislative powers. This would appear to be indicated also under our conditions, but whether such powers should be exercised by the Department of Agriculture directly through its officials, or be delegated to the municipalities of organized districts, is a matter for further consideration.

WORK IN THE KOOTENAYS.

Reference was made in the last annual report to a trouble of Lambert cherries in which the fruit remained small and never ripened normally. The symptoms suggested that a nutritional deficiency might be a factor in producing this condition, and an experiment with certain of the minor elements was planned in conjunction with Mr. E. C. Hunt. Soil applications of boric acid, copper sulphate, and magnesium sulphate were made in the fall of 1936 in a block of affected Lamberts at Willow Point in three replications. No appreciable improvement at picking-time, however, could be observed as a result of any of these applications.

Mention has been made in previous reports of the presence of a mosaic ("mottle-leaf") disease of sweet cherries, the virus character of which was definitely established by Dr. McLarty. The only method of transmitting the disease known at present is by budding or grafting infected material on to healthy plants, but that some other means of spread exists in nature, probably through the agency of insects, was clearly shown in a cherry orchard at Boswell. Here a definitely infected tree was found three years or more ago and its removal recommended. Owing to a change of ownership, however, nothing was done. This summer one adjacent tree is as badly affected as the one originally condemned, and two others show suspicious symptoms. The difficulty in dealing with a disease of this nature is the recognition of definitely characteristic symptoms in the earlier stages. Typical mosaic can be recognized with a fair degree of certainty, but there are chlorotic conditions whose nature is not sufficiently clear to justify a recommendation to destroy a tree. There appears to be, for instance, a tendency to a chlorotic condition when trees have been severely winter-injured, as has occurred during the past two winters in the Kootenay area. An arrangement was therefore made with Dr. Newton, of the Saanichton Laboratory, for the Plant Pathologist to collect material of all suspected types of chlorosis or virus disease in cherries, together with field-notes, and send it down to Saanichton to be tested by budding on healthy seedling stock. Material was collected from Taghum, Nelson, Sunshine Bay, Mirror Lake, Crawford Bay, and Boswell, the trees being marked for future identification. The results of the inoculations should be available early in 1938 and form a basis for recommendations to growers as to what trees should be removed.

HERBARIUM.

Many specimens of wild plants, weeds, and plants suspected of being poisonous are sent in each season for determination. Such material is often very unsatisfactory from a botanical standpoint and its identification takes up an unnecessarily large amount of time which could be much lessened in many cases if a proper reference collection were available. With the transfer of the Dominion Plant Inspection Office to its new quarters, space became available for the housing of such a collection and a good beginning has been made. Plants collected by the members of the staff, together with plants sent in for identification, donations from members of the Burrard Field Naturalists' Club, and duplicates from the Vancouver City Museum, total 3,000 herbarium sheets. It is not proposed to carry the general collection much further, but it is hoped to make it as complete as possible in grasses, weeds, both native and introduced, and in all stages of development, and poisonous or suspected plants.

WEEDS.

Collecting for the herbarium gave an opportunity of studying the problem of weeds and plant introductions. The number of new species that have established themselves in the Province since the publication of Henry's Flora is considerable, while others occasionally met with at that time are now abundant and widespread.

Two factors would appear to be of special importance in bringing in new weeds: (1.) An increasing range of countries from which living plants or seeds are imported for cultivation. In this connection an interesting observation may be recorded. In visiting a farm on Lulu Island a new plant was found growing as a weed which proved to be the Virginia Meadow Beauty (*Rhexia virginica* L.), a representative of a family (Melastomaceæ) not native to British Columbia. This plant occurs in the Atlantic States from Maine southwards. The farmer in question has made a specialty of blueberries and has brought in blueberry-plants from several of these maritime States and apparently either the seeds or tubers of this plant have been brought in with them and established themselves. In this case the plant is not likely to become a pest, but it illustrates the way in which alien plants may be introduced.

(2.) The automobile. Weed-seeds imbedded in mud on the tires of an auto may be carried long distances and finally dropped where they will germinate and establish themselves on roadsides, at auto camps, etc. It seems highly probable that some of the introductions of Prairie weeds into Eastern British Columbia have come about in this way.

The following are some of the new weeds observed:—

Russian Knapweed (*Centaurea repens* L.).—This is apparently established at Cawston in the Similkameen, but over what area has not been ascertained. Professor John Davidson also has a plant, sent in from Barnhart Vale. This composite has the general habit of the knapweeds, but with rather small heads, ⅜ to ½ inch diameter, flowers lilac in colour, and the outer scales of the head entire. The most distinctive feature, however, is the strong brown to black, creeping root-stock which puts the plant as a weed in the same class as perennial sow-thistle or Canada thistle. In California it is stated to be one of the "major noxious weeds. It has now become well established throughout the warmer sections of the State, being a serious menace in cultivated fields, in orchards, and along roadsides and ditch banks." (Monthly Bull., Cal. Dept. of Agr., Oct., 1931.) This weed is a native of southern Russia and is said to have been introduced into the United States in Turkestan alfalfa-seed. How it came into British Columbia has not been ascertained. It is possible that climatic conditions may prevent its spread in British Columbia, except in the hotter areas, but in view of its record in California and Colorado it is highly desirable that measures be taken to prevent its further spread and, if possible, eradicate it.

Spotted Knapweed (*Centaurea maculosa* Lam.).—This is a tap-rooted biennial, the root being much of the same order as a medium-sized dock. The whole plant is greyish-green in appearance due to a dense covering of short hairs. The leaves are cut into narrow divisions. The flower-heads are bright purplish or dark pink and the scales of the head are dark-tipped, giving a spotted appearance to the head. This weed and the next have taken possession of many acres of neglected orchard at Bonnington Falls and are abundant on the roadsides there, as well as scattered at various points in the Kootenay Lake region.

Forked Catchfly (*Silene dichotoma* Ehrh.).—This has the general habit of a cockle or catchfly, but the inflorescence forks into two similar branches with a flower in the fork, the

process being usually repeated. The flowers are rather small, almost sessile, and arranged in a somewhat one-sided way up the stem. The calyx has ten conspicuous green ribs. The flowers and seed-pods are much like those of night-flowering catchfly, but smaller and with fewer seeds; on the other hand, they are much more numerous. The plant appears to be a winter annual or biennial. The centre of infestation of this weed also appears to be around Bonnington, but, like the last, was noticed at various points from Robson to Kaslo.

Gout or Biship's Weed (*Ægopodium Podograria* L.).—A variegated form of this umbelliferous plant is sometimes grown by incautious gardeners, usually to their lasting regret. The common form of the plant has been noticed at several points in Grandview, Vancouver, forming large patches by the roadside and on vacant lots. Judging by the way the fleshy creeping root-stocks take possession of the ground it would seem to have the possibilities of a serious agricultural weed. As it is fruiting by the roadside it will probably be spread by automobiles.

Sand Plantain (*Plantago arenaria* W. & K.).—This is a bushy annual, a foot or so high, with narrow linear leaves and a much-branched stem, each branch ending in a small head of typical plantain flowers. A patch of two or three hundred plants was found by the roadside near Jericho Golf Links, Vancouver. The seeds are one source of the *Psyllium* seed now extensively sold as a laxative and it would appear that this introduction had a therapeutic origin. The plant is an established weed in the Central States and it was noticed that the patch in question produced an abundance of ripe seed.

Creeping Yellow Watercress (*Radicula sylvestris* (L.) Druce).—This has become a great pest, especially in gardens in the Vancouver area and has been sent in from as far east as Salmon Arm. The creeping root-stocks are very brittle and difficult to remove in their entirety.

The above are all introduced weeds. Of native species it is to be noted that of numerous collections of supposed broad-leaved dock (*Rumex obtusifolius* L.), the great majority proved on closer examination to be the native western dock (*R. occidentalis* Wats.). This was true even in the Kootenays.

On Vancouver Island, the annual burnet (*Sanguisorba annua* Nutt.) is reported as quite a troublesome weed in grain-fields.

RECOMMENDATIONS.

(1.) It is highly important that a farmer should be able to recognize the various weeds. This does not mean that he should necessarily know their botanical name, but he should be able to notice a new arrival on his farm in order that he may have it identified and obtain information as to its nature and the possibility of its becoming a serious pest.

(2.) We have an efficient quarantine service to safeguard against the introduction of pests and diseases, but the wise grower, who knows the limitation of even the best inspection service, grows his imported plants in isolation or at least under observation until he is satisfied they are not likely to prove a source of danger to his other stock. In the same way a farmer growing a crop from seeds or plants from an outside source would do well to keep a careful watch for alien weeds. Such plants often appear first in small numbers and if recognized there is a chance of getting rid of them before they are established.

(3.) The Provincial Government allots a fund to deal with outbreaks of new diseases or pests so as to check their spread at the outset. It is worth considering means for extension to include dangerous new weeds; e.g., the Russian knapweed mentioned above. While weeds are not so completely destructive to crops as a disease or an insect pest may be, the prospect of eradication, if measures are taken in the early stages, should be much better.

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

BUNT OR STINKING-SMUT INVESTIGATION.

The varietal resistance and yield of different varieties of winter wheat to soil-borne infection of bunt at Armstrong in 1937 is shown in Table 1.

Albit x Hohenheimer, Hohenheimer x White Odessa 130 and 135, Hybrid 128 x White Odessa, Hymar, Rex, Triplet x White Odessa, White Odessa x Hard Federation, and White Odessa x Dickkoff were very resistant to smut inoculum collected in the Okanagan Valley.

Hussar and Oro, previously very resistant for many years, had 8.7 and 6.3 per cent. bunt, respectively. The fact that the variety Relief is heavily infected indicates that a new physiological form of bunt has appeared in the Northern Okanagan. This information has been given to the officials at Pullman, Washington, who specialize in studies on physiological forms of bunt.

Table 1.—Varietal Resistance and Yield of Different Varieties of Winter Wheat to Soil-borne Infection of Bunt at Armstrong in 1937.

Variety.	Bunt. Per Cent.	Yield in Bushels per Acre.
Albit x Hohenheimer	Slight	31.8
Hohenheimer x White Odessa 130	0.0	49.9
Hohenheimer x White Odessa 135	1.5	39.6
Hybrid 128 x White Odessa	Slight	38.9
Hymar	Slight	50.7
Relief	61.2	21.6
Rex	Slight	52.5
Ridit x Utah Kanred	5.5	45.3
Rio	33.7	33.7
Triplet x White Odessa	Slight	52.9
White Odessa x Hard Federation	Slight	44.9
White Odessa x Heilz Dickkoff	Slight	36.4
White Odessa x Hohenheimer	11.4	45.9
Hussar	8.7	46.2
Oro	6.3	46.3
Yogo	29.8	36.8

"Slight" includes anything less than 1 per cent. Infection of this order was not accurately determined.

BUNT SITUATION IN THE OKANAGAN VALLEY.

Infection of winter wheat by soil-borne smut spores takes place in the Northern Okanagan and is largely responsible for the smutty crop of 1937 and other years. Contamination or infection of winter wheat by bunt can take place in two ways: (1) Seed contamination. (2) Smut-contaminated soil from spores of the smut fungus scattered on the soil during threshing operations. Thorough seed treatment by chemicals has been very effective in the control of smut from seed contamination, but has had only a slightly beneficial effect in reducing the percentage of smut when winter wheat is planted in smut-contaminated soil.

Strict adherence to the following practices has been found to be helpful in reducing smut losses in the Northern Okanagan:—

(1.) Seed treatment with Ceresan, copper carbonate 50 per cent., and Leytosan gave less smut than with formaldehyde.

(2.) Early seeding when the temperature from the day the wheat is seeded until it reaches the surface of the soil is above 55° F. reduces the amount of smut. Seeding in August or even in the first two weeks of September gives better control than seeding from September 15th to October 15th.

(3.) Late seeding after October 15th tends to reduce the amount of smut.

(4.) Delayed seeding three to four weeks after the first heavy fall rains lessens the danger from smut.

(5.) Seeding before threshing-time in the valley gives practically complete control.

(6.) Spring wheat is not infected by soil-borne smut. Chemically treating spring wheat gives complete control.

(7.) Growing resistant varieties of winter wheat offers a hopeful measure of control. The following varieties have been found to be fairly resistant and have yielded well for a number of years at Armstrong: Ridit, Oro, Hussar, White Odessa, and Jenkins x Ridit. Although these varieties have been fairly resistant up to the present, they will eventually become smutty and will have to be replaced by other varieties now on trial. Seed of the resistant varieties can be obtained through Mr. H. H. Evans, District Agriculturist, Courthouse, Vernon.

SNAPDRAGON-RUST (*Puccinia antirrhini* D. & H.).

This severe disease of a popular ornamental plant has also caused serious loss to seed-growers. Work on its control has been carried on for the past three years and a scientific paper has been prepared for publication.

Summary.

(1.) Copper sprays are more effective than sulphur in the control of snapdragon-rust in the coastal areas of British Columbia.

(2.) Bordeaux 4–4–40 plus a spreader, agral 2, lethelate, or penetrol is an effective preventive of rust in snapdragons grown for seed.

(3.) Only two applications of Bordeaux plus a spreader were necessary in 1936 and 1937 to protect the seed-crop.

(4.) Spraying after the flowers have begun to bloom is not necessary in the case of plants grown for seed.

(5.) Spreaders, agral 2, lethelate, and penetrol improve the efficacy of Bordeaux.

(6.) The following copper sprays plus agral 2 gave sufficient protection from rust on snapdragons grown for seed to warrant their trial on ornamental snapdragons: Bouisol, 1 pint to 10 gallons of water; Bordinette, 1 lb. to 10 gallons of water; copper hydro, 1 lb. to 10 gallons of water; and Burgundy, 4–5–40.

(7.) Burning of volunteer and other snapdragon plants before the spring since 1933 may account for the late appearance of rust in 1934 to 1937, inclusive.

CRACKING OF CHERRIES BY RAIN.

In view of the heavy losses sustained by growers in 1936 and field observations indicating that this loss was much less in certain cases where Bordeaux mixture had been applied to the fruit to control brown-rot, some work was undertaken on this problem. The following table summarizes the results of one series of tests:—

VARIETY—BING.

Treatment.	Per Cent. Cracked after Immersion for Eight Hours in Water.
Check, no treatment	71.5
Bordeaux 2–3–40, 2 weeks after calyx	25.5
Bordeaux 2–3–40, 4 weeks after calyx	33.0
Bordeaux 2–3–40, 6 weeks after calyx	25.0
Bordeaux 2–3–40, 8 weeks after calyx	46.0
Bordeaux 2–3–40, July 8th	54.0
Bordeaux + agral 2, July 8th	36.5
Gum arabic, 1 lb. to 10 gals. water	57.5
Bordinette	68.0
Copper hydro	45.5

In spite of the irregularities in the results it seems clear that Bordeaux mixture protects the fruit against splitting to an appreciable extent. The difficulty is that even a 2–3–40 strength applied five weeks before picking leaves a residue which necessitates wiping the fruit at picking-time. The search for substances which will exercise a similar influence without leaving a deposit has, so far, not been successful.

SOIL STERILIZATION.

This is now extensively employed by greenhouse-owners and a study was made of some of its effects on plant-growth. Tomato seedlings were the plants used.

Sterilization of peat and loam together by steam appears to reduce growth (Table 1). The application of sodium nitrate, superphosphate, potassium sulphate, ammonium phosphate, phosphate and potash before or after steam sterilization with peat after, produced seedlings of approximately the same weight. Ammonium sulphate, potassium chloride, and a complete fertilizer with peat applied after steam sterilization improved seedling growth. The best growth was obtained by superphosphate before or after steaming with peat applied after, phosphate and potash before or after steaming with peat applied after, and complete fertilizer and peat applied after.

Manure applied before or after sterilizing soil by steaming, with fertilizers applied before or after, does not appear to have much effect on growth. Potassium sulphate with manure applied after steaming improved growth (Table 2).

Table 1.

Treatment.	Fertilizer applied before and Peat after Steaming.	Fertilizer and Peat applied before Steaming.	Fertilizer and Peat applied after Steaming.	Total.
	Wt. in Gms.	Wt. in Gms.	Wt. in Gms.	
No treatment	7.62	6.01	5.70	19.33
Ammonium sulphate	11.22	5.77	19.45	36.44
Sodium nitrate	9.39	4.24	8.38	22.01
Superphosphate	29.08	10.54	25.82	64.44
Potassium sulphate	9.16	5.26	10.11	24.53
Potassium chloride	5.06	5.46	7.65	18.17
Ammonium phosphate	20.53	15.20	20.43	56.16
Phosphate and potash	25.35	14.40	26.29	66.04
Complete	21.05	12.52	28.73	62.30
Lime	13.49	6.37	6.15	26.01
Totals	151.95	86.77	159.11	.....

Table 2.

Treatment.	Fertilizer applied before and Manure after.	Fertilizer and Manure applied before Steaming.	Fertilizer and Manure applied after Steaming.	Total.
	Wt. in Gms.	Wt. in Gms.	Wt. in Gms.	
No treatment	18.92	14.96	22.11	55.99
Ammonium sulphate	29.78	26.99	28.25	85.02
Sodium nitrate	28.82	26.53	23.29	78.64
Superphosphate	22.07	18.27	23.67	64.01
Potassium sulphate	20.27	19.90	30.34	70.51
Potassium chloride	19.45	13.54	16.60	49.59
Ammonium phosphate	30.00	24.07	25.68	79.75
Phosphate and potash	21.29	18.53	20.32	60.14
Complete	27.22	33.64	29.34	90.20
Lime	18.82	28.61	21.23	69.66
Totals	236.64	235.04	240.85	.....

ANTHRACNOSE OF APPLES.

The following experiments on anthracnose of apples were conducted in co-operation with Mr. E. W. White to test the efficiency of Bouisol compound compared with Bordeaux, the standard spray. Spraying was done during the first week in August.

The results, Tables 1, 2, 3, and 4, substantiate the previous two years' work, in that:—

(*a.*) Bordeaux is slightly more effective than Bouisol at the rate of 4.5 pints in 100 gallons of water.

(*b.*) Bordeaux should be used as heretofore as the main spray in commercial orchards.

(*c.*) Bouisol could be recommended to owners of a few trees.

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, 1937.

Treatment.	No. of Anthracnose Lesions.*		
	Tree 1.	Tree 2.	Total.
Check	13	35	48
Bouisol, 1.5 pints	10	15	25
Bouisol, 3.0 pints	----	5	5
Bouisol, 4.5 pints	2	3	5
Bordeaux	----	----	----

* Lesions on 25 twigs on each tree were counted.

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	204	208	412
Bouisol, 1.5 pints	101	108	209
Bouisol, 3.0 pints	38	37	75
Bouisol, 4.5 pints	33	24	57
Bordeaux	6	9	15

* Lesions on 25 twigs on each tree were counted.
† A plot consists of 5 trees.

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

Treatment.	No. of Anthracnose Lesion.*		
	Tree 1.	Tree 2.	Total.
Check	21	30	51
Bouisol, 1.5 pints	2	31	33
Bouisol, 3.0 pints	10	18	28
Bouisol, 4.5 pints	5	3	8
Bordeaux	2	2	4

* Lesions on 25 twigs on each tree were counted.

Table 4.—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	10	13	9	32
Bouisol, 1.5 pints	6	4	13	23
Bouisol, 3.0 pints	6	4	----	10
Bouisol, 4.5 pints	1	3	3	7
Bordeaux	1	5	----	6

WHEAT-MIDGE.

Midge has become a serious pest on wheat in the coastal areas of British Columbia. Nearly complete crop-failures have been reported by some of the growers recently.

More than the average amount of moisture in the months of June and July in recent years and also the using of wheat as a nurse-crop have been favourable for the operations of the midge. Wet seasons favour the midge and it carries over the winter in the wheat stubble. Little injury develops if dry weather prevails or if the wheat-field is deeply ploughed in the fall (Table 1).

Early varieties of winter wheat like Dawson's Golden Chaff, Red Rock, Forty-fold, O.A.C. 104, Kharkov, and Crail Fife escapes midge damage in the experimental plots in the Cedar District this year. Even Sun, a late winter wheat, was only slightly damaged. Spring wheats, however, appeared to be very susceptible. Marquis heads were attacked 100 per cent. Further investigations on the varietal differences of spring wheats and dates of seeding should be conducted.

Table 1.—Precipitation at Nanaimo for June and July and Estimated Damage by the Wheat-midge.

Year.	June.	July.	Damage estimated.
1926	0.42	0.03	Very low.
1927	1.69	0.16	Low.
1928	1.71	0.23	Low.
1929	1.75	0.72	Low.
1930	1.39	0.05	Low.
1931	4.13	0.46	Medium.
1932	0.55	3.70	Medium.
1933	2.08	0.54	Medium.
1934	2.03	1.47	Medium.+
1935	1.40	3.54	Medium.+
1936	3.19	2.39	High.
Average for 35 years	1.45	0.85	Low.+

PUBLICATIONS.

A paper on "Resistance of Winter Wheats to Hessian Fly," by W. R. Foster and C. E. Jefferies, was published in Canadian Journal of Research for 1937, and one on "Cracking of Cherries," by W. R. Foster, in Scientific Agriculture, 1937. Field Crop Circular No. 10 on Cereal Smuts was revised and several articles contributed to the press.

REPORT OF PROVINCIAL ENTOMOLOGIST.

MAX H. RUHMANN, B.A., ENTOMOLOGIST.

Collaboration with other branches of the Department of Agriculture, when entomological problems occur in their work, provides much activity for officials of the Entomological Branch. Identifications are made of specimens submitted, control measures are recommended, and, when necessary, investigations are made and control studies undertaken. Spray tests and experimental sprays are applied by the Horticultural Branch, which has the equipment and personnel to undertake this work.

EXTENSION-WORK.

The major activity of this Branch is extension-work, which entails the identification of insects and other arthropods submitted by the general public. Such information as may be of interest is given and, when necessary, control measures are recommended. Inquiries in this group are received from fruit-growers, general farmers, truck-crop growers, householders, and school classes. As a result of inquiries from fruit-growers and farmers it is

frequently necessary to make an examination of the conditions in field or orchard to ascertain the actual cause of the injury complained of, which is sometimes due to other insects than those submitted, or perhaps due to pathological or physiological conditions. Investigations are therefore necessary so that definite recommendations may be given. A constant watch is kept on the prevalence and distribution of economic insects so that possible epidemics may be foreseen.

FUMIGATION.

In cases where homes, warehouses, or other buildings require fumigation with hydrocyanic-acid gas in the Interior the work is undertaken by this Branch when no qualified commercial fumigator is available. The dangerous nature of this gas makes it essential that no inexperienced person be permitted to fumigate with it.

The conditions required when this work is undertaken by this Branch is that the applicant shall prepare the building for fumigation according to the instructions given. He shall also provide the fumigating materials and the necessary containers. The fumigation is applied by the official of this Branch. He also attends to the proper sealing of the building while fumigation is in progress, and opens the building at the completion of the process and attends to the disposal of the residue. Special trips are not made for the purpose of fumigating, and no charge is made for the work.

ENTOMOLOGICAL COLLECTION.

An entomological collection is maintained which is housed in the general office of this Branch in the Court-house at Vernon. The collection consists of many thousands of specimens which are stored in cabinets and Schmidt boxes. It contains a large proportion of economic forms which are required for reference. The collection is open to public inspection, and many visitors avail themselves of the opportunity of examining the collection.

LABORATORY-WORK.

The laboratory-work consists of the identification of specimens, the preparation and mounting of specimens for the collection, and the preparation of economic material for exhibition purposes.

Laboratory tests are made of spray materials to study effects on insects and foliage.

A stock of chemicals is maintained for the preservation of specimens, general experimental work, photographic work, and the preparation of special formulæ for other branches of the Department when required.

The laboratory is equipped with a photographic dark-room for the preparation of photographic records.

For several years, at the request of the Provincial Apiarist, this office has undertaken the microscopical examination of smears from diseased brood-combs for the determination of foul-brood for Interior bee-keepers; this is to facilitate early determination.

OFFICE-WORK.

General correspondence and library-work. Miss C. M. Bigland also assists the Horticultural Office with stenographic work during the busy season and produces all the mimeographic work for the local offices of the Department of Agriculture.

THE MORE IMPORTANT ENTOMOLOGICAL RECORDS.

Apple Aphis (Aphis pomi) was much in evidence early in the year in all Okanagan fruit sections.

Green Peach Aphis (Aphis (Myzus persicæ)) was quite abundant in the Oliver District.

Black Cherry Aphis (Myzus cerasi) was more abundant than usual in the Southern Okanagan.

Codling-moth (Carpocapsa pomonella).—Increase was noted in the Coldstream section. Other infested areas of the Okanagan showed an increase of late injury from the second brood which continued active over a longer period than usual due to warm temperatures continuing until the end of September.

Tarnished Plant-bug (Lygus pratensis).—Practically no injury was noted this year in the orchards from this insect.

European Red-mite (Paratetranychus pilosus).—A considerable reduction was noted for this mite in all districts.

Pear-leaf Blister-mite (Eriophyes pyri).—A general increase of this insect was noted on apple-trees. This mite is easily controlled. Growers are apt to allow this mite to increase considerably in their orchards before applying control measures.

Oyster-shell Scale (Lepidosaphes ulmi).—A general increase of this pest is noted, and growers are urged to apply a dormant spray this winter to reduce infestation.

European Fruit-scale (Aspidiotus ostræaformis) is particularly prevalent in Keremeos orchards and requires attention.

San Jose Scale (Aspidiotus perniciosus) are still being found in the Keremeos-Cawston area. Specimens were also received from Kaslo; this is a redevelopment of the 1933 outbreak. The scale appears to be well established in this isolated fruit area. The first appearance of this scale in the Kaslo orchards was about 1910 and this district was again under quarantine during 1924 to 1927. Presumably the original infestation was introduced with nursery stock about thirty years ago.

Pear-thrips (Tæniothrips inconsequens) at Kelowna was considerably reduced through effective spraying.

Fruit-tree Leaf-roller (Cacœcia argyrospila).—A decided increase of this pest is noted and many growers are taking steps to reduce the infestation with a dormant spray.

Oblique-banded Leaf-roller (Cacœcia rosaceana).—A decided increase is also noted of this insect and should receive attention.

Lilac Leaf-miner (Gracilaria sp.)—A severe outbreak of this tiny moth caused the browning of over 50 per cent. of the leaves of many lilac hedges and bushes in Vernon.

Corn-ear Worm (Heliothis obsoleta).—This moth caused considerable injury to feed-corn at Grand Forks. It was reported in the Kamloops District as well this year.

Colorado Potato-beetle (Leptinotarsa decimlineata).—Work on this insect at Grand Forks was in collaboration with Mr. G. L. Landon, District Agriculturist.

The Colorado potato-beetle was first reported in British Columbia potato-fields in the East Kootenay District in the year 1922. The Provincial Department of Agriculture took immediate steps to prevent the spread of this pest to other parts of the Province and considerable success has been achieved in control. However, in July of this year, it was reported that potato-beetles had been found in the Grand Forks District in West Kootenay and one or two settlers also reported that they had found beetles on their potatoes in 1936 in the vicinity of Grand Forks.

It was found that the infestation, although light, was scattered over an area of about 3½ miles from east to west and about half a mile in width. The infested plots were treated with calcium-arsenate dust; however, this scattered poison was not found to be effective in controlling the adult beetles which commenced to emerge on July 25th and collecting of the beetles was undertaken. A total of about 800 beetles were collected from twelve potato plots. These beetles were all destroyed. The total crop of potatoes in the Grand Forks District this year was approximately 300 acres.

The farmers in this district have been fully informed of the economic loss that would be occasioned by the spread of the Colorado potato-beetle and preparations have been made for a careful watch over the potato-fields in that district next year.

A few potato-beetles were also found in the vicinity of Thrums and Salmo in the West Kootenay. It is believed that they have been brought in unintentionally through the movement of automobiles and trucks coming into British Columbia from the neighbouring States. The work undertaken this year in the West Kootenay, as well as in the East Kootenay, will be continued in 1938.

Wheat-midge (Thecodiplosis mosellana).—No further report was received of injury by this insect in the Okanagan. In Vancouver Island, Mr. W. R. Foster, Assistant Plant Pathologist, is making an intensive study of this insect and also of the Hessian fly, both of which are of great economic importance on Vancouver Island and in the coastal districts of the Mainland.

Locusts.—The work on the control of the grasshopper outbreak in the Province was conducted by various officials of the Department of Agriculture in collaboration with the Dominion Entomological Branch. Control measures adopted in the Boundary District have been reported by Mr. G. L. Landon.

REPORT OF PROVINCIAL APIARIST.

A. W. FINLAY, PROVINCIAL APIARIST.

Colony losses during the winter ranged from 25 per cent. in the Fraser Valley to 40 per cent. in the greater part of the Okanagan. The heavy mortality in the latter district was not entirely due to unfavourable weather conditions, being chiefly the effects of arsenical-spray poisoning suffered the previous late summer when poisoned pollen curtailed or stopped late-brood rearing so that colonies went into winter weak or with old bees. Increased spraying of fruit-trees in the orchard districts has entirely wiped out many of the small apiaries and caused the commercial apiarists to move most of their bees to other locations.

Winter losses on the Lower Mainland and Coast districts were increased through unfavourable spring weather. April was wet and cold with only the first few days of May warm enough to enable bees to gather nectar. Brood-rearing increased rapidly at this time, but almost ceased again by the end of the month, except where bee-keepers supplemented hive stores by feeding.

June in the Interior was favourable to the bees, enabling well-wintered colonies and package bees to rapidly build up to storing-strength. Fine weather during July and the first week in August contributed to a steady honey-flow that in the aggregate produced a better than average crop in spite of spring handicaps. The Lower Mainland, Fraser Valley, and Vancouver Island also produced a fair to good honey-crop, though slightly below earlier estimates as the flow ceased abruptly the first week in August instead of tapering off as usual. The total honey-crop for the Province is estimated at 1,424,725 lb., an increase of 295,000 lb. over that of 1936. The quality is excellent this season, and grades high in colour, flavour, and density.

THE HONEY MARKET.

The annual production of honey in this Province, though steadily increasing, does not keep pace with consumption by about 30 per cent., the balance being imported from other Provinces. The lower price of imported honey brings it into direct competition with the local product and, to a great extent, fixes the price paid the British Columbia producer.

The cost of transportation from distant points of production would appear to be sufficient protection for the local bee-keepers to meet competition on the home market, but such is not the case, as it costs almost as much to ship honey from the major producing districts of the Okanagan and Kootenay Valleys to the Vancouver market as it does from Ontario (via water-carrier freight) to the same market. Quotation of Ontario honey prices has for many years been used by Vancouver buyers to cut prices paid to British Columbia bee-keepers. The consumer preference for British Columbia honey, accountable only to superior quality, has helped preserve a fair price to the producer of from 1 to 3 cents a pound over imported honey, which, in view of greater costs of production, has enabled our bee-keepers to carry on their industry.

Many of our commercial honey-producers are now greatly concerned over a new situation that has recently arisen to threaten their industry. The barrier of transportation costs of honey from the Prairie Provinces has been lowered by the action of the Board of Railway Commissioners for Canada in granting special freight-rate privileges on honey shipped to the Vancouver market from points as far east as Winnipeg. The reduction of approximately $200 on a 50,000-lb. car enables Manitoba bee-keepers to more than meet the cheap water rate from Toronto to Vancouver via Panama, enjoyed by Ontario bee-keepers, as honey shipped by water has to be insured and includes dockage and handling charges. This allows for a situation where cheaply produced Prairie honey will compete on the Vancouver market with Ontario's surplus, and with a total disregard for the interests of British Columbia bee-keepers. Large quantities of Manitoba and Alberta honey have already appeared in the stores, and though the wholesale price of British Columbia honey has not yet been reduced there is no doubt it will shortly have to meet the competition of lower prices, possibly to the extent where it can no longer be produced economically in some localities, with a consequent depression in what has been a steadily increasing industry.

FIELD-WORK.

Following the usual policy of checking over apiaries in which disease had appeared the previous season, opportunity was afforded by a few days of fine weather in March to do this work. A number of affected colonies were found and destroyed. This early work again proved of special value in eliminating potential sources of infection by destroying odd diseased colonies that had died during winter.

District Inspectors were unable to make much progress in systematic apiary inspection during the early part of the season owing to unfavourable weather conditions. The work in May was, therefore, chiefly confined to the examination of apiaries where disease had appeared the previous season and to requests for inspection requiring a permit to move bees to another location. The value of early inspection, even during weather that would suggest the opening of hives to be detrimental to normal colonies, is of considerable importance, as colonies are often found at this time either dead or weakened through disease to the point where such would be an immediate menace to adjacent apiaries, or other colonies in the same apiary, as soon as conditions were suitable for general bee-flight. The elimination of such odd colonies at this time undoubtedly prevents the spread of contagious diseases as much as double the work done for this purpose during the later summer months. The results obtained by following the policy of early inspection over a number of years in the reduction of the percentage of diseased colonies in affected areas show clearly the necessity of making the annual appointments of District Inspectors as early as possible each season.

Some minor changes were made in outlining the territories covered by District Inspectors to meet changed conditions. Where certain areas had been almost or entirely cleaned up, only a limited check-up was made and the Inspector's work extended into new territory not previously systematically examined.

It is pleasing to report that the outbreak of American foul-brood on Vancouver Island is now practically cleaned up. Considerably less disease appeared in the Kootenay districts, and South Okanagan is again almost free from disease. Concentration of disease appears naturally where bee-keepers are closest together and will, therefore, require particular attention to keep under control.

Much good work is done by the attendance of Apiary Inspectors at the field meetings held in such districts by the associated bee-keepers where they have an opportunity to demonstrate the diagnosis and treatment of disease and obtain the co-operation of the bee-keepers in carrying out this work. 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	197	1,782	34	20
J. F. Roberts	Okanagan	253	1,856	183	—
H. L. Johnson	Chilliwack-Sumas	251	1,049	48	12
E. R. Freeman	Lower Fraser	393	1,871	199	11
W. J. H. Dicks	Greater Vancouver	313	1,046	75	—
J. Gillespie	Vancouver Island	70	342	5	12
J. A. Smith	South Okanagan	8	56	4	—
Totals, 1937		1,485	8,002	548	55
Totals, 1936		1,090	6,558	429	72

The annual visit of your Provincial Apiarist to districts where no resident Apiary Inspector was employed was carried out as usual with the co-operation of the various District Representatives of the Department. A reduction in the percentage of disease in the Creston area is due to the assistance of Field Inspector C. B. Twigg, who personally checked over apiaries found affected the previous season. A few diseased colonies were found in the Nelson District, but an examination of the adjacent territory as far as Brilliant, in company with District Horticulturist E. C. Hunt, showed this area apparently clean. The Grand Forks District was examined with the assistance of G. L. Landon, District Agriculturist, and found free from disease outside the Doukhobor settlement, but a large percentage of the colonies in the villages were found affected, including equipment in some villages where the bees had died out. Under the Doukhobor system of bee-keeping, where the care of apiaries is a com-

munity instead of an individual responsibility, little progress can be made in eliminating disease by educational methods, and the efforts of the District Representative are best confined to the protection of clean areas by burning all diseased material found adjacent to them.

An effort was made this season to check up on the number of registered apiaries that were no longer in existence and of which no notice of cancellation had been made. The comparatively large percentage of such discovered in one small district clearly indicates the necessity of an amendment to the regulations concerning the registration of apiaries, that would include annual registration in place of the present form. A report on this subject has been presented to the Department for consideration.

OFFICE WORK.

Eight hundred and seventy letters were received and 990 sent out. The list of registered apiaries was increased by 339 applications while 123 cancellations were recorded for 1937. Microscopic examination of 188 smears and samples of diseased brood-combs were made and reports of bacterial diagnosis sent out, with instructions for treatment, where necessary.

Other office-work consisted of supervision of Inspectors' reports, departmental reports, and interviews with visiting bee-keepers. Annual statistics of apiaries, hives, and honey-crop are based largely on reports received from registered bee-keepers and the observations of Inspectors in the field.

EXHIBITIONS AND FALL FAIRS.

Exhibits of honey and apiary products have been for many years a prominent feature at the larger fall fairs of the Province. The 1937 honey exhibits at the Vancouver Exhibition excelled all previous exhibits at this fair by a wide margin, both in the number of competitive entries, quality of honey, and space occupied. The commercial displays were of excellent artistic design and the quality of the products of a general high standard. The number of entries was 149, exceeding the record of the previous year by thirty-nine. An encouraging feature was the interest shown in competitive exhibits of honey, as indicated by the appearance of many new names of exhibitors whose initial entries succeeded in obtaining a fair proportion of the awards even in the larger commercial displays.

The exhibits in the honey section at the Victoria Exhibition were outstanding in quality, grading No. 1 or better for all entries. Lack of suitable space in the Agricultural Building necessitated the staging of an excellent commercial display in the Industrial Building. Competition was very keen in the larger classes where most of the honey displayed was from the Cowichan Lake district.

MEETINGS.

Lantern lectures and addresses were given on various phases of bee-keeping, by request, at several of the winter meetings of the British Columbia Honey Producers' Association. Summer field meetings were attended and demonstrations in practical bee-keeping given at various points in Vancouver and the Fraser Valley.

REPORT OF THE LIVE STOCK BRANCH.

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

Pastures suffered from the cold, late spring weather both in the mixed-farming districts and in parts of the range country. The long dry spell in midsummer put pastures in some parts of the Province into winter very short. Northern British Columbia was somewhat drier in the summer but later had an abundance of rain which brought along growth quite rapidly, and of course harvesting was somewhat late in the northern sections. Frosts appeared generally in Northern and Central British Columbia about the end of September.

Speaking generally, however, the moisture on the range in the range country has been coming back to normal during the last few years with sloughs and lakes beginning to fill up, and there has been a general increase in moisture which has had a very desirable effect upon the mineral content of the grasses, and as a result range stock for the most part are improv-

ing in their nutrition. The winter of 1936–37, although somewhat severe, did not seem to kill out so much alfalfa in the range country, and some work started with the assistance of the Field Crops Commissioner on alfalfa-killing with the use of Ladak alfalfa seems to indicate that this variety would be quite a factor in reducing the loss from this cause.

Conditions on Vancouver Island, the Gulf Islands, and the Lower Mainland were reasonably normal this year. Severe weather early in the autumn forced a lot of cattle into feed-lots and down on to winter pastures in the range country, but December came along mild and cattle went back on range again until well on towards the end of the month. Winter ranges with this extra grazing will as a consequence be heavily overgrazed to come into the spring of 1938.

LIVE-STOCK CONDITIONS.

Cattlemen might be said to have had a very good year when compared to the last few years. The opening-up of the United States market left a place for surplus cattle and prevented a glutting of our Coast markets. United States buyers were in the field making direct purchases. With the United States quota practically filled in November the prices showed a definite decline and the market became crowded with surplus cattle, for the most part the plainer stuff. The number of choice cattle available from the Prairies has been somewhat limited this year due to another drought-year in that part of the country. Thousands of head from the Prairies have gone to the United States and to the Eastern Canadian markets. Most of these cattle have gone into the feed-lots and will reach our market as grain-feds next spring, which would indicate the advisability of our British Columbia feeders trying to market before these cattle begin to move.

Many American feeders throughout the middle States who ordinarily feed swine could not secure enough feeder hogs and have purchased feeder cattle which would tend to further fill up the spring market for grain-fed beef. Many cattle-finishers purchased feeder cattle at quite a high price and cannot possibly hope to make a profit on their investment. The Prairie generally is down considerably in the cattle in feed-lots and even the Province of Alberta has at least one-third fewer cattle on feed. Manitoba, however, has more than usual. With the outlook as it is for cheap cattle in Ontario and the East this year there is the possibility that some of these Manitoba grain-feds might reach our Coast market, but transportation charges being proportionately high would help our local feeders somewhat.

With so many low-price years ranchers have not been moving to market their usual number of she-stock with the result that this year with prices improved a somewhat large number of these surplus females have been put on the market.

During the year the stockmen in the country adjacent to Williams Lake formed themselves into an Association known as "The Cariboo Stockmen's Association," and retained a representative at the stockyards, Fraser Street, Vancouver. They have worked faithfully to assist all classes of stockmen throughout the country. Up until recently they have been able to place with the packers in Vancouver and on the American market all of the stock that has been shipped in by their members. However, now with the quota filled and with the market slow and the packers not anxious for cattle, the Association is faced with the problem of trying to satisfy its members.

Calf and lamp crops have been quite up to normal, due somewhat to improved range conditions as mentioned previously and to quite an extent to better feeding and management, in line with work being done by this Branch, particularly along the line of mineralization and attention to malnutrition conditions. Lamb prices have been quite good, somewhat in line with beef prices, and wool-marketings have been higher this year than a few years ago. Stockmen in Northern British Columbia in the Bulkley and Nechako Valleys have sent more live stock than usual to market. James Travis, District Agriculturist at Prince George, reports twenty-six car-loads of cattle and one car-load of lambs shipped to Prince Rupert and forty car-loads of cattle to Vancouver. Mr. Travis reports 25 per cent. more cows being milked in the Prince George District. Mr. Donald Sutherland, District Agriculturist at Kamloops, reports that the work of the local creamery manager has definitely increased the dairy industry in the Kamloops District. From every part of the Province comes a definite increase in interest in horse-breeding. Mr. H. E. Waby, District Agriculturist at Salmon Arm, reports a definite improvement in dairy cattle, due to the work of this Branch in the field of nutrition. Personal observations made by your Commissioner would go to support

Mr. Waby's contention that there is a distinct improvement in the condition of the cattle in that area. Much credit is due Mr. Waby for the very excellent follow-up work he has given to this educational campaign. Mr. Shirley Preston, District Agriculturist at Smithers, reports definite improvement in nutrition throughout his district as a result of our work.

Conditions in the field of the swine industry might be said to be gradually improving with more and better sows going to the farms and more farmers keeping one or two brood-sows, which is along the line of the programme we have in mind for the improvement of the industry. There are very few farms but what can profitably handle at least one brood-sow. This change in policy on the part of the farmers is distinctly in evidence throughout the North Okanagan. Car-loads are going out from many of these districts to the outside market where this was unknown a few years ago.

The problem that we are faced with at the present time is to take care of the work coming out of this policy. Many of these farmers require guidance, especially in the problem of disease which is so prevalent to-day amongst swine—conditions that did not exist a few short years ago when some of these men may have been interested in swine-breeding. Your Commissioner has been called upon to give more assistance to the industry than ever before, and everywhere it is evident that stockmen are coming to the realization that with the uncertainty of markets and commodity prices, modified not only by conditions from within the Province and from within the Dominion but as well by general world conditions, they must give consideration to improvement in their production methods. The reception given your Commissioner in the work under way and the work being undertaken is evidence of the fact that stockmen and farmers in general realize the place that science plays in live-stock and agricultural production. It is further evidence of the fact that they realize old-time methods must be replaced by improved practices. Stockmen, too, are becoming awake to the fact that as the country gets older, as the live-stock population becomes denser, and as interchange of live stock becomes more common, their problems are definitely increasing, and as a consequence they are looking to this Department for assistance and guidance. Sections of the Province which but a few years ago did not know the Department, nor had they confidence in the Department, to-day look with favour upon our suggestions and our advice.

RANGE AND FEED CONDITIONS.

As pointed out earlier in this report, moisture on the range is greatly increased with lakes and sloughs beginning to fill up again. Heavier rainfall throughout the summer season for the last few years has seemed to strengthen the range somewhat. But over very large areas the range is still in a deplorable state. The series of dry seasons which obtained a few years back put the final touch to our present range situation, although, of course, the range has been on the down-grade for some years. Poor range management is very largely responsible for this state of affairs and it will continue until more stringent regulations are put into force requiring proper range protection. More and more cattle have been placed upon the range especially during the last few years when cattle prices were low and ranchers held their surplus. Some outfits with small leases adjacent to other ranchers with large leases turn out far more cattle than their small holdings can possibly support. Each year sees more and more squatters and homesteaders being allowed to locate on bits of land in the centre of the range country. In very many cases this land cannot possibly support these people, and it simply encourages them to trespass upon the legitimate range land of the old-established rancher. If these people really wished to farm there is an abundance of good land in districts largely confined to farming where they could make a living and be an asset to the country.

This Branch, co-operating with the Field Crops Branch, is working for the improvement of the ranges by reseeding and by encouraging range rotation where possible. The work of this Branch and that of the Field Crops Branch in this particular field is definitely interdependent. Your Commissioner finds in his work for live-stock improvement that fundamental to many of the rancher's troubles is the question of proper feed both winter and summer. Faulty nutrition lays the foundation for disease, and regardless of how much attention is given to the purchase of good sires ranchers cannot possibly produce choice and good cattle until the feed situation is taken care of. Work is being done in co-operation with the Field Crops Branch in the use of silage in many sections of the country where this crop was not being considered. Roots are being grown on some ranches to enable them to finish

off a few car-loads of beef each year. While the suggestions of experimentalists may be useful in correcting this situation these suggestions cannot furnish the real cure for the situation. What is needed is a reasonable reduction of the cattle population, better placings of these cattle on the range, and of course a very great deal depends upon Nature supplying more moisture to the range during critical periods of the year. Coming out of work done in the United States, our Canadian workers continue to advise rotation of grazing, and while ranchers are quite awake to the merits of this plan very few are in a position to do the necessary fencing. Only Government assistance can ever see this plan generally adopted. It is the opinion of your Commissioner that a closer check-up on what cattle are really being carried on the range is necessary, since in many sections the question of bulls of proper type in sufficient numbers as required under the "Animals Act" is being overlooked by many cattlemen.

British Columbia farmers and ranchers are quite well supplied with winter feed for their live stock. Work started some few years ago in conjunction with the Field Crops Branch with Ladak alfalfa with the problem of winter-killing in alfalfa seems to be producing some encouraging results. Some small areas planted seem to be standing up well. In addition a most interesting point came out of this work. Ladak alfalfa planted on very open, stony gravelly soil where Ontario variegated alfalfa gave only a very light growth has produced a very fine crop of more than twice the tonnage. It is hoped that further observations on this point will verify this first test.

HORSES.

The year 1937 has been one of continued interest in horse-breeding. More requests for stallions and inquiries regarding stallions and breeding stock have come to this Branch this year than for many, many years previously. Farmers' Institutes, live-stock associations, ranchers and farmers from every part of the Province are inquiring about breeding stock. Much interest in the Federal-Provincial premium policy is being shown, and it is quite evident that no assistance rendered the live-stock industry is of more worth than this policy. It definitely enables individuals or groups to purchase a stallion and take care of the financing of it through the assistance of this policy. There is a general feeling that our "Horse-breeders' Protection Act" requires certain changes to bring it in line with present-day needs. Evidence of this has come from bodies of stockmen from all over the Province, including the British Columbia Horse-breeders' Association. The strong feature of this argument, however, is the fact that it is coming from groups of practical farmers who are not personally interested in the production of registered stock.

Your Commissioner has been able to assist in the placing of several stallions and a few head of breeding females in different parts of the Province. British Columbia-bred horses were first placed, and when no more home-breds were available outside stock was located. Two young Clydesdale stallions bred in the Fraser Valley were placed in the Upper Country. "Craigie Remembrance" (27716), a 2-year-old Clydesdale sired by "Craigie Maxwell" (Imp.) (25499) and out of "Bonnie Princess" (51472), a daughter of "Music Hall" (Imp.) (27735), bred by Duncan Montgomery, of Ladner, B.C., went to Parke & Marston, of Ashcroft. This young Clydesdale has been a prominent winner wherever shown, being champion of the 1935 Vancouver Exhibition. "Sir Matthew" (27748), 2-year-old Clydesdale sired by "Maxwell's Pride," a son of "Craigie Maxwell," out of that good breeding mare "Greta" (Imp.) (51799), bred by Alex. Davie & Sons, Ladner, B.C., went to Lord Martin Cecil, of 100-Mile House. "Monarch Davie," a 2-year-old Percheron stallion sired by the "International Champion Monarch" and bred by Carl Roberts, of St. Adolphe, Manitoba, went to Mr. L. E. Merry, of Kimberley. Through the Alberta Percheron Association, "Churchill Junior," a 3-year-old Percheron stallion, went to J. Zirnhelt & Sons, 150-Mile House. Andrew McGowan purchased the Percheron stallion "Ashmont" (13340) from F. W. Jones, of Golden. A 2-year-old Clydesdale filly from the stud of A. E. Arnold, Shoal Lake, Man., "Croydon Floradora" (57768), has been placed with Arthur Parke, Buonaparte Ranching Co., Cache Creek (Ashcroft), B.C. This mare carries the cream of Clydesdale breeding, being sired by "Deanston Gallant" (24412), a grandson of the great "Bonnie Buchlyvie." Her paternal grandam is the great "Deanston Ina." She is out of the great breeding mare "Doune Lodge Rosadora," who was got by "Doune Lodge Baron Moray," son of the great "Baron of Arcola," who was the son of "Baron's Pride." "Doune Lodge Baron Moray" was out of

the famous Scottish Cawdor Cup winner, "Countess of Moray" (Imp.). This breeding should do a great deal to supplement our British Columbia Clydesdale breeding. The animals being imported have been very good winners in the strongest shows in Manitoba and this line of breeding has helped to place Manitoba high in Clydesdale classes at the Royal Winter Fair each year. Your Commissioner has personally known many of the animals in the pedigrees of these young Clydesdales and can only say that they were the best in the country at the time, and as years have passed their progeny has followed along by making good wins in the major shows.

Many sections of the farming and ranching country in British Columbia are particularly well suited to producing good horses of light agricultural and draught type and producing them economically. If farmers and ranchers would replace their light, scrubby stock with one or more good brood mares they could easily have one or more good young quality horses for sale each year. Young horses and brood mares in the hands of careful men can do the farm-work and produce or grow into money.

Clydesdales are being placed for the most part since the supply of good Belgian and Percheron stallions is very limited. Observations made seem to indicate that Clydesdales used on even the lighter range mares produce animals of draughty conformation with good bone, feet, and hair substance.

We have at the present time some forty-eight stallions enrolled in the Province. Most of the registered stallions have been inspected under the Federal-Provincial premium policy. There were four registered Belgian stallions inspected, one of which was placed in "A" classification, two in "B," and one stallion was rejected. There were eleven registered Percheron stallions, and nine head have been inspected, four of which classified "A," three "B," and two rejected. In all, there were eighteen Clydesdales, twelve of which have been inspected. Eight were classified "A," one "B," and three were rejected. Two outstanding "A" class Clydesdale stallions died during the year—namely, the fine young breeding-stallion "Maxwell's Pride," owned by Parke & Marston, of Ashcroft, B.C., and the other the imported Clydesdale stallion "Dunduff Titwood," owned by William Haslam & Son, of Nanaimo, B.C. There are enrolled some fifteen head of grade stallions and of course there are many more grade stallions in service that are not enrolled. It cannot be denied that some of these grade horses may produce a few fair foals when mated with good mares, but they nevertheless furnish the chief source of supply for our poor-quality light work-horse, a type of animal which costs more to produce than it is worth. There may have been a scarcity of quality registered stallions up to the present, but there should be an abundance of quality registered horses available within the next year or so. These scrub sires are doing more to keep good stallions out of the country than any other factor. They travel in competition with good horses and cut service fees to the place where they get a good share of the business. The average farmer is a poor judge of horses, especially stallions, and is easily influenced by the sales-talk of scrub-stallion owners. Some protection against the travelling of these inferior horses is definitely needed.

Light-horse breeding still continues to hold a prominent place. The demand is good, especially in the United States, for the big quality saddle-horses, hunters, and polo ponies. Most of the breeding of this type of horse is being done in the interior of the Province. Your Commissioner has been instrumental in placing a number of good saddle-horses. A number of good brood mares and a stallion was placed with Mr. and Mrs. Julian E. Fry, of Lac la Hache, who are laying the foundation of a stud of quality riding-horses. There is a move on the part of the horsemen about Kamloops to form a local horse club with the idea of fostering an annual spring horse sale. All types of horses will be offered, including the different light-horse types, agricultural, farm chunks, and draught horses.

BEEF CATTLE.

The beef-cattle industry might be said to have had a good year when compared to recent years. With the outlet for beef to the United States and with the Cariboo Stockmen's Association assisting in the placing of cattle on all available markets, the supplies available were quite well taken care of up until early November when the United States quota was filled and the supply of especially plain cattle was too much for the market.

Beef prices started off in midsummer with choice heavy steers selling in Vancouver during July at $7 to $7.50, with Calgary $1 higher. During August the same price obtained

for the first two weeks. The middle of the month saw this class of beef selling at from $7 to $7.25, and the last week of the month from $6.75 to $7, which was in line with Calgary. September saw prices $6.50 to $6.75 throughout and in line with Calgary prices, and the first week of October saw these same prices. In the second two weeks of October heavy steers dropped to $6 to $6.25, which, however, was 25 cents to 50 cents higher than Calgary. The first week of November saw prices from $6 to $7, which was 50 cents to $1.50 over Calgary. November and the first three weeks of December this type of cattle sold at $4 to $4.25, which was in line with Calgary prices. The last week in December saw the price $4.75 in Vancouver for heavy steers, which was 25 cents above Calgary prices.

Your Commissioner has been following the policy of dealing with the fundamental problems facing this industry. Some of these problems require the co-operation of other branches of this Department, more especially that of the Field Crops Branch. Every possible help has been received from the Field Crops Commissioner and the work of the Field Crop Union has assisted very materially. Feed supplies and range management are fundamental to success in this industry, more particularly with the bulk of our beef being produced in the range country where the feed supply, both winter and summer, is at times somewhat uncertain.

Disease is still a problem but is being dealt with under a very definite programme. Investigational work on the particular problems of the cattlemen in Central British Columbia was undertaken a few years ago, and this year your Commissioner, with the help of S. G. Preston, District Agriculturist, Smithers, investigated the question of sires in that particular country, and coming out of these observations very distinct recommendations are being made which should help materially in improving the quality of cattle coming from this area. Improvement in the sires being used by ranchers is being encouraged. The placing of sires through independent purchasers and through the departmental policy under the Farmers' Institutes is being followed. Help was given by your Commissioner during the year in the establishment of a number of pure-bred herds in different parts of the Province. These herds should help to supply the needs of the local stockmen for sires.

It is interesting to note that during the year two quite large Shorthorn herds have been established on Vancouver Island, one a beef and dual-purpose Shorthorn herd at Westholme, Vancouver Island, by Mr. R. M. Ferguson. This was the almost complete foundation herd established some years ago by Mr. F. W. Jones, of Golden, B.C. A Bates' strain English milking Shorthorn herd has recently been established by Mr. E. M. Maber, of Saanichton, Vancouver Island.

BRANDS.

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

Shipments.—Reports showing numbers of cattle and hides shipped during the year will be completed as soon as possible after the end of the year. In hides there was again considerable activity, the number of licensed operators increasing from fifty-six in 1936 to eighty this year.

Inspection Service.—There were no changes in the organization. Provincial constables did considerable work in checking movements of stock shipped, especially horses. Particular attention has been paid by the Police to checking shipments over the Cariboo Highway, everything being carefully examined at the toll-gate at Spuzzum. Reports of stock and hides passing through are received every two weeks, enabling this office to keep closer check on shipments and brands. The Police have also carried on a great deal of investigation-work.

Prosecutions.—Convictions were secured as follows:—Defacing brands: One at Keremeos. Unlawful killing: Two, at Cranbrook and Fernie. Moving stock illegally: Two, at Kamloops and Merritt (pending). Not keeping hides three weeks: One, at Cranbrook. Dealing in hides without licence: One, at Lytton.

Brand Commissioners.—A meeting was held at Victoria on December 9th. Many suggestions for strengthening the Act and ensuring better protection for the stock industry were discussed, and these will be submitted later to the stockmen in the various districts for consideration with a view to having necessary amendments to the " Stock-brands Act " introduced at the 1938 Session.

Registrations, etc.—The number of brands recorded, renewed, etc., during 1937 was as follows:—

	Recorded.	Renewed.	Reissued.	Transferred.	Total.
Cattle-brands	173	236	58	21	488
Horse-brands	105	118	33	11	267
Totals	278	354	91	32	755

The number of licences issued was: Hide-dealers, 80; slaughter-house, 43; beef-peddlers, 6.

Cattle and hide shipments, 1937, are as follows: Cattle, 39,995; hides, 32,318 (an all-time record). Cattle are 12,016 over 1936 (27,979); hides are 7,397 over 1936 (24,921).

Summary of Cattle and Hide Shipments by Districts.

	Cattle.	Hides.
Cariboo	3,193 (up)	537 (up)
Kamloops-Nicola	3,852 (up)	1,273 (up)
Okanagan	566 (up)	112 (up)
Similkameen	478 (up)	39 (down)
South-east B.C.	1,649 (up)	2,424 (up)
Central B.C.	169 (down)	2,454 (up)
Peace River	2,447 (up)	636 (up)

DAIRY CATTLE.

The dairy industry had on the whole a somewhat better year than during 1936, with prices a trifle better for butter-fat. Uncertainty of the market in Vancouver continues to affect dairying and dairy-cattle production in the Fraser Valley. Dairying continues to be one of the major agricultural activities of the Province, centring in and around the Fraser Valley and the Okanagan Valley, especially the northern part. It is of course one of the main agricultural activities on Vancouver Island as well as on some of the smaller islands of the Gulf group. Dairying is also extending about such centres as Kamloops, Quesnel, Prince George, and at a few other points in the Province.

In the larger dairying districts the strictly dairying breeds predominate, but about some of the smaller centres a good deal of the milk is being produced from cattle of dual-purpose type, which is a very good thing for the live-stock industry in general as well as for the dairying industry. In many parts of the Province where dairying should only be looked upon from the standpoint of the production of manufacturing milk it would be well if dual cattle held a stronger position.

The market to the United States for good dairy cattle, both grade and pure-bred, has been very good this year with so many cattle having been slaughtered in the adjacent States during the last year or two. Prices ranged from $20 to $35 and $40 over prices obtained in previous years. Plainer-grade cows sold for from $50 to $60 up, and the choicer pure-bred animals went up to $400 and even $500 for the choicest of the animals. Most of the cattle went from the Fraser Valley with some from the Okanagan.

In spite of the trouble in the Orient, that market still continues to take its quota of good dairy cattle. British Columbia to-day holds the strongest place in this market in competition with all countries, which is evidence of the quality of our British Columbia dairy cattle.

While dairy cattle in British Columbia lead all Canada in average production in tested herds, there is still much work to be done with competition constantly becoming stronger from other countries where dairying is carried on. Only those dairymen who seek to obtain economical production can hope to stay in the business. Observations made over a number of years have fully convinced your Commissioner of the necessity for dairymen extending their programmes of dairy-cattle improvement to include other fundamental modifying factors in addition to cow-testing work.

From a very cursory survey made by your Commissioner of the dairy-cattle replacements throughout Canada an alarming situation was found. This survey showed replacements ranging in some districts from 5 to 8 per cent. and in others as high as 30 to 35 per cent.

Included as the most important causes for cattle being replaced was of course a group of diseases generally known as breeding-diseases which include sterility, abortion, mastitis, etc.

The other major cause for cattle being replaced is of course low production. It must be borne in mind that disease problems and faulty nutrition contribute very, very greatly to the lowering of the average production of dairy cattle. It must also be remembered that if cow-testing were more generally adopted there would be very many more animals removed from the dairy herds of this country.

Your Commissioner has endeavoured through the medium of lectures to dairymen and to groups such as Cow-testing Association Supervisors, through the press, and by means of letters, to impress upon dairymen the necessity for their dealing with these fundamentals, and the advisability of their adopting a definite policy in the general management of their herds.

The industry is faced with attacks from every angle. Public-health groups are loud in their demand for the eradication of cattle reacting to Bang's disease, which is credited with being the causal organism responsible for the so-called undulant fever of humans. When this scare was first broadcast it hit the industry very heavily, but since that time open-minded leaders within the industry have had time to survey the situation with the result that to-day it is hoped that there may be means to get around this trouble without having to resort to the drastic plan of slaughtering reactors. It is also safe to say that the danger from humans drinking milk or consuming dairy products from average herds has been greatly exaggerated. There is prominently in the field a group of workers who are loud in their demands for general blood-testing of cattle. This group secures strong support from the action taken by the people south of the Boundary-line where many cattle have been slaughtered, especially during 1935 and 1936. It is well, however, to bear in mind that the eradication of Bang's disease was not primarily the reason for the slaughter of those animals but the slaughter was carried out largely as a relief measure in order to remove surplus cattle which could not be fed at that time. The Governments of those States and the Federal Government of the United States thought best to remove reactors to Bang's organism.

Your Commissioner is of the opinion that there is a very definite place for the agglutination test in the general management of the dairy-cattle herds of this country, but that this test should not be made the pivot around which the entire industry must rotate if it is to gain a solid position. Experience to date distinctly shows that much of the increase of this trouble exists in herds where cattle from outside sources are added to already established herds. Generally speaking, additions to clean or to partially-infected established herds is sufficient in very, very many cases to start an epidemic of breeding-troubles. In herds where all additions are bred on the farm the disease does not seem to cause so much trouble. It is only in recent years when dealing in cattle has become more extensive that we find breeding-diseases so much in evidence.

If general or cumpulsory blood-testing is established as a policy throughout this country it is certain to throw a very heavy burden upon the industry and unless butter-fat prices go up the industry cannot carry on. If one is to take note of butter-fat prices over the last decade or so the prices to-day may be somewhat higher, but butter-fat prices certainly have not kept pace with the increased demands made upon the dairy-cattle industry in the way of quality and safety as required by governmental and public-health regulations, nor have these prices kept pace with other commodity prices.

The dairy-cattle industry is sorely in need of a clear-cut Provincial and country-wide policy based upon a plan destined to not only protect the health of the milk-consuming public but at the same time take care of the needs of the dairy industry.

SHEEP.

Lamb prices generally were very good. Prices the first week of January saw lamb quoted at $6.50, going up to $7 by the middle of the month and $8 by the end of the month, dropping 50 cents for February. Lambs during March brought $8 up to the 25th of the month, when they went up 25 cents and held at that fairly steadily until June 1st. The first two weeks of June saw lambs bring $10 but by the 24th they had gone down to $9.50. July 1st they brought $8.25 and at the end of the first week $8. During the balance of the month they brought $7.50 with, of course, a few very choice lambs bringing $8 or over. August saw prices range about $7.75 in Vancouver, which was $1 to $1.50 more than Calgary prices. During September and October Vancouver prices averaged about $7.75, being from 75 cents

to $1 over Calgary. The rest of the year prices held much the same, with Vancouver prices somewhat above Calgary.

While prices for lamb were quite satisfactory during 1937 the sheep industry has been somewhat at a standstill. The increase in predatory animals, chiefly coyote and bear in the range country and cougar on the Gulf Islands, has made it hard for sheepmen. The Cariboo has suffered greatly, as has some sections of the Okanagan and Boundary country; in fact, very few large bands are now being kept in all the Cariboo territory.

The dog menace still continues to be a very great problem, with the areas about Indian reserves and small towns giving continued trouble. The Provincial Police Force has given especially good co-operation this year, both in trying to locate killer dogs and in securing better information for this office. Until a better check is made, however, on the number of stray dogs running about killings will continue high, and until such time as sheepmen make some honest effort to control and care for their sheep during the night, killings will be heavy.

I am pleased to report, however, fewer killings of sheep this year. Last year there were 350 sheep killed while this year only 219 were reported. Last year there were 434 head of poultry killed and this year 178, made up as follows: Thirty-eight chickens, 129 turkeys, and eleven geese. Last year four goats were killed by dogs and this year eight head. The total compensation for 1935 was $1,096.15, a year in which prices for lamb were quite low. The 1936 compensation amounted to $2,692.05, and for 1937 the compensation for sheep was $1,400.40, for poultry $236.70, and for goats $74.50, making a total compensation for the year of $1,711.60. The *per capita* valuation this year generally was a trifle higher than in 1936 in keeping with a somewhat better price on the market for these animals, but in spite of that the cost to the Government was considerably less.

SWINE.

August was again the peak month of the year for hog prices. Prices in Calgary for butcher hogs ranged from January to almost the first of July steadily between $7.25 and $7.50, with an occasional week reaching as high as $7.85. Vancouver prices averaged during that period from about 75 cents to $1 higher.

Throughout July butcher hogs in Vancouver brought $9 to $9.25 and the last week of the month going to $9.50, which was about 50 cents above Calgary. During the first week in August butcher hogs brought $9.50 to $10, the next week $10 to $10.50, and the following week $10 to $10.25, and the last week of the month dropped to $9.50 to $10, with the monthly average about 75 cents above Calgary prices.

The first week of September in Vancouver saw butcher hogs $9 to $9.25, the second week $9.25 to $9.50, and the third week $9.50 to $9.75. On September 23rd prices for butcher hogs were from $9.75 to $10, and September 30th $9.25 to $9.50.

October saw $9 to $9.25 at the beginning of the month with $8.25 to $8.50 on October 21st, with an average of $8 obtaining through November until the end of the year.

It may be generally said that pork prices during 1937 were above the average for 1936. This better-price average may be due to a number of causes, but it is felt that scarcity of feed contributed considerably to this rise in price. It must also be borne in mind that the United States hog marketings were somewhat below normal which helped to keep up our prices.

In trying to arrive at a possible reason for our variation in prices for pork, which at times is out of line with feed prices, I believe it is well to bear in mind that Canada is a bacon-exporting country and is therefore influenced by general world price changes, and since Great Britain is the largest bacon-importing country an examination of the British market offers perhaps the best guide to our fluctuations in prices. Prices obtaining in British Columbia this year very closely reflected the prices which obtained in Great Britain. What brings about this change in prices in Great Britain is perhaps hard to explain fully, but it is the opinion of your Commissioner that it is simply a case of supply and demand. Great Britain secures most of her bacon from countries where climatic conditions favour late spring litters and this means the rush of hogs on to the market beginning with the early fall months of the year.

Our British Columbia swine-breeders must decide for themselves which is the most profitable programme for them—early spring litters, say, during March, which could reach the market during August, which has been the peak-price month for pork for some years,

or late spring and early summer litters which reach the market during the rush period in the fall. There is little doubt but that a good many swinemen try for early spring litters, but it is equally true that the losses in these litters are proportionately higher than in the later litters. This again brings us back to the argument advanced constantly by your Commissioner that swine-nutrition and general management are the largest contributing factors, and that until swinemen become real students of this subject and are able to produce larger spring litters with fewer losses and do it at no great additional cost pork will always tend to be scarce during midsummer.

It is encouraging to find that farmers are not sacrificing their breeding stock to any extent at this time and it is hoped that they will follow the practice of retaining at all times a good foundation. Swinemen, too, are taking a keen interest in better-breeding stock. It, however, is problematical whether British Columbia breeders, at least those in the Fraser Valley, can profitably adopt the extreme lean type in select bacon hogs. The Okanagan Valley can perhaps adopt this type but for the fresh-pork trade, which is the attractive market for our Fraser Valley farmers, a type of hog is being adopted of somewhat quicker-maturing qualities and in type like a top-bacon hog carrying if anything more length but inclined to be somewhat lower down.

Your Commissioner did a good deal of swine-promotional work during the year and is pleased to report that work established some few years ago in the North Okanagan has become well established and begins to look now like a permanent and profitable branch of farming in that district.

Work done in the Revelstoke area in a small way during the last two years, so well supported by Mr. H. E. Waby, is beginning to bear fruit. It is hoped that a follow-up this year will round out this work in that district.

NUTRITION AND ANIMAL HEALTH.

The problem of disease and nutrition has been briefly mentioned previously in this report when discussing particular branches of the industry but a summary is perhaps necessary.

My report for 1936 might be repeated completely and will bear review if anyone is sufficiently interested in the subject. I would like to again say that if it were possible to properly nourish the live stock of this Province at all times of the year and throughout their entire lives, even prenatally, the losses from disease and disease-like conditions would be very materially reduced. I might in fact go so far as to say that no real progress can be made in the control of many of these diseases until these fundamental modifying factors are dealt with.

The range country is not yet generally awake to the above factors since it is impossible to individually contact all ranchers in order to acquaint them of the facts. However, some very encouraging results are being secured with the help of some of the district officers. Your Commissioner has developed some real permanent interest in many districts throughout the Province and as time permits the work is being steadily extended.

One very encouraging piece of work was begun in the Meldrum Creek area a couple of years ago and has been followed up by Mr. Luyat, District Agriculturist at Williams Lake. The cattle in question were suffering from time to time with all the usual diseases such as hæmorrhagic septicæmia, coccidiosis, sterility, some abortions, retained placentas, etc. The condition came to a crisis with a number of older cows becoming paralysed prior to calving and with a high percentage of dystocia cases in young heifers in which in almost every instance calves had to be removed by force. In these cattle "knock-heel" was very prevalent and the cattle being forced to run on timber range were making no progress.

As a result of the recommendations of your Commissioner, which included some changes in management and some attention to nutrition, especially to mineralization, these particular herds had during 1936 and 1937 the best years of their history—more calves, no "doggies," stronger calves, no poor and weak cattle on the range, and for the first time in the history of the district fat cattle in June with no weak animals at that date, and in addition, what is most encouraging, they report very little evidence of "knock-heel." If further trials, which we hope to make, bear out this year's experience we may have arrived at a practical control of this very troublesome and costly problem of timber milk-vetch (*Astragalus campestris*) poisoning, which produces the condition commonly called "knock-heel," a condition which

costs in deaths and reduced efficiency literally thousands of dollars to the cattlemen of the country.

Some work in other sections along this line has been under way for some few years but the vastness of the territory and the great amount of travelling required makes it extremely difficult to examine these tests in the way that they should be checked.

Reports coming to this office just recently where attention is being given to the so-called hospital herd so common about most ranches, and which is a source of yearly loss, and where the suggestions of your Commissioner regarding management, feeding, etc., are being adopted, some very satisfactory results are being secured, and it is hoped that this weak link in the range-cattle business can be effectively dealt with in the future.

Work done by your Commissioner on sheep-diseases, especially the heavy annual loss in ewes prior to lambing, has resulted in some very satisfactory results. Ewes carrying twin lambs and being forced to limit their activities on account of snow or bad weather conditions develop a type of fatal paralysis. A good deal of field-work was done in both the range country and on the Islands with the result that to-day we are in a position to give advice which will completely prevent these losses. Where exercise is maintained with ewes carrying twin lambs during this danger period just for a few weeks prior to lambing there is rarely any trouble. Treatment has been found unsatisfactory and in discussion with workers in other countries it has been found that they got no results from treatment. It is rather interesting, however, that in dealing with a bad outbreak on the Islands your Commissioner in trying to keep up the general strength of the sick animal suggested the use of milk-drenches and in a few of these cases ewes were reported to have recovered. Nothing at the time was thought of this, however, and it was still felt that treatment was impractical. A worker just recently came forward with a suggestion that he, too, had secured some beneficial results from the use of milk-drenches. Many post-mortems conducted by your Commissioner in addition to field examinations have disclosed almost uniform symptoms of paralysis with apparently no pain and showing on post-mortem pale kidneys and decidedly modified livers, the liver showing pale and friable as though steamed and easily crushed in the hand and highly charged with fat.

Swine-diseases continue to be a very keen problem. It is difficult to spread information to all breeders of swine regarding the importance of nutrition in the breeding of hogs. No other animal is so easily affected by weakness in diet or by faulty management. Herds where disease was taking a heavy toll yearly seem to be getting along nicely by following the modified plan suggested by your Commissioner. The British Columbia Swine-breeders' Association is doing a good work in passing along data to its members and to interested swinemen regardless of whether they are members of the Association or not.

To assist stockmen generally in outlying districts a group of circulars were prepared by your Commissioner dealing with a variety of problems peculiar to our outlying live-stock areas. These circulars have been greatly appreciated by stockmen.

The field of breeding-diseases was mentioned at some length when discussing the dairy-cattle industry and will not be dealt with further here.

Some four years ago an attack was made on tuberculosis on a particular range in the cattle country where approximately 20 per cent. of the breeding herds were affected. A recent test, which was the third application on these herds, only showed approximately 3 per cent. reactors. This programme is receiving such strong support from the cattlemen that it is expected that one full range will be fully under control by next year and it is hoped that we will be in a position to completely clean this up in a very few years. Requests have come to your Commissioner for the testing of some 4,000 head of range-breeding cattle for early in the year 1938, which is the beginning of the clean-up work on another large range. All the cattlemen concerned give excellent co-operation and are pleased to accept their own losses and readily ship out all reactors marked.

The live-stock industry suffered but very few serious epidemics during 1937. Forage-poisoning in horses was quite common in many districts where their general care and management was neglected. Some quite severe outbreaks were reported from the Fraser Valley, from Pemberton Valley, and from areas on the West Coast as well as from the Okanagan and Boundary.

WARBLE-FLY AND TICK CONTROL-WORK.

It gives me a great deal of satisfaction to again be able to report very satisfactory progress in our warble-fly control-work.

A small area in the Bulkley Valley was not treated in 1937 but will again receive treatment during 1938. In the Pine View area, under the supervision of District Agriculturist James Travis, 394 cattle were treated for the second year and given three monthly treatments, and a total of 329 warbles for the three treatments were found, or an average of 0.84 warble per animal. It is evident that this area is making very satisfactory progress, for which much credit is due to the local committee of farmers and to the excellent way they are supporting and carrying out the work under Mr. Travis' direction. The work is so appreciated in the district that it is expected that this area will be enlarged for 1938.

In the district under the supervision of District Agriculturist H. E. Waby, Salmon Arm, our first area-work was undertaken in the Deep Creek area. Treatment in this area was not needed in 1937 but the farmers are co-operating fully with us and are again checking this year on any new cattle that have entered the district during the year 1937. Stockmen are most anxious to keep their district clean.

Some 2,000 head of cattle were treated in the area which extended from the end of the Deep Creek area to Sicamous, on both sides of the Shuswap River, up to Enderby and including Grindrod.

About 200 head were treated in the White Lake and Gleneden Districts.

Some 400 head were treated in the Windermere District under the supervision of the local Farmers' Institute and under the direction of Mr. Waby. Mr. Waby reports very satisfactory results with approximately 1,000 warbles only being found in the Mara-Enderby area; 1938 should practically clean up that area.

The Salmon Arm area which has been under control for a few years is also practically free of warbles but will receive a check in 1938. Mr. Waby has been in the forefront in this work for this Branch, having helped to establish the first area in the Province in the Deep Creek District. The work requires a great deal of organizing and supervision, and the actual work has to be done at a season of the year when the weather may be very trying and the roads oftentimes almost impassable.

Mr. Donald Sutherland, District Agriculturist, Kamloops, has been conducting an area about the Upper Louis Creek District where satisfactory progress is reported, and 1938 should see a complete clean-up of that district. The work about the City of Kamloops and Tranquille has never been very well organized and progress has not been satisfactory.

In the Fraser Valley very good work has been done by Mr. R. G. Sutton, District Agriculturist, New Westminster. Two areas were given treatment during 1937—the Barnston Island area, which had been treated first in 1936, and the Atchelitz area coming in for the first time in 1937. Due to very unusual weather conditions the first treatment in these areas was applied somewhat late during 1937, which no doubt will result in some more warbles than otherwise would appear being found in 1938. Two treatments were given in the Barnston Island area, one on February 24th and one on March 23rd, when 305 cattle were treated. During 1936 the first treatment showed 3.2 warbles per animal and the first treatment in 1937 showed 1.32 warbles per animal. The second treatment in 1936 showed 1.5 warbles per animal and 1937 1.13 warbles. The season being late, a third treatment was not given.

With the help of a well-organized local committee eighty-eight herds, consisting of 1,323 head of cattle, were treated in the Atchelitz area from 9.30 a.m. to 4 p.m. on March 10th. This treatment coming at this late date no second treatment was given, but in 1938 it is hoped that both these areas will be given the three regular treatments at the proper time. A request has been made to extend the Atchelitz area in 1938 which is evidence that the farmers appreciate the work. With the keen interest shown in these areas it should not be long before the entire Fraser Valley comes under control.

Work on the two ticks which affect live stock in British Columbia—namely, the so-called wood-tick (*Dermacentor andersonii*) and the winter tick (*Dermacentor albipictus*)—did not materialize on the same wide basis that was expected due to a breakdown in organization. However, a number of very fine single projects commenced during the last few years gave very fine results, and it is expected that several more extensive areas will be undertaken in 1938. The use of standardized Derris as recommended for the first time in this work by

your Commissioner as control-treatment has been giving some very satisfactory results. Some stockmen reporting on these kills report complete kills on the *albipictus* and in addition report that cattle going out on pastures badly infested with *Dermacentor andersonii*, where losses almost always occurred in previous years, now do not have any deaths.

Throughout the summer of 1937 your Commissioner spent a good deal of time in looking into these badly-infested tick areas and making arrangements for definite programmes for 1938. It is hoped the trials this coming year will include our very worst wood-tick areas where ranchers have in the past been compelled to practically keep their animals entirely off such ranges during the spring months.

The cattlemen who have been working with this Branch in this work have been directed to apply the standardized Derris chiefly about the head, neck, and shoulders, and most of these men have been applying this material while dehorning young stock and have been using this class of animal to run on these badly-infected ranges. Three years' work on some small test areas have reported 100 per cent. results.

Some work done a few years ago by your Commissioner in an area badly infested with *Dermacentor albipictus* about Heffley Creek where horses were dying from this winter-tick infestation shows complete control. Up to that time treatments suggested to these stockmen included a variety of mixtures such as different arsenicals but these applications were considered by the stockmen as only very slightly effective on the tick and very hard on the animals being treated.

This work requires a lot of organizing and preliminary educational work in order to get the work going. One great difficulty is to get a standardized Derris powder. If this can be secured a great step forward will be taken. Much data must be secured as to the activities of the tick and their appearance and development. Your Commissioner feels that if these treatments prove effective and practical an endeavour could be made to practically eliminate these pests from the range.

GENERAL.

Your Commissioner during 1937 did, if anything, more field-work than during previous years. Every part of the Province requires some direction and I am very pleased to say that farmers seem to appreciate our assistance. It is only by directing activities in many of these districts along proper lines that we can ever hope to approach efficiency.

The wide range of problems met with in the work of this Branch demands continued study of current literature. It requires frequent conferences with workers in other parts of the Dominion and with workers in the States to the south. Out of such conferences this year some very valuable material has been secured.

Requests for the help and advice of this Branch have increased to the place where it is now becoming a problem to take care of the work.

General work on Vancouver and the Gulf Islands continues to take up all the spare time of your Commissioner while in Victoria. Your Commissioner expects to undertake some specific work this spring on lamb production and to make a start on live-stock improvement at the north end of Vancouver Island. Nutritional and management work with dairy herds on the Island has taken some considerable time but is getting results.

As a member of the Feed Standards Board and of the Provincial Marketing Board your Commissioner has been called upon to spend some time. Time has been devoted to assist other branches and other departments by means of lectures and conferences.

I wish to thank the office staff for their very loyal support throughout the year and to thank the officers in the field for their help in carrying out the many programmes of work instituted by this Branch. My work during 1937 has been most interesting.

REPORT OF DAIRY BRANCH.

HENRY RIVE, B.S.A., DAIRY COMMISSIONER.

The year has been only a moderately successful one for the dairy industry of British Columbia. The spring was not propitious and the early summer was exceedingly wet and in many portions chilly. Intermittent spells of very hot weather also prevailed. Much waste and spoilage occurred with the first cuttings of clover and alfalfa throughout, due to the excessive rains. Early grains also suffered but later crops benefited by the moisture and silo mixtures yielded well. Root-crops, in general, were fairly successful.

The total dairy production for the season will be slightly below that of 1936 but prices paid for butter-fat have been rather higher and the total value will be somewhat above that of last year.

DAIRY-FACTORIES.

Twenty-nine butter-factories, three cheese-factories, two condenseries, one milk-powder plant, and one casein plant have been in operation during the year. A cheese-factory is proposed for Armstrong and may commence operations in the coming spring. All dairy-factories and milk plants have been called on regularly and methods and equipment relating to grading and testing of milk and cream supplies as well as to sanitation, drainage, and storage have been inspected and checked.

CREAMERIES.

The quantity of creamery butter manufactured during 1937 will be about 12 per cent. less than during 1936. This is due in part to season but also to diversion of supplies to other outlets. The quality of British Columbia butter is, without question, improving greatly, the local supply holding its own very well in competition with butter from without the Province. At exhibitions in various parts of Canada Okanagan creameries have been remarkably successful, winning in very strong classes. The price of butter has advanced during the year appreciably. There has been noted throughout a renewal and modernizing of equipment.

CHEESE.

Far less cheese has been made during the past season than hitherto which is to be regretted. This also is due, largely, to the diversion of milk-supplies to other outlets. It is expected that the cheese-factory about to be opened at Armstrong will undertake the manufacture of Cheddar. It is unlikely that any concern will be caused to neighbouring creameries by the institution of this factory. The dairy industry in the Okanagan is capable of enormous expansion if profitably directed. As to the manufacture of cheese in this Province, there exists a large field for varieties other than Cheddar almost totally unexplored by local manufacturers.

CONDENSED PRODUCTS.

A gradually advancing price has stimulated the manufacture of evaporated milk and an increase of about 10 per cent. for the year's operations will be recorded. About the same amounts of milk-powder (skim) and of casein have been made.

ICE-CREAM.

Ice-cream manufacturers experienced a rather unsatisfactory season fluctuating with the extremes of weather experienced. The total made shows an increase but competition in respect to sales of mix (wholesale) has been severe. Scores of so-called counter-freezers have made their appearance in confectionery stores and lunch-counters—secured as attractions rather than as necessary pieces of equipment. The investment required is out of proportion to the chances of increased business. Control of composition is now vested in the Dominion Department of Agriculture under the "Dairy Industry Act" instead of through the Dominion Department of Health under the "Food and Drugs Act."

HERD IMPROVEMENT.

There are now twelve Cow-testing Associations employing sixteen supervisors who are testing regularly, the year around, 7,000 dairy cows. From 1931 on, maintaining these

associations at reasonable strength became very difficult owing to the dull times. The feeding of all farm animals, including cows on test, was seriously interfered with so that totals of average production were seriously affected. Of late, practice has been considerably restored so that little variation in average production per cow is shown for the years 1933–1936, inclusive. The average for the four years is 338 lb. of butter-fat and for the single year of 1936, 338 lb. Several associations are expanding; new routes have been added, others are in course of institution. Of the total of cows milking in British Columbia about 7 per cent. are therefore on test; roughly 6 per cent. C.T.A. and 1 per cent. R.O.P.

On the Lower Mainland the percentage tested increases to about 11 per cent., most of the Cow-testing Associations being found in that area. There is great need of further extension of milk recording before much can be accomplished in general herd improvement. With the making of records of milk production and the elimination of low producers the proving of sires goes on also and any great advance in the future must be through the discovery, retention, and utilization of pure-bred dairy sires proven and pure for inheritance of high production.

The extreme differences in production of daughters of pure-bred sires under observation by this Branch afford proof of the immediate necessity of some effective means of distinguishing between worthless and worthy. Of the four main dairy breeds to be found in this Province, the average capacity of the low group in each breed (according to daughters' production) is about 320 lb. butter-fat per annum. Of the high groups the average is over 550 lb. In other terms the high producing bulls available have daughters each surpassing the daughters of the low by an average production equal to that of an ordinary cow of the country. In order that some method of control may be established, a tentative draft of a system for supervision of sales of pure-bred cattle has been prepared and is now under discussion by the dairy-breed associations of British Columbia.

CREAM-GRADERS' LICENCE EXAMINATION COURSE.

This course for 1937 was held November 15th to December 3rd, inclusive, at Almond's Block, Pender Street East, Vancouver. Fourteen applicants registered; seven for testing only.

LICENCES ISSUED.

During the year twenty-three applicants for testers' licences were examined. Seventy-two licences were issued. Forty-five licences to cream-graders were issued. To fifty-seven persons, firms, companies, or associations, creamery or dairy licences were issued.

VERIFICATION TEST.

One verification test only was requested. This was on behalf of V. Tessaro, of Abbotsford, and was duly carried out.

MEETINGS.

Meetings at New Westminster, Chilliwack (2), Abbotsford (2), Cloverdale, Victoria, Saanich, North Saanich, Quesnel, and Vancouver (3) were attended by members of this staff. Two radio talks on dairy subjects were given at Kelowna.

DEMONSTRATIONS.

A three-day demonstration in the making of a simple type of farm cheese was given at Parksville. Several ladies of the neighbourhood attended throughout.

PUBLICATIONS.

Dairy Circulars No. 32, " The Sixth List of Dairy Sires," and No. 33, " Annual List of Milk and Butter-fat Records," are the publications of this Branch for the year.

GENERAL.

Co-operation with the Dominion Bureau of Statistics in the matter of dairy returns and with the Dominion Dairy Branch in making available Montreal and Toronto dairy quotations to those locally interested goes on regularly.

The periodic inspections of factories and dairy plants was carried out by Messrs. F. C. Wasson and F. Overland, Dairy Inspectors and Instructors.

Control of Cow-testing Associations has been with Mr. G. H. Thornbery, Assistant in Charge Herd-improvement Work, who is also responsible for dairy sire lists and ratings.

Reports and returns in regard to manufactured products and markets, with inquiries and applications respecting general dairy-work, cream-grading, testing, licences, milk recording, and dairy sires, increase steadily in number and volume.

REPORT OF CHIEF VETERINARY INSPECTOR.

ANSON KNIGHT, V.S., CHIEF VETERINARIAN.

During the year large areas of the Province have been covered by your Veterinary Inspectors. In general we find the stock in good condition and feed plentiful. Grazing conditions on the ranges have been good and, consequently, the cattle are going into winter quarters in good condition. Wild-hay meadows and domestic meadows have produced good forage-crops with the result that there is evidence of plenty of feed for all classes of live stock to carry them through the winter.

Grain-crops throughout the Peace River Block, Central British Columbia, have been good. There is considerable activity in live-stock matters throughout the Peace Block, probably leaning more towards the production of swine. Farmers north of the Peace River finding the haulage expense rather heavy are inclined to feed more grain into pigs. The quality of the pigs has been well maintained and I believe the percentage of selects will tally fairly well with the Prairie Provinces. A number of good breeding pigs have been brought in from time to time and the results are being shown in the quality of bacon hogs which passes through the grader's hands. Should the present prices hold I believe there will be a further increase in swine production throughout Central British Columbia, and more especially in the Peace River Block.

There has been no serious or extensive outbreak of disease amongst live stock. Diseases that may be considered contagious and infectious and may at times produce serious conditions are listed below.

BLACKLEG.

Small sporadic outbreaks occurred in two districts—Shuswap and Black Pine. All carcasses were burned. Other young stock on the ranches affected were injected with blackleg bacterin as a prophylactic measure.

KERATITIS (PINKEYE).

An outbreak of this disease occurred in two areas—Vernon and Sullivan Valley. This is an acute disease involving the eye structures, characterized by intense swelling and inflammation associated with opacity of the cornea. In severe cases permanent blindness may result. Fatalities of this disease are practically *nil*, but it affects the general condition of the animal and therefore causes an economic loss. Cattle in contact were injected with keratitis bacterin which appeared to alleviate the condition and prevent further spread of the disease.

HÆMORRHAGIC SEPTICÆMIA.

Outbreaks of this disease occurred in the vicinity of Heffley Creek, Sullivan Valley, and Chilcotin, causing the loss of a small number of animals. Animals affected with this disease usually die, the onset and fatal ending being very rapid. The cattle-owners were advised to burn the carcasses and inoculate any contact cattle with hæmorrhagic septicæmia bacterin as a preventive measure. Although animals of all ages are susceptible the disease has not in any year involved any large numbers of cattle. The losses have been few and in almost every outbreak the trouble has disappeared as rapidly as the onset.

CALF DIPHTHERIA.

An outbreak of this disease occurred in the Nicola District. This is an acute, highly contagious inflammation of the mouth and pharynx and may involve the respiratory organs.

Isolation of affected animals and treatment with antiseptics were advised. Fatalities may occur, but when taken in time and affected animals treated losses can be curtailed.

PULMONARY MIXED INFECTION.

Outbreaks of this disease were found in three districts—Savona, Westwold, and Beresford. All dead animals were burnt and the remainder of in-contact animals injected with bacterin.

COCCIDIOSIS.

A small loss occurs from this disease almost every year. The prevention remains very largely in the hands of those stockmen whose young stock have become affected. Probably the chief factor in the yearly loss is the practice of stockmen to use the same corrals and feeding-grounds year after year. When this disease occurs on a farm or ranch the corral and surrounding ground become contaminated through the fæces of diseased animals, the infective material remaining dormant throughout the year until the cattle are brought from the ranges into their winter quarters. The losses occur chiefly amongst calves and yearlings with an occasional two-year-old. The greatest loss is amongst calves. A factor causing the heaviest losses amongst calves is the practice of weaning the calves late in the fall or early winter and putting them on dry and coarse feed. The trouble usually takes place after the first severe winter spell when the temperature drops to several degrees below zero. No doubt being suddenly weaned with a change of feed and severe winter weather has lowered the vitality of the calves and hence the greatest loss occurs in the younger animals.

The stockmen have been advised to make changes of feed gradually, use more concentrates and good quality hay, and also give protection from severe winter weather, and place the animals on new feeding-grounds, discarding old corrals. In the early stages this disease lends itself to medical treatment, the dosage and ingredients of which the stockmen have been advised from time to time.

ACTINOMYCOSIS.

Only one advanced case of this disease has been dealt with during the past year, the animal being placed in quarantine and not allowed to run on the roads or common pasturage.

PLANT-POISONING.

Poisoning by the plant *Astragalus campestris* was observed amongst range cattle, involving only three head of cows. Poisoning by this plant is to some extent quite common. The plant is found growing usually more abundantly between the altitudes of 2,000 to 4,000 feet. Fatalities are rather rare, but when an animal is badly affected by the poisonous plant it becomes very emaciated and it may take several months or longer to recover, therefore causing considerable economic loss.

No other cases of plant-poisoning were reported.

FOOT-ROT.

This disease is confined entirely, so far as we are aware, to the interior of British Columbia. Dr. McKay reports that he has examined around 37,000 head of sheep. He reports that two or three ranges which are occupied by the sheep during the grazing period are polluted with foot-rot. Mention is made of the Hunters and Crowfoot Mountain Ranges, also Adams Plateau. Hunters Range and Adams Plateau are considered wet ranges. As foot-rot usually occurs on damper ground on the margins of lakes, streams, etc., or in boggy or soft ground, it is therefore more active on the ranges that may be considered as wet-range lands, the ground being contaminated in the first place by diseased sheep. This no doubt occurred some fifteen years ago when sheep were introduced into this Province from outside points and the disease at that time was not brought under the "Contagious Diseases (Animals) Act." When the ranges become affected it is a very difficult matter to eradicate the trouble. Severe freezing of the ground may have a tendency to clear up the trouble, but should there be a heavy fall of snow following a mild freeze-up, thus protecting the ground from severe freezing, the virus that produces the rot is somewhat protected and carries over from year to year.

Another factor is probably using the same trails from year to year in drifting to and from the ranges. If new trails could be obtained it may facilitate matters in cleaning up this disease.

I beg to submit herewith copy of a letter sent to C. J. Haddon, District Forester at Kamloops, by Dr. D. H. McKay:—

"KAMLOOPS, B.C., November 22nd, 1937.

"*Mr. C. J. Haddon, District Forester, Kamloops, B.C.*

"DEAR SIR,—In regard to cleaning up foot-rot: I am given to understand that there are no more ranges to be opened up. If there were more ranges to be opened it would necessitate having from two to three more Inspectors in this Upper Country as the period of incubation is from fifteen to twenty days and that would mean three or four inspections on ranches, and foot-baths would also have to be put on the ranges with periodic inspections made on the ranges to see that the foot-baths were being used.

"The only thing that I can see with regard to this is to let those who are troubled with foot-rot go on the ranges that are affected. These ranges are as follows: Hunters Range, which is polluted; Adams Plateau; and Quest Mountain (possibly).

"If we were to close these three ranges it would mean that five bands of sheep, amounting to approximately 3,500 head of sheep, would have no place to go and the five sheepmen would have to go out of the business.

"The Hunters Range became affected some twelve or fifteen years ago and sheepmen moving from Hunters Range to some other range have affected the other two so that it seems too bad if these sheepmen would have to go out of business through no fault of their own.

"Yours truly,

D. H. MCKAY, *Veterinary Inspector.*"

VAGINITIS.

This disease has been causing some loss amongst the farmers owing to the diminished milk-supply of cows affected with this disease. This is one of the diseases that can be looked at purely from an economic standpoint as animals so affected fail to conceive. The disease was quite prevalent throughout certain centres of Central British Columbia for two years but appears to have subsided at the present time.

A few cases were noted, however, in the Peace River Block, but it should not cause inconvenience in that area owing to the fact that they do not depend on the dairy industry for their maintenance, dairy cows being kept in the Peace Block mainly as a source of supply of milk for domestic purposes. No specific remedy has been found for this disease. The disease once established in the animal's system appears to run its course and after a number of months will subside and the animals will carry on without loss in the future.

INTERNAL PARASITES.

Sheep and swine owners in the past have been considerably troubled by parasites of various kinds affecting domestic animals. The chief losses have occurred amongst the sheep and swine. Through advice of your Veterinary staff the farmers are to a large extent conversant with the treatment of animals so affected, and also the methods to adopt in keeping young stock and older pigs on fresh or uncontaminated ground, as well as medical treatment for affected animals. Of late years parasites have been a small factor in losses amongst domestic animals.

IMPORTATION OF LIVE STOCK FROM OUTSIDE POINTS.

In this connection Dr. J. D. MacDonald reports that while visiting the Fernie District on his annual inspection, it appeared that importation of grade dairy stock from Alberta may be causing a menace to the health of our British Columbia animals, more particularly animals affected with tuberculosis. The matter of transporting animals is done by train and also by truck. The matter of T.B.-testing of cattle from Eastern Provinces was taken up several years ago, around 1914. We were informed at that time that compulsory testing of cattle for tuberculosis coming from other Provinces could not be allowed owing to the "British

North America Act," which governs commercial stock. Pure-bred animals were not considered in that category and therefore could be made subject to test before entering British Columbia, and I believe this practice is largely carried out by shippers of pure-bred cattle. If it were possible for transportation companies to notify us of entry of cattle on their lines into British Columbia, giving the owner's name and address, these animals could be checked up when your Inspector is in the various areas affected by such transportation lines.

Animals entering by truck would be a very difficult matter. In this case it appears to me that it would be necessary to maintain a staff on the border between Alberta and British Columbia to check up on any trucks carrying live cattle, obtaining the name and address of the party importing the animals, and the destination of the animals.

Considerable testing has been carried out on animals imported from Alberta. A few reactors have been found at various times but this loss has not been at all serious. As the regulations now stand no compensation is paid on animals imported from Alberta into British Columbia unless such animals have been in British Columbia for one year or over. We have been able to check up on a number of animals in this regard, but where animals are sold by the importer and probably change hands two or three times during the year it is a very difficult matter to check up on the origin of such cattle.

TUBERCULOSIS.

The time of your Inspectors has largely been taken up in the testing of cattle for tuberculosis. This work has been spread over a wide area, including Vancouver Island and the Gulf Islands, Coast points, East and West Kootenays, points south of Kamloops, Okanagan Valley, Cariboo, Central British Columbia, and the Peace River Block. Dairy cows made up the largest class of cattle tested, being chiefly cows belonging to dairymen carrying on the milk business and selling milk and cream for human consumption in the towns, cities, and villages throughout British Columbia.

The total number of cattle tested was 12,405, with 77 reactors. All reactors have been killed and the carcasses burned or buried under the direct supervision of your Inspectors or some official of the Department. Attached herewith is a summary of the T.B.-testing throughout the Province, by which you will note the districts visited by your Inspectors, number of premises, number of cattle tested, and the number of reactors.

DAIRY-FARM INSPECTION.

Your Inspectors have given considerable attention to those dairymen engaged in the milk business, lending advice in regard to the construction and improvement of dairy premises when necessary. The better class of dairymen have maintained their standard of cleanliness and care in handling milk for human consumption, while those who are inclined to be careless require more attention. The latter are slower to make improvements and are inclined to adopt the attitude of just " getting by."

A summary of the dairy-farm inspections, giving data in regard to the number of cows inspected in each district and grades of the dairy premises, is shown in the Appendix.

REPORT OF POULTRY BRANCH.

J. R. TERRY, POULTRY COMMISSIONER.

The poultry industry was adversely affected by the weather of the past winter. January proved one of the coldest months experienced, and even in coastal and island regions conditions were decidedly wintry. Thousands of female birds were marketed during late December, all of January, and up to the middle of February. This annual occurrence is one of the chief reasons why so many breeders do not find the industry profitable. Pullets hatched too early or too late form the majority of those slaughtered. The early wintry weather and later the January or February freeze-up checks these particular pullets, and as a result the birds are sacrificed on account of non-production.

The year from a financial standpoint has been disappointing. True, the price of eggs has risen higher a few cents per dozen, but the price of feedstuffs during the year has been

on the up-grade for at least 80 per cent. of the period. The drop in freight rates a year or so ago occurred at a time when there were large surpluses of grain, wheat particularly, throughout the world, and as a result the lower price passed on to producers was not so beneficial as expected. Wheat was at least selling at from 80 cents to $1 per 100 lb. less than now, but two and three years ago the demand for eggs and poultry meats was very poor. Complaints are made regarding the variance in price of wheat on various points on the Island—as much as 45 cents difference per 100 lb. occurred between prices at Victoria and Cowichan, the latter point being the lower priced. Price of grain has dropped very slightly since the harvest-time. Wheat is now retailing at from $2.10 to $2.45 per 100 lb. in various parts of the Province, from a high of $2.65 during the early fall.

Egg prices for the past ten years average as follows:—

	Cents.		Cents.
1928	29	1933	15
1929	30	1934	15
1930	24½	1935	16
1931	20	1936	21
1932	15	1937	25

It should be noted that these prices are averaged for the three principal grades: Large, medium, and small.

Many breeders, unfortunately, do not market more than about 30 per cent. of their egg production as "large," and, as can be seen, a difference of 3 cents to 4 cents per dozen on all eggs produced means a big cut in possible profits. It should be remembered that the promulgation of the Federal "Egg Marketing Act" was a result of the agitation by the breeders for a better return for their produce. Taken all in all, it must be admitted that the only benefit has been derived by the consumer, who now knows what he or she is getting when buying graded eggs. For instance, at the time the production of very small eggs is at its height this period coincides with the natural season when eggs are scarce. Instead of there being a good market at remunerative prices for large eggs, the small eggs are sought after instead, even though the production of large eggs may only be 10 per cent. of the total.

DRESSED-POULTRY TRADE.

The consuming public during the past few years has been gradually becoming aware of the advantage of buying properly-fattened poultry, and appears willing to pay a premium for A1 products. As mentioned in last report, this section of the industry is not one to be entered lightly by inexperienced breeders. On the other hand, there are located in this Province fitters and fatteners of poultry for market that are among the best anywhere, and they are finding an ever-increasing market for their wares. Practically all of these breeders utilize game blood to work with. On account of superior weight the Cornish game male is generally used, mated with either Light Sussex (the best table cross), Rhode Island Reds, Barred Rocks, or Wyandottes. The one objection, and a serious one, is that Cornish males are not very fertile as a rule. Old English Games—the ones selected to be the largest obtainable, if possible not less than 6½ lb. in weight—crossed with any of the above breeds, will give a higher percentage of hatchability, together with the sought-after white flesh. The heavy cockerels are generally marketed at Christmas, but there is a growing demand for 3½- to 4-lb. milk-fed birds at remunerative prices.

BREEDING AND REARING RESULTS.

For the third year in succession the general average of early hatches was very low, and in many cases breeders and others had to substitute later-hatched stock to fill original orders. With the growing demand by hatcheries and others for early-hatching eggs many breeders use pullets in their breeding-pens, as it is almost impossible to get old hens laying heavily enough in January for this purpose. Reports were heard of many poor hatches from such stock. As often pointed out, whether hens or pullets are used in the pens it is imperative that only the very best of selected stock must be used. Pullets that have previously suffered with roup or allied diseases should never be used in breeding-pens immediately afterwards.

During the earlier part of the hatching season the orders for chicks were fair, but later on trade slackened somewhat. All stock hatched was sold later on, either at six, eight, ten,

twelve, or fourteen weeks of age. It behoves all purchasers of young stock to carefully examine birds on arrival and report anything unusual to either breeder or hatchery. It is unfair to keep the purchased fowls for a month or so, oftentimes in unsuitable surroundings, and then complain and expect redress. As a rule, the general run of chick-purveyors have too much invested not to attempt to give value for money received.

During the season Oriental chick-sexers were again imported for the work. Since then, however, it has been found by demonstration that the Province now contains sufficient Canadian experts capable of the work, and it is possible they will be used exclusively next year. An examination of Canadian chick-sexers was held during the year, under the auspices of Dominion and Provincial Departments, and the following successfully passed the test: Miss A. Balakshin, R.R. 2, Chilliwack; Mrs. Josephine Koop, Box 228, Nanaimo; Mr. Q. S. Moffett, Box 33, Cloverdale; Mr. Harry Naganobu, R.R. 3, New Westminster; Mr. N. S. Richards, Salmon Arm; Miss Elaine Scherck, R.R. 3, Chehalis, Wash., U.S.A.; and Mr. N. E. Whitehead, R.R. 1, Haney.

POULTRY-DISEASES.

As in past years, officials of the Branch have again been called upon to investigate disease outbreaks amongst flocks. Possibly the most frequent complaints have been from paralysis infestations. It cannot be too strongly pointed out that any fowls suspected of this disease should never be used in the breeding-pen at any time afterwards. All such fowls should be killed and disposed of. Only by rigidly culling out all diseased and suspected fowls will this scourge be overcome. In many cases visited it has been found that infected male fowls are always quickly disposed of, but breeders invariably want a drug-store remedy whereby they can save all females diseased.

Coccidiosis has been again taking toll, and in most cases outbreaks have been amongst six- to eight-weeks-old stock. It should be pointed out that during inclement (wet and cold) weather this disease is most likely to appear. Chicks should therefore be kept on clean ground, if possible, and all food given during wet weather should be fed in clean receptacles. It should be remembered also that the feeding of expensive drugs and condiments will not help much once the coccidia has found a foothold. The breeding of disease-resistant stock to produce like progeny is to be strived for. This procedure, linked with strict daily culling, will tend to restore vitality to most of the popular breeds.

BOYS' AND GIRLS' POULTRY CLUBS.

An increase of clubs organized during the year has to be recorded. In addition to clubs using hatching-eggs, nearly a dozen clubs were organized where the members used day-old chicks. Rhode Island Reds and Barred Rocks ran neck and neck for favouritism, there being 1,041 eggs of the Reds used to 1,001 for the Barred Rocks. White Wyandottes and White Leghorns, with 169 and 208 eggs respectively, supplied the remainder. Nearly forty clubs were formed as against thirty last year. Rocks and Reds were the choice of the chick clubs.

As in past years, most of the clubs were formed by departmental officials, Women's and Farmers' Institutes, and local Poultry Associations. In most instances in addition to competing for Department prizes the competitors exhibited some of their stock at local and district fall fairs. The Provincial Associations at Vancouver and Victoria organized judging competitions during their expositions. Vancouver had the larger list of contestants, with Victoria close up. At the latter show some club members came nearly 40 miles, and incidentally visited their first agricultural show. For the first time in several years the Province did not enter the Dominion Poultry Judging Competition at the Royal Fair at Toronto. It is hoped to resume again next year, however. Several very promising members are now ready to qualify, both as to age and experience. It is regrettable to report that many children were forced to sell their flocks in early fall owing to feed costs. This year is the first time they have had to do this since the work started.

BLOOD-TESTING.

The third year's work commenced early this year, and thus enabled the work being concluded before the end of the calendar year. Changes were made in the laboratory section, the work being in entire charge of the Provincial University, with Doctors Jervis and Beily

officiating. The culling, banding, assembling material, and inspection-work was again carried out by the Department. The Fraser Valley District again provided 98 per cent. of the work, and was handled by Mr. G. L. Landon, assisted by Mr. John Smith. Island flocks were attended to by the writer. Over 90,000 birds were tested, being 20,000 more than last year. As usual, White Leghorn fowls predominated, the percentage of the total being almost 80 per cent. Rhode Island Reds and Barred Rocks ran each other neck and neck. The new breed, New Hampshires, a red-plumaged fowl, approximating in shape and colour to the Reds of thirty years ago, and Light Sussex were next in numbers tested.

On the whole, the weather was much more propitious than in former years, thus facilitating the work. This should not, however, detract from the meritorious work of Mr. Landon and his assistant. Reports show that the test is gaining on the Pullorum disease, for which it has been inaugurated. It is surprising, however, to find such a large body of breeders who are under the misapprehension that the test is a cure-all or preventive for such diseases as infectious bronchitis, leg-paralysis, coccidiosis, and even tuberculosis.

The Inspectors again found that, outside of several flocks suffering from catarrhal affections, the percentage of birds culled for disease is gradually lessening. Flock-owners again testify to the satisfactory nature of the Inspector's culling.

WATER-FOWL.

The two fowls, geese and ducks, have not been very extensively bred this season. Dwindling demand and cost of feedstuffs are principal reasons. The Toulouse again proved the favourite in most all of the Province's sections. There appears to be a demand for goose grease, and when properly rendered many druggists are willing to pay good prices. An inquiry for goose down was received from a Vancouver firm. Apparently they wished the product from live birds. In the East and on the Continent down-plucking was a regular procedure, but most branches of the R.S.P.C.A. work actively against the practice.

Amongst the ducks kept and raised, the White Pekin is still the most popular, with the Khaki Campbells as runners-up.

TURKEYS.

There appears to have been a decrease in turkey production throughout the Dominion during the past year. In Manitoba the drop has been 40 per cent. This is to be expected when one takes into account the enhanced price of grain. It is more profitable to sell these rather than feed at present prices.

In our own Province turkeys raised about equalled last year's in numbers, with the price slightly higher. Each succeeding year witnesses a greater proportion of better-fed carcasses for sale, and this year was no exception. It is the opinion of this Branch that the display this year exceeded all others for quality and finishing. This is all the more remarkable when one takes into account the high price of grains. Bronze, White, and Red Bourbon breeds, as listed, were the most popular market-fowl.

OFFICE AND FIELD WORK.

There were many inquiries in person at the Department seeking information *re* poultry-keeping and allied phases. In most cases inquirers wished to start in a small way, and quite a few were curious *re* the merits or otherwise of the battery-laying system. This work has been taken up in Great Britain for the past seven or eight years, but does not seem to have made much headway during the past year. It is to be noted that where a plant of this kind is to be established on an existing poultry-farm many expenses need to be incurred, such as structural changes to existing buildings, etc. The matter of equipping a battery system is also expensive. It is necessary to use metal and wire for the coops, and these will average from 90 cents to $1.25 per bird. Very little is known yet as to the proper rations. In any event these need to be more varied than are fed to the usual farm flock. The matter of frequent "false" moulting has also to be taken into consideration. Only persons with sufficient experience and, above all, sufficient capital should launch into this work, and then only after very careful consideration of all aspects. During the writer's connection with the poultry industry there have been similar schemes such as this, but the matter of labour involved and disease dangers soon eliminated them.

FLOCK APPROVAL.

Report of flock approval and blood-testing for the season just ended has been prepared by G. L. Landon, B.S.A., and is reproduced as follows:—

"A total of 93,008 birds were blood-tested during the period from September 15th to December 18th, 1937. A total of 72,330 leg-bands were used. This is a large increase in the number of birds tested as shown by the following table:—

Year.	No. of Flocks approved.	No. of Birds tested.	No. of Bands used.	Total Amount collected for Leg-bands sold.
1935–36	117	42,074	30,926	$309.26
1936–37	127	77,493	63,616	636.16
1937–38	143	93,008	72,330	723.30

"One cent per bird was collected for laboratory costs this year as compared with 2 cents per bird during the past two years. One cent was also collected for leg-bands used and remitted to the Department of Agriculture. Owing to the fact that only 1 cent was collected for blood-testing the University of British Columbia made no refunds to flock-owners, it being considered advisable to make a charge of 1 cent for the laboratory costs of the blood-testing. I am advised by Dean F. M. Clement that the 1 cent does not quite cover all the costs of the testing.

"The total cost of 2 cents per bird in British Columbia compares very favourably with 3½ cents in Alberta, 5 cents in Saskatchewan, and 9 cents per bird in Washington State.

"SUMMARY OF THREE YEARS' TESTING.

Year.	No. of Birds tested.	No. of Reactors.	Percentage of Reactors.
1935–36	42,074	2,563	6.09
1936–37	77,493	1,879	2.42
1937–38	93,008	3,224	3.47
Total	212,575	7,666	3.60

"The following is the summary of birds tested for 1937–1938 according to breed:—

Breed.	No. of Birds tested.	No. of Reactors.	Percentage of Reactors.
White Leghorns	75,598	2,279	3.01
Rhode Island Reds	7,589	427	5.62
Barred Rocks	6,130	126	2.05
Miscellaneous breeds	3,399	392	11.5
Retests	292	-----	-------

"It is apparent from the above figures that the percentage of reactors is higher than last year. This was to be expected owing to the increase in the number of flocks approved, and particularly in view of the fact that many new flocks were tested this year for the first time.

"In this connection I may say that the percentage of reactors shows an increase, to some extent, by the fact that some poultrymen retest their reactors without advising us that they are reactors from the first test. We have this problem every year as there are some who continue to discredit the blood-testing and are continually attempting to embarrass the officials in charge of the laboratory.

"The following table is interesting in that it gives the results of three years' testing of thirty-nine flocks. These flocks have been tested each year for three or more years:—

Breed.	No. of Birds tested.			Percentage of Reactors.		
	1935.	1936.	1937.	1935.	1936.	1937.
Rhode Island Reds	2,344	3,601	4,398	4.73	2.38	7.32
Barred Rocks	1,031	1,599	1,127	3.29	0.025	0.071
New Hampshires (one flock only)	651	1,263	215	3.07	1.03	0.0
White Leghorns	13,060	25,355	25,088	5.51	2.23	1.60

"With the exception of the Rhode Island Red flocks there has been a steady reduction in the percentage of reactors."

REPORT OF FIELD CROPS BRANCH.

Cecil Tice, B.S.A.

Grain-crops gave an average yield for the whole Province. In the Okanagan, due to the prevalence of smut, yields of fall wheat were considerably reduced. In the British Columbia section of the Peace River District all crops were harvested in good condition. However, the yield of all grains in this area was below average owing to the dry spell in the spring. In Central British Columbia grain-crops generally yielded well. Root and ensilage crops were good.

From present indications there will be ample feed-supplies for this winter. Hay and fodder crops were good in all parts of the Province and many districts report a surplus of hay. Reports received to date indicate that there will be ample seed-supplies of all kinds to meet our requirements. In fact, there will be a considerable surplus of timothy, alsike, alfalfa, and red-clover seed.

FIELD CROP UNION.

The annual meeting of the Field Crop Union took place during the Winter Fair at Hastings Park, Vancouver, on December 7th. Your Commissioner, who is secretary-treasurer, presented his annual report. This revealed that the membership had increased over 100 per cent. during the past year; the total membership being 325 members.

The following statement gives an idea of the location of the various members:—

	Members.
Central B.C.	83
Kamloops and Okanagan	59
Islands District	26
Lower Mainland	33
Boundary District	8
Cariboo	28
Kootenays	49
Peace River Block	39

The Union is indebted to the Provincial and Federal Departments of Agriculture and the University of B.C. for their co-operation.

CORN TEST-PLOTS.

For some time variations have been noticeable in the corn-crops of the Interior, depending on the source of seed, the variety or strain of the variety, and whether the corn was grown on the bottom lands or benches, with or without irrigation.

For this reason a small quantity of seed of two hybrid corns—namely, Algonquin and Iroquois—was obtained from Quebec, and five strains of Minnesota 13, one strain of Northwest Dent, and one strain of Gehu were obtained through Dr. S. E. Clarke, of the Dominion Experimental Farm at Swift Current. These were planted on Ross Lockhart's farm at Armstrong. The soil was a deep clay loam under irrigation. The corn was planted May 15th, cultivated throughout the season, and irrigated once. The crop was cut for ensilage

about September 8th. This date is about as late as it is safe to harvest corn to guard against fall frost in the Armstrong area.

In summarizing the results of this test, Mr. M. S. Middleton, District Horticulturist, who supervised the work, reports as follows: "It would appear that the Algonquin and Iroquois hybrids are not as suitable as some of the Minnesota strains, under the Armstrong climate, and that the Lethbridge strain of North-west Dent and Gehu are too early for best results when the corn is to be used for ensilage. Both the latter and Minnesota 13-E could be grown successfully for grain. For ensilage, however, it would appear that the A-2, M, or D strains of Minnesota 13 would meet our requirements for an ensilage corn under the seasonal conditions as they exist at Armstrong.

"The difference between the true strains and hybrids as compared to the local field corn was in the outstanding uniformity, not only in the height of the plants, but in the height and position of the ears, and maturity."

WEEDS.

Activity in connection with weed-control work has been largely confined to the use of weed chemicals. However, on account of the importance of the weed problem in the Peace River Block, the two temporary Weed Inspectors, Messrs. Cushway and Hingley, were reappointed.

In other districts of the Province inspection-work was handled by the Provincial Police and District Agriculturists. This Branch appreciates the co-operation it has received from the Provincial Police in connection with weed-inspection work and from Provincial Public Works Department in connection with the control of weeds on roadsides.

Through this office limited quantities of such chemicals as Atlacide, sodium chlorate, activated carbon bisulphide, and calcium cyanamid have been supplied to district officials for test purposes.

The results obtained vary considerably, depending on the conditions under which the chemical was applied. Reports on all of this work have been furnished by the various District Agriculturists and from the officials of the Horticultural staff. All of these reports are on file in the Field Crops Office.

THRESHING RETURNS.

The final tabulation of threshing returns is made by Mr. S. S. Phillips, Assistant Crops Commissioner. There is considerable delay in getting these returns in from certain districts, although it is apparent that the returns are becoming more complete each year. A detailed list showing the complete threshing returns for 1936 will appear in the Appendix to this report. It will be necessary to include the 1937 returns in next year's report as statements have not yet been received from a great many districts.

FALL WHEAT DEMONSTRATION PLOT.

Due to the prevalence of midge in the spring wheat in the Nanaimo-Cedar District on Vancouver Island in 1936, it was decided that encouragement should be given to the production of fall wheat as this is less susceptible to midge-infestation. With this object in mind seed of two varieties of fall wheat were supplied to the Nanaimo-Cedar Farmers' Institute. These were sown on the farm of E. Balo, the President of the Institute. Of the two varieties, Dawson's Golden Chaff proved earlier, superior in yield, and was less infested with wheat-midge than the Sun variety.

CHICAGO INTERNATIONAL AND TORONTO ROYAL FAIRS.

As usual, British Columbia exhibitors were well represented at the Chicago International Hay and Grain Show and in the seed sections of the Toronto Royal Winter Fair.

The most outstanding winning was that of Gordon Gibson, of Ladner, who was acclaimed the World's Wheat Champion at Chicago. This is the first time the honour has come to a British Columbia exhibitor. Gordon Gibson is the son of W. G. Gibson and the wheat was grown under his father's supervision. Mr. Gibson (Sr.) has been a consistent exhibitor at exhibitions both within and outside the Province for many years. He has won many prizes. It was not altogether surprising to learn, therefore, that Mr. Gibson's son had attained this high honour. Considerable credit is due the winner in producing a sample of hard red

spring wheat in a district where wheat-growing is not extensively practised. The variety Gordon Gibson exhibited was Reward and the weight per measured bushel was 65.2 lb. (United States).

Mr. James Decker, of Pemberton, and William Rogers, of Tappen, distinguished themselves at the Toronto Royal Winter Fair. The former won the championship for the best exhibit of potatoes and the latter won the championship for the best exhibit of wheat, other than hard red spring. Both of these farmers also have been consistent exhibitors for many years and have won a large number of prizes.

The complete list of British Columbia winnings at both of these exhibitions is appended.

SEED-CLEANING MACHINERY.

The Provincial and Federal Departments of Agriculture, working in co-operation, continue to give assistance to organizations in the purchase of seed-cleaning machinery where it is considered such machines will be of real practical value. Nine hand-machines were purchased for use within the British Columbia section of the Peace River Block.

CROP COMPETITIONS.

Two standing field-crop competitions for green oats were held during the year. These took place in the Peace River District—namely, at Groundbirch and Progress.

SEED-DRILL SURVEY.

In order to obtain further information regarding the quality of seed being sown by farmers a seed-drill survey was conducted in two districts—namely, Creston and the Peace River Block. This survey consisted in the taking of 1-lb. samples of seed direct from the drill at the time the farmer was seeding his grain and submitting the samples to the Dominion Seed Branch for analysis. The District Agriculturists in the districts concerned—namely, Messrs. Crack and Twigg—procured the samples.

PRODUCTION OF PEAS.

Considerable progress has been made in the Okanagan and other Interior points during the year in the growing of peas. Altogether 1,500 acres of peas were contracted by the British Columbia pea-growers. Of this amount, 250 acres were planted to seed of canning varieties and the remainder to commercial peas.

FIELD-CROP SEED PRODUCTION.

The production of field-crop seeds continues to receive attention in co-operation with the Dominion Seed Branch. Figures showing the production of seed for 1937 are not yet available. The following statement shows the kinds and quantities of seed produced in 1936:—

Kind.	Quantity. Lb.
Sugar-beet	3,000
Mangel	1,497
Swede turnip	326
Timothy	950,000
Alsike clover	30,000
Timothy and alsike (mixed)	20,000
Red clover	70,000
Alfalfa	60,000
Meadow-fescue	6,000

The total value of the above seed-crops was given as $90,690.19.

PROVINCIAL SEED FAIR.

The annual Provincial Seed Fair was held in conjunction with the Winter Fair at Hastings Park, Vancouver, December 6th to 8th, inclusive. The entries, which numbered nearly 400, were a considerable increase over the previous year. Increased interest generally in the Winter Fair was noted this year. In fact, this year's fair was probably better than any previous fairs.

DISTRICT SEED FAIRS.

District Seed Fairs were held at Dawson Creek, Armstrong, Metchosin, and Burns Lake. Of these, the fair at Burns Lake was the only one directly managed by departmental officials. The fairs at Dawson Creek, Metchosin, and Armstrong were all under local management, but received grants from this Department.

GRAIN FREIGHT RATES.

Considerable controversy has existed during recent years regarding freight rates on cereal grains due to the difference between domestic and export freight rates. There are apparently two issues in connection with this matter. In the first place the freight rates on grain from the Prairies for export are lower than the domestic rates on similar grains to Vancouver.

The export rate on Prairie grains is approximately one-half that of similar grains being hauled to Vancouver for local use or manufacture. This is regarded as detrimental to local millers and poultrymen as well as to the dairy industry, which depends on Prairie grains as concentrates in their feeding-rations.

On the other hand, large producers of grains in this Province consider they are placed at a disadvantage when Prairie grains move to the Coast at lower rates than grain produced within the Province.

Your Commissioner has made some investigations regarding freight rates on grains from Prairie points to Vancouver and from British Columbia points to Vancouver, and has obtained the following information with respect to feed grades of cereals enjoying special freight rates between certain points: Calgary to Vancouver (grades 4, 5, and 6), 30 cents per 100 lb.; Creston to Vancouver (grades 4, 5, and 6), 32½ cents per 100 lb.; Midway to Vancouver (all grades), 32 cents per 100 lb.; Vanderhoof to Vancouver (all grades), 44 cents per 100 lb.; Kamloops to Vancouver (all grades), 26 cents per 100 lb.; Vernon to Vancouver (all grades), 30 cents per 100 lb.

These rates all relate to grades of wheat that are too low for milling and to oats, rye, and barley of feed grades.

SOIL ANALYTICAL WORK.

A large number of soil and lime samples were analysed by the Provincial Analyst for this office during the year. The total number of samples analysed were as follows: Soil samples, eighty-six; lime samples, nine.

In addition to this, fifty-five soil analyses were made by the Spurway method by S. S. Phillips. Correspondence relating to these tests was all dealt with by Mr. P. C. Black.

GRAIN SCREENINGS.

Mr. Walter Sandall, District Field Inspector at Vancouver, reports that: "The Board of Grain Commissioners of Canada Bulletin No. 4 provides for five grades of screenings, which are identified as follows: Oat Screenings, No. 1 Feed Screenings, No. 2 Feed Screenings, Uncleaned Screenings, and Refuse Screenings, graded according to prescribed regulations.

"In compliance with the Provincial 'Noxious Weeds Act' and amendments thereto, grain screenings which contain weed-seeds in excess of the percentage allowed by the 'Canada Grain Act' of the Dominion, or the regulations made thereunder from time to time for No. 2 screenings, shall not be removed from any elevator, mill, or warehouse to any place within the Province, except by special permit issued at the office of the District Field Inspector, Court-house, Vancouver, B.C.

"Permits consist of two specific forms—i.e., one permitting removal of grain screenings by feed merchants or dealers, and one a Feeder's Permit which entitles the holder to remove screenings conditional to prescribed regulations. Permits are issued only to applicants whose premises are so situated that the use of screenings will not, in the opinion of the Inspector, develop a weed menace. Such premises are subject to inspection from time to time.

"During the year screenings permits were issued for various quantities from 1 ton to 200 car-loads. These permits are valid during the year of issue and expire on December 31st of that year, providing the quantity covered by such permit is not sooner exhausted,

A permit entitles the holder to remove screenings from only the grain-elevator or dealer stated on the permit.

"A car-load of grain screenings equals approximately 30 tons.

"Twenty-two permits to remove screenings, obtainable only by dealers, were issued to six applicants, providing for the removal of 836=25,080 tons, of which 4,152 tons 1,430 lb. only was removed. Seven Feeders' Permits were issued to six applicants, covering a total movement of 21.5 tons, of which only 3.25 tons were consumed."

MANAGERS' REPORTS.

Complying with regulations governing the movement of grain screenings, monthly reports were received at the office of the District Field Inspector, Court-house, Vancouver, B.C., from managers of all grain-elevators and the principal dealers within the Province. Each report contained name and address of consignee, date of delivery, quantity, grade, number of permit (if any), and whether for home use or export. The forms are supplied by the Provincial Government.

The following table will show the quantity of screenings removed from British Columbia grain-elevators each month during 1937, as compiled from the managers' reports. It will be seen that the removal of screenings is considerably lighter than in previous years, indicating that the quantity of screenings has been reduced as a result of the poor grain-crops in the Province of Alberta.

Month.	For Use in British Columbia.		Export direct from Elevator.	Total per Month.
	Nos. 1 and 2 Feed.	Elevator and Refuse.	Elevator and Refuse.	
1937.	Tons. Lb.	Tons. Lb.	Tons. Lb.	Tons. Lb.
January	30	1,015 500	868 1,560	1,914 60
February	181 1,520	1,192 530	747 180	2,121 230
March	....	535 870	480	1,015 870
April	30	413 580	62 1,820	506 400
May	240 1,080	149 1,070	409	799 150
June	....	99 1,270	43 1,160	143 430
July	26 1,250	149 980	....	170 230
August	....	26 200	....	26 200
September	....	54 150	....	54 150
October	....	154 1,130	....	154 1,130
November	2	209 290	....	211 290
December	2 1,110	153 1,860	....	156 970
Sub-total	513 960	4,152 1,430	2,611 720	7,277 1,110
Exported by Vancouver dealers	....	533	533	....
Total	513 960	3,619 1,430	3,144 720	7,277 1,110

N.B.—533 tons of screenings were exported by Vancouver dealers from the 4,152 tons 1,430 lb. received by them under permit. That amount deducted from local consumption and added to exports changes the sub-total figures; giving the correct position in the total. Also 645 tons included in the export column were shipped to Calgary. Statement regarding screenings for 5-year period is shown in Appendix No. 6.

B.C. WINNINGS AT TORONTO ROYAL WINTER FAIR, 1937.

A. Seed from a Registered or Certified Crop.

(*a.*) *Spring Wheat (except Durum).*—Region 1, Canada, West of Fort William: 7, J. K. Landon, Armstrong.

(*b.*) *Oats (White, Other than Early).*—Region 1, Canada, West of Fort William: 7, B. Young, Koksilah.

(*c.*) *Peas (Garden or Canning).*—1, Pearson Bros., Vernon.

(*d.*) *Potatoes (Irish Cobbler).*—3, J. Decker, Pemberton.

(*e.*) *Potatoes (Green Mountain).*—1, J. Decker, Pemberton.

(*f.*) *Potatoes (Any Other Variety).*—2, Robt. Taylor, Princeton; 4, Ross Bros., Pemberton; 17, J. H. Avent, Courtenay.

B. General Seeds of Commerce.

(*a.*) *Corn (Dent, Any Variety).*—Region 1, Canada: 3, Mrs. A. Kelsey, Erickson.
(*b.*) *Corn (Flint, Any Variety).*—Region 1, Canada: 3, Mrs. A. Kelsey, Erickson.
(*c.*) *Sweet Corn (8-rowed).*—8, Mrs. A. Kelsey, Erickson.
(*d.*) *Alsike.*—6, E. J. Down, Woodpecker.
(*e.*) *Wheat (Durum).*—1, Wm. Rogers, Tappen.
(*f.*) *Alfalfa.*—15, Frank Choveaux, Okanagan Landing.
(*g.*) *Wheat (Soft Winter).*—2, Wm. Rogers, Tappen.
(*h.*) *Peas (Field).*—3, J. Decker, Pemberton.
(*i.*) *Beans (Field, Other than Small White).*—3, Pearson Bros., Vernon.
(*j.*) *Red Clover.*—5, J. B. Wilson, Ladner.
(*k.*) *Timothy.*—5, E. C. Barger, Telkwa.

Championship Ribbons.

Any Wheat, Other than Hard Red.—Wm. Rogers, Tappen.
Potatoes.—J. Decker, Pemberton.

The Potash Trophy, Solid Gold Watch, for Best Twelve Potatoes.

James Decker, Pemberton (Green Mountain).

C. Boys' and Girls' Classes.

(*a.*) *Green Mountain Potatoes.*—4, Boultbee Rogers, Langley Prairie; 8, Eugene Weins, Abbotsford; 10, Charles Smyth, Huntingdon; 13, Robert Hazlett, Abbotsford.

B.C. WINNINGS AT INTERNATIONAL HAY AND GRAIN SHOW, CHICAGO, 1937.

Field Peas (Large Yellow).—2, J. Decker, Pemberton.
Red-clover Seed.—7, Fraser Valley Delta Co-op., Ladner.
Alsike Clover Seed.—4, R. Blackburn, Prince George; 6, E. J. Down, Woodpecker.
Hard Red Spring Wheat.—1, Gordon Gibson, Ladner; 8, Mrs. A. Kelsey, Erickson; 11, Wm. Rogers, Tappen; 31, W. S. Simpson, Sweetwater.

REPORT ON SOIL-SURVEYS.

C. C. Kelley, B.S.A., Officer in Charge.

During 1936 and 1937 the efforts of this Branch have been concentrated on two of the larger and more important of the arable regions of British Columbia. These are the Lower Fraser Valley, surveyed in 1936, and the Okanagan Valley, surveyed in its several parts between 1932 and 1937.

LOWER FRASER VALLEY.

The lower Fraser Valley, or Fraser Delta Region, is in one climatic zone. Annual precipitation varies from 36 to 63 inches in different parts of the area, depending largely on distance from the bordering mountains on the north and east. Mean annual temperature is 50° F. The ground does not freeze for any appreciable length of time in winter. Characteristic of a maritime climate, there is a high winter maximum rainfall and a mid-summer drought in July and August.

The map-area, covering 545,000 acres, is divisible into upland and lowland districts. The uplands had a climax forest of Douglas fir, hemlock, and giant cedar, which has been logged off, but the luxuriant secondary native vegetation of evergreens and deciduous trees is an important factor in land reclamation. The greater part of the upland is still undeveloped.

The lowlands are less than 25 feet above sea-level, and before dyking were subject to floods during the annual freshet stages of the Fraser River. The native vegetation was meadow-like, with groves of deciduous trees, grassland, and bogs of Sphagnum peat. The lowland district covers approximately 240,000 acres, of which about 50,000 acres are covered by peat-bog.

The soils are of a podsolic type characteristic of the humid Coast region west of the Cascade Mountains. The older upland soils are coloured reddish-brown to brownish-yellow, with iron concretions, low organic-matter content, and acid reaction. These soils developed on impervious boulder-clay and open sandy and gravelly substrata of glacial origin. The soil-types with open subsoils are most subject to the midsummer drought. The more drought-resistant upland soils are developing slowly for the production of fruits, vegetables, and some mixed farming.

The lowland soils are recent delta deposits of the Fraser; mainly fine sediments eroded from large deposits of silts and clays of glacial origin which border the Fraser and its main tributaries in the interior of the Province. These soils are young, of fine texture, and altogether the richest soils in the Lower Fraser Valley. The lowlands are well developed for dairying, mixed farming, grain-growing, etc. The more decomposed peat in this area is used for vegetable-growing and for pasture.

During the winter of 1936–37 the advance map-sheets for the soil-survey of this region were produced, and a limited number of copies were printed and distributed to officials engaged in research and field work. At the same time the advance map-sheets were taken over by the Hydrographic and Map Service, Department of Mines and Resources, Ottawa, for the purpose of draughting the map for publication. The map will be ready for the lithographer by February, 1938.

Concurrently, material to supplement the field-work has been gathered from various sources for the purpose of producing a report on the soil-survey of the Lower Fraser Valley for publication. Being the first report of its kind to be prepared in this Province, the arrangement of material in the way best suited to local needs has been a main consideration. This data will be available for printing by the spring of 1938.

THE OKANAGAN VALLEY.

The Okanagan Valley, from Salmon Arm on Shuswap Lake to Osoyoos at the American Border, is about 160 miles long and 2 to 10 miles wide. About one-third of the valley-bottom is occupied by lakes. The lowest average elevation is about 1,200 feet above sea-level. At the north end the annual mean temperature is 46° F. and precipitation 18.56 inches. At the south end mean annual temperature is 50° F. and precipitation 7.94 inches. This variation at approximately the same elevation has the effect of a gradual drying-off from north to south, leading to the development of several soil zones in the valley-bottom.

The range is from subhumid to arid, with corresponding changes in soil and native vegetation. A section at the north end is in the zone of grey-brown forest soil, with light forest-cover. This zone is on the margin for dry-farming in the sandy soils.

Southward the forest area gives way to black earth, a Chernosem type, with bunch-grass the native climax and grain-growing the main activity in the heavy soils. The black earth in turn fades into a dark-brown soil zone, with yellow pine associated with bunch-grass and the land irrigated for orchard fruits. At the south end of the valley the soils are in the brown zone and sage-brush supplants bunch-grass when the heavy soils are overgrazed. Soft fruits are important in the irrigated areas.

The soils are of glacial origin with considerable variety in top-soils and subsoils. The texture range is from loamy sand to heavy clay. In contrast to the non-calcareous Fraser Valley types the soils are calcareous. The top-soils are neutral to weakly acid in the zone of the grey-brown forest soils at the north end of the valley and weakly alkaline in the more arid areas to the south.

It is thus apparent that there are no less than four climatic zones in the Okanagan Valley from north to south, making this the most remarkable valley for climatic variety in British Columbia and probably in Canada. All of these climates are moderate and agreeable. Such climatic variations within a comparatively small area permits unusual variety in the general agriculture and in the number of commodities that may be produced. As far as food supplies are concerned the valley could be made almost self-sufficient.

With an agreeable climate and satisfactory public services, the valley is one of the best parts of the Province in which to live, and the possibilities for further expansion are of more than ordinary interest. In addition to several smaller sections there is a considerable area near the Shuswap drainage-basin, at present marginal for dry-farming but suitable

for agriculture when irrigated. Large unused hydro-electric power-sites lie adjacent to this area on the Shuswap River. If these two resources could be linked together economically, wealth could be produced and the population of the area increased. The development of new irrigated areas in the Okanagan Valley is linked with the development of cheap pumping power.

The reconnaissance soil-survey of the Okanagan Valley in 1937 connected the areas in which detailed surveys have been previously made, included the Similkameen Valley from Hedley to the American Border, and classified over a quarter of a million acres. The unusual technical difficulties met with during this survey, mainly with regard to the condition of existing maps and the variety of soil and climate, required more effort than was expended on twice the area in 1936. Considerable office-work remains to be done before the survey project covering this valley is reduced to its final form.

GENERAL.

A detailed soil and contour survey covering 328 acres was made of the Dominion Experimental Farm, Summerland. At the same time a preliminary study was made of the relation between soil texture and the moisture-holding capacity of irrigated soils with the aid of Experimental Farm officials. The object is to relate the moisture-holding capacity of soils to the large-scale texture classification maps of irrigated areas in the Okanagan Valley.

While exact figures are not yet available for the Okanagan survey of 1937, the total area of classified land with different scales of work in the Lower Fraser, Okanagan, and Kootenay Districts is approximately 925,000 acres. This represents fundamental work segregating and describing the soil qualities and agricultural resources of each area upon which any subsequent system of land economics may be based.

DISTRICT AGRICULTURISTS' REPORTS.

Much of the information contained in the complete reports of the District Agriculturists has been incorporated in the reports of the Live Stock Commissioner and of the Field Crops Commissioner; however, there are several items of particular interest with reference to each of our agricultural districts which can best be recorded under the several district headings. These are as follows:—

LOWER MAINLAND.

R. G. SUTTON, DISTRICT AGRICULTURIST.

There has been one notable change in the live-stock picture during the past year. That has been the large number of dairy stock which has been exported to the United States. It is estimated that over 3,000 head have been purchased by United States buyers and taken across the Line. Prices paid have been very good, ranging from $50 for ordinary cows to $500 for some selected breeding stock. A large number have been purchased at a price very close to the $100 mark. One can hardly say this movement has created a scarcity of milking cows but it has cleaned up the surplus and cows now average $25 to $40 more than before this movement started. Dairy cattle, as a rule, wintered well. Feed was not scarce and with pasture coming on earlier in the spring, there was little, if any, set-back.

There is little change in the swine situation, approximately the same number are being raised. Some litters arriving in February during the cold weather suffered losses but later litters have developed normally. Market conditions have remained much the same as last year.

Practically the same may be said of sheep-raising. This branch of the live-stock industry remains more or less stationary.

There is as much, or more, interest shown in raising draught horses as compared with last year. A fine crop of colts was raised and information to hand indicates that as many, or more, mares have been bred this year.

Several car-loads of horses have been brought into the district this year, both from Interior points and from Saskatchewan, and there seems to have been no difficulty in disposing

of them. For the most part they have been of the general-purpose class, but two car-loads would go over 1,400 lb.

Clover-seeding came through the winter in excellent shape with very little loss. Seeding started in good time on the uplands, being in progress by March 15th, but due to frequent rains it was delayed and spread out over a long period. Some of the lowlands were not finished until June 1st. In a few other localities where surface water could not get away, spring grain was drowned out and had to be reseeded. On a number of bottom-land fields, potatoes were drowned out and turnips were used as a catch-crop.

Due, however, to the copious precipitation, pasture has been good and the hay-crop heavier than usual. The average yield for the valley is estimated at 3 to 3.5 tons per acre, and many farms reported heavier yields than that. Some hay was cut by the middle of June, but the weather was unsettled. The main part of the crop was put up during the fore part of July, under good conditions.

Spring grain-crops, as mentioned above, were very irregular and in a few places suffered from flooding in June. During July and early August the prospects appeared good, but in late August, just when the majority of the grain was ripening, heavy rain and wind caused it to lodge. As is always the case under such conditions, harvesting was rather difficult and somewhat wasteful as much grain shells out and is left in the field. Had it not been for the damage caused by the wet weather in June and the lodging of the grain in August, it is possible that the yield would have been above the average. As it is, the estimated yield will be slightly below normal. The market has been good and the price started off at threshing-time at $25 to $27 per ton.

Ensilage corn went in the ground a little later than usual, was tardy in starting due to cold, wet weather. However, it came on well during the summer, and the fine weather of September and early October gave a fine, well-matured stand by the time silo-filling started. The average yield would be well up to normal.

Root-crops were slow in starting in the spring but came on fairly well. At pulling-time, however, observations indicated the average size of roots was a little below normal. The roots did not seem to have made the customary growth. At time of writing, the mangel-crop is in and the turnip-crop has been lifted and yield and quality are normal.

Approximately the same acreage of potatoes as in 1936 was planted this year. The first of the early crop went in the ground early in March, but again planting was rather irregular due to weather conditions. Planting of the late crop was delayed and in a few cases lost by flooding. Late blight made its appearance late in August and made a clean sweep, killing down practically all the tops. Had this happened earlier in the season the reduction in yield would have been heavy, but it came at a time when the tubers were well formed and the loss in yield was light. Some reports reaching this office at the start of digging indicated there would be a heavy loss from late-blight rot. A number of inspections were made at once and observations based on these inspections indicate the damage from this cause will be light unless it develops unexpectedly in storage during the winter. The estimated crop will show about 25 per cent. increase over last year.

Clover-seed has been a good crop this year. There was little winter-killing and the fine weather in September and early October permitted threshing under good conditions. Some of the best fields show yields of over 300 lb. per acre. The total crop is estimated at just over 100 tons. Due to a shortage in Eastern Canada the price is up, being 20 to 22 cents.

Each year sees a small increase in the acreage of alfalfa and small areas of it are much more common than they were five years ago. The increased use of lime and a better choice of seed are responsible.

Soy-beans are still grown in small lots, still in a more or less experimental way. It is believed that while production of the seed may be more or less problematical, yet the plant can be depended on to yield a hay or mixed-silage crop of considerable value.

The general crop picture this year is a good one. There have been losses in some lines, but on the average crops have been good and prices fair. Except for a few cases there is an abundance of feed in the barns for the winter.

When the "Assistance to Settlers Plan" was announced, the spring was already well advanced and so many applications came in that it was impossible for one man to make the required inspections in time for the assistance to be of any value for the present season.

Accordingly, two extra men were employed for a month, and working under the supervision of this office they were able to handle the bulk of the applications by the end of May. Since that time some fifteen or twenty additional inspections have been made, vouchers for purchase of live stock and equipment have been certified, and, at date of writing, the work is well in hand.

New Settlers.—There has been a very large influx of new settlers, chiefly from the Prairie Provinces. These men frequently call at this office or write requesting information and advice regarding selection of land, soil management, crops, and live stock.

Warble-fly Control.—Two warble-control areas were carried out during the spring. One was at Barnston Island, being the second year of treatment, and one the district surrounding Atchelitz for the first year of treatment. In the case of Barnston Island two applications were made, one on February 24th and one on March 23rd. The first application should have gone on earlier, but owing to ice in the river the ferry service to the island was suspended for a time. This area comprises all the cattle on Barnston Island, a total of 305 head. The first treatment showed an average of 1.32 warbles per head and the second 1.13.

Comparing these figures with a year ago shows a reduction in the count. The first application, made on March 23rd, 1936, shows 360 head, with an average of 3.2 warbles per head, and the second application, 1.5 warbles per head. It is expected that the treatment will be continued in 1938 and figures should then show a substantial reduction in the count.

A third application should have gone on, but by the time three weeks had elapsed after the second application farmers were busy on the land and could not take time to do the job.

The second district was that covered by the Atchelitz Farmers' Institute and was started at the request of that body. This district took in 88 herds, small and large, with a total of 1,323 head.

After some preliminary staff-work a day for treating the cattle was appointed, and at 9.30 a.m. twenty men and ten cars assembled at the hall. A quantity of material was mixed up and distributed in 2- and 3-gallon containers. The party then went to work, each car taking a prearranged route. By 4 o'clock each farm within the area had been visited and over 1,300 head had been treated. This application was made on March 10th. It should have been made earlier, but the drifted condition of the side-roads made that impossible. A second application was planned for the first week of April, but by that time spring work had started and all young stock had been turned out.

It is expected that the first application next year can be put on in February so as to permit at least a second, and possibly a third, treatment. Three treatments should be made at intervals of three weeks, beginning around the middle of February, but sometimes it is impossible to do this between the time the side-roads become passable and spring work starts. It is expected that other areas around Chilliwack will request the same service next year.

B.C. Lime Committee.—Continuing from last year, the work of this Committee has occupied a great deal of time and entails a quantity of clerical work and correspondence. In the capacity of Secretary to the Committee, your Agriculturist has attended some fifteen meetings and handled, up to December 15th, over 328 applications. These applications cover a total of 2,224 tons of agricultural lime used on the Lower Mainland on which the total subsidy paid out amounts to $1,112.

The bulk of this tonnage is used on the Lower Mainland where it is most needed. The balance is used on Vancouver and the Gulf Islands. A detailed report of the Committee was prepared and submitted on April 1st, last, and another, covering the fiscal year 1937–38, will go forward next April.

KAMLOOPS.

Donald Sutherland, District Agriculturist.

Fair yields of all crops were recorded. Forage-crops were on a par with the previous years' figures with grain yields, particularly in the dry-farming areas, showing a marked improvement. The Brigade Lake and Rose Hill areas, where last year grain-crops were almost a total failure, gave average returns for all grains. An increased acreage of potatoes was planted, but lower yields resulted in an average crop of approximately 8,000 tons. The movement to the market has been slow pending a clean-up of the Coast potatoes. The yield and market for the onion-crop has been very satisfactory.

It is interesting to note that studies made by the staff of the Range Experimental Station show that on the ranges the grasses make a very rapid growth. Studies indicate the importance of rains in May and June and warm weather. On the low ranges, the principal grasses commence growth about April 1st and culm and leaf development is practically completed by the middle of June. On the higher range, growth starts about two weeks later and is almost completed by July 1st. This refers only to bulk, for seed setting of course follows after the dates given.

Live-stock Conditions.—Owing to the heavy snowfall and late spring with a scarcity of feed supplies, stock went out on to the ranges in poor condition. Due, however, to fair growth, stock recovered quite quickly. Due to the activity of the American market, deliveries and prices were brisk up until November 1st, by which time practically all the marketable beef had been disposed of from the Kamloops and Nicola areas. Prices for lambs were also very satisfactory.

The B.C. Sheep-breeders' Association reports wool deliveries up 50,000 lb. and pelts 12,000 lb. over the year previous.

As foreshadowed in the 1936 report, dairying shows considerable gains with the local creamery reporting a make of 123,000 lb. of butter as against 108,000 lb. in 1936. Further gains are in sight, particularly in the North River area which is becoming quite "dairy-conscious." The price of butter-fat paid by the local creamery for special is 28 cents as compared with 25 cents in December, 1936. In 1936, the creamery paid out $22,500 to shippers. This year, returns will amount to $30,000 or better. Credit for the renewed interest rightfully goes to the manager of the Kamloops Creamery, who has put forth a great effort to develop a vigorous interest in dairying throughout the district.

Seed-grain Distribution.—In accordance with instructions received from the Department, this office supervised the distribution of 23,800 lb. of seed-grain to sixteen settlers in the community who, because of crop failure in 1936, were unable to finance their own requirements.

The seed was purchased locally with the exception of a quantity of registered Alaska oats and Trebi barley put out through the district to introduce the varieties to the farmers.

The season was more favourable than the previous one and, with three exceptions, satisfactory crops were harvested. Late seeding and early frosts made it necessary, in the case of the three instances mentioned, to harvest the crops for hay and green feed.

The quantity of Alaska seed-oats put out in the Heffley Creek District did exceptionally well and requests have been made by various farmers who would like to purchase Alaska seed-oats for next spring.

Sodium Chlorate.—A quantity of sodium chlorate was put out in 1936 on couch-grass. In the case of Mr. J. Schamp, of Pritchard, the couch-grass on the area treated was completely killed out and he was able to grow vegetables on that particular piece this year.

Sufficient work has been done with this material to convince the most skeptical that under Interior conditions couch-grass can be completely killed out, provided the application is done in the late fall and is thorough.

A Hindu tomato-grower in the Fruitlands area purchased several hundred pounds of chlorate this fall and has treated an extensive area of his land overrun with weeds. Results of this trial will be followed with interest.

Bull Sale and Fat-stock Show.—With the permission of the Department, your representative again acted as secretary-manager of the Annual Provincial Bull Sale and Fat-stock Show, Kamloops, March 15th and 16th. Due to the interest displayed by American buyers, bidding was brisk and prices set a new record with returns for sixty-nine head of breeding stock sold, amounting to $11,935 and for 363 head of fat stock to $29,157.21.

This sale has become the leading spring fat-stock show in Canada. Recognizing the importance of the undertaking to the city, the citizens of Kamloops this fall approved of a by-law enabling the construction of a new live-stock barn and sales-ring to house the bull sale and other live-stock undertakings.

Ram Sale and Fat-lamb Show.—After a lapse of three years, the B.C. Sheep-breeders re-established the Annual Ram Sale and Fat-lamb Show in Kamloops. Dates for the sale were October 1st and 2nd, and every assistance was given to the management. The undertaking was entirely successful and the B.C. Sheep-breeders are enthusiastic over prospects of

larger sales in future. In all, ninety rams were sold at an average price of $30.33; thirty-eight ewes at an average price of $13.63, and 7,983.5 lb. of fat lambs at an average of $7.93. Breeders and feeders were entirely satisfied with prices received.

Grasshopper-control.—As secretary of the Kamloops and the Nicola Grasshopper-control Committees, considerable time was devoted to this work. Operations this year were extensive, since the Interior along with numerous other sections in Canada and the States faced one of the worst outbreaks that ever hit the North American Continent. It would be impossible to estimate the losses that would have been suffered by the farmers and ranchers had not control been in force. One can only compare the minor crop-damage this year to losses in early years when hoppers denuded the ranges and individual ranchers were forced to purchase winter feed at a cost as high as from $11,000 to $20,000.

Despite the knowledge that operations were costly this year, land-owners are wholeheartedly behind the Control Committees. It is to be hoped that the peak of the infestation has been reached and operations will not have to be so extensive during the next few years.

This year the Nicola Committee arranged a field-day on August 25th and a number of interested land-owners were taken over the district to give them a direct insight into the work being done and the excellent kills being secured by the baiting operations.

SALMON ARM DISTRICT.

H. E. Waby, District Agriculturist.

Nutritional work has been stressed and good results are being obtained. Flocks and herds that were showing evidence of unthriftiness, through advice given, have shown marked improvement. Mineral mixtures are now being recognized as an essential part of live-stock management and we feel sure the use of same is correcting numerous troubles, such as sterility, milk-fever, garget, digestive troubles, etc.

Warble-fly control has again been carried forward and some 2,000 head of cattle were treated in the district extending from Deep Creek Road to Sicamous and both sides of the Shuswap River to Enderby, including Grindrod District. About 200 head were also treated in the Gleneden-White Lake Districts and about 400 in the Windermere District. Good results have been obtained, and as about only 1,000 warbles were found in the Mara-Enderby area, this year should show a clean-up. Deep Creek District and also Salmon Arm District are still under observation, but so far no evidence of reinfestation has been found. It is intended, however, to make a close check on the last-named districts as several farmers have moved in small herds from the Prairie Provinces and these herds are usually found badly infested with warbles.

First-cut alfalfa was delayed owing to rainy weather and some damage occurred to this crop. However, the resulting moisture brought on the second-cut and a good crop of quality hay was harvested. Owing to the open, dry fall, root-crops were taken in unusually well and all crops, including potatoes, have shown little or no weather damage. A tendency is shown to revert more to silage and less roots for stock-feeding owing to shortage of help, and the difference in cost of handling is thought to be, in the case of roots, scarcely warranted. Considerable frost-damage to corn was reported during the September frosts and some mould in silage is also reported. Several plots of soy-beans were grown in the Grindrod-Enderby District but did not mature well. A new variety of horse-bean is being grown near Enderby. This crop carries a heavy stem and stands frost better than soy-beans, and it would seem that a crop of this kind might have a place in our forage-crop work. An analysis for protein content is to be made of the mature beans and results will be noted.

Weed-control is receiving more support than ever before, owing largely to the use of sodium chlorate for couch-grass control. Farmers have, through the publicity this work has received, evidently become weed-conscious to a noticeable extent. Good results were again obtained, ranging from 85 per cent. to 100 per cent. kill, and crops of a varied nature were grown to success on treated land. Sow-thistle and Meadow Champion were also treated and good results were had. Advice was given on Canadian thistle and French-weed control—more especially in East Kootenay districts—and good results obtained, mostly by cultural methods. About 1½ tons of sodium chlorate was sold through the Farmers' Exchange at Salmon Arm and it would seem that this valuable aid to weed-eradication will now assume a

place with farmers of the more progressive type. Great satisfaction has been expressed at the 1937 reduction in price of the above chemical.

Rodent-control has again received considerable attention and we report a very considerable reduction in gophers in a number of districts where Cyanogas has been used consistently. We would also point to the fact that numerous farmers are now using the formula of poison-bait as advised by your Department for pocket-gophers and good results are reported. In connection with the control of ground-squirrels, we would again point to the great value a closed season on badgers would be to all districts badly infested with gophers and ground-hogs. It is noted where badgers have been working that almost a total clean-up is made and in several districts farmers are banding together to try and protect badgers for the purpose mentioned above.

Junior-club work has again been successfully carried on and three poultry clubs, two potato clubs, and one swine club were organized. Each club carried its interest through the season well and good results were obtained. Considerable improvements were seen in the quality and appearance of plots of tubers of the potato clubs over previous years, and hopes are expressed that some of the Juniors will now be fitted to take part in some of the elimination contests. A home-garden club for farmers' wives was organized in the Mount Cartier District with an idea to help beautify the homes and give members a source of pleasure, at once inexpensive and of value to the community. Flowers, bulbs, and seeds were kindly donated for the work and it was very gratifying to see the pleasure already derived from this work. Seed-grain was distributed to farmers in the East Kootenays as well as again being extended in the Revelstoke area. This grain was given on the return plan as outlined by your Department for redistribution to other farmers in the district. Receipts were taken for same. In addition to the seed-grain distribution, a large area of range land was seeded to crested wheat-grass, improved brome and western rye-grass. This grass-seed was sown under various conditions and different kinds of soil. The farmers of the Ta Ta Creek, St. Mary's Prairie, Cranbrook, and Jaffray Districts are to be congratulated on their active co-operation and appreciation of this work. The need of growing legumes, such as sweet clover and alfalfa, was strongly stressed in the Kootenays, especially the St. Mary's District, in order to prevent blowing of soil and as a source of organic matter and fibre. A lengthy programme along these lines was carried out as the need for same is becoming very much in evidence.

WILLIAMS LAKE.

G. A. LUYAT, DISTRICT AGRICULTURIST.

Two hundred and sixty head of cattle were marketed through the annual auction sale held September 2nd, under the auspices of the Cariboo Live-stock and Fair Association. Although only two buyers were present the prices were steady. The highest priced single steer sold for $8.65 while the champion single went for $8.30. The champion load of fifteen steers received $8. Other groups, car-loads and singles, were sold at prices ranging from $6.15 on steers which represented an increase over the Vancouver prices at the time. The Chilco Ranch took the first award in every class of steers—singles, groups, and car-loads—and also received the special Hereford prize donated to the one having purchased two British Columbia-bred Hereford bulls. At the time of the sale the smaller packing-houses, who formerly always attended the event, had had their coolers filled with Alberta dressed beef.

Some ranches claimed an increase in calf-crop over 1936 while others reported a decrease. Open grazing in the estimation of your representative has probably more to do with the calf-crop than any other single factor. Many herds are poorly wintered as well and the rations often are lacking in protein and phosphates, all of which has something to do with the calf-crop.

On the majority of the stock ranches the supply of hay will be quite sufficient to see the winter through, particularly now with a mild open part of it already gone by. At the time of this report no feeding except to calves has been done. The ranges benefited by the cool spring season and beef on the ranges finished up in somewhat better shape than in the previous year. Heavy rains in the late summer and early autumn revived the grass and ranges took on quite a fresh green tinge. The bunch-grass in the winter pastures grew quite luxuriantly and should provide an abundance of feed for the winter and early spring.

The sheep population of the Cariboo is fairly well at a standstill now, it being made up entirely of small farm flocks. Good lamb-crops were had everywhere last year as a result of the small numbers with better care being taken of them. It is admitted in the district that the coyote is the limiting factor in the sheep business. To run a large band with herders, the range is not available and, on the other hand, when a small band is kept with casual supervision the losses from predatory animals take all the profits. Lamb prices were only slightly better than last year at $6 to $6.50 f.o.b. Williams Lake. Four hundred and twenty-seven head were marketed at the annual auction sale held September 2nd but good active bidding was lacking, no interest being shown by the buyers. This has been the third auction at which lambs have sold poorly and the hint is that buyers do not want this section in the sale. A good part of the number offered for sale was held back and shipped on consignment to the Coast with better prices resulting. The wool market is on the up-grade and the sheepmen have averaged 20 cents per pound, although a few do not market to the best advantage.

Prices for butter-fat at the Quesnel Creamery have been higher, they paying up to 30 cents per pound, but there has been no increase in the cow population in the surrounding territory. There are only a few well-bred dairy herds in the Cariboo. Major Cook, at Quesnel, operating a pure-bred Jersey herd, and Jacobson & Sandick, of Forest Grove, well-bred grade Jersey herds with high production behind them. The greater part of the cream shipped comes from cows without any dairy breeding.

The hog industry has had a slight set-back due to high grain prices during the year and poorer pork prices. Fair weather was had during the farrowing season and some good strong litters were had. There are only two farms on which the two-litter-a-year plan is operated, others in the hog business as a side-line are not equipped to handle this industry in such an intensive form. A very limited number of boars have been imported into the district during the year, this condition being due to the lower pork prices. The mining areas around Barkerville are taking an abundance of pork but competition amongst the local butchers seems to always drag the price down. A number of pigs had to leave the district as feeders due to the short supply of grain in 1936.

Sheep and hogs have been very clear of any infectious diseases and no trouble amongst them has ever been reported. The liver-tapeworm in sheep on a few farms has made its appearance but has not taken on a serious hold.

No reports of losses from wood-ticks has been reported to this office. Ringworm is commonly seen amongst calves and sometimes in horses.

Quite a fair number of good draught colts were reared this year in the Cariboo District, although the supply is not nearly adequate to meet the demand. Good sound young broken teams of horses weighing 1,450 lb. to 1,500 lb. command a price of $225 to $250 and are hard to get. Considerably more interest in breeding is shown yearly. At the present time, there are seven registered draught stallions in the district with four of them being of the Percheron breed.

The poultry business in the Cariboo has extended somewhat but not to the degree it should have, as there is still a great number of cases of eggs imported into the Cariboo, particularly during the winter season. Feed prices have been high but egg prices are higher here than they are at the Coast. Enterprising poultrymen report that there is a profit to show from poultry production but the business must be well looked after and operated on a scientific basis. About 95 per cent. of the chicks reared in the district are brought in as baby chicks from the Coast. It is generally the case that where poultry are kept as a side-line, they are very much neglected and housing conditions are not of the best, more so in respect to lighting facilities.

The alfalfa stands were not winter-killed to any appreciable extent in the Cariboo for it went into the winter under a good blanket of snow. The stands, particularly the first crop, were good and heavy. Crops were cut but the harvesting conditions were poor, this applying more so to the second crop which was put into the stack in very poor shape. The cutting of the second crop was delayed in many cases into late September. Irrigation water was plentiful everywhere for all crops. Haying on the meadows was very much delayed by the rainy weather and also by the surplus water lying on the meadows which made cutting impossible

till quite late in the year. The dry-land hay gave good yields since the season was wet and the rains fell at the right time.

The cereal-crops were slow in getting started during the cool wet season of the spring and therefore harvesting operations in this part of the farm business were delayed until late August, when rains prolonged threshing over the best part of September. The yields were quite high in the majority of places as well as on the dry farms.

Potato yields were higher than last year by considerably more, although the quality was not so good. A good market was had for the balance of the 1936 crop in the spring on the Vancouver market, although considerable culling had to be done due to damages caused by wireworms. The market in the Barkerville area takes a good share of this crop at usually a good figure, the price this year being $20 per ton. The root-crops, mainly swedes, were good and benefited from the cool season in August and the rest of the fall. The seed grown locally from carefully-selected seed-roots of the U.B.C. cylindrical swede variety did particularly well and growers were exceptionally well pleased.

The grasshopper situation during the year 1937 was very greatly improved over that of 1936. The cold weather delayed the hatching and caused very irregular appearances of young hoppers. They made very slow growth. Warm spells followed by showers finally developed a type of fungus which wiped out all the outbreaks in the areas lying around Riske Creek, 150-Mile House, Williams Lake, and 100-Mile House, at least very few eggs were laid in those areas and the outlook for a smaller infestation in 1938 looks very favourable. In the late spring of this year after a few hot days, the beds on the lower benches of Riske Creek hatched in such numbers that the situation looked very grave. The Control Committee of the South Riske Creek Grasshopper-control Area poisoned three areas shortly after hatching and made a clean sweep of the young hoppers.

In the Clinton Grasshopper-control Area, the situation was very efficiently handled and the outbreaks were checked quite promptly; no crops were destroyed. A number of improvements in mixing-pens were made, such as erecting permanent tight floors and building strong corrals around the mixing area, thus making sure that a good mix could be made without waste and also that cattle be kept out.

During the course of the year a few ranches changed hands. J. J. Donnelly, at the 150-Mile House, disposed of his cattle and ranch, moving to the Fraser Valley. Perhaps the largest sale was that of the Chilco Ranch, formerly operated by Mr. and Mrs. Vick, and sold to G. Mayfield, who has been operating at the 141-Mile Ranch.

The Last Ranch Cattle Co. has been organized as a subsidiary company to the Rocky Mountain Cattle Co., to operate in the Nazco and Anahim Lake country. This outfit has just completed a three-year survey of the territory, where they plan to run one of the largest cattle ranches in British Columbia. Col. Victor Spencer has acquired the Carson Ranch at Pavilion Mountain and the Little Dog Creek Ranch. At the Pavilion Ranch a slaughter-house is operated and beef is sold to the mines in the Bridge River country. On the Dog Creek property they are feeding baby beef for the Coast market. A number of inspections and appraisals have been made during the year for the Land Settlement Board.

BULKLEY VALLEY.

S. G. Preston, District Agriculturist.

Frosts did little damage this season except in unfavourable areas of the Grassy Plains section to the Lakes District and a few east slopes in the Bulkley Valley. Damage was confined chiefly to garden produce, although low germination returns in timothy seed and grain from Grassy Plains is laid to this cause. The first killing frost in the fall occurred September 21st and was followed by four nights of heavy frost. Timothy for seed was harvested by this time and part of the grain. As it was late in the season and there was a good deal of immature grain, the frost, in all probability, destroyed the germinable quality of the seed but caused it to ripen up immediately so as to make fair feed.

Thresher returns this year indicate an increase in the production of winter wheat with some decrease in oats and barley. The latter is, no doubt, due to the poor quality of the grain or unfavourable weather making it impossible to thresh. While there will be nearly enough grain for seed in the Bulkley Valley, reports from the Lakes District show a shortage of oats at least.

Mention at this time can be made of problems which are not directly concerned with the Department but in which your representative has been asked to give certain advice or assistance.

A site has now been established for an experimental sub-station. From this office we were able to give considerable information on desirable locations for this sub-station.

The creamery question comes up every so often and this year a number of creamery operators have made inquiries or visited the district with a view to establishing a creamery. With the assistance of the Supervisor of the Bulkley Valley Cow-testing Association it was possible to furnish these men with information on the butter-fat yields to be expected.

Dairy Cattle.—There is little change in the dairy industry and practically the same amount of cream is shipped this year to the Interior Creamery (Prince George) and fluid milk and cream to Prince Rupert. Of the creamery operators who have visited the district with a view to establishing a creamery at Smithers or Telkwa, the project does not look too promising; 60,000 lb. of butter-fat would be a fair estimate of what could be expected the first year. A number of new settlers from Saskatchewan and Alberta and several families from Switzerland appear anxious to raise dairy cattle. This may, in a few years, influence the production of butter-fat in the Valley but at the present time the condition is unchanged and winter feeding for milk production will have to be encouraged and the herds increased before a creamery could pay its way.

Probably due to the natural increase of alsike clover into the hay-fields and to a certain amount of mineral feeding there have been only two or three cases of mineral deficiency of any importance noted. True, more mineral could be used to advantage and would result in heavier bones in the animals, but there has been practically no loss of calves or deformation this season.

Sheep and Swine.—These are two projects that receive little support in this district. While both are raised to some extent, sheep-raising is confined to definite farms, and has been for years. Swine, on the other hand, may be found on practically every farm but little effort is made to raise more than is needed for home consumption.

Sheep-raising on a large scale requires a knowledge of the business that is lacking in most cases and also requires full attention. Most of the farmers in this district depend on certain cash crops, such as timothy, or some branch of agriculture such as beef-cattle or milk production. A few sheep may be kept on these farms in an enclosure and the surplus sold to supply a limited local demand for mutton, but no effort is made to increase the flock. The price of wool in the past has also been a limiting factor. Now that the price has increased somewhat, those already in the business may enlarge their flocks but there is little expectation of much increase in the near future. Practically all wool was marketed through the Sheep-producers' Association. There is a small local demand for raw and carded wool for home spinning, weaving, and wool comforters.

Small Fruits.—The crop of small fruits was excellent this year in all parts of the district. Growers are able to supply their own needs and a few have some surplus. Since the loss of raspberry and strawberry trade to Terrace, several years ago, no effort has been made to regain the market.

The raspberry cane-borer, which infested a few plantings of raspberries at Terrace in 1936, was controlled by destryoing the stands and setting out a new lot.

Other Fruits.—The apple-crop from Terrace was the best yet produced. Notably good were the McIntosh Reds and Wealthys. While the apples did not reach the full size expected, they matured well and were of excellent quality. In this branch also, lack of grading is a drawback to the appearance and demand for the produce. Common scab was evident this spring, but was controlled successfully where the required number of sprays were used.

Field Crops.—The season was late for grain-crops in the spring and late seedings were retarded by a short dry spell. The expected yields were high, but continued rains throughout the summer and fall prevented ripening of all late varieties. The early varieties of oats, wheat, and barley introduced or encouraged by the Department of Agriculture were especially valuable this year.

Olli barley, which was introduced in 1936, again gave a good yield and matured ten days to two weeks before O.A.C. 21. At the Central British Columbia Seed Fair the first prize

went to the Olli barley. O.A.C. 21 barley is for the most part successful in both the Bulkley Valley and Lakes District, and will no doubt slightly outyield the Olli variety. The latter, however, appears a safer crop, which is an important consideration if feed is to be produced for finishing live stock.

Cartier Oats.—Last year 100 lb. were supplied to H. H. Silverthorne at Houston for trial. He was well satisfied with the oats and seeded most of it this year. The yield appears to be higher than Alaska and ripens fully as early. Another 100 lb. of this seed was supplied to C. Griffin, of Barrett Lake, this year. The crop appeared excellent, but this experiment as well as two lots of Olli barley and one of Diamond oats are still in stacks waiting for threshing as no figures are available on yields.

Diamond oats supplied to Chas. Hunter, of Colleymount, were sown on an acre of land. Mr. Hunter, the grower, was pleased with the results and maturity and stored it as soon as possible in the barn so there would be no damage from rain.

The amount of alsike clover present in the timothy stands is much higher than ever before. This is a drawback to the timothy-seed industry, but of great value to those raising hay for dairy feed. The alsike clover gives also a much later pasture than the timothy. Other hay-crops such as brome-grass, meadow-fescue, crested wheat-grass, and alfalfa showed no increase for this purpose. For seed, however, small amounts of brome-grass, crested wheat-grass, and meadow-fescue were threshed.

Weed-control.—The farmers of this district depend largely upon timothy-seed for a cash crop. The presence of noxious weeds has in some cases affected the grade of the seed. Little effort has been made in the past to have these weeds controlled. At present they do not present a serious problem, but if left will in a few years spread to some of the large areas The ox-eye daisy (*Chrysanthemum Leucanthemum*) appears to be the most difficult at present, although many farmers resent the spread of dandelions. The latter, however, appear to be a problem for the farmer himself and will no doubt be controlled satisfactorily by an improvement in farm methods.

Insect Infestations.—Northern British Columbia is notably free of insects attacking cultivated plants. This season there was brought to the attention of the Dominion Entomological Branch, first, a grub attacking the immature heads of timothy, and, second, a grub on turnips.

Dr. Wm. Newton, of the Plant Pathology Station at Saanichton, inspected some of the infected fields. No control could be recommended other than ploughing after the hay was removed. Dr. Newton was, however, of the opinion that this insect would not present a serious menace and would be noticeable only during certain years favourable to its development. The grubs found were identified as larvæ of the crambid moth.

From the Woodmere District near Telkwa a number of turnips were brought in which were badly infested with grubs. Some of these were sent to the Entomological Branch at Vernon for identification. They were identified as larvæ of the Bibionidæ (March flies). They are reputed to live in the organic matter in the soil and only rarely do any damage to the crops.

The Seed Fair was held this year at Burns Lake. The quality and number of exhibits was not as good as usual. Grains especially were weathered. Only those who were fortunate enough to get their grain cut and threshed early had samples of sufficient merit to show.

A number of the winning exhibits from the local seed show were sent to the Vancouver Winter Fair. All firsts in timothy and alsike clover were taken by Northern British Columbia. Two exhibits of timothy-seed from this district sent to the Royal Winter Fair at Toronto were awarded fourth and fifth prizes.

PRINCE GEORGE DISTRICT.

JAMES TRAVIS, DISTRICT AGRICULTURIST.

Agricultural Short Courses were continued at Vanderhoof, following up the work of previous year. S. G. Preston, District Agriculturist, Smithers, assisted with lectures and demonstration as previously. The regular sessions, five in number, were devoted to plants and plant-life, with a special session attended by the members of the Vanderhoof Board of Trade, at which specific subjects, including live-stock raising and freight rates, alsike-seed

production and alfalfa, were presented. Projector and mimeoscope machines were used in connection with lectures.

The first treatment of cattle for warble-fly control throughout the defined Pineview area was administered early in April. The Derris-powder formula was used. Farmers were visited by members of committee and methods of application were demonstrated. In poultry-club circles sittings of eggs were procured for members. Inspection of certified seed-potatoes was conducted at Newlands and reports furnished. Package bees from California were installed in demonstration hive at Pineview location.

With a view to increasing the domestic-bee population of the alsike-seed growing centres as an agent to flower fertilization, the Deputy Minister placed a Kootenay hive from his apiary at our disposal and assisted in furnishing package bees and equipment. Despite weather conditions a strong hive was built up and will be wintered over. Local interest has been stimulated and an increase in private colonies is expected next spring.

Lime deposits and gopher menace were personally investigated at McBride, Dunster, Croydon, and Shere.

Early in June the Sixth Annual Ploughing-match was held at Vanderhoof, at which Indians and whites competed. This work was judged and an address delivered when prizes were awarded.

The Relief Vegetables Committee of the Prince George Board of Trade was assisted in assembling shipments for the Prairies.

Alsike-seed threshing operations commenced on December 18th.

Early in October the Clipper cleaner transferred from Telkwa was installed at Woodpecker and Mr. E. O. Hutchinson was instructed in the operation of same. This machine was installed in time to handle the season's crop of alsike-seed and has already proved to be a great boon to the district of Woodpecker, Red Rock, Hixon, and Strathnaver.

The growing of alsike-clover seed is rapidly becoming an industry of major importance for several reasons: It is quickly available for crop-rotation, matures seed rapidly, and has proven to be a good paying cash crop over a period of years. The distribution for the present year over the respective districts is approximately as follows: Pineview, 100 tons; Vanderhoof, 10 tons; Woodpecker-Strathnaver, 20 tons; Salmon Valley, 20 tons; compared to 20 tons for all districts in 1936. Little or no winter-killing was experienced and sufficient moisture was available at all times during the growing period. Due to September rains some difficulty in threshing was experienced and in several cases severe losses were sustained. Crop shortages of this seed were reported throughout the clover-growing districts of Ontario and United States, thereby upholding the prices offered to growers by wholesale firms—No. 1 grade averaging 20 cents per pound—a price comparable to that of 1936.

At Chicago International Grain and Hay Show this year R. Blackburn, Prince George, was awarded third prize, and E. J. Down, Woodpecker, fifth prize for alsike-clover seed.

Comparison with last year, when hay and feed supplies were short, there is an ample supply of mixed hay and sheaf oats on hand. Had there been less precipitation during the haying period there would undoubtedly have been a substantial surplus. Unfavourable weather influenced the farmer to cease cutting when his quota was assured. This factor, coupled with the retention of alsike-clover fields for seed purposes, served to check the accumulation of hay and hold the supplies to a little above the normal level. Consequently, there is little inducement on the part of the growers to unload "competitive" or "cheap" hay on the market.

Throughout the Vanderhoof District oats and wheat have again yielded heavy crops. Up to December 11th twenty car-loads have moved to Coast elevators from this point where a modern elevator with a capacity of 30,000 bushels has recently been erected. Seed-oats of Banner and Victory varieties, and seed-wheat of Marquis, Garnet, and Reward, of sufficiently high germination is plentiful, but there is a persistent demand for reliable seed of early varieties of oats, particularly Legacy, also for hardy, early-maturing strains of fall wheat.

In co-operation with the Provincial Department of Agriculture, certain growers are conducting trials of a variety of crops in order to determine their importance and adaptability to the Central Interior. These include:—

Crested Wheat-grass by W. Coulter, Hixon.

Astragalus Rubyi (a type of wild pea of prostrate habit, making abundant growth of high-quality hay) by W. O'Meara, Vanderhoof, and J. W. Barrett, Pineview District, Prince George.

Oats, White Cross (early), by W. Cornell, R.R. No. 1, Prince George.

Flax, Bison, by Mrs. Josephine Mitchell, Summit Lake.

Wheat, Fall, Oro, by A. Miller, Mud River.

Under direction of the Provincial Horticulturist, shipments of sixteen hardy varieties of apple-trees, totalling 136 trees, were received. This young stock has been placed with fourteen selected growers and planted on approved sites throughout the district.

An October shipment of 300 strawberry-plants in six varieties was received at Prince George on the 19th instant. Four previously selected growers will endeavour to bring the plants through the winter.

The movement of live stock to Coast and Prairie markets was slightly stimulated due to higher prices prevailing over those paid during 1936, especially for the better-finished lots of good steers or choice heifers. Local producers of small lots still have difficulty in selling beef or pork which lacks finish and quality.

The figures from December 1st, 1936, to November 30th, 1937, show approximately twenty-six car-loads of cattle and one car-load of sheep as having been shipped to Prince Rupert, and forty cars of cattle to Vancouver over the same period.

The Annual Colt and Calf Show at Vanderhoof brought forward some very fine yearlings as well as sucking-colts, and the progeny of registered Shortborn bulls on show was an indication of the interest being taken in good breeding stock. Throughout the Pineview and Woodpecker Districts some nice colts are showing up from the Belgian horse " Farceur Boy." Two more stallions are expected with settlers arriving from Alberta and located near Woodpecker.

The gopher menace has been causing some concern throughout the Croydon and Dunster Districts, resulting in much damage to growing crops. At the instigation of the Department demonstrations in the use of Cyanogas as a means of control have been conducted throughout the affected districts with favourable results. Recent reports from the local institutes indicate that this method is meeting with much success and plans are under way for a more extensive campaign of extermination next year.

GRAND FORKS DISTRICT.

G. L. Landon, District Agriculturist.

Crops were good generally with good yields of grain, hay, and potatoes. Owing to the wet weather in June, the first crop of alfalfa was spoiled. A considerable quantity of field corn also moulded in the fall. Acreages of the principal crops in the Grand Forks Valley were as follows: Alfalfa, 726 acres; potatoes, 242 acres; onions, 47 acres; grain-crops, 929 acres; and vegetable-seeds, 65 acres.

Threshers' returns are not complete as yet for 1937, but those received to date show 33,401 bushels of spring wheat; 4,134 bushels of winter wheat; 11,837 bushels of oats; 3,725 bushels of barley; and 1,853 bushels of rye threshed; making a total of 54,950 bushels threshed.

While the hay-crop was good, there will be no surplus feed and a possibility of a shortage before stock can be turned out on the ranges again.

One of the worst outbreaks of grasshoppers on record occurred in the Midway and Kettle Valley Districts, with isolated areas affected in other sections. The young commenced hatching in May and immediate steps were taken to combat them. Entomologists estimated the insects were hatching at the rate of 5,000 to 10,000 per square yard.

Poison-bait material was mixed and distributed for several weeks at Midway. Labour was more or less voluntary although some public subscriptions were received to pay a small portion of the labour costs. Poison-bait materials were supplied by the Department.

In connection with the campaign experimental tests were undertaken using Epsom salts (magnesium sulphate). This was applied on several plots, using the formula recommended by Oklahoma State Experiment Station. Results were either conflicting or indecisive and

further tests will be undertaken in 1938. Epsom-salts bait would be safer to use where live stock are grazing, although the committee in charge handled the situation so well that no trouble of any kind occurred.

A comparatively severe outbreak of the Colorado potato-beetle occurred in the Grand Forks Valley, the first this district ever experienced. It is also believed to be the farthest point west the beetles have arrived in Canada.

The adult beetles and larvæ were located in approximately fourteen fields in various parts of the valley. A close check-up was made on all areas through the valley, but it was physically impossible to examine carefully all the fields in the 250 or more acres grown in the valley.

Mr. Max Ruhmann, Provincial Entomologist, spent several weeks in the district assisting in checking up on the outbreak. An efficient duster was secured and several hundred pounds of calcium arsenate and lead arsenate dust were used on the affected fields.

Mimeographed letters were sent to every farmer in the valley several times during the summer, warning them of the danger of the outbreak and stressing the need for careful examination of their potato-plots. Considerable publicity was also given the matter in local newspapers. Generally speaking, excellent co-operation was received from the growers. Mr. Ruhmann and I visited Stevens and Ferry Counties, located along the border in Washington State. We found that beetles had been in Stevens County for about twelve years at a distance of about 60 miles from Grand Forks. They are considered simply another pest there. However, it is impossible to determine how they arrived in Grand Forks or where they came from.

The *Fusarium* attacking spinach grown for seed again made its appearance and experiments at the Summerland Pathological Laboratory indicate that soil temperatures above 60 degrees favour the organism. This indicates that Grand Forks District will have to give up the idea of growing spinach-seed at least for the present.

No expansion can be recorded in the vegetable-seed industry, the acreage being 61 acres, made up of 47 acres of onions for seed, 6 acres of carrots for seed, and 8 acres of field beans. The beans were grown under contract for a Vancouver firm, the varieties being Luther Burbank and Great Northern. The growing of beans for table use on a contract basis is a new venture for this district. The price received was 3 cents per pound f.o.b. Grand Forks and prospects are not good for any expansion at present. The district needs more cash crops of this kind.

There were twelve varieties of onions grown for seed purposes, five varieties of carrots, three varieties of beans, and one variety of cabbage.

Your Agriculturist gives a considerable amount of time to the seed industry, as it is considered one of the most important in the Province.

Grand Forks Valley was constituted a seed-control area under the "Seed-growers' Protection Act" during the year.

The Clipper cleaning-machine and Marriott hand-screens continue in great demand and are in use most of the time.

Rodent-control is the most important project in the district and interest was keen during the year. Several Cyanogas foot-pumps were purchased during the year and large quantities of Cyanogas were purchased through the Farmers' Institutes. The rebate policy of the Department to members of Farmers' Institutes is proving very satisfactory and is really getting results in the control of rodents. Considerable quantities of strychnine is also purchased in some districts under the rebate policy, but this is not encouraged as it is felt that Cyanogas is equally as effective and safer to use.

Poultry-work.—From September to December, inclusive, a total of 93,008 birds were blood-tested, as compared with 78,000 in 1936 and 42,000 in 1935. A separate report on the Pullorum testing of Fraser Valley flocks appears in the report of the Poultry Commissioner.

PEACE RIVER DISTRICT.

T. S. Crack, Acting District Agriculturist.

During the month of April a car-load of certified Garnet wheat (1,390 bushels) was shipped from Grand Prairie and distributed amongst fifty farmers who wished to improve

their seed. This seed was sold for $1.50 per bushel, which yielded and turned out very well this fall, but owing to the cut in price it is hard to say whether it will be advisable to continue growing Garnet or encourage Reward or Red Bobs 222.

It was not necessary to have any oats or barley brought in to the district this year for seed as the Legacy oats and Olli barley purchased in the spring of 1936 produced seed enough for all those desiring seed for this year; in some cases Olli barley threshing out as high as 53 and 59 bushels to the acre, but averaging about 40 bushels.

The oats throughout the Block did not turn out very well, averaging from 35 to 45 bushels per acre. At the present time it is a question whether it will be wise to ship out seed-oats as there are a number of settlers in the Block who will not have seed for the spring.

There are eighteen hand cleaning-machines in this district which were purchased through Government assistance. They are doing splendid work and are greatly appreciated by the districts receiving them. There are also two power cleaning-machines—one stationed at Rolla and one at North Pine. Both are doing very fine work.

Dr. Knight, Chief Veterinary Inspector, visited the district during the month of August and tested in the neighbourhood of 500 head of cattle for T.B. and found only one reactor. The whole district south of the Peace River was covered, but the roads were too bad to travel on the north side at that time.

Through the Peace River Co-operative Seed-growers' Association eight car-loads of oats were shipped out last spring for seed purposes, some of them going as far as Quebec.

Professor P. A. Boving, of the University of British Columbia, arrived in the Block on July 26th and left again the evening of August 24th. He delivered twenty-two addresses during that time and also attended as judge at practically all the fairs.

Five Agricultural Fairs were held in the district—namely, Fort St. John, Groundbirch, Riverside, Progress, and Dawson Creek—during August. All were successful with the exception of Groundbirch Fair, which had to be postponed for one week owing to the bad weather and road conditions. This fair should join in with the Kiskatinaw Fair and make one fair in the west section of this district. One School Fair was held at Doe River on August 23rd with a marked improvement over 1936.

The Peace River District Seed Fair was held at Dawson Creek on November 13th with a very keen interest being taken, there being a marked improvement over the 1936 fair, and if weather conditions are favourable for 1938 I look for keener competition. Thirteen seed exhibits were sent from this district to the Vancouver Seed and Root Fair and all of these received prizes.

There were two standing-crop competitions with oats held in the Groundbirch and Progress Districts. A garden competition was held in the Groundbirch District which was very successful. Professor P. A. Boving assisted in the judging of this competition and was so interested in it that he donated a cup for competition in this district. I hope during the coming year to extend this competition to other districts.

Three very successful field-days were held at Beaverlodge, Pouce Coupe, and Baldonnel Experimental Stations. These were all very well attended and much interest was created.

There has not been any evidence of grasshoppers in any part of this district this year. The plague at Charlie Lake and Taylor Flats that I reported last year did not appear this year as we had a late snow-storm in May which appeared to kill them as they were hatching out.

This season four Boys' and Girls' Clubs were organized—namely, one beef calf club, one swine club, one potato club, and one poultry club. For another year, if possible, I consider it will be advisable to extend swine and calf clubs, also grain clubs, to other districts. This has proved to be good work so far as it has gone.

From January 1st to December 15th, the live stock shipped by the Dawson Creek Co-operative Shipping Association was as follows:—

1,751 head of cattle	$45,109.66
6,380 hogs	96,846.99
395 sheep and lambs	2,099.38
Total receipts	$144,056.03

This represents approximately 75 per cent. of the live stock leaving this district; small shippers sending the balance. Another live-stock shipment will be leaving Dawson Creek on Saturday, December 19th. The estimate of this shipment is as follows:—

1,000 hogs	$15,000.00
24 head of cattle	800.00
Total receipts	$15,800.00

This will show an increase over 1936 as follows:—

721 head of cattle	$18,989.19
2,122 hogs	35,257.21
223 sheep and lambs	2,539.33
Total receipts	56,785.73

There have been forty-five experiments tried out in the Block under the Field Crop Union. It was impossible to keep in touch with all of these during the growing season, but most of them were fairly satisfactory, although some were neglected.

There are sixty-six threshing-machines operating in the Block. Reports of the threshermen as completed to date show the following amount of grains threshed in this district during 1937:—

	Bu.
Spring wheat	580,937
Winter wheat	1,383
Oats	346,965
Barley	54,386
Peas	31
Rye	1,132
Flax	12
	Lb.
Alfalfa	1,590
Clover	208
Timothy	166
Brome-grass	62

Very good work was done by the Weed Inspectors, both north and south of the Peace River, and many patches of weeds were controlled; several small patches of Canada and sow-thistle being found and treated successfully. East and north of Rolla is very badly infested with stinkweed, which is our hardest problem to control at the present time. One small patch of hoary pepper-grass has made its appearance at Rolla and was treated with Atlacide in the early summer and once with sodium chlorate this fall. When the ground froze up there was no sign of life in the plants.

Far more interest and sound work is being done by the local institutes throughout the Block than in previous years. The convention held at Doe River and attended by the Superintendent of Farmers' Institutes indicated the wholesome attitude of our organized farmers toward their community needs. Mr. Jamieson, the Advisory Board member, returned from the Board meeting held in Victoria in November, and has since visited several of the institutes and given a full and interesting report of the Board. The Women's Institutes throughout the district are carrying on very good work. I have attended several of their meetings and find they are all working for the betterment of their respective districts.

The farmers of this district are generally concerned in mixed farming; some, of course, are interested in wheat-growing, but only in such districts as Rolla, Landry, and a few around Dawson Creek.

The spring was very dry during seeding and until early summer, causing to some extent a shortness of feed in some districts for this winter. The indications are at the present that there will be sufficient feed and seed in the district for our own use during the winter and coming spring without having to have any shipped in.

The weather during the harvest and threshing periods was ideal and all crops were harvested in very good shape, although the yield was not up to the average. With the present prices the farmers are making out very well.

More interest is being taken in the improvement of breeding of live stock than in previous years and there is now a decided improvement.

There is a considerable amount of summer fallow and fall ploughing done ready for the coming spring. The land did not freeze up until the second week in November and no damaging frosts until that time.

During November I visited several institutes and spoke on suitable subjects along with the motion picture, and all these meetings were very well attended. Mr. Albright, from the Experimental Station, Beaverlodge, Alberta, was in the Block for seven days the beginning of November and spoke at eleven meetings in different districts, and also assisted in judging at the seed fair. All his meetings were very well attended.

APPENDICES.

APPENDIX No. 1.

Greenhouse Surveys, 1923–37.

District.	Area in Square Feet and No. of Growers.							
	1923.	1925.	1927.	1929.	1931.	1933.	1935.	1937.
Lower Mainland	690,480	782,154	843,720	1,081,868	1,042,634	1,079,359	1,170,208	1,042,948
Growers (white)	45	56	70	80	81	91	146	156
Lower Mainland	163,670	208,794	254,590	382,117	666,639	705,124	819,025	1,033,521
Growers (Orientals)	2	6	8	14	32	39	128	151
Vancouver Island	570,930	567,357	663,653	746,324	856,685	918,762	868,299	905,609
Growers (whites)	51	65	88	110	128	143	155	168
Vancouver Island	382,382	654,664	844,095	1,018,024	1,222,883	1,271,291	1,545,234	1,666,554
Growers (Orientals)	9	15	18	22	34	36	45	46
Okanagan	67,770	80,650	116,277	117,177	121,345	135,605	168,325	207,092
Growers	8	12	21	23	16	20	29	31
Kootenay	29,948	33,737	42,427	40,171	38,216	42,523	41,696	41,141
Growers	5	8	9	11	12	12	12	12
Totals	1,905,180	2,327,356	2,764,762	3,385,681	3,948,402	4,152,664	4,612,787	4,896,865
Growers	120	162	214	260	303	341	515	564
Whites	1,359,128	1,463,898	1,666,077	1,985,540	2,058,880	2,176,249	2,258,528	2,196,790
Growers	109	141	188	224	237	266	342	367
Orientals	546,052	863,458	1,098,685	1,400,141	1,889,522	1,976,415	2,354,259	2,700,075
Growers	11	21	26	36	66	75	173	197

APPENDIX No. 2.

SUMMARY OF RESULTS OF SPRAYING AT MR. HART'S, 1937.

Variety.	No. of Sprays.			Material used and Percentage of Damage.						
	Calyx.	1st Brood.	2nd Brood.	(1.) L.A.	(2.) L.A.	(3.) L.A.	(4.) C.L.A.	(5.) Pheno.	(6.) C.A.	(7.) L F.O.
McIntosh	.....	2	....	8.3	8.2	7.0	15.0	16.1	14.6	8.0
,,	.....	3	....	5.8	5.6	6.0	9.0	15.7	10.7	4.6
,,	.....	2	1	5.9	3.9	3.8	9.1	9.3	8.1	8.9
,,	.....	3	1	8.2	2.0	4.0	6.9	10.0	10.5	6.4
Jonathan	.....	2	....	14.9	6.7	8.0	5.0	13.5	3.9	2.8
,,	.....	3	....	13.3	9.2	6.5	6.9	7.7	4.1	3.9
,,	.....	2	1	10.1	2.8	5.5	.....	7.7	7.7	.....
,,	.....	3	1	6.0	3.2	2.5	4.2	6.3	3.2	2.8
Stayman	.....	2	....	10.0	7.5	6.1	8.3	7.3	7.7	3.3
,,	.....	3	....	6.6	10.4	12.3	8.7	5.0	6.9	3.4
,,	.....	2	1	3.2	5.8	5.4	5.6	6.1	4.8	1.4
,,	.....	3	1	5.4	5.3	3.1	5.3	4.3	2.4	1.6
Newtown	.....	2	....	20.1	12.6	13.9	24.4	38.0	.....	.....
,,	.....	3	....	9.2	7.9	18.9	22.4	41.5	15.2	.....
,,	.....	2	1	9.3	5.2	7.4	14.2	31.8	7.0	.....
,,	.....	3	1	7.4	7.6	13.7	9.0	10.9	17.7	.....

NOTE.—Column No. 2 received a calyx spray; Nos. 1 and 3 are duplicates.
L.A., lead arsenate and fluxit.
C.L.A., colloidal lead arsenate.
Pheno., phenothiazine.
C.A., calcium arsenate.
L.F.O., lead arsenate plus fish-oil.

APPENDIX No. 3.

SUMMARY OF SPRAYING AT MR. RAMSAY'S (PERCENTAGE OF DAMAGE), 1937.

Variety.	3 First Brood plus 1 Second Brood.			3 First Brood only.		
	Plot 1.	Plot 2.	Plot 3.	Plot 1.	Plot 2.	Plot 3.
Wealthy	3.9	.....	3.4	.....	12.5	11.7
Gravenstein	3.4	.....	.....	.....	.....	.....
St. Lawrence	6.2	.....	.....	.....	.....	.....
McIntosh	11.7	.....	17.0	.....	.....	.....
Cox's Orange	.....	.....	3.4	.....	.....	.....
Snow	.....	.....	15.1	.....	.....	20.8
Delicious	25.8	19.9	19.1	.....	.....	.....
Yellow Newtown	.....	.....	9.9	.....	.....	.....
Northern Spy	11.6	17.8	17.6	.....	24.9	29.1

Variety.	2 First Brood plus 1 Second Brood.		2 First Brood only.	
	Plot 4.	Plot 5.	Plot 4.	Plot 5.
McIntosh	20.7	34.4	.....	.....
Delicious	.....	10.1	.....	.....
Northern Spy	15.0	43.0	.....	.....
Newtown	24.3	.....	.....	.....
Wealthy	.....	.....	25.2	13.3

NOTE.—*Plot No. 1, arsenate of lead and fluxit.*
Plot No. 2, calcium arsenate plus blood albumen, etc.
Plot No. 3, arsenate of lead and fluxit.
Plot No. 4, arsenate of lead and fluxit.
Plot No. 5, phenothiazine.

APPENDIX No. 4.

Exported Nursery Stock.

Two hundred and thirty-seven shipments of nursery stock in 2,249 containers, valued at $29,870.79, comprised the total exported during the year. The particulars are listed under the various countries concerned:—

Countries.	Fruit-trees.	Small Fruits.	Orna-mentals.	Roses.	Plants.	Roots.	Bulbs.	Conifer-seed.	Spruce-cones.	Miscellaneous.
								Lb.	Sacks.	
British Isles	---	12	1	32	126	6	7,638	13¾	.....	.....
Australia	---	.....	1	.....	.....	---	3,679	.....	.....	.....
New Zealand	46	187	.....	.....	2	---	2,790	70	.....	.....
India	---	.....	.....	.....	6	---	29	.....	.....	.....
Bermuda	---	.....	.....	15	.....	---	.....	.....	.....	.....
Austria	---	.....	.....	.....	.....	---	.....	255	.....	.....
Germany	---	.....	.....	.....	.....	---	.....	376	.....	.....
Norway	---	.....	.....	.....	.....	---	.....	2	.....	.....
Finland	---	.....	.....	.....	.....	---	.....	28¼	.....	.....
France	---	.....	.....	24	.....	---	.....	150	.....	.....
Denmark	---	.....	.....	.....	.....	---	.....	695	.....	.....
Czecho-Slovakia	---	.....	.....	.....	.....	---	.....	25	.....	.....
Holland	---	.....	.....	.....	.....	---	3,000	1	.....	.....
Roumania	---	.....	4	.....	.....	---	.....	.....	.....	.....
Italy	---	.....	.....	16	.....	---	.....	.....	.....	.....
Colombia, C.A.	---	48	.....	.....	.....	---	.....	.....	.....	.....
China	2	.....	.....	.....	.....	---	.....	.....	.....	.....
U.S.A.	5	1,100	983	11,195	2,872	1	34 quarts, 1,275,244	6,488	1,355	627 scions, 25½ lb. nuts, 3 oz. flower-seed
Totals	53	1,347	989	11,282	3,006	7	34 quarts, 1,292,380	8,104	1,355	627 scions, 25½ lb. nuts, 3 oz. flower-seed

APPENDIX No. 5.

Summary of Importations of Feed-grains brought in from Alberta to Coast Districts under Provisions of Tariff 145.

Month.	Wheat.		Oats.		Barley.		Mixed Grain.		Rye.		Screenings.		Total Certificates issued.	Cancelled.
	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.		
January	1,681	1,250	1,156	1,950	386	1,710	.....	.....	.....	.....	.....	.....	69	1
February	2,283	171	444	212	142	586	.....	.....	.....	.....	.....	.....	45	...
March	1,407	1,060	116	1,175	93	1,200	12	1,000	.....	.....	.....	.....	37	...
April	995	60	722	1,260	34	930	20	.....	.....	.....	.....	.....	39	1
May	670	.....	407	210	53	480	.....	.....	.....	.....	.....	.....	26	...
June	1,635	170	112	1,580	207	1,120	30	.....	.....	.....	.....	.....	42	...
July	1,972	1,060	60	1,980	216	600	.....	.....	.....	.....	30	.....	50	...
August	1,600	1,800	75	120	141	1,200	.....	.....	.....	.....	.....	.....	40	...
September	2,621	700	69	1,610	72	1,620	.....	.....	.....	.....	.....	.....	49	...
October	2,386	1,700	74	665	1,124	705	30	.....	.....	.....	.....	.....	82	1
November	2,188	1,020	351	1,133	651	1,588	.....	.....	.....	.....	.....	.....	72	...
December	1,700	1,830	348	1,720	475	290	31	1,180	.....	.....	.....	.....	65	...
Totals, 1937	21,143	831	3,940	1,615	3,600	29	124	180	.....	.....	30	.....	616	...
,, 1936	28,843	653	4,552	1,744	5,592	1,398	288	520	82	270	63	.....	970	...
,, 1935	31,612	1,340	6,103	570	7,070	664	574	1,720	.....	.....	.....	.....	1,186	...
,, 1934	26,339	428	2,538	14	4,383	224	.....	.....	.....	.....	80	1,000	866	...

APPENDIX No. 6.

Movement of Grain Screenings from Vancouver Elevators for the Years 1933–1937 (inclusive).

Year.	For Use in British Columbia.				Export.		Total.	
	Nos. 1 and 2 Feed.		Elevator and Refuse.		Elevator and Refuse.			
	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.
1933	1,934	934	15,283	1,170	3,009	1,670	20,227	1,774
1934	1,464	1,460	12,757	1,810	4,140	850	18,363	120
1935	1,503	840	10,860	440	2,302	330	14,665	1,610
1936	1,191	200	11,644	1,040	4,387	1,770	17,223	1,010
1937	513	960	3,619	1,430	3,144	720	7,277	1,110

APPENDIX No. 7.

Summary of Inspection and Grading of Dairy-farms.

District.	No. of Premises.	No. of Cattle.	A.	B.	C.	Ungraded.
Vancouver Island and Gulf Islands	557	7,164	259	84	3	211
Coast Points (Squamish)	27	97	1	3	1	22
Lower Fraser Valley	2,430	39,741	186	2,142	102	.....
Okanagan	67	693	3	41	2	21
Interior (south of C.P.R. and C.N.R.)	88	1,296	3	64	.....	21
East and West Kootenays	286	3,394	66	76	3	141
Cariboo and Lillooet	13	166	4	4	1	4
Peace River Block	133	522	.....	.....	1	132
Totals	3,601	53,073	522	2,414	113	552

APPENDIX No. 8.

Total Summary of Tuberculin Testing.

District.	No. of Premises.	No. of Cattle tested.	Reactors.
Vancouver Island and Gulf Islands	521	6,481	8
Coast Points	30	154	....
Central B.C.	89	595	3
Peace River Block	131	487	1
Cariboo and Lillooet	15	153	....
East and West Kootenays	206	2,477	28
Interior (points south of C.P.R. and C.N.R.)	107	1,336	29
Okanagan	80	722	8
Totals	1,179	12,405	77 (0.62%)

APPENDIX No. 9.

Summary of Honey Production by Districts.

District.	Year.	Apiaries.	Hives.	Crop.	Hive Average.
				Lb.	Lb.
Vancouver Island, Gulf Islands, and Howe Sound	1936	660	2,407	73,475	30.5
	1937	660	2,407	121,150	50.7
Greater Vancouver	1936	451	2,365	73,725	31.2
	1937	451	2,365	101,725	43.0
Lower Fraser	1936	765	6,620	213,725	32.2
	1937	765	6,620	385,225	58.1
Upper Fraser and Chilliwack	1936	357	2,825	102,600	36.3
	1937	357	2,825	193,225	68.4
Okanagan, Shuswap, and Thompson Valleys	1936	600	4,780	518,500	108.5
	1937	600	4,780	476,500	99.6
Kootenays	1936	213	1,710	129,100	75.5
	1937	213	1,710	125,400	73.3
Central Interior	1936	33	310	18,600	60.0
	1937	33	310	23,250	75.0
Totals	1936	3,079	21,017	1,129,725	53.7
	1937	3,079	21,017	1,426,475	67.8

APPENDIX No. 10.

THRESHERS' REPORTS, 1936.

District.	Spring Wheat.	Winter Wheat.	Oats.	Barley.	Peas.	Rye.	Legume-seed.	Grass-seed.	Mixed Grains.
	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Lb.	Lb.	Bu.
Kamloops and District	35,706	15,011	52,263	27,112	297	2,002	6,000	.....	.....
Okanagan	83,949	64,243	161,192	48,439	126	6,824	22,900	.....	159
Nelson and Arrow Lakes Districts	3,857	190	7,572	476	20	.....	.....	.....	.....
Grand Forks and Boundary	23,736	10,351	11,619	4,136	.....	1,468	.....	.....	.....
Creston and East Kootenay	234,860	.....	13,100	890	.....	.....	.....	.....	.....
Cariboo	41,757	.....	138,044	17,374	.....	770	.....	1,000	.....
Prince George	13,236	490	144,941	4,953	551	40	34,775	.....	.....
Smithers, Bulkley Valley, and Lakes Districts	15,467	390	67,836	9,608	76	72	.....	1,139,311	.....
Salmon Arm and District	14,050	3,100	58,830	23,285	4,043	.....	1,500	.....	.....
Peace River	589,251	819	529,263	98,527	.....	1,956	6,100	12,300	30
Lower Mainland	6,425	1,700	335,355	12,280	5,496	184	10,200	.....	337
Vancouver Island	8,768	25,264	166,598	6,027	964	110	.....	.....	1,886
Totals	1,071,062	121,558	1,686,613	253,107	11,573	13,426	81,475	1,152,611	2,412

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