PROVINCE OF BRITISH COLUMBIA

TWENTY-NINTH ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1934

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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1935.

To His Honour J. W. FORDHAM JOHNSON,
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 1934.

K. C. MACDONALD,
Minister of Agriculture.

Department of Agriculture,
Victoria, B.C., January 17th, 1935.

OFFICERS OF DEPARTMENT OF AGRICULTURE.

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

ADMINISTRATION AND GENERAL SERVICES.

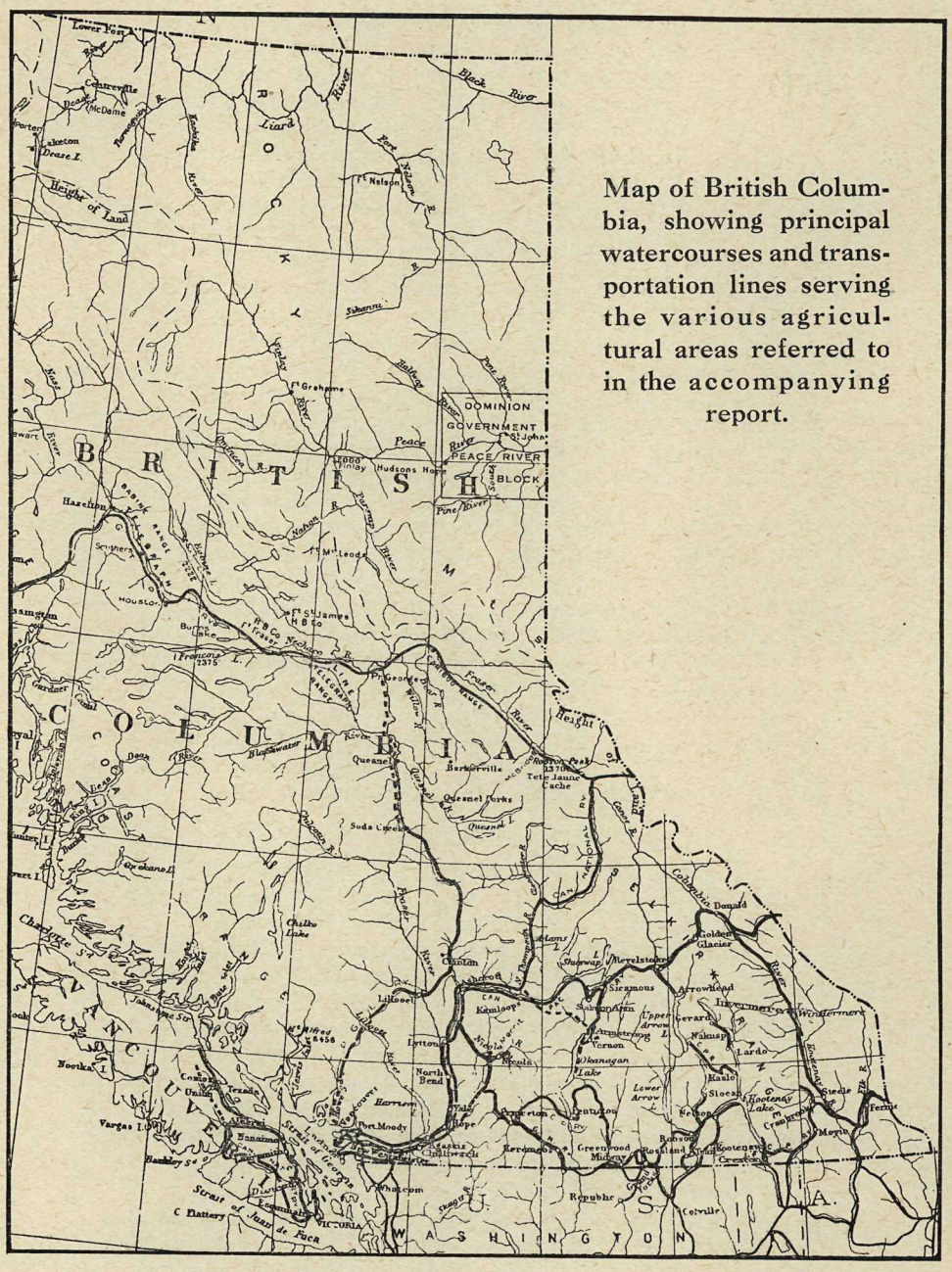
J. A. Grant, Markets Commissioner, Victoria, B.C.
W. H. Thornborrow, Accountant, Victoria, B.C.
George H. Stewart, Statistician, Victoria, B.C.
C. P. L. Pearson, Assistant Accountant, Victoria, B.C.
A. J. Hourston, General Assistant, Victoria, B.C.
A. H. Shotbolt, Exhibition Specialist, Victoria, B.C.
L. W. Johnson, Senior Clerk, Victoria, B.C.
C. C. Kelley, B.S.A., in Charge of Soil Survey, Kelowna, 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, V.I.
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, Nelson, B.C.
Dr. D. H. McKay, Provincial Veterinary Inspector, Kamloops, B.C.
J. R. Terry, Poultry Commissioner, Victoria, B.C.
F. H. Davey, Secretary and Inspector, Live Stock Branch, Victoria, B.C.
George Pilmer, Brand Recorder, Victoria, B.C.
John Cahilty, Brand Inspector, Kamloops, B.C.
George W. Challenger, 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.
H. S. French, B.S.A., District Agriculturist, Prince George, B.C.
G. A. Luyat, B.S.A., District Agriculturist, Williams Lake, B.C.
Don Sutherland, B.S.A., District Agriculturist, Smithers, B.C.
H. E. Waby, District Agriculturist, Salmon Arm, B.C.
James Travis, District Agriculturist, Pouce Coupe, B.C.



Map of British Columbia, showing principal watercourses and transportation lines serving the various agricultural areas referred to in the accompanying report.

REPORT OF THE DEPARTMENT OF AGRICULTURE.

REPORT OF DEPUTY MINISTER OF AGRICULTURE.

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

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

SIR,—I have the honour to submit herewith the Report of the Department of Agriculture for the year ended December 31st, 1934.

NEW LEGISLATION.

At the first session of the Eighteenth Legislature minor amendments were introduced to several Statutes concerning agriculture. The "Agricultural Act" was amended to bring its provisions in line with the Federal "Destructive Insect and Pest Act"; the "Stock-brands Act" to provide that Provincial constables are ex officio Inspectors of Brands; and the "Horse-breeders' Registration and Lien Act" to require annual registration of stallions used for breeding purposes.

The outstanding Statute of major importance to agriculture introduced at the last session of the Legislature was the "Natural Products Marketing (British Columbia) Act," designed as enabling legislation to make effective in British Columbia any provisions of the Dominion Statute then under discussion at Ottawa, but not yet enacted at the time of proroguing of the Provincial Legislature.

Under the Dominion "Natural Products Marketing Act," assented to on July 3rd, 1934, a Marketing Board consisting of Federal departmental officials was constituted by the Governor in Council on August 11th, 1934, to pass upon the merits of schemes presented by the producers of primary commodities from farms, forests, seas, lakes, and rivers.

A Provincial Marketing Board consisting of Eric Pepler, of the Department of the Attorney-General; James A. Grant, Markets Commissioner, of the Department of Agriculture; and Wallace R. Gunn, Live Stock Commissioner, of the same Department, was constituted similarly in British Columbia by the Lieutenant-Governor in Council on August 22nd, 1934. The Provincial Marketing Board at December 31st had recommended that four Commodity Boards be set up for the regulation of the marketing of Tree-fruits, Milk, Beef, and Sheep, respectively, produced within prescribed areas of the Province. Similar action was taken by the Federal Marketing Board to implement the powers conferred on Commodity Boards by the Provincial Board in so far as such additional powers were beyond Provincial jurisdiction.

SEED-GRAIN DISTRIBUTION.

Owing to a shortage of seed-grain in the Central Interior and the Peace River District due to weather conditions that prevailed in the fall of 1933, it was found necessary to co-operate with the Relief Administration in making available a limited supply of seed for these areas.

The distribution of seed-grain was effected through the joint efforts of Government Agents, Provincial Police, and District Agriculturists. Approximately twelve car-loads of seed oats and barley were shipped into these areas and distributed, the maximum quantity available to any applicant not exceeding 1 ton.

As security for the repayment of seed-grain advances promissory notes were taken, payable on November 30th last. Due to the fact that many recipients of relief seed-grain had no title to the properties they occupied, the distribution was not made under the "Seed-grain Act" of 1918. Collections of outstanding accounts are proceeding under the direction of the respective Government Agents.

Reports from District Agriculturists in Central British Columbia indicate that weather conditions following a satisfactory growing season have enabled settlers this year to harvest ample seed-grain as well as adequate feed-supplies for live stock.

Referring to the seed-grain distribution in the Bulkley Valley, Donald Sutherland, District Agriculturist at Smithers, states:—

"Had it not been for the action of the Provincial Department of Agriculture in purchasing and distributing for cash and on note six cars of seed-oats along the line, the area would face a serious feed shortage at this time. The quality of the seed sent in was excellent, and since

local supplies were wiped out, this new seed, of uniform grade and quality, confined to the two leading varieties—Victory and Banner—has served to replenish the former mixed lots of oats harvested by the average farmer, with a quantity of clean, pure seed greatly superior to the old stock. While it is almost impossible to secure any accurate estimate of the total quantity of oats harvested and threshed, one could possibly locate from five to seven or more cars of good seed along the railway-line for sale elsewhere, without cutting into the quantity required for local seeding operations next season."

Further in his report Mr. Sutherland deals with the satisfactory yield of timothy-seed as follows:—

"The outstanding feature in the season's operations lies in the large crop of timothy-seed harvested in the Bulkley Valley and Lakes Districts. It is estimated that the total quantity of seed produced will be in the neighbourhood of 350 tons, and sales to date are returning to the growers about 16 cents a pound for No. 1 seed, with usual spreads for lower grades. Compared with prices of 5½ and 6 cents a pound for seed of the same quality the two previous seasons, the crop this year has proved the salvation of those fortunate enough to have harvested any quantity."

Grain generally throughout the Nechako Valley yielded well this year according to H. S. French, District Agriculturist, Prince George, who states that oats are exceptionally good, although in some cases the grain was discoloured by heavy rainfalls during the harvest season. In co-operation with the Field Crop Branch, varieties of oats new to the district were tried out, and according to the District Agriculturist's report the Orloff, Gopher, and White Cross varieties are several weeks earlier than the oats formerly grown. The yield also was satisfactory and sufficient seed-grain of these early varieties of oats has been saved to permit of sowing on a fairly large scale next season.

In the Peace River District, however, James Travis, District Agriculturist at Pouce Coupe, reports that:—

"Incessant rains throughout the spring and summer months produced heavy rank growth, which prevented ripening and harvesting of grain. Wind and rain flattened and twisted the crops, rendering cutting difficult and in some cases impossible. Snow fell on September 12th and was followed by rain, frost, and further snowfalls. Threshing was spasmodic and in December machines were working in snow-covered fields threshing damp and frozen grain of low grades. In spite of the difficulties encountered in harvesting the crop, the work is being continued during the winter, and by the beginning of December approximately 400,000 bushels of grains of all kinds had been delivered at railway points in the Peace River Block."

FARMERS' AND WOMEN'S INSTITUTES.

In the ten Farmers' Institute districts conventions were held, and at the call of the Minister of Agriculture the Advisory Board met in Victoria at the beginning of February. Among the numerous resolutions presented for consideration, those referring to the necessity of marketing legislation were considered of most immediate importance and recommendations for marketing legislation were made to the Select Standing Committee on Agriculture by the Advisory Board. Action on this matter has already been referred to in this report.

From several institute districts resolutions were received with reference to the necessity to assist the institute members in their efforts to eradicate gophers, ground-squirrels, and other rodents. Acting upon these recommendations, a sum of money for the purpose of subsidizing Farmers' Institutes in their purchases of poisons and other materials required for gopher eradication was included in the estimates of the Department, and during the year a successful campaign aimed at the eradication of rodents has been carried on by the institutes in a number of districts of the Southern Interior.

Dealing with gopher eradication demonstrations in the Kootenay District, H. E. Waby, District Agriculturist, reports that:—

"Where demonstrations were given for the use of Cyanogas applied with a special pump, farmers recognized its value and proceeded to take advantage of it. Many demonstrations were held in 1934, and farmers, who were of the opinion that Cyanogas must be applied early in the season, have had this misapprehension corrected. It is admitted that the Cyanogas can be most effectively used in early spring, but the experience of 1934 has shown that its use at any season of the year may be recommended. It is effective at all times, as the gas, when properly applied, penetrates to the deepest recesses of the burrows and tunnels."

The East Kootenay, Salmon Arm, and Kamloops Districts report good results with the gopher eradication, but in some districts, institutes which had urged upon the Government the necessity for a policy such as has been put into effect have failed this year to take advantage of its benefits.

In those districts where Farmers' Institutes and other local organizations have taken the lead in reducing the rodent menace they have had full co-operation from corporations, including the Canadian Pacific Railway, which is arranging to continue its assistance of rodent-control along its right-of-way in 1935.

In the Cariboo District demonstrations have been carried on mainly with the object of reducing the number of ground-hogs, which for a number of years have proved very annoying to farmers and cattle-ranchers.

In dealing with this question of rodent-control, G. L. Landon, District Agriculturist at Grand Forks, reports that:—

"The campaign for rodent-control begun in 1933 was continued during 1934 with gratifying results. Owing to the policy adopted by the Department of Agriculture in rebating 50 per cent. of the cost of poisons such as strychnine, and dust-powders such as Cyanogas, large quantities were purchased by farmers in the Boundary districts. A knapsack duster for applying Cyanogas dust to burrows has been used extensively in the district this season."

There were this year 217 active Farmers' Institutes in the Province and these succeeded in maintaining their paid-up membership on the basis of recent years. The usual grant of $10 was sent to each institute submitting its membership list, financial statement and report, and otherwise complying with the provisions of the "Agricultural Act." The District Institutes also received the usual financial assistance.

It is gratifying to note that the price of stumping-powder to institute members for land-clearing purposes has been further reduced. The present quotation is $8.75 per hundredweight f.o.b. James Island. The $2 rebate still applies on powder used by institute members in the actual clearing of land for agricultural production. This means that the present price of stumping-powder is now lower than at any other time since the Department's present stumping-powder policy was inaugurated fourteen years ago.

There are now 161 Women's Institutes with a total membership as at June 30th, 1934, of 3,873. This number stands at the same figure as last year, as there were three new institutes organized and three were disbanded in 1934. The total income of the Women's Institutes was approximately $35,775 and the individual institutes made cash expenditures of $11,495 on community betterment and charitable work.

During the year the Superintendent of Women's Institutes visited ten of the twenty-one institutes in the Peace River District, in addition to addressing the District Institute Conference at Progress. She found the various locals were valuable assets to their communities, providing libraries, organizing children's clubs, arranging for the improvement in the health of the individuals, and otherwise contributing to the betterment of local conditions.

Following the visit to the Peace River District, the Superintendent attended Women's Institute meetings throughout Central British Columbia and the Fraser River District. In the northern sections as well as in the Southern Interior and on Vancouver Island the efforts of the organized women have been directed toward providing comforts and necessities for the sick and needy. Many of the institutes have featured home-crafts, using local wool as the material for sweaters, socks, mitts, and other garments.

The Women's Institute District Conferences this year included Peace River, South Vancouver Island, and both North and South Fraser River Districts. Victoria and Vancouver conferences were attended by Dame Janet Campbell, D.B.E., who was sent out by the Canadian Council of Child and Family Welfare.

GRASSHOPPER-CONTROL.

Under the "Grasshopper-control Act," 1930, five grasshopper-control areas are operating actively in British Columbia. Of these, two were organized during the present year.

George W. Challenger, District Agriculturist, as Secretary of the Nicola and Kamloops Areas, reports that effective control has been secured in both of these areas, which are completely organized and in a position to prevent the spread of the grasshoppers.

G. A. Luyat, District Agriculturist, Williams Lake, as Secretary of the South Riske Creek and Clinton Grasshopper-control Areas, reports that satisfactory conditions prevail as a result of prompt action taken last season as provided for by the Act.

R. P. Murray, District Field Inspector, Penticton, as Secretary of the Oliver-Osoyoos Grasshopper Control Area, states:—

"The campaign can confidently be stated to have been a success and represented maximum results from a careful and economical outlay of the funds expended. Control on the open dry areas was excellent."

"EGGS MARKS ACT."

Referring to the "Eggs Marks Act," chapter 74, R.S.B.C. 1924, and amendments thereto, Walter Sandall, District Field Inspector, Court-house, Vancouver, reports that arrivals of all eggs imported into the Province were inspected to see that they complied with the requirements of the "Eggs Marks Act." The arrivals of imported eggs reported into the Province are as follows:—

Victoria: 120 eggs for hatching purposes from the United States of America and 60 cases at 200 per case of salted eggs from China. Vancouver: 165 eggs for hatching purposes from the United States of America and 315 cases at 200 per case of salted eggs from China. The salted eggs from China are duck-eggs preserved in mud and used solely by the Chinese residents in Canada for flavouring and medicinal purposes. No imported egg products have been reported as having been brought into British Columbia. No arrivals of imported eggs or egg products have been reported from the boundary ports during the year, as the inspection service at these ports has been withdrawn and the appointments of the Inspectors rescinded as from March 31st, 1934.

FEED-GRAIN CERTIFICATES.

In compliance with the Canada Freight Association Tariff 145, feed-grain certificates to the number of 866 have been issued from the office of the District Field Inspector at the Court-house, Vancouver, for wheat, oats, barley, and screenings, said to be used solely for purposes of feeding live stock and poultry. Milling companies and dealers in stock and poultry feeds are the principal applicants for these certificates. All grain shipments covered by this special Tariff 145 have originated at points in the Province of Alberta and have been transported over Canadian Pacific and Canadian National Railways to British Columbia.

SUMMARY.

Month.	Wheat.	Oats.	Barley	Screenings.	Total Certificates issued.
	Tons.	Tons.	Tons.	Tons.	
January	2,302	168	327	.....	70
February	1,919	112	421	.....	60
March	1,679	210	527	50	64
April	1,506	332	323	.....	60
May	2,425	478	322	.....	83
June	2,497	516	283	.....	82
July	2,369	388	214	.....	75
August	2,067	260	233	.....	68
September	1,852	40	490	.....	63
October	2,160	34	305	.....	68
November	4,077	——	551	.....	121
December	1,486	——	387	30	52
Totals	26,336	2,538	4,383	80	866

STAFF CHANGES.

The changes in the staff of the Department of Agriculture include the reinstatement of M. S. Middleton as District Horticulturist at Vernon and the reappointment of G. A. Luyat as District Agriculturist at Williams Lake. The resignations of Miss E. V. Bickle as clerk-stenographer in the Dairy Branch and of Miss L. L. Gold as stenographer in the Plant Pathology

Branch were accepted. Other changes in the staff included alteration in titles in several cases where officials already on the staff were transferred to other branches.

With regret it is recorded that several former members of the agricultural staff have passed away during the year. Among these were the late William E. Scott, formerly Deputy Minister of Agriculture; W. W. Alton, formerly Provincial Veterinary Inspector; and W. Wallace Duncan, formerly Director of Markets for British Columbia.

DISTRICT AGRICULTURISTS' ACTIVITIES.

In addition to undertakings of District Agriculturists already mentioned and also referred to in the reports of Branch heads, several items deserve particular attention.

Bull Sale and Fat-stock Show.—The sixteenth annual Bull Sale and Fat-stock Show was under the management of G. W. Challenger and was held at Kamloops on March 21st and 22nd, 1934. There was a total of sixty-four pure-bred bulls and females of the beef breeds, forty-one of which were supplied by Provincial breeders; the balance were Hereford bulls brought in from Alberta.

In the breeding class James Turner, of Cadboro Bay, had the grand champion Shorthorn bull, "Marshal's Star," which topped the sale, selling for $900 to J. Bulman & Sons, Westwold. The grand champion Hereford bull, "Prince Domino, 58th," was sold to the Douglas Lake Cattle Company for $825. The prices showed a decided improvement over 1933 as shown by the following table:—

Breed.	No. of Head.	High.	Average.	1933 Average.
Angus	1	$85.00	$85.00	$66.00
Herefords	29	825.00	224.83	169.79
Shorthorns	34	900.00	104.56	98.63

Entries for the Fat-stock Show were slightly heavier than for the 1933 show, with considerable improvement in quality, particularly in the car-load classes. Guichon Ranch, Quilchena, won the grand champion car-load of steers for the sixth consecutive time. First and second prize in groups of steers went to the Douglas Lake Cattle Company. Gordon Turner, of Kilgard, had grand champion steer of the show, which animal was also awarded first prize in the boys' and girls' competition.

Prices paid for fat stock created a record for this year in Western Canada. The grand champion car-load of steers went to Burns & Company at $7.75, also the second prize car-load at $8. Woodwards, Limited, Vancouver, bought the grand champion steer of the show at 30 cents a pound and the first prize group of five at $8.50. Prices paid were 1 to 3 cents above market and one-third better than the 1933 average.

Range Reseeding Tests.—According to the District Agriculturist, no additional plots were laid out this year, but the tests already under way in the Kamloops, Nicola, and Ashcroft areas were studied closely from time to time. Grasses showing up particularly well in these plots were crested wheat-grass and western rye, with crested wheat showing the most hardy, particularly under heavy pasturing. Even when grazed bare this grass will come along quickly and produce seed. Western rye is also a good grass and the seed is cheaper at the present time than crested wheat-grass.

Some of the stockmen and farmers have become interested in reseeding through results noticed from these plots. Several are growing crested wheat-grass under cultivation and saving the seed, then broadcasting this seed over parts of their range from which the native bunch-grass has disappeared. They are able to secure a satisfactory catch by harrowing the seed lightly in. Once a few of the grass-roots become established and seed produced, the balance of the area becomes reseeded naturally and a good stand of nutritious grass is obtained.

Following observations on our range reseeding plots of the success of tall oat-grass under protection, two farmers in the dry-farming areas of Rose Hill tested out this grass as a hay-grass under dry-farming conditions. From our range plots it would appear that this grass would

be very satisfactory for a perennial hay under dry-farming conditions, particularly if it could be protected in the early spring from the stock.

Progress of Feeder Policy.—In reporting on the progress of the feeder policy in the Fraser Valley, R. G. Sutton, District Agriculturist at New Westminster, states that this year only two car-loads of feeder cattle were brought into the district under the above arrangement. One went to Ladner and one to Langley. Owing to the rising tendency in the hay and grain market and the failure of beef prices to make any appreciable advance, it is doubtful if these two lots made any profits. This fall a few men have purchased feeder cattle privately, but no interest has been shown in obtaining steers under the feeder contract.

The District Agriculturist for Kamloops adds that:—

"During the winter of 1933–34, three car-loads of cattle from the Kamloops District were supplied to feeders in the Ladner, Fort Langley, and Armstrong Districts under a contract agreement sponsored by the B.C. Beef Cattle Growers' Association. While results were not very remunerative, the cattlemen supplying the cattle secured from ½ to 1 cent above the market for cattle supplied under this policy. The feeders obtained from $15 to $17 per head for finishing the cattle, which worked out on the ratio of grain and hay to give them in the neighbourhood of $16 a ton for grain and $10 a ton for hay on the farm.

"This contract plan has been dropped this fall, due principally to the uncertain conditions of the cattle market and the fact that there is an abundance of feed on the cattle-ranches. When the policy was organized it was hoped that it might be the means of developing a cattle-finishing business in the Fraser Valley and relieve the Interior ranges of some of the feeder cattle. It was unfortunate that when the policy was started the market was on the downward trend."

Seed-promotion Work.—According to the report of G. L. Landon, District Agriculturist at Grand Forks, "the vegetable-seed industry is the bright spot in the agricultural industry of this district and is assuming greater importance each year. Approximately 25 acres of onion-seed bulbs were planted during the year of the following varieties: Red Wethersfield, 4 acres; Strassburg, 4 acres; Southport, 1 acre; Mountain Danvers, 2½ acres; Danvers Yellow Globe, 8¼ acres; and Ebenezer, 5 acres. In addition, some carrot-seed of the Chantenay variety was produced and about 500 lb. of radish-seed (Scarlet White Tip). There will be two new varieties added to the list of onion varieties in 1936—namely, White Globe and Brown English. Growers are being urged to branch out into the production of carrot, radish, and other seeds, and to get away from too many onion varieties owing to the danger of cross-pollination."

In the Fraser Valley the possibilities of seed-growing are now appreciated, and, according to the New Westminster District Agriculturist's report, "the set of hand-screens and the small Clipper cleaner belonging to the Department of Agriculture have been in almost constant use from the last of August to the end of the year. Altogether, they have been loaned to upwards of thirty farmers for use not only in preparing exhibits, but for cleaning small lots of special seed for planting. Considerable progress might be noted in seed production. As well as the well-established lines of ordinary field crops, an increasing quantity is being produced of seed of roots, flax, peas, and some staple vegetable-crops such as cabbage, carrots, parsnips, beans, etc. In the Seed Show held last February, out of a total of seventy-four exhibitors, eighteen were from this district, winning awards ranging from first to fifth.

"This fall, extra effort has been made to have appropriate exhibits of seed shown at Toronto Royal, at Chicago International, and at the 1934 Provincial Show at Vancouver. Five exhibits of wheat, oats, and clover-seed were selected and forwarded to Toronto. Of these, one exhibit of hard red spring wheat from Ladner gained first and championship; one of oats, third prize, and one seventh prize. At the International at Chicago an exhibit of field peas from Ladner won the championship."

Fall Fairs.—In addition to the Class A exhibitions held at Vancouver and Victoria and the Class B fall fairs held at Armstrong and Chilliwack, there were forty-five agricultural fairs held in British Columbia in 1934.

Publications.—Bulletins and circulars distributed during the year totalled 41,846, in addition to 69,613 copies of mimeographed stencils which were sent out from the offices at Victoria. Additional to the stencilled information, circulars and bulletins were made available from

the district offices throughout the Province. A statement of the departmental publications issued during the year appears in the following table:—

Name.	Description.	No.
Care and Feeding of Dairy Cattle	Bulletin 67	1,500
Tomato-growing in B.C.	Hort. Circ. 65	2,000
Third List of Dairy Sires	Dairy Circ. 65	1,200
Butter-making on the Farm	Bulletin 71	1,000
Poultry Rations for Chicks and Layers	Poultry Circ. 19	4,000
Pruning Fruit-trees	Hort. Circ. 60	6,000
Twenty-eighth Annual Report		750
Climate Report, 1933		2,200
Fruit Spray Calendar		2,000
Top-working of Fruit-trees and Propagation	Hort. Circ. 42	2,000
Practical Poultry-raising	Poultry Bull. 26	3,000
Farmers' Institute By-laws		500
Care of Milk and Cream	Dairy Circ. 6	2,000
Root-seed Production	Field Crop Circ. 7	1,000
Milk and Butter-fat Records, 1933	Dairy Circ. 26	1,000
Strawberry Culture	Hort. Circ. 58	4,000
Breeding Stock Hints	Poultry Circ. 27	2,000
Statistics Report, 1933		1,200
Green Feed Deficiency Disease in Fowls	Poultry Circ. 36	1,000
Raspberry Culture	Hort. Circ. 35	2,000
Preservation of Food	Bulletin 83	2,000
Field Crop and Garden Spray Calendar		1,500
Total		43,850

REPORT OF MARKETS COMMISSIONER.

J. A. GRANT.

The fruit-marketing season of 1934 surprised both shippers and dealers in the increased volume that moved into consumption. By comparison with 1933 the volume showed a marked increase in all commodities, especially so in forced and field rhubarb, and in all small fruits, apricots, and peaches. Field-ripened cantaloupes made a new record and so did strawberries in car-lots. Prices were slightly lower than the previous year, but the lower freight and express rates with the increased volume helped to make returns to the grower about the same as in 1933. The sale of live stock and poultry was more satisfactory than in 1933. Prices in live stock firmed during the year, especially in hogs.

Weather conditions were favourable both to growing and harvesting the crops and the season was fully three weeks ahead of normal. Shipping to Eastern points was resorted to, but prices realized on the Eastern Canadian markets were not satisfactory, because "fair market values" did not apply until the ordinary date of application and, for practical purposes, this was three weeks too late. Producers in British Columbia were greatly disappointed over this attitude on the part of Eastern interests, as it deprived them from commercializing their climatic advantages. Forced and field rhubarb, strawberries, hothouse tomatoes, cherries, and apples were the principal commodities that rolled to Eastern markets. Cherries shipped to New York market netted fully as much as was obtained on the domestic market. The increased volume of commodities was due largely to the early season that prevailed in British Columbia, but was not shared in other Provinces, thereby giving this Province a much longer shipping season than is customary. Owing to the dry weather at shipping-time, perishable fruits arrived at destination in good condition and rebate claims for poor quality were very rare.

The purchasing-power in Manitoba and Alberta and certain points in Saskatchewan was considerably better than in 1933, as farmers there got better prices for their grain and stock, but in Central and Southern Saskatchewan prolonged dry weather was responsible for another crop-failure. This time both grain and stock suffered more than in other years of crop-failures. The farmers in Western Canada, notwithstanding the increase in prices obtained for their produce, fully realize that they are still producing under cost of production and are taking steps to organize against the mass buying which they claim is responsible for low prices. Their

problem is different from the one facing our farmers, as their main crop is grain and has to be sold on world markets, and does not lend itself to regulation in the same way as produce sold on the domestic market.

During the last few years a system of greater diversification in commodities produced has come into being in Western Canada. Great increases have been made in the production of beef cattle, sheep, hogs, poultry, and butter, and surpluses created in all these commodities. The nearest market for these surpluses is British Columbia, and as these commodities are not organized effectively they are dumped on the Coast market at prices that do not produce a living to Prairie farmers, and the low prices react against the British Columbia producers of these commodities.

Visits made to Prairie points created the impression that farmers were in earnest to have their commodities organized for their own advantage, but owing to their weak financial condition this work will be slow. They are studying the remedies obtainable under provision of the "Natural Products Marketing Act" that became effective last May.

Since the "Natural Products Marketing Act" passed at Ottawa in May, this office has had many requests for information explaining the intent of the Act. We published excerpts from the British Marketing Act and later sent out mimeographed copies of the Dominion Marketing Act to those applying for same. The previous experience with marketing legislation, both in the Okanagan Valley and the Fraser Valley, gave the farmers in both districts an advantage over other districts. The beef-cattle men and sheep-breeders, who had no previous knowledge of orderly marketing, made requests to have the Act explained in relation to the control of their products. Meetings for this purpose were held at Kamloops, Williams Lake, and Nicola. In August your Commissioner was appointed to a seat on the Provincial Marketing Board, and from that date has given attention to examining schemes submitted to the Board.

Board duties have taken considerable of the time devoted to the ordinary visits to markets and shipping-points, but owing to having market news supplied by Federal officials at Prairie points and Vancouver the usual marketing information was sent out without interruption. Over 100 Market Bulletins were issued and sent out twice weekly to the press and farmers' organizations. Extra reports were sent out weekly to public-market managers, etc., giving beef, hay, grain, poultry, and egg prices.

Early in spring a visit was made to Central British Columbia, where meetings were held at many points. The Board of Trade at Prince Rupert and Prince George expressed willingness to co-operate with Central British Columbia farmers in purchasing their supplies from them, provided that transportation rates were adjusted to give the local farmers an advantage on the near-by markets and their pack made equal to competitors. Negotiations were started with the Canadian National Railways and a substantial reduction was made on freight rates in farm products. The farmers were willing to organize to grow what the local market needed and pack in a commercial way, and a great improvement has been reported in marketing produce from Central British Columbia.

FORCED RHUBARB.

The forced-rhubarb deal again showed an increase in volume over 1933, and while prices were slightly reduced to the consumer the growers got about the same returns. This was brought about through shipping more in car-lots and by the whole of the producers shipping through one sales agency.

FIELD RHUBARB.

Field rhubarb was shipped to the market fully three weeks earlier than the previous year. Car-lots were moving by March 24th and continued until June 21st. In all, 120 cars were sold at Prairie points, which is fully equal to last year's shipments. Prices realized averaged 70 cents per crate (40 lb.) to the shipper. The rhubarb was shipped through one distributing agent to the Prairie agencies, except the first few cars, which met with disaster through divided distribution.

HOTHOUSE TOMATOES.

The hothouse-tomato production was similar to that of 1933. The Prairie demand was considerably less than last year, but Ontario took almost double the supply of 1933. The local markets have been demoralized, due to organized growers giving only partial support to their selling agencies. The average price netted was slightly less this year; 1933 f.o.b. shipping-point

price averaged $2.29 and 1934 $2.20½ per crate. Approximately 40,000 crates were shipped to Prairie and Eastern points.

STRAWBERRIES.

Strawberries were also shipped at an earlier date than in the previous year, and on account of Eastern Canada having a late season about fourteen cars were shipped to that market, but owing to the refusal of the Federal authorities to advance the application of fair market values to match the early season these shipments met with competition from Southern United States and poor returns were received. The shipping season was dry, which enabled berries to arrive at destination in good shape. Owing to a divided distribution at shipping-point, prices averaged very low and the market was kept in an oversupplied condition from start of shipping. A new high record in distribution was made, 153 car-lots being shipped, as against a previous high of 132 cars in 1928. In addition to these, about 70,000 cases were shipped to the Prairie markets in less than car-lots. The season closed very rapidly, leaving several hundred tons of unfilled orders placed by British firms and a scarcity of berries for local jam-manufacturers.

RASPBERRIES.

Shipments of raspberries were also up compared with last year. Fifty-seven car-lots were shipped, as against twenty-three cars in 1933; 11,944 cases were also shipped L.C.L. A new innovation was started this year in assembling mixed cars of Everbearing strawberries, blackberries, loganberries, and late raspberries. In all, forty-seven mixed cars were shipped and in addition about 10,000 cases L.C.L.

LOGANBERRIES.

Loganberry shipments fared about the same as last year, but the crop netted a better price. The winery demand was a little better and export shipments nearly doubled those of last year. Approximately 72,000 cases have been shipped to the British market this year.

A visit was made to Salem, Oregon, early in July to investigate the loganberry situation there. This State furnishes practically all the British demand outside of what is supplied from British Columbia. It was found that Oregon growers only realized 2½ cents per pound for their export logans and were greatly depressed over the low returns. They actually refused to pick over one-third of the crop, as there is little or no demand for logans in the United States and their export business does not return anything like the cost of production. The packers over there put up the logans on a cost-plus-commission basis, and when returns are available deduct their charges and the growers get what is left. British Columbia loganberry-growers netted about 4 cents per pound for their canned logans, and are not encouraged, as that price is about 1 cent per pound less than is needed to continue in production. If the "code" system could be successfully worked in Oregon it would raise the export price, and British Columbia loganberry-growers would practically command the British market. The impression left was that British Columbia loganberry-growers should stay organized and cater for the British demand, as the future of that market seems encouraging.

CHERRIES.

The cherries of the Okanagan were of exceptionally good quality this year, but the reverse was the case of the Kootenay cherries, due to brown-rot. The market was stabilized by processing the Royal Anns in sulphur solution, and while they only netted the grower from 3½ to 4 cents per pound, this channel of distribution has been a stabilizing factor in view of the present economic condition, and has kept this variety off the market and prevented overcrowding of other merchantable varieties. About 20,000 15-lb. lugs were shipped from the Okanagan Valley and 3,112 lugs from the Kootenay to New York. These netted as good average prices as the Canadian markets. There were also 24,441 15-lb. lugs shipped from the Okanagan and 5,006 lugs from Kootenay to Eastern Canadian markets. Final returns on cherries were fairly satisfactory in the Okanagan, but rather unfavourable in the Kootenay—largely on account of condition.

APRICOTS.

The apricot-crop was the heaviest to date. Eastern Canada took 4,903 cases and the balance sold in Western Canada, Vancouver taking the largest quantity of any individual

market. Approximately 500 tons were sold to the cannery. Returns on apricots were considerably below last year, which was to be expected on account of the very heavy volume. Average price to grower would be about $40 per ton.

PEACHES.

Early peaches such as Triumph and Early St. John collided on the Prairie markets with the carry-over of imported varieties from California. Prairie jobbers were advised that British Columbia supplies would be at least two weeks earlier than usual. However, when imported peaches cleaned up, the market remained steady until the end of the season. During the peak about 50,000 boxes were sent to cold storage and ultimately cleaned up, but the storing was not quite as profitable as the regular season sales. The net result was satisfactory to growers and a price equal to 1933 was averaged, or approximately $60 per ton.

PEARS.

The 1934 crop moved out at a little higher price than the 1933 crop realized. The crop on the Lower Mainland and Vancouver Island was very light. Prices varied according to variety. The Bartlett variety was scarce and nearly all the cannery needs had to be imported from Washington.

PRUNES.

The prune-crop opened at a price at the beginning of the season that was maintained until the whole crop was cleaned up. Prices were approximately the same as 1933 and this deal was satisfactory to the growers.

PLUMS.

The British Columbia plums marketed on the Prairies met competition from Ontario and only a few varieties are popular. The expensive British Columbia pack (4-basket crate) does not move profitably, as the housewives prefer the jumble orchard pack. Experiments should be made in orchard-packed 6-quart Ontario baskets, as this package is popular, and it would eliminate the packing-house costs and cut down the selling costs. British Columbia plums have not been sold at a remunerative price for some years and this experiment might help matters.

APPLES.

The apples held from 1933 crop were sufficient to supply the market needs and fair prices were realized until the crop was cleaned up. Any dumping that was necessary was due to apples being overripe and in process of decay. The Interior Tree Fruit Marketing Board was not empowered to function this season until after the Wealthy apples were marketed. The Cartel system of pooling was again authorized and an orderly distribution made. The export has fallen off slightly from last year, and this has been levelled up by a better demand at Prairie points. The crop is fully as large as in 1933. At the end of 1934 over three-quarters of the pooled crop has been sold. The balance left on hand is of better keeping varieties compared with last year, and the demand is likely to be increased due to a short crop in Ontario and Quebec. The Okanagan, main line of the C.P.R., and the Kootenay has an estimated crop for 1934 of 4,544,635 boxes; the domestic market has accounted for 1,713,744 boxes and export 1,703,630 boxes. The percentage of Cartel McIntosh sold on December 30th is 88.03, against 76.07 at same date last year. The combined Cartels' figures are as follows:—

	Per Cent.
Domestic shipments, 1,578,400 boxes	36.9
Export shipments, 1,652,160 boxes	38.6
Balance unsold, 1,027,441 boxes	24.1

CANTALOUPES.

The early season favoured the cantaloupe deal, and as the bulk of the crop was handled by a pool controlling about 85 per cent. of the production the result was a stabilized market. Great care was taken in picking vine-ripened specimens and having the brand stamped thereon. The vine-ripened cantaloupes were commented on favourably by the trade and returns to the producers were satisfactory.

ASPARAGUS.

In two years the asparagus acreage has increased ten times. The acreage planted in the Okanagan is approximately 185; Fraser Valley, 120; and Vancouver Island, 50 acres. The pack is reported as good and all Prairie shipments were made in pyramid crates.

VEGETABLES.

Apart from shipments in mixed cars from the Interior, which would equal the 1933 volume, there were 376 cars shipped to the Prairies and Eastern points from the Coast. These shipments included 50,452 sacks and 760 boxes of potatoes, 21,680 crates of lettuce, and 10,290 crates of cauliflower.

POTATOES.

The marketing of potatoes, both new and mature, was again without stability, due to internal competition. The dry weather prevailing during the main shipping season reduced the crop in non-irrigated districts to about 60 per cent. of normal. In irrigated districts the yield was about normal. The Prairies report about 40 to 60 per cent. of a normal crop, with a prospective demand from Prairie cities before the season ends. Prices have ruled at from $6 to $8 per ton to growers in the Fraser Valley. These retailed in Vancouver as low as 59 cents per 100 lb. This condition is likely to continue until some system of orderly marketing is established.

TRANSPORTATION.

Several reductions in freight and express rates took place during 1934. In the early spring the Canadian National Railways made substantial reductions on L.C.L. freight rates from Smithers to Prince Rupert. These reductions greatly stimulated trade between farmers in the hinterland and Prince Rupert. The same company attached a freight-car to their passenger-trains, thereby giving a service of at least four times a week.

A reduction on express rates in car-lots of berries and cherries to Alberta was made effective on May 7th: From Creston to Calgary, $1.80 per 100 lb., against $2.40 previously paid; to Edmonton, $2 against $2.40; Mainland points to Calgary and Edmonton, $2 against $2.40; from Vancouver Island to Edmonton and Calgary, $2.25 per 100 lb., reduced from $2.70. Old blanket rates to other points remain unchanged. Notwithstanding these reductions in express rates, more strawberries were shipped by freight in refrigerator-cars than ever; some were shipped to Regina and arrived in good condition. Express rates to Eastern cities were reduced considerably, but all shipments of small fruit to the East were unprofitable, due to poor condition of arrival and United States competition.

For some years we have been stressing the need of growing more apricots and peaches as well as head-lettuce and asparagus. The gap between supply and demand on the domestic market in these commodities is rapidly closing. In a good crop season such as existed this year in apricots there was abundant supply to meet all demands. Peaches have still a margin of production to make up, especially in supplying the cannery needs. British Columbia head-lettuce has made rapid advances on the Prairie market needs and asparagus is coming up rapidly. The low buying-power prevailing has to be reckoned with, but given normal buying conditions all the above-mentioned commodities can be increased.

The outlook for 1935 might be considered as encouraging if the markets are approached in an orderly way. The fresh-fruit market for rhubarb and berries is now oversupplied. To relieve this situation advantage should be taken of the export demand for processed berries in SO_2 solution. Under present uncontrolled conditions shippers have no regulatory powers, and the result is an overfed fresh-fruit market and a starved state of the export demands. Prices can be stabilized by reducing fresh-fruit shipments to the normal demand and processing the unwanted surpluses. In such commodities as are not produced in sufficient volume to meet the demand, some system of preventing dumping from other Provinces would encourage home production and act in the interest of the absentee producers, who at present are not receiving sufficient for their export produce to make ends meet. Orderly marketing will not in itself create a buying-power, but it is capable of systematizing production in keeping with the demand to the advantage of producer and consumer and holding the middleman in his place.

SUPPLEMENT TO MARKETS COMMISSIONER'S REPORT.

The "Natural Products Marketing Act, 1934," was passed at Ottawa in May. As the Act was still under consideration at Ottawa when the British Columbia Legislature adjourned in April, an Act known as the "Natural Products Marketing (British Columbia) Act" was passed, authorizing the creating of a Provincial Marketing Board with supplementary powers to enable the Federal Act to be operative in British Columbia.

The British Columbia Marketing Board was appointed in August by Order in Council, and consisted of Colonel Eric Pepler, Chairman, James A. Grant, and Dr. Wallace R. Gunn, all of whom were in the Provincial Civil Service. As marketing legislation was anticipated, your Markets Commissioner spent some time in Central British Columbia explaining the intention of the legislation to Board of Trade officials and Farmers' Institute members, and before being appointed to the Board visited Williams Lake twice and Nicola once to explain the possibilities of the new legislation, and what it applied, to beef-cattle organizations—showing that without a good majority of the commodity producers being in favour of a scheme it would not be considered workable. After being appointed to the Marketing Board this work was discontinued.

From September to December considerable time was given to preparing of marketing schemes. Up to December four commodity schemes have been approved by the British Columbia Board; one originating at Ottawa and supplemented by a British Columbia scheme, giving the Commodity Board, named in the Ottawa scheme, power to regulate the British Columbia markets. Three schemes, that are mostly concerned with marketing within the Province, have been recommended to the Minister of Agriculture and appeared in The British Columbia Gazette after approval by the Lieutenant-Governor in Council. Only one of these schemes has been given supplementary powers at Ottawa—namely, the Milk Scheme.

Five schemes are under consideration—namely, hothouse tomatoes, coarse grain and hay, etc., potatoes, grapes, and milk produced in South Vancouver Island. One scheme, a small-fruit scheme, was submitted, but withdrawn as it was found to be one in which the bulk of the produce was marketed outside of British Columbia and should originate at Ottawa.

All the Provincial schemes provide that Commodity Boards will submit a scheme to the Dominion Board at Ottawa to secure such powers that are not within the authority of the Provincial Board to grant.

REPORT OF PROVINCIAL HORTICULTURIST.

W. H. Robertson, B.S.A.

From a fruit and vegetable grower's standpoint the seasonal conditions for the past year have been very satisfactory. The winter was extremely mild in all sections. In the Interior, and particularly in those districts where irrigation is an important factor, the fall of snow was sufficient to fill to capacity the irrigation reservoirs. Spring came early, with the result that many of the spring crops were on the market from two to three weeks ahead of what they would be in a normal year. The late spring and early summer was dry, which shortened the strawberry and loganberry crops in the Coast sections. The lack of rainfall, however, was particularly advantageous in the cherry districts of the Okanagan, which often suffer considerable loss of this crop during the picking season. Rains were experienced in the late summer and early fall, but did not materially interfere with the harvesting of the apple-crop, the picking of which was practically finished by the end of October. Late fall and early winter conditions have been mild, with a satisfactory rainfall and no snowfall on the lower levels.

HORTICULTURAL CROPS.

Tree-fruits.—In the case of apples the winter and early spring conditions seemed to indicate a heavy crop of fruit. Due to the early blossoming of the trees, the extremely short blossom period, and cold nights, the big crop anticipated did not materialize. On the whole, the crop will probably, when finally harvested, be slightly heavier than in 1933. Pears were lighter than in 1933, and the same also may be said with regard to stone-fruits, with the

exception of apricots, of which there was an estimated crop of 252,520 crates. Some idea of the 1934 production may be obtained from the following table:—

Fruit.	1933 Production.	Estimated 1934 Production.
Apples (boxes)	4,815,107	4,847,575
Crab-apples (boxes)	136,474	128,100
Pears (boxes)	271,167	214,100
Plums and prunes (crates)	304,308	330,805
Peaches (crates)	220,540	251,750
Apricots (crates)	102,327	252,520
Cherries (crates)	173,338	180,270

Small Fruits.—The strawberry-crop, due to hot, dry weather at picking-time, was shorter than was expected at the beginning of the season. Many contracts were unfilled, due to the shortage, and berries which had been carried over from the previous year were disposed of. The market for the 1935 crop should be fairly good. Raspberries were a heavier crop than in 1933, and the patches give promise of a good yield next year. Loganberries were a light crop, due to hot weather previous to and during the picking season. The wineries took a larger part of the crop this year than has been the case for a number of years. This outlet, together with the demand for canning-berries, resulted in the whole crop being disposed of at prices somewhat better than those of the previous year. Other small fruits, such as blackberries, gooseberries, currants, etc., were normal in yield.

With regard to grapes, more interest is being taken in this crop, although there has been no material increase in acreage during the past two years. There is very little acreage on Vancouver Island. On the Lower Mainland there is slightly over 100 acres, most of which is in small plantings. The largest acreage is to be found in the Kelowna District of the Okanagan Valley, where there are approximately 175 acres.

There would seem to be future possibilities in grape production in certain sections of the Province, both from the standpoint of table use as well as for the wineries. Trials are being made not only with new American varieties, but with European varieties as well. As to this industry in the Kelowna District, B. Hoy, District Field Inspector, reports as follows:—

"The grape-crop was of excellent quality and the tonnage well up to expectations. Little new planting was done, but more interest is being taken in European varieties. J. W. Hughes, who pioneered with commercial production of the American varieties here, is interesting himself in Vinifera varieties, hoping to get a better table-grape. Rittisch Bros. also are continuing their experimental work and have done much to create an interest in early-maturing European varieties. Little attempt has been made to date to grow them without winter protection.

"The variety Pearl of Csaba, which is very early ripening, seems to have possibilities so far as hardiness is concerned. W. J. Palmer has one plant that has been growing without any protection for some years. This had an excellent crop of grapes this year. They were ripe in July and the bunches were well filled with good-size excellent-flavoured grapes. Other varieties show possibilities, but much more work will have to be done before any of these varieties can be recommended commercially. Yield, as well as hardiness, quality, etc., will have to be considered. Little is known of this at present.

"Of the American varieties, Campbell's Early is perhaps the most satisfactory for this district, considering yield, hardiness, maturity, shipping qualities, etc. Portland, an early green grape, is of excellent quality, a good yielder, but only a fair shipper. Owing to its high sugar content it is very satisfactory for wine-making.

"The yield of grapes this year will perhaps be from 450 to 500 tons.

"Mr. Hughes is still continuing to experiment with grape-juice. The Sheridan grape makes excellent juice."

Some investigational work has also been done by R. P. Murray, District Field Inspector at Penticton. The following is an extract from his annual report:—

"For some time past the office has had numerous inquiries regarding the possibilities of Vinifera grapes as a commercial undertaking. Information on this subject is limited and the experience of those who have grown this class of grape was disappointing. This was due largely to a poor selection of varieties and to a lesser extent lack of experience in growing this crop. Most of the varieties tried required too long a season to ripen, and only in very favour-

able seasons were any grapes ripe enough to eat out of hand. Even then the quality was only fair.

"As no work was being attempted to obtain reliable information, your official purchased the following Vinifera varieties: Thompson's Seedless, Chasselas Blanc, Black Prince, Angulata, Blue Portuguese, Palomina, Malvoise, Carignan, Divyaka, Madeline Angevine, Seibel 4629, Seibel 2838, Seibel 5279, Coridere 10, Oberlin 595, and Castel 19637. Also the following European hybrids originated at Geneva, N.Y.: Golden Muscat, Urbana, Seneca, Mills, and Keuka.

"Several of these varieties have fruited this year, and although the district has experienced a long ripening season, some failed to ripen satisfactorily, and these will be discarded.

"At present the following varieties show considerable promise for this district: Pearl of Csaba, Seibel 2838, Madeline Angevine, Golden Muscat, Urbana, and Keuka. The latter two varieties are reddish-coloured grapes, while the other varieties mentioned are all light or amber coloured. From information received from the various marketing agencies on the Prairies the demand is apparently for a dark-coloured grape. It is possible that varieties such as Blue Portuguese, Angulata, Black Prince, Urbana, and Keuka will be satisfactory from a colour standpoint, and it is hoped will be early enough to mature in any season in this district."

Vegetables.—There was little change in the vegetable situation in the Province over that of former years. The production of greenhouse crops such as tomatoes and cucumbers was about the same as last year and with very little, if any, improvement in price. In so far as outdoor vegetables are concerned, there was very little change in total acreage over that of 1933, and although the quality was good the returns on the whole were unsatisfactory. In the Oliver-Osoyoos District the cantaloupe acreage was approximately 193 acres. This is about the usual acreage planted each year. The growers in that district have for the last two years systematized their picking and packing, with the result that there is a demand for their product on the markets of British Columbia and the Prairies. Returns for this crop have been very good.

Asparagus plantings have been increasing for a number of years, with the result that at the present time there are approximately 364 acres planted out to this crop. A survey was made of British Columbia plantings this year, and the details of which are given in the following table:—

British Columbia Asparagus Plantings, 1934.

District.	1934.	1933.	Previous.	Total.
Vancouver Island	5	⅝	24¼	29⅞
Fraser Valley	11	24	70½	105½
Salmon Arm	3⅝	¼	9⅛	13
Clearwater	1¼	....	....	1¼
North Okanagan	10⅝	39	154¾	204⅜
Kootenay and Boundary	3⅛	1⅞	5⅜	10⅜
Totals	34⅝	65¾	264	364⅜

OTHER CROPS.

Broom-corn.—The growing of broom-corn in the Kamloops District has been tried out for the last two years. This year it was again tried at Kamloops, as well as at several other places in the Province. The results, with the exception of Kamloops, were unsatisfactory. The possibilities at this point seem promising and may eventually lead to commercial production. C. R. Barlow, District Field Inspector for that area, makes the following report with regard to these plantings:—

"In continuation of test-work carried out in 1931 and 1932, six varieties of broom-corn were planted experimentally on Captain Hilliard's farm at Kamloops in 1933. A small sample of about 50 lb. of the 'brush' of these six varieties was, late last fall, submitted to the Canadian National Institute for the Blind at Vancouver for manufacturing into brooms and for report on same as to quality and suitability for manufacturing purposes. The report, which was received in February this year, was of a sufficiently encouraging nature to warrant a further

trial of broom-corn this season, and plans were made for the planting of ⅓ acre of each of the three varieties reported on most favourably by the institute—namely, Illinois Favourite, White Italian, and Imperial Evergreen.

"It was unfortunate that after all arrangements had been completed and the time of planting had arrived the grower with whom the arrangements had been made decided not to plant the crop. This caused a very considerable delay in planting, as it was not until the beginning of June that another suitable grower and location could be found. This was eventually found on the farm of Stewart Wilson at North Kamloops, but it was not until June 8th that the crop could be planted, and even then land was only available for ⅙ acre of each variety instead of ⅓ acre as originally planned.

"The corn was planted on a light sandy loam, an alfalfa-sod being turned in two weeks before planting. Notwithstanding the fact that the crop was planted nearly a month later than it should have been, the plants grew and the 'brush' matured fairly satisfactorily.

"On September 21st the standing crop was inspected by Mr. Phitzmeyer, of the Canadian National Institute for the Blind, and he expressed himself as being satisfied with the quality, but also stated that it would have been even better had the crop been planted earlier, as it would have matured before the cool nights of fall, which are deterimental to quality. Much valuable information was obtained from Mr. Phitzmeyer with regard to the cutting, curing, baling, cleaning, etc., of broom-corn. It was recommended by Mr. Phitzmeyer that after cutting and curing the crop it should be shipped to the institute's factory in Vancouver for making up into brooms and for a report thereon as to quality, etc. This recommendation has been followed out. The crop was cut on October 5th and 6th and after curing was shipped to the factory in November. The report from the institute is not yet to hand, and it is therefore impossible, at the time of writing this report, to state the actual cash value of the crop. Mr. Phitzmeyer, however, estimated the crop at about 600 lb. per acre of cleaned brush, but also pointed out that this tonnage could probably be considerably increased by planting earlier, also by spacing the plants a little closer than was done this year. At the prices paid for broom-corn in recent years these results are quite encouraging, especially if it is taken into consideration that this year's crop was grown under distinctly adverse circumstances. Mr. Wilson states he is sufficiently convinced of the feasibility of growing the crop, and that, should the report from the institute's factory prove satisfactory on receipt, he will seriously consider the purchase of the necessary equipment to handle a crop of 40 acres next year, thus having sufficient tonnage to take advantage of car-load rates."

Certain other crops which should be mentioned are hops, tobacco, and peas. These crops are principally produced in the Fraser Valley. The following remarks contained in the report of G. E. W. Clarke, District Horticulturist, give some idea of the importance of these crops:—

"*Hops.*—There has been a revival in the requirement for this crop and growers are finding a ready market for the entire production. In the past two years acreages which were not being cropped previously have been brought into production and there has been an increase in new plantings. Approximately 80 acres were set out this spring in the Sardis District.

"The season was not favourable for heavy yields and the production has been about a 70-per-cent. crop.

"*Tobacco.*—This crop is grown principally in the Sumas Reclamation Area, but smaller plantings are located at other points on the Lower Mainland. The acreage amounted to about 600 acres, a reduction of nearly 25 per cent. over 1933 plantings. Of this acreage, nearly 200 acres were damaged by severe winds in September.

"*Peas.*—The Fraser Valley is well adapted for the growing of peas and until the last few years practically no difficulties were experienced.

"This is a crop that assists materially in the developing of a balanced farm programme and the yields and quality should be the highest in Canada.

"Approximately 1,800 acres were contracted by the canneries for the growing of canning varieties. In addition to this, there were about 3,000 acres in varieties suitable for the "boiling-pea" trade. There were also over 100 acres contracted for the growing of pea-seed of the canning varieties.

"The above-mentioned acreages do not take into consideration the acreage growing garden varieties for the fresh green-pea market.

"Aphis and pea-moth were serious factors in some sections and caused considerable reduction in quality and yield."

HORTICULTURAL SURVEY-WORK.

Small-fruit Survey.—In order to have available accurate information as to the acreage planted to small fruit in the Province a survey of the small-fruit plantings is made every two years. This work is undertaken in co-operation with G. H. Stewart, of the Agricultural Statistics Branch. For survey purposes the Province is divided into the following districts: Vancouver Island, Fraser Valley, Clearwater, Salmon Arm, North Okanagan, Kootenay and Boundary District. The following figures will give some idea of the variation in acreage of small fruit over the last fourteen years:—

	Acres.		Acres.
1920	3,414	1928	5,756
1922	6,202	1930	4,813
1924	6,310	1932	4,989
1926	5,201	1934	6,159

Details of the 1934 survey with regard to districts and acreages in different small fruits are on file and available in the Horticultural Branch Office, Victoria, B.C.

Stone-fruit Survey.—For the past four years the Horticultural Branch has each year made a survey of the new stone-fruit plantings in the Okanagan Horticultural District. The details of this survey show the estimated plantings of stone-fruit each year. The figures for 1930 are taken as a basis and were secured from our orchard survey of 1930. The figures for the four following years have been supplied by nurseries or secured from other sources. The plantings during the last four years show the following increases: Peaches, 60 per cent.; apricots, 30.8 per cent.; plums and prunes, 26.5 per cent.; and cherries, 23.5 per cent. The details of this survey according to districts are also on file in Victoria and available on request.

PRUNING DEMONSTRATIONS.

In 1933 the three-day pruning demonstrations were replaced by one-day demonstrations. These proved very popular with the growers. This year these demonstrations were again held. In all, eighty-three pruning demonstrations were given, with a total attendance of 1,313 people.

FLOWER- AND VEGETABLE-SEED PRODUCTION.

The past season has been a most satisfactory one for producers of both vegetable and flower seed. Climatic conditions have been excellent. There was an early spring which enabled the growers to plant early. The summer was not as wet as it has been during the past two years, while the fall conditions were most satisfactory from the standpoint of harvesting.

Seed production in the Province is gradually increasing, although slowly. In practically all lines there has been no trouble in disposing of all that has been produced, and even growers who were not fortunate enough to obtain contracts have disposed of their seed at satisfactory prices.

Both Eastern and British buyers are showing an increased interest in seed-production possibilities in the Province, as evidenced by their letters and inquiries as to where seed can be obtained or contracts placed.

This Branch has helped in every way possible to bring growers and buyers together, and also by supplying growers with satisfactory vegetable stock seed, either certified or commercial. Assistance has also been given by making available to growers such seed-cleaning machinery as at present owned by the Department.

It is recommended that the present policy of assistance be continued during the coming year.

HORTICULTURAL DEMONSTRATION-WORK.

As in the past, different lines of demonstration-work were undertaken in the different districts of the Province. It is only possible to mention briefly some of the more important work as carried out by the different officials.

Lettuce Strains Tests.—Work with various lettuce strains was undertaken by G. E. W. Clarke, District Horticulturist, in the Lower Mainland, and H. H. Evans, District Field Inspector, Vernon. Mr. Evans submits the following report on the work undertaken in the Vernon-Armstrong District during the past season:—

"This is a continuation of previous work endeavouring to find the most suitable strains of lettuce adaptable to Okanagan growing conditions in their resistance to tip-burn, bolting,

and frost-injury, with the object in view of extending the cutting period in both spring and fall-grown crops. We were able this season to procure several new strains, a number of which show excellent promise.

"There were eighteen plots carried in both spring and fall crops. With the spring crop nine strains were planted on peat-muck soil on the property of W. C. Boss, a vegetable-grower at Armstrong. The other nine strains, which arrived too late to be included with the above series, were planted on a clay-loam soil at Vernon. For the fall crop the whole series was seeded on the peat muck at Armstrong. It is only fair and also gives much pleasure to express at this time appreciation for the deep interest and close co-operation afforded by Mr. Boss in conducting these tests.

"Growing conditions for both spring and fall crops were excellent. The following details present the observed performance of the various strains at cutting period. Each plot carried 25 plants.

"Records of the W. C. Boss Plots, Spring Crop.

"Cold-frame seeded March 23rd. Planted in plots April 15th. Examined and recorded, June 13th and 28th.

"*Seed-house No. 1 Strains.*

"*Plot 1, Imperial No. 6.*—Heads slack, not filling. Quality very fair; texture good. Tip-burn and slime, 100 per cent. (This strain unsuitable for spring crop.)

"*Plot 2, Imperial D.*—Heads filled and firm; 80 per cent. fit to cut; texture coarse but brittle. Quality very fair; inclined to be bitter. Mixed in type, ball and pointed heads. Tip-burn and slime slight. (Very promising; should receive further testing.)

"*Plot 3, Imperial No. 2–50.*—Heads filling but slack; will not firm to cutting stage; getting mature. Quality excellent. Tip-burn and scald, 95 per cent. (Unsuitable for spring crop.)

"*Plot 4, Imperial F.*—Heads all filling and firm; 65 per cent. fit to cut. Quality excellent; ball-head type. Tip-burn and scald, 40 per cent. (Should receive further testing.)

"*Seed-house No. 2 Strains.*

"*Plot 5, Imperial No. 6.*—Comparable in all essentials to Plot 1.

"*Plot 6, Imperial D.*—Comparable to Plot 2 and 85 per cent. of heads fit to cut.

"*Plot 7, Imperial F.*—Type mixed, ball and pointed; 75 per cent. of heads fit to cut. Tip-burn, 25 per cent. Comparative to Plot 4 in other essentials. (Should receive further testing.)

"*Plot 8, Imperial No. 152.*—Heads filling and firm; 60 per cent. fit to cut; texture and quality excellent; good ball type. Almost 100 per cent. tip-burn and scald. (Should receive further testing.)

"*Plot 9, Imperial No. 615.*—Heads filling more slowly than some of the other strains, but firm when mature; 50 per cent. fit for cutting; texture and quality very good. Tip-burn showing about 30 per cent. Pointed type of head. (Promising and should receive further testing.)

"Records of the Vernon Plots.

"Spring planting; seeded in open ground April 3rd.

"*Seed-house No. 3 Strains.*

"*Plot 1, Imperial No. 2, Stock No. 9149X.*—Heads filled but slack; 15 per cent. had bolted; texture and quality good; ball-head type; 100 per cent. tip-burn. (Unsuitable for spring crop.)

"*Plot 2, Imperial No. 3, Stock No. 7141X.*—Heads loose and not filling; 30 per cent. bolted; quality and texture very fair; 40 per cent. with tip-burn. (Unsuitable for spring crop.)

"*Plot 3, Imperial No. 6, Stock No. 9322X.*—Heads slack and not filling; 60 per cent. bolted; quality and texture very fair. Tip-burn, 100 per cent. (Unsuitable for spring crop.)

"*Plot 4, Imperial No. 12, Stock No. 9165X.*—Heads well filled, fairly solid; no bolting; compact ball type; 80 per cent. fit to cut; texture and quality very good; no bolting. Tip-burn and scald, 75 per cent. (Standard spring crop.)

"*Plot 5, Imperial No. 41, Stock No. 9159X.*—Heads not filling; very slack and bolting badly. Tip-burn and scald, 15 per cent. (Unsuitable for spring crop.)

"*Plot 6, Imperial C, Stock No. 26803X.*—Heads filling well, but uneven in firmness; texture and quality good; starting to bolt. Tip-burn and scald slight, about 10 per cent. (Should receive further testing.)

"*Plot 7, Imperial F, Stock No. 26807X.*—Heads well filled and solid; 75 per cent. fit to cut; heavy deep-green growth; texture coarse; quality good. Tip-burn and scald, 20 per cent. (Should receive further testing.)

"*Plot 8, Imperial D, Stock No. 47250X.*—Heads well filled and solid; 60 per cent. fit to cut; bolting just started; compact type; texture coarse but brittle. Quality very fair; inclined to slight bitterness; type mixed ball and pointed heads. Tip-burn and scald, about 10 per cent. (Should receive further testing.)

"*Plot 9, New York Special, Stock No. 26795X.*—Heads filling, but very slack; 25 per cent. bolted; type badly mixed; quality and texture good. Tip-burn and scald, 10 per cent. (Unsuitable for spring crop.)

" (Nos. 6, D, F, 152, 615, 12, and C for further tests.)

"Records of the W. C. Boss Plots, Fall Crop.

"Field seeded July 21st. Each plot carried 25 plants. Examinations made, September 19th, October 1st and 16th, November 2nd.

"*Seed-house No. 3 Strains.*

"*Plot 1, Imperial No. 3, Stock No. 7141X.*—September 19th, growing fast but not filling. October 1st, just starting to head; frost-damage medium on outer leaves. October 16th, heads filled but loose, quality good. November 2nd, heads still loose; frost-damage no worse. (Not suitable for this period.)

"*Plot 2, Imperial No. 2, Stock No. 9149X.*—This plot comparable at all stages to Plot 1. Quality fair. (Not suitable for this period.)

"*Plot 3, Imperial No. 6, Stock No. 9322X.*—September 19th, growing fast but not filling. October 1st and 16th, some heads firming nicely and will cut; others loose and will not fill; strain not uniform. Frost-damage heavy, penetrating the head; quality fair. November 2nd, few heads firm; others no good; frost-damage very heavy. (Not suitable for this period.)

"*Plot 4, Imperial No. 12, Stock No. 9165X.*—September 19th, heads filling nicely. October 1st, heads filled but slack; not fit to cut; frost-damage medium. October 16th, heads well filled but slack; quality good; frost-damage heavy, penetrating heads. November 2nd, heads were firm but not good; frost has almost ruined the plot. (Standard crop strain.)

"*Plot 5, Imperial No. 41, Stock No. 9159X.*—This plot comparable at all stages and in all respects to Plot 4. (Would not replace the No. 12.)

"*Plot 6, Imperial No. C, Stock No. 26803X.*—September 19th, heads filling nicely. October 1st, heads firming nicely but not uniform; frost-damage very slight. October 16th, heads filled and firm, ready for a cut-over; quality good; frost-damage slight. November 2nd, frost-damage slight; 75 per cent. of heads solid; good type and frost-resistant. (Should receive further testing.)

"*Plot 7, Imperial No. F, Stock No. 26807X.*—September 19th, heads just starting to fill. October 1st and 16th, heads filling slowly, growing to large size; frost-damage medium on outer leaves; quality very fair. November 2nd, heads large, filled but slack; no further frost-injury. This strain apparently needs long growing period. (Should receive further testing.)

"*Plot 8, Imperial D, Stock No. 47250X.*—September 19th, heads not filling. October 1st, 16th, and November 2nd, this plot comparable at all stages to Plot 6. At November 2nd 80 per cent. of heads fit to cut. (Should receive further testing.)

"*Plot 9, New York Special, Stock No. 26795X.*—September 19th, heads just turning. October 1st and 16th, this strain comparable to the No. 12 and Plot 4. November 2nd, heads filled but slack; frost-damage heavy; would not replace the No. 12.

"*Seed-house No. 1 Strain.*

"*Plot 10, Imperial No. 6.*—September 19th, October 1st and 16th, this plot comparable in these periods to Plot 3. On No. 3 the plot was better filled and firmer. Frost-damage very heavy. (Not suitable for this period.)

"*Plot 11, Imperial D.*—This plot comparable at all stages to the similar strain in Plot 8. (Should receive further testing.)

"*Plot 12, Imperial F.*—This plot is comparable at all stages to the similar strain in Plot 7. (Should receive further testing.)

"*Plot 13, Imperial No. 2–50.*—September 19th, heads starting to fill. October 1st and 16th, heads all filled but slack; quality good; frost-damage heavy; could be cut as No. 2 heads. November 2nd, frost-injury severe. This strain might prove suitable on a different soil type.

"*Seed-house No. 2 Strains.*

"*Plot 14, Imperial F.*—This strain compares with the similar strains in Plots 7 and 12. One noticeable difference was observed, in that by October 16th the heads were much firmer and could have been cut over. In Plots 7 and 12 there were no heads fit to cut at this date.

"*Plot 15, Imperial No. 152.*—September 19th, heads filling rapidly. October 1st, heads filled and solid; 75 per cent. fit to cut; quality good, but possessing slight bitterness; no frost-injury; low growing compact type. October 16th, all heads filled and solid; those fit to cut on October 1st were still in excellent cutting condition; no frost-injury. November 2nd, heads overmature but still solid; six heads only had burst. (This strain has great promise and should be further tested.)

"*Plot 16, Imperial No. 615.*—September 19th, heads not filling. October 1st, heads filling and firming; quality good; frost-injury slight. October 16th, heads filled and fairly firm; 50 per cent. fit to cut; frost-injury slight to medium. November 2nd, heads filled and firm but not solid; no further frost-injury. (Should receive further testing.)

"*Plot 17, Imperial D.*—Performance of this plot comparable in most essentials to similar strains in Plots 8 and 11. The difference noticed was a less number of heads fit to cut on even dates with Plots 8 and 11 and an apparent deeper green colour tone to the foliage. (Should receive further testing.)

"*Plot 18, Imperial No. 6.*—This plot comparable in most essentials to the similar strains in Plots 3 and 10. The one exception noted was less frost-injury than apparent on Plots 3 and 10 at even dates of examination.

"In summarizing spring and fall performance of the various strains under test, I would mention that but one seeding was made for either spring or fall test, and it is just possible that an earlier seeding at both periods may have shown better results with certain strains which in the present records are considered unsuitable for the Armstrong-Vernon District. The following strains, namely, C, D, F, 152, and 12 did, however, give definite indications of value and adaptability for both periods and are undoubtedly worthy of more exhaustive trials. It is noticeable with the spring plantings the great variations in percentage of tip-burn and tendency to bolt between various strains and the performance of the same strains as regards frost-resistance in the fall crop. At the present time Imperial No. 12 for the main spring crop is an excellent strain; its tendency to tip-burn towards the end of the cutting season indicates the need of further effort, if possible, to locate another strain more resistant to tip-burn which would prove supplemental to and adaptable in extending the spring cutting season of the No. 12. In the fall crop season the No. 12 performs very well in average seasons for the early crop. If, however, there is an extended period of cool, wet weather at the heading stage, the heads grow large but refuse to tighten sufficiently to give a good cut of No. 1 heads. Also a severe damage will occur with a 7° to 10° frost when the head is in this succulent stage. Several of the strains previously mentioned as giving definite indications of frost-resistance will, it is felt, with further testing, prove their value for the fall and possibly the spring crops. In this connection the performance of the strain No. 152 in the past season's test showed outstanding promise in quick development, solidity of head, ability to carry good cutting condition over a long period, and excellent resistance to frost-damage. The Imperial D strain is also proving its value in frost-resistance, good quality, and late keeping tendencies."

It is anticipated that work with lettuce strains will be continued in 1935.

Beet Strains Performance Tests.—Work with various beet strains has been carried on for a number of years by H. H. Evans. The object of this work is to secure a suitable beet for canning purposes. Work during the past season has progressed favourably and a full report is on file in this office.

Strawberry-plant Selection-work.—This project is being carried on on Vancouver Island and is under the supervision of E. W. White, District Horticulturist, who reports as follows:—

"This project was started last year and some progress has been made this year. As reported, the plan was to select and stake 100 of the best plants in first-year bearing plantations of different growers and then to propagate as many plants as possible from these in the fall after the plantations had been cleaned up. Six growers were selected and agreed to undertake the work, but only three were successful in securing a supply of plants. In Gordon Head W. J. Houlihan propagated about 1,500 plants and these were set out in a plot by themselves. In Keating W. H. McNally was able to secure about 600 plants and these were planted out in two rows in the centre of a large planting of British Sovereigns. These are the only Magoons

now being grown by Mr. McNally. Bickford & Sons were only able to secure about fifty plants and these were planted in the outside row of a new planting of British Sovereign. On a piece of land under his control the writer also selected about 200 plants which were set out as a part row in a new planting of Magoons. About 200 British Sovereign were also selected by the writer and planted out this spring.

"As growth developed during the summer considerable variation was noticeable in the vigour of the plants set out. Runners have been set from the best plants and these will be used for continuing the selection next year. The plants set out in the spring of 1934 will be bearing in 1935 and it is proposed to carefully watch the crop. If certain plants show improved qualities they will be staked, and an effort will be made to again propagate from these staked plants in the fall after the crop is harvested and the plants cleaned up.

"At the present time where comparison is possible no great difference can be noticed between the selected plants and those propagated in the ordinary way. However, it is hoped that some difference will be noticed when the crop matures next summer."

Trials with Sixty-day Golden Corn.—This corn, while perhaps not of as high quality as some other corns at present on the market, has the advantage of earliness, a great advantage from a marketing standpoint. This variety was tested out last year and again this year in a number of districts, and in all cases was from ten days to two weeks earlier than Golden Bantam. As there is now sufficient seed in practically all sections that is available to the growers wishing to secure it, further trials with this variety will be discontinued. New introductions, however, will be tried in the future with a view to securing earliness as well as quality.

Raspberry Variety Tests.—Raspberry variety tests are being conducted in a number of districts with a view to securing a variety well suited to a particular district both from the standpoint of shipping and canning. The results naturally vary and depend largely on seasonal growing conditions. One set of trials were conducted at Salmon Arm under the supervision of C. R. Barlow, District Field Inspector. The following is taken from his report on these trials:—

"The cane-growth on the test-plots of six varieties of raspberries—namely, Count, Brighton, Viking, Lloyd George, Latham, and Newman 23—planted last year on the farm of Captain F. Cox at Salmon Arm is somewhat disappointing. This is attributable in the main to dry conditions, which were probably aggravated by the fact that in an endeavour to improve soil-texture a cover-crop of hairy vetch was seeded on the plots last fall which was allowed to stand a little too long in the spring before being disked in. While the quantity of fruit picked from the plots this year cannot be taken as a fair criterion of the respective merits of the different varieties as producers, or of the quality of the berries, reference to the table given below will give a tentative idea of the behaviour of the different varieties. It will be seen that the Lloyd George variety, although somewhat late in maturing cane-growth, is so far the most promising of those under test, and that Count and Brighton rank lowest.

"Owing to the poor growth produced this year it is doubtful if anything more conclusive regarding the respective merits of the fruits can be arrived at next season than has been possible this year, but should a satisfactory cane-growth be produced in 1935 it will be possible to arrive at more definite conclusions in 1936."

Raspberry Variety Test, Salmon Arm.

Variety.	Crop.	Quality.	Cane-growth in Order of Strength.	Maturity of Canes.
Count	Good	Soft, poor flavour	5	Fair, some green tips.
Brighton	Good	Soft, very poor flavour	4	Poor, many green tips.
Latham	Fair	Fairly firm, flavour good	1	Very good.
Lloyd George	Good	Firm, flavour good, large berries	2	Fair, some green tips.
Viking	Fair	Firm, fair flavour, berries small	6	Fair.
Newman 23	Fair	Firm, flavour poor to fair	3	Good.

NOTE.—Cane-growth on all varieties weak.

Work with raspberry varieties was also conducted by H. H. Evans, District Field Inspector at Vernon. He reports as follows:—

"Plots in this test were planted in the spring of 1932 at W. H. Baumbrough's, Vernon District. The objects in view were to obtain, if possible, a variety promising better quality, yields, and hardiness than those at present in general use.

"Through the generally mild weather conditions prevailing in the winter of 1933–34, there was no inducement to winter-kill in any variety of raspberry. This susceptibility of the varieties under test was fully recorded in 1933. Powdery mildew, which was severe on some varieties in 1933, was practically absent during the past season, the varieties Latham and Newman 23 showing only a mild infection. These two varieties appear susceptible to the disease, with severity of infection influenced by seasonal conditions. The Adams 87 is extremely shy in cane-bearing, all others being quite generous in this habit. The standard varieties of Cuthbert and Viking are not included in the plots, but are in Mr. Baumbrough's commercial plantings and are three and two years older than the test-plots. Comparative yields of these two varieties will be taken in 1935, when size of all bearing plants will be more uniform. The Viking variety is inclined to be a shy cane-bearer. All varieties made strong individual cane-growth."

Yield Table, 1934.

Variety.	First Ripe Fruit.	Picking Period.	Yield in Pints per Plant.	Remarks.
Brighton	June 15	18 days	3	Quality good; colour good; size small; large percentage only fit for jam. Much fruit would not be picked if in commercial plantings.
Count	June 15	20 days	3	Quality fair; colour fair. Other remarks for Brighton apply with this variety.
Newman 23	June 23	28 days	1¼	Quality fair; colour fair; size medium; berry firm; fruit very uneven in size; badly attacked with a fruit-worm. Not promising.
Lloyd George	June 18	21 days	4	Quality excellent; colour good; size large; berry inclined to be soft. Excellent for local market.
Latham	July 1	23 days	2⅔	Quality good; colour good; size fair; berry firm and dry; some mildew. Crop shy for size of plants.
Adams 87	June 23	24 days	1	Quality good; colour poor; size large; many berries spoiled with sun-scald and wind.
St. Regis Everbearing	June 10	More or less continuous	1¼	Quality very good; colour fair; size small. Crop ran lighter than expected.
Viking	June 18	35 days	....	Quality excellent; colour good; size good; yield heavy; proving very satisfactory; may yet replace Cuthbert.
Cuthbert	June 23	27 days	....	Quality excellent; colour good; size medium; yield medium.

Raspberry and strawberry tests have also been conducted in the Vancouver Island and Kootenay Districts and will be continued during the coming year.

Fertilizer Trials.—For a number of years various fertilizer trials with both vegetables and tree-fruits have been undertaken in both the Okanagan and Kootenay Districts. Some of the results have already been published in departmental circulars. Work of this kind was again carried out during the past year and some excellent reports received which undoubtedly can be used in preparing future publications.

All phases of orchard-management applied to the plots by the owners have been uniform and good throughout. Trees that were root-injured in 1932 appeared to have recovered. Terminal growth of the trees was excellent and the foliage large and of good colour, indicating tree-vigour. Details of this year's fertilizer experiment are on file at Victoria.

PLANT-INSECT AND PEST-CONTROL WORK.

Apple-scab Sprays.—Sprays for the control of apple-scab were again undertaken in both the Kootenay and Okanagan Districts. The work in the Kootenay District was undertaken by E. C. Hunt, District Horticulturist, in co-operation with J. W. Eastham, Provincial Plant Pathologist. While Mr. Eastham will undoubtedly report on a part of this work, it would

seem advisable that the work as carried out by Mr. Hunt be incorporated in this report. The report in question follows:—

"The control of this disease in the Kootenay and Arrow Lakes sections is still a very important matter to the fruit-growers. Apple-scab is no doubt the worst orchard trouble that the fruit-grower has to deal with in this district. Due to this, a great deal of experimental and demonstration work has been carried out by your assistant in its control. The work has extended over a number of years and many materials and combination mixtures have been tested out. Lime-sulphur has been, and still is, the chief spray material used in the control of apple-scab; but while efficient in the control of the disease, it is liable to cause serious foliage-injury under certain weather conditions. Due to this a number of other spray materials have been under test here in the Kootenay. While most of them have given a much better foliage condition to the trees, they have not in all cases proven as satisfactory as lime-sulphur in the control of apple-scab, particularly for the susceptible varieties under the exacting conditions of the Kootenay District. However, during the seasons of 1933 and 1934 the iron sulphate-lime sulphur-calcium arsenate combination was given a thorough test in a number of locations in this district in the control of apple-scab. This mixture in 1933 gave excellent results in all sections where it was tried and seemed to be the most effective material so far tested out. The material that year was used at full strength; that is, 10 lb. of iron sulphate, 2½ gallons of lime-sulphur, and 4 to 5 lb. of calcium arsenate to 100 gallons of water. Unfortunately, this combination mixture ran the cost up to almost double that of the lime-sulphur sprays, so it was decided to make further test with this material and this work was carried out in 1934. The main object of the 1934 tests was to find out how weak a solution of the iron-sulphate combination spray would control apple-scab under Kootenay conditions, also if the time between sprays could be extended or one or more sprays omitted. The test-plots for this work were located at Mr. Appleton's orchard at Sunshine Bay and the variety was McIntosh Red, trees in full bearing. The actual spraying-work was carried out by your assistant, and the checking-up of the results was left in the hands of J. W. Eastham, who will cover the work in detail in his annual report. In conclusion, however, it might be well to state that the results indicate that 'two weeks' between sprays is about the limit, and on the average year four sprays is not enough for satisfactory control, but five sprays will cover the period of infection much better. Also that the iron-sulphate combination mixture should not go below in strength of 6 lb. of iron sulphate, 1½ gallons of lime-sulphur, and 3 to 4 lb. of calcium arsenate to the 100 gallons of water. This is 60 per cent. of the standard or full-strength mixture. The weaker solutions of this mixture did not give satisfactory control of scab in the test-plots this past season. Where growers used the 60 per cent. of the standard mixture they had excellent control of apple-scab. This makes quite a saving in the cost of the iron-sulphate mixture and brings it down to almost the cost of the lime-sulphur sprays, and a much safer spray material to use under Kootenay conditions."

Report on similar work as conducted in the Okanagan Valley at Vernon by H. H. Evans follows:—

"The 1934 season constituted the fourth consecutive period of experimental work on scab-control of the Vernon District with this office working in conjunction with the Dominion Pathological Laboratory at Summerland. Some changes were made for the past season in construction of the formulæ applied, and in Plot 6 a new one added in the cupric oxide-bentonite-lime calcium-arsenate mixture. Formulæ containing no lime-sulphur and which appear promising are being tested in an endeavour to obviate sulphur-burn and stunt. In the Lavington District climatic conditions were such as to make scab-control a very difficult problem during the past season, but proved excellent conditions to give a severe test as to the efficiency of the various formulæ.

"The objectives in this work are: (*a*) Fungicidal efficiency of the various compounds; (*b*) observable physical reactions of the various compounds on tree and fruit."

Observable Spray-injury.—Actual spray-burn is made note of in the accompanying table. Plot 1, besides slight burning the foliage showed off-colour and stunted. In Plot 2 the foliage was large and of excellent colour. In Plot 4 the foliage showed good colour, but appeared to have received a check in sizing. All fruit-counts were made by G. E. Woolliams, of the Summerland Experimental Station.

There was a general spread of scab in June after the three usual control-sprays had been applied and it was considered advisable to apply a second cover-spray to half of the trees in

each plot as a further check in control. This was done on June 22nd, three weeks after the first cover-spray. In making scab-counts on the crop Mr. Woolliams stated there was no discernible difference in the percentage of control obtained for the three or four applications in any plot, and for this reason he made no differentiation in taking fruit-counts. From this it would appear as though three efficiently applied, properly timed sprays are capable of giving satisfactory commercial control of apple-scab in the Vernon District. (For details on this work *see* Appendix No. 1.)

Codling-moth Control.—Codling-moth is now found in practically all of the important tree-fruit districts of the Province and the areas in which it is found at the present time show an increase. Where it is, general control is being undertaken by spraying. In some cases such spray-work is controlled either by municipal or Provincial Government spray-zones, and in one case—namely, in the Vernon District—by direct Government spraying. No attempt is made in any spraying undertaken, regardless of what supervision, to eradicate this pest. For a number of years this Branch through its officials has attempted to show the growers that sprays, if applied at the correct time and with proper application, can effect satisfactory commercial control. Demonstration spraying-work has been conducted by B. Hoy, District Field Inspector, and M. H. Ruhmann, Assistant Entomologist, the object of the work being to show the growers the best methods to employ in codling-moth control. Mr. Hoy's report, which covers the work in detail, is herewith submitted for your consideration:—

"The codling-moth can be considered our major insect pest. It does more damage than all of the other apple-insects combined and is the most costly to fight. Spraying tests over a period of years have demonstrated that excellent control is possible if sprays are applied on time and the work done thoroughly.

"Daily records are taken of the moth-flight during the season, and instructions as to the time to spray given out by radio, telephone, and newspapers. This work is having its effect and is closely watched for by all growers. When instructions to spray are issued practically every machine in the district is in operation in a few hours' time.

"The improvement in spraying has been very noticeable and each year increases. Only a couple of years ago the really efficient operators in the district could be counted on one hand, but now there are scores.

"The spraying tests conducted by this Department have played a major part in this improvement. They demonstrated the possibilities of thorough and timely spraying, and the most sceptical grower could not deny facts that he could see with his own eyes.

"On the spray plots conducted by the writer and Mr. Ruhmann, the results of which are given in detail in Appendix No. 2, a field demonstration was held this year. While the attendance was not large, it represented practically every district from Penticton to Vernon. The owner of the orchard told of the excessive loss in 1933, which ran over 50 per cent., and the results of this year's work was there for evidence. The equipment with which the spraying was done was on hand and a few trees sprayed to show the method of spraying.

"Codling-moth control-work occupies the major portion of your official's time throughout the summer months in this district, but when it is considered that the work done here is used as a basis for the spraying throughout the Okanagan, the results in improvement of spraying and control justify many times the expenditure of money, time, and effort."

Fire-blight Control.—As pointed out in previous reports, the Okanagan Valley is the principal area in which fire-blight is found. The horticultural official stationed in the district makes a careful survey of all tree-fruit areas during the dormant period. At the time of this inspection new growers are shown the best methods of removing cankered limbs and hold-over cankers, and all orchards are inspected with a view to removing as far as possible any possible source of infection that might cause an outbreak of the disease during the coming year. The following table shows the area inspected in each district:—

District.	Total Acres inspected.	Passed.	Not passed.
Salmon Arm	304	304	*Nil*
Vernon	6,000	5,331	669
Kelowna	4,500	4,500	*Nil*
Summerland	2,838	2,823	15
Penticton	1,900	1,900	*Nil*
Oliver	60	60	*Nil*
Totals	15,602	14,918	684

Potato-beetle Control.—Potato-beetle control-work was again undertaken in 1934 along similar lines to that carried out in previous years, and was under the supervision of F. A. Marsack. There is little to report regarding this work except that the boundaries of the area in which this pest is found are not quite as extended as in the past. As this section of the Kootenay District is the only part of the Province in which the potato-beetle is found, it would seem good policy to continue the present methods of control.

Nursery Inspection.—The policy of inspecting all nurseries in the Province was again carried out. Records taken at the time of inspection show 139,465 trees inspected, with 2,618 trees condemned. The condemned trees amount to 1.9 per cent. of the whole. Under the "Agricultural Act" it is necessary for all nurserymen as well as nursery agents to take out a licence before making sales of nursery stock in the Province. During the past year eighty-six licences were issued.

San Jose Scale.—In last year's report two outbreaks of San Jose scale were recorded. The Chapaka Reserve infestation was sprayed in the spring of 1933 and again in the spring of 1934. The results were very satisfactory, although a complete clean-up was not effected. This was largely due to the fact that the trees were old and neglected and in many cases covered with loose bark. The Indian Department, which is co-operating with us in the work, have agreed to have the necessary tree-scraping done. If this is carried out this winter, another spray will be applied which should result in complete eradication of the scale.

In the Kaslo District an outbreak occurred in 1933 in the same area where the pest was found in 1924. Spraying was undertaken last spring and other clean-up measures instituted, with the result that only a few live scale were found during the summer. Another spray will be applied this coming spring.

The San Jose scale situation at Spences Bridge remains about the same as in the past. With the systematic application of sprays, as well as by cutting and burning bush areas where it appears in this locality, the pest is being kept well in check.

REPORT OF PROVINCIAL PLANT PATHOLOGIST.

J. W. Eastham, B.Sc.

The work this year on apple-scab control in West Kootenay included the routine developed in preceding years of determining the first date when ascospores were mature in the old leaves, and issuing spray notices by telephone and through the press.

The opportunity is here taken to thank the local press of Nelson for its continued co-operation, through the prompt insertion of spray notices and other information for the growers.

Owing to the early spring it was anticipated that ascospore-discharge would begin earlier than usual. Ascospores were, in fact, mature in the Fraser Valley by March 5th. Leaves sent in by E. C. Hunt from Willow Point as soon as the snow was off developed ripe spores by April 9th when kept in a moist chamber in the laboratory. Owing, however, to the unusually dry weather in the Kootenays, development under natural orchard conditions was very slow and there was little, if any, discharge until the end of April.

With the exception of 0.21 inch on April 1st and 0.06 inch on April 9th, there was no rain in April until the 26th, when rain fell every day for a nine-day period. The first spray notice was issued through the local press of Nelson on April 23rd, just previous to the pink stage in Macintosh. A few growers may have put on a pre-pink spray this season, but in the majority of cases the pink was the first spray given. The season was a full two weeks ahead of 1933. On the experimental spray plot at Sunshine Bay the pink spray was applied on May 15th in 1933 and on May 1st in 1934.

In 1933 a fairly extensive test was made of the iron sulphate, lime sulphur, calcium arsenate spray at the strength of 10–2½–5 (4), with exceedingly encouraging results, the only objection being the cost, which was approximately double that of lime-sulphur, a rather important matter under present conditions. It was therefore planned to test a number of weaker dilutions to see if satisfactory control of scab could be obtained without materially exceeding the cost with lime-sulphur. This work was done, as formerly, in conjunction with E. C. Hunt.

The orchard selected for these tests is one at Sunshine Bay, in which scab has always been a serious problem. Three combinations of iron sulphate, lime-sulphur, and calcium arsenate were tested—namely, 6 lb. iron sulphate, 1½ gallons lime-sulphur, and 3 lb. calcium arsenate (Plot A); the same with the last spray omitted (Plot B); 6 lb. iron sulphate, 1½ gallons lime-sulphur, 1 lb. calcium arsenate (Plot C); 4 lb. iron sulphate, 1 gallon lime-sulphur, 2 lb. calcium arsenate (Plot D). All per 100 gallons of mixed spray. In addition, one plot was sprayed throughout with lime-sulphur alone, 1 in 40. Spraying dates were as follows: May 1st (pink); May 18th (calyx); June 5th and 22nd. The fruit was picked September 18th, counts being made of one entire tree in each plot.

Variety, Macintosh.

	Total Apples.	Clean.	C Grade.	Culls.
		Per Cent.	Per Cent.	Per Cent.
Check unsprayed	774	1.9	3.8	94.3
L.S. 1–40	2,051	65.4	25.3	9.3
A, 6–1½–3	1,918	46.8	35.2	18.0
B, 6–1½–3, three sprays only	1,142	50.0	39.1	10.9
C, 6–1½–1	821	35.8	37.4	26.8
D, 4–1–2	2,141	29.5	39.7	30.8

The season was a bad one for scab, as may be seen from the fact that the fruit on the unsprayed tree was 98.1 per cent. scabby (1933 unsprayed tree, 67.7 per cent. scabby), but the figures do not show very satisfactory control. This is due mainly to the plots being selected in an exposed portion of the orchard and high winds at the time of spraying making it impossible to do a satisfactory job. In this particular season (total rainfall: June, 1.49 inches; July, 55 inches; August, 0.03 inch) no advantage accrued from the fourth spray. There was obviously a distinct lowering of the efficiency of the spray when any of the ingredients were reduced below the 6–1½–3 in 100 gallons formula. This would appear to be the minimum strength that can be recommended. The results obtained elsewhere were much better than those on the above plots. The general orchard in which they were situated was sprayed with 6–1½–3. A representative Macintosh tree (2,378 apples) showed 83.5 per cent. clean and 16.5 per cent. scabby, and this mostly slight. In an ordinary commercial orchard at Willow Point where the same mixture was used (four sprays, dates approximately as above) a Macintosh tree gave 82 per cent. clean and 17.8 per cent. scabby. This is excellent commercial control and the results obtained by these growers was confirmed by others. It is probable that the 6–1½–3 formula will be generally used in the Kootenays next year.

BLACKLEG OUTBREAK IN CABBAGE-SEED CROP.

Blackleg of crucifers (*Phoma lingam*) is a widely distributed and often serious disease. It was first reported in America in 1911, is now present in most of the United States, and has been reported from a number of the Eastern Provinces of Canada, although not as causing serious general loss. It attacks practically all cultivated plants of the cabbage family as well as some weeds of the same family (charlock, pepper-grass, and various mustards). This latter fact makes it difficult to eradicate if it gets well established. The disease is, moreover, spread by infected seed. All parts of the plant above ground may be attacked, and when the seed-pods are affected the seeds within become invaded by the mycelium of the fungus. Such infected seeds will give rise to diseased plants which in turn serve as centres of infection. Many such plants die, the tissues at the ground-level turning black, whence the name *blackleg*. This is usually the stage at which most loss occurs, but the killing of large areas of leaf-surface, and cankers on the stems, may seriously injure plants grown for seed in the second year. The disease has been reported from British Columbia on specimens sent to the Division of Botany, Ottawa, in 1932, from the Prince George area, but how widely distributed or destructive it was, cannot be ascertained. No case has been reported to the District Agriculturist there in the past two seasons.

In June, 1934, the Plant Pathologist was asked to investigate the condition of two cabbage-fields being grown for seed at Dewdney. These comprised over ½ acre of Golden Acre, the

seed of which came from Holland, and 2 acres of Penn State Danish Baldhead, from seed purchased from a New York firm. The plants in both plots had made good growth and showed a heavy set of seed. Many of the leaves showed numerous large spots filled with pycnidia, many stems were cankered or completely girdled, and, most important, almost every pod showed lesions. It was evident, therefore, that if this seed should be distributed the disease would be spread far and wide, and the results would be seriously inimical to the reputation of the developing seed industry of this Province. On the other hand, in view of the wide distribution of the disease elsewhere and the possibility of its being reintroduced at any time on seed, it seemed desirable before taking any drastic action to be sure at least that the Province was otherwise free from it. Apparently there had been little loss the first year from the blackleg stage of the disease, the grower having noticed nothing suspicious. This indicated that the disease had originally only been present in slight amount. A careful examination of cruciferous weeds in the areas surrounding the affected fields did not show any evidence of the disease having spread to these hosts. With the assistance of the Dominion Seed Branch, a list was obtained of all cruciferous crops known to be for seed in the Province and a systematic inspection made. In addition, many commercial plantings in different areas were examined. No other case of the disease was found. An amicable arrangement was therefore made with the owner of the infected crops that he should carefully pull up and burn the entire crop. The crop was duly destroyed and the land placed under quarantine so far as the further growing of cruciferous crops is concerned.

Since the disease is widely distributed abroad and is liable to be carried in the seed, since such infected seed does not show any symptoms likely to be recognized by the growers, and since our own crops are free from it, there would seem to be a strong case here in favour of buying British Columbia seed.

LYTTON ALFALFA.

The alfalfa grown in the Lytton-Lillooet District consists largely of a strain of obscure origin, but supposed to have been brought in by one of the original settlers soon after the gold-rush days. This strain, it is stated by the growers, has shown exceptionally good results in resistance to winter-killing and has gradually, for this and other reasons, superseded other varieties. As conditions in this district are favourable for seed production, growers are looking for a wider market than the local one, and with this in view have submitted seed for trial by the Dominion authorities at their various experimental farms. Unfortunately, both on the Prairies and in Ontario it has shown itself susceptible to downy mildew (*Peronospora æstivalis*, Syd.). "Lytton was heavily infected and severely damaged by downy mildew at Lacombe and Edmonton, while other varieties of alfalfa were free or bore only traces." (Report, Canadian Plant Disease Survey, Ottawa, 1933.)

At the request of the Division of Botany, Ottawa, an examination was made of about 70 acres of the Lytton strain grown for seed at Lytton and McGillivray in July and a report made. On the whole, the fields were remarkably free from disease. A little of the common leaf-spot (*Pseudopeziza medicaginis*) was found in moister places, a little yellow leaf-blotch (*Pseudopeziza Jonesii*, Nannf.), (*Pyrenopeziza medicaginis*, Fuckel) in patches in some fields only. No wilt (*Sclerotinia*) or bacterial blight (*Pseudomonas medicaginis*) was found. However, along irrigation-ditches and in spots where there was excess moisture from seepage, *Peronospora* mildew was quite severe. The conclusions drawn from the inspection were that the Lytton variety was probably an excellent one for Dry Belt conditions, being very free from disease and winter-injury in its original district, but that it showed undoubted susceptibility to downy mildew under moister conditions. It would be a mistake to recommend it, therefore, in non-irrigated sections, except on a small scale and in an experimental way.

OTHER DISEASE OBSERVATIONS.

An appreciable amount of loss occurred in the Kootenays during the past season in sweet cherries, especially in the Bing variety, due to brown-rot. This has not been of any consequence; in fact, has not been noticed at all in most years; but the fact that some loss was involved in both 1933 and 1934 raises the possibility of its becoming a serious factor. The casual organism of this rot is *Sclerotinia cinerea* and the rot produced is usually slower in developing than that from *S. americana*, which is often destructive in the Fraser Valley. The loss resulting from this disease is not only from fruit destroyed on the tree, but the development of infection in fruit apparently sound, during transit, results in claims for rebate, litiga-

tion, and general dissatisfaction. It is planned, therefore, to carry on some spraying tests to find a spraying programme that will reduce the amount of infection in the fruit. Blossom-blight so far has not been observed in the Kootenay.

Coryneum blight (*Coryneum beijerinckii*) was found on two apricot-trees at Longbeach, Kootenay Lake, the fruit being so severely disfigured as to be unmarketable. Severely affected apricot fruit was also sent in from Lillooet in 1932. Several cases have been observed on peaches at the Coast. Although none of the cases so far found are in areas of commercial peach and apricot production, the fact that the disease can be severe under certain conditions in the Dry Belt at Lillooet and in the Kootenays makes it seem possible that the apparent immunity of the Southern Okanagan to the disease may be due to accident and not to climatic conditions preventing its development.

PROVINCIAL QUARANTINE SERVICE.

There has been a considerable importation of trees, plants, etc., from the Prairie Provinces, chiefly of hardy varieties and strains for those portions of this Province where the winters are severe. Altogether 268 permits were issued for outdoor plants, covering the following: Fruit-trees, 550; small fruits, 1,179; ornamental shrubs, 13,315; roses, 945; fruit seedlings, 344; ornamental seedlings, 37; herbaceous plants and roots, 1,265; bulbs, 248; and scions, 42.

Many of these plants were going into the remote parts of the Province such as the Peace River Block, northern line of the Canadian National Railway, and points on the Canadian Pacific main line in the Rocky Mountain region, and permits for such destinations were issued without any provision for further inspection, as it was believed that the risks of any pest being introduced to the detriment of the Province by such shipments was negligible. Shipments going into orchard districts, or where a District Agriculturist is available, were inspected either at a point in transit or subsequent to planting. There were 127 consignments so inspected and no disease or pest reported.

In addition to the above imporations, a general permit was given to the Superintendent of the Dominion Experimental Station at Beaverlodge, Alberta, to cover shipments to 130 British Columbia residents in the Peace River and other northern districts. These included hardy strains of gooseberries, currants, raspberries, rhubarb, and lilacs, and other ornamentals, the quantities being unspecified.

From the records given above it would seem that the risk of bringing in disease or pests on *bona-fide* Prairie-grown stock is very slight. On the other hand, if all restrictions were removed and the permit system abolished, there would be danger of Eastern-grown stock being reshipped here. However, the risk of insect pests in particular surviving the climatic conditions in the isolated northern districts and becoming a menace to the rest of the Province appeared to be so slight that it does not seem to be necessary to put the settlers in such areas to the additional trouble of procuring permits. Accordingly, the following revision of the regulations governing interprovincial shipments into British Columbia was submitted for consideration to the Minister:—

Regulations governing Interprovincial Shipments into British Columbia.

(Subject to Dominion Quarantine Regulations.)

1. *Points in the Peace River Block of British Columbia and all points along the main line of the Canadian National Railway from Lucerne to Prince Rupert, inclusive.* All classes of nursery stock (subject to Dominion Quarantine Regulations) originating anywhere in Canada may be shipped direct to consignees at any of the above points without being held or rerouted for inspection. No permits or special tags are required.

2. To all other points in British Columbia, plants grown and propagated in the *Prairie Provinces of Alberta, Saskatchewan, and Manitoba* may be shipped direct to consignee, but only if provided with a special shipping-tag, attached for the information of the transportation company. To secure these tags it is necessary for the intending purchaser to write to the Provincial Quarantine Officer, Court-house, Vancouver, stating the name of the nursery from which the plants are to be purchased and the kind and number of each. A "permit" and tag or tags will then be furnished the applicant to be forwarded to the nursery. Permits and tags are only made out to cover specific orders.

3. Plants originating east of Manitoba and destined for any point in British Columbia other than those specified in clause 1 must come to Vancouver for inspection. Permits and shipping-tags are not furnished for such shipments on account of the danger of introducing two serious pests, the San Jose scale and the corn-borer. Shipments originating in the Prairie Provinces and not provided with direct shipping-tags will also be routed via Vancouver.

"DRY-BERRY" DISEASE.

Much work has been done by W. R. Foster at the Sidney laboratory on the cause and development of the loganberry "dry-berry" disease. Since infection with the fungus (*Hapalosphæria deformans*) takes place in the open blossom and blossoming extends over a considerable time, spraying does not offer much promise as a control measure, and here also the finding of resistant strains seems to offer the only feasible control. A start has been made to obtain an assortment of seedling loganberry-plants for subsequent testing. In the case of the same disease in the raspberry there is fortunately a resistant variety of first-rate commercial standing available in the Cuthbert.

W. R. Foster, Assistant Plant Pathologist, has again given much of his time to the problem of cereal diseases and pests. A portion only of this work is reported here, but it seems probable that the finding and use of resistant varieties will be the ultimate solution of many of these problems

STINKING-SMUT EXPERIMENTS.

In Table 1 the yield and percentage of stinking-smut in different varieties of inoculated winter wheat at Armstrong, B.C., indicates that White Odessa, Hussar, Ridit, and Oro are resistant to the physiological forms of smut of that district and also appear to be suitable in regard to yield. This is the second year that these wheats have been immune to smut inoculum of the Okanagan Valley. The test is being continued at Armstrong. H. H. Evans, District Agriculturist, co-operated in this work.

TABLE 1.—YIELD AND PERCENTAGE OF STINKING SMUT IN DIFFERENT VARIETIES OF INOCULATED WINTER WHEAT AT ARMSTRONG, B.C.

Variety.	Colour.	Smut.	Yield in Bus. per Acre.
		Per Cent.	
Hybrid 128	White	65.8	11.20
Jones' Fife	Red	56.4	13.92
White Odessa	White	0.0	42.16
Hussar	Red	0.0	41.92
Ridit	Red	0.0	40.56
Oro	Red	0.0	36.12
Jenkins X Ridit	Red	0.5	35.84
Martin	White	0.2	28.16
Albit	White	0.2	20.24

In addition, fifty-seven varieties of fall wheat are being tested in 228 plots, under the immediate supervision of Mr. Foster, at the Experimental Station, Sidney; the seed being inoculated with stinking smut from the Okanagan.

HESSIAN-FLY EXPERIMENT.

Hessian fly, a destructive wheat pest, has been causing considerable damage on Vancouver Island. This year, 1934, the Hessian-fly damage was high, particularly on certain varieties. Page 35 shows the average percentage attacked and injury of different varieties. Dawson's Golden Chaff, Egyptian Amber, Canberra, Imperial Amber, O.A.C. 104, Red Rock, and Triplet were very resistant and appear to offer a practical means of control. Dawson's Golden Chaff, Imperial Amber, and Red Rock yield as well as or better than the commonly grown variety Sun, which is very susceptible to Hessian fly. Albit, Golden Sun, Kharkov, Marshal Foch, Martin, Ridit, Sun, Victor, V.I.S. 131, White Odessa, Yeoman, and Yaroslav are very susceptible.

Object: To determine the percentage attacked and injury by the Hessian fly to different varieties of wheat. A plot consisted of three rows a rod long and each variety was replicated five times.

Variety.	Average Per Cent. Attacked.	Average Per Cent. Injury.
Albit	97.1	88.4
Baldmin	37.3	27.9
Berkeley Rock	11.9	11.0
Canberra	2.6	2.5
Crail Fife	66.7	62.4
Dawson Golden Chaff	0.2	0.2
Dawson's Golden Chaff (O.A.C. 61)	0.2	0.1
Egyptian Amber	*Nil*	*Nil*
Fortyfold	46.6	42.9
Golden Sun	97.2	88.5
Hussar	53.1	46.9
Hybrid 128	78.8	69.8
Imperial Amber	0.2	0.2
Jenkins X Ridit	88.9	80.6
Kanred X Dawson's Golden Chaff	2.4	2.0
Kharkov X Dawson's Golden Chaff	3.8	3.2
Kharkov	97.7	91.2
Marshal Foch	98.9	89.6
Martin	98.7	94.8
O.A.C. 104	0.4	0.3
Oro	47.1	43.3
Ridit	90.5	77.9
Red Rock	0.4	0.2
Sun	100.0	93.7
Triplet	0.4	0.4
Victor	99.4	96.1
V.I.S.	86.1	75.2

BROWN-ROT AND BLOSSOM-BLIGHT EXPERIMENT OF CHERRIES AND PLUMS.

Blossom-blight of cherries has been a serious cause of loss in the Victoria and Saanich Districts for some years. The causal fungus is a species of *Monilia*. Specimens submitted to the Oregon Agricultural College pathologists were identified as being identical with *Monilia oregonensis* described from that institution, but not considered identical with *Sclerotinia cinerea*. Unfortunately, however, the spraying recommendation given for control of blossom-blight in most fruit districts of the Pacific States (Bordeaux mixture just before blossoming) has not, by itself, materially reduced loss from blight, while the labour of pruning out all blighted spars and twigs, and so reducing possible infection, seems prohibitive, especially under present price conditions. It seemed, therefore, that a more intensive study of the disease was warranted.

The Experimental Farm and the Provincial Plant Pathology Branch co-operated in this experiment. Owing to an inadequate number of trees of one variety of cherries or plums to conduct a proper experiment we obtained our replications by using different varieties. A plot consists of one tree sprayed and buffered on the north and south side with a tree not sprayed.

The average set of 29,128 flowers on the north side of the Montmorency, Early Richmond, Morello, and Olivet cherries and Peach plum was 20 per cent. less than on the south side. The percentage set in the north side was 9.43 and on the south side was 11.8 for the Montmorency, Early Richmond, Morello, and Olivet. When the Peach plum is also included the percentage set is 7.91 and 9.88 respectively. The significance of the difference of these figures is apparent as 59,222 flowers were counted. The average set of the Montmorency, Morello, and Olivet cherries on the north side of trees is 10.1 ± 0.389 and on the south side 13.3 ± 0.389—a significant difference, as shown in Table 3.

The percentage of healthy fruits was increased over the checks by 34.1 for bud-spray, 27.1 for bud and calyx, 26.8 for calyx-spray, 16.3 for flowering, and 28.7 for flowering and

calyx. (*See* Table 2.) The effect of spraying with Bordeaux at different stages on the percentage set of Montmorency, Early Richmond, Morello, and Olivet cherries and the Peach plum is shown in Table 1.

Table 1.—The effect of spraying with Bordeaux at different stages on the percentage set of Montmorency, Early Richmond, Morello, and Olivet cherries and the Peach plum.

Stage.	Average Per Cent. Fruit Set.
Bud	11.6
Bud and calyx	10.3
Calyx	9.3
Check	8.0
Flowering	9.7
Flowering and calyx	10.6

Table 2.—Total number of healthy fruits of Montmorency, Early Richmond, Morello, and Olivet cherries and Peach plum after spraying with Bordeaux at different stages.

Stage.	Number of Healthy Fruits.
Bud	869
Bud, calyx	775
Calyx	771
Check	572
Flowering	683
Flowering, calyx	802
Calyx, two weeks	592
Bud, flowering, calyx, two weeks	500

Table 3.—Average set of fruit on the north and south side of Montmorency, Morello, and Olivet cherries sprayed at different stages with Bordeaux.

Stage.	Average Set.	
	North Side.	South Side.
Bud	14.8	17.9
Bud, calyx	11.8	13.7
Calyx	8.7	13.1
Check	8.8	12.8
Flowering	9.4	14.2
Flowering, calyx	11.9	15.5
Calyx, two weeks	6.9	11.0
Bud, flowering, calyx, two weeks	8.9	8.3
Average	10.1	13.3

MISCELLANEOUS.

Some years ago work was carried on in collaboration with the Horticultural Branch for the control of apple-tree anthracnose and a spraying programme developed which has proved reasonably satisfactory. Since that date many new fungicides have come on the market and the possibility of some of them being superior to those in use has to be tested. At the present time W. R. Foster and E. W. White are co-operating in testing Bouisol, a colloidal copper compound, against the standard Bordeaux and Burgundy mixtures for control of anthracnose.

A considerable amount of Mr. Foster's time has been devoted to the preparation and giving of lectures on "Inheritance and Breeding." Seventeen lectures were given, as follows: Dairy Convention, Chilliwack (2); Sidney, Duncan, Inspectors of Cow-testing Associations, Vancouver (2); Ladner, Dewdney, New Westminster (2); Cloverdale, Hammond, Summerland, Kelowna, Salmon Arm, and the Gyro Club, Victoria.

A noteworthy event was the visit of Mr. Harris, specialist on the diseases of strawberries and raspberries at the Experimental Station at East Malling, Kent, England, and for a year exchange research-worker at the Dominion Pathological Laboratory, St. Catharines, Ontario. Mr. Harris spent several days on a survey of the diseases of strawberries and raspberries on Vancouver Island and the Fraser Valley. As a specialist, his knowledge of the diseases of these crops was of much value to the plant pathologists, inspectors, and horticulturists in

connection with certain obscure troubles of these crops, particularly the failures of strawberries due to root-rot and the "running-out" of raspberries. Perhaps the most valuable aspect of his visit was his report that the raspberries in British Columbia were on the whole more free from virus diseases than those in Eastern Canada, and that, so far as concerns varieties already in cultivation here, it would be better to build up from our own plantings rather than to import foundation stock from the East.

REPORT OF PROVINCIAL ENTOMOLOGIST.

MAX H. RUHMANN, B.A.

Co-operation with the Kelowna office of the Horticultural Branch in the codling-moth spray tests was possible, and assistance was given in all spray applications and the checking of results. As in previous years, a large block of apple-trees was selected which had shown a high infestation of worms during 1933. This block was divided into a number of plots, each of which received a different series of sprays. As in previous years, the results were very satisfactory. The details of this work will appear in the Provincial Horticulturist's report.

Apart from the information acquired from these spray tests, the number of trees used for these experiments places the project on a commercial basis and becomes an excellent demonstration of what may be accomplished by any fruit-grower in his commercial work.

Mealy Bug.—The most important problem coming to our attention this summer was the increased infestation of a mealy bug in the Nelson District. This insect has been a matter of concern to the growers in this district for some years, due to the apparent difficulty of control with the commonly used sprays. The rapid increase of this pest in the last two years, in spite of the growers' efforts to control it, has made it necessary to make a major project of the study of this insect, so that satisfactory control may be obtained.

At the end of June J. J. Campbell, of Willow Point, near Nelson, was in Vernon, when he requested us to make an examination of the conditions and to suggest a more effective spray programme. Mr. Campbell provided transportation to Nelson. A thorough examination was made of the infestation, which was found to be widespread through the Willow Point orchards, attacking particularly apple and cherry trees. In Nelson this mealy bug had spread to many deciduous, ornamental trees. At this time, the end of June, large masses of eggs were in evidence. These were just commencing to hatch, and arrangements were made to apply some test-sprays in early August, at which time it was anticipated that a spray might be effectively applied.

Early in August we proceeded to Nelson and on examination found that the mealy bugs had reached an ideal stage for effective control. The young mealy bugs were scattered on the under-side of the foliage and were as yet unprotected by wax filaments. An average of eleven young mealy bugs per leaf was counted on the trees selected for the spray tests. Adult mealy bugs were only found on the trunk and main limbs of the trees, in most instances beneath the loose, scaly bark.

On August 6th the following sprays were applied: (1) 1 per cent. oil emulsion; (2) 1 per cent. oil emulsion plus ¾ pint Deraten to each 100 gallons; (3) 1 per cent. oil emulsion plus ¾ pint nicotine sulphate 40 per cent. to each 100 gallons.

One hundred gallons of each spray were used, each 100 gallons of spray being sufficient to thoroughly spray from seven to nine trees, according to the size.

An examination of the results of these sprays was made on August 9th. It was found that practically 100 per cent. of the young mealy bugs on the foliage had been killed, no variation being found in the effectiveness of each spray used. These sprays had produced little effect on the adult scales protected under loose, scaly bark on the trunks and main limbs of the trees, indicating the necessity of the thorough scraping of the trunk and main limbs of trees with loose, scaly bark, before sprays are applied.

At the end of September an apparent increase was reported in the intensity of the mealy-bug infestation in the infested Nelson area since August. This district was again visited, and on examination made on October 8th infestation at this time had materially increased. In one orchard which had not been sprayed young mealy bugs were found on the trunk and under-

side of the main limbs in masses, measuring as much as 6 inches in length, 1¼ inches in width, and ¼ inch in thickness. Much of the fruit in this orchard had to be wiped to remove the sooty mould developing in the excreta of the mealy bugs on the fruit. An examination of the trees sprayed in August showed a reinfestation from adjoining unsprayed trees. In no instance were mature mealy bugs found at this time on the trees. Later reports received at Vernon indicate a severe infestation of mealy bugs at Boswell.

Arrangements have been made with growers at Willow Point to apply experimental sprays during 1935, we to provide the spray material and apply the same, the growers to provide the spray-machine, team and a man to drive and operate the machine.

Black Widow Spider (Latrodectes mactans).—This is the only known poisonous spider in North America. A specimen taken at Summerland in a tomato-field was submitted to this office in August. On a short descriptive note of this spider being published in the Interior papers, specimens were received from many Interior points, including Nelson, Trail, Nakusp, and from Enderby south to the boundary, indicating its general distribution. The few specimens received from these points seem to indicate that they are not very numerous. This spider does not readily bite human beings, and although its bite is very painful it very rarely has fatal consequences even in the tropics, where the blood would be less resistant to the poison. The spider is represented by other species of the same genus in Europe, North Africa, and South America, all of which are similarly poisonous, yet records of fatal results from their bites are very rare.

Fleas (Ctenocephalus felis?).—For several years outbreaks of fleas have been reported in local coal-cellars. Two such reports were again received this year. All infestations have been exterminated by the use of crude naphthalene, a by-product which is both cheap and effective.

San Jose Scale (Aspidiotus pernicious).—The two areas under quarantine for this scale were inspected. Excellent progress has been made towards the eradication of this pest.

OTHER ECONOMIC INSECTS NOTED DURING THE YEAR

The *Eye-spotted Bud-moth (Spilonota ocellana)* is showing an increase in the last two years. Unusually large numbers were captured in the codling-moth bait-traps.

The *Fruit-tree Leaf-roller (Cacœcia argyrospila)*, which has been at a low ebb for some years, is showing a marked increase this year.

The *Oblique-banded Leaf-roller (Cacœcia rosaceana)* is showing a slight increase and was responsible for considerable culling of apples.

The *Alfalfa Semi-looper (Autographa californica)* was quite abundant in the North Okanagan, Kamloops, and other Interior districts, causing damage to clovers and truck-crops. All infestations were heavily parasitized.

The *Lesser Apple-worm (Laspeyresia prunivora)* was much in evidence in the Coldstream section this year, particularly affecting Wealthy apples. This section is still entirely free of the codling-moth and the orchards are consequently receiving comparatively few arsenical sprays.

The *Corn Ear-worm (Heliothis obsoleta)*, although noted every year in the Interior, rarely reaches sufficient numbers to attract the attention of growers. This year it was unusually numerous in the Boundary section (Grand Forks), the Lower Okanagan, and on Vancouver Island, and many inquiries were received fearing the appearance of the European corn-borer. It is usual for this moth to appear in increased numbers after a very mild winter in the Interior of the Province.

The *Forest Tent-caterpillar (Malacosoma disstria)* is showing considerable increase, particularly in the Kootenay, from where several reports have been received of abundance of caterpillars. Flights of the *Cabbage-worm (Pieris rapæ)* butterfly were below normal this year. The *Diamond-back moth (Plutella maculipennis)*, which has been at a very low ebb for several years, is showing some increase.

The *Ugly Nest Caterpillar (Archip cerasivorana)* was very numerous for many years, making the country roadsides unsightly with its nests on wild cherry. About seventeen years ago it suddenly disappeared completely from the Interior. This year a nest was observed on wild cherry near Armstrong. The *Red-humped Caterpillar (Schizura concinna)* is again becoming conspicuous in some orchards. The *Yellow-necked Caterpillar (Datana ministra)* is showing considerable increase. The webs of the *Fall Web-worm (Hyphantria cunea)* were conspicuous in apple-orchards. The *Peach Twig-borer (Anarsia lineatella)* was reported to

be increasing in the Southern Okanagan. *Cutworms* were present in unusually few numbers in the Interior.

The *Dock False-worm (Ametastegia glabrata)* larvæ were unusually abundant this year and bored into many apples on the trees in some sections. It is reported that this worm has appeared in an export shipment of Delicious apples sent to the Argentine, and this is causing some trouble. This could only occur through careless grading, as the injury caused by this worm is very conspicuous, somewhat resembling a stem-puncture.

The *Cherry-slug (Caliroa cerasi)* is usually conspicuous in some orchards. Considering the ease with which this sawfly can be controlled, it is surprising that it is permitted to cause so much foliage-injury. The *Violet Sawfly (Emphytus canadensis)* is becoming a serious pest in gardens. Pansy and violet beds are frequently seen almost entirely defoliated by the larvæ. The *Cabbage-maggot (Phorbia brassicæ)* damage was lighter than usual.

The *Onion-maggot (Hylemyia antiqua)* infestations were below normal in the onion-fields of Vernon and Kelowna. The *Corn-blotch Leaf-miner (Agromyza parvicornis)* showed a severe infestation in South Vernon, where a fodder corn-crop was seriously injured, 80 per cent. of the leaves being infested with from two to seven maggots. *Grasshoppers* showed a considerable increase, particularly on the range lands of the Southern Okanagan.

The *Rose Curculio (Rhynchotes bicolor)* was unusually numerous, wild and cultivated roses being severely affected. *Flea-beetles* were destructive in cold-frames; little injury resulted to seedlings in the field. *Wireworm (Elaterid spp.)* injury appeared to be lighter than usual.

Woolly Aphis (Schizoneura lanigera) did not exceed a normal infestation. The new canker paint is proving very effective in checking development of perennial canker. The *Rosy Aphis (Anuraphis roseus)* caused much less injury than in 1933. *Tarnished Plant-bug (Lygus pratensis)* injury was generally lighter than for some years.

The *Box-elder Bug (Leptocoris trivittatus)* was unusually numerous this year and was the cause of many inquiries in the fall of the year. *Oyster-shell Scale (Lepidosaphes ulmi)* continues to be a serious pest in the older orchards and requires thorough and timely applications of spray to obtain reasonable control. *Black Cherry-aphis (Myzus cerasi)* infestations range from normal infestations in the North Okanagan to fairly heavy in the South Okanagan.

REPORT OF PROVINCIAL APIARIST.

A. W. Finlay.

The exceptionally mild winter of 1933–34 allowed greater activity than usual in colonies of bees that should normally have remained quiescent for several months. This condition resulted in heavier honey-consumption in winter, with consequent losses in early spring, due to depletion of stores. Early examinations of March and April showed losses of 20 per cent. above normal from starvation. A very wide difference in colony strength was noticeable at this time between hives well supplied with sufficient stores for continued brood-rearing and those found to be short. The former were able to take advantage of the favourable weather during dandelion-bloom and stored considerable surplus, while weak colonies merely built up slowly, resulting in a marked difference at the end of the season in the final crop obtained. Continued warm and dry weather during the summer months favoured nectar-secretion from clover and other plants on low lands of the coastal districts, especially heavy crops being secured in the Delta areas; but yields were light on thin soils and high lands, particularly in fireweed locations. The fireweed honey-crop was further affected by unfavourable weather, though of short duration, during the height of its blooming period.

In the Dry Belt the heavy precipitation of the previous winter provided abundant water-storage for irrigation purposes and, followed by a warm summer of continued fine weather, accounted for a steady honey-flow of long duration from alfalfa and sweet clover. The absence of sudden changes in weather conditions made hive manipulations easier and swarming-troubles more easily controlled. Losses from spray poisoning were lighter than usual, due to quick drying of cover-sprays in the fruit-growing areas and to the fact that many bee-keepers had moved their apiaries out of the fruit districts after experiencing heavy losses from this cause last season. In connection with arsenical poisoning due to sprays falling on cover-crops in orchards, it is worthy of notice that alfalfa harvested from orchards where trees were sprayed

has been blamed for death of rabbits to which such alfalfa was fed when shipped to Coast districts this year.

Winter losses were made up by natural swarming or artificial increase and the importation of package bees and queens. Custom statistics show that package bees to the value of $2,452 were imported into the Province in 1933. Statistics for this season are not yet available, but are estimated to be considerably higher.

FIELD-WORK.

Apiary Inspectors for the various districts commenced their work early in April, their first visits being to apiaries where disease had been found and treated the previous season, for the purpose of checking any further developments. Systematic inspection of disease-affected areas followed, and this work continued as far as the allotment of funds for the particular district allowed. All colonies found badly affected were destroyed at once and diseased material burned. Colonies slightly affected were treated by the shaking method and the contents of the hives, excepting the bees, destroyed by fire, but this only in early summer when there was sufficient time for such colonies to recover and where proper facilities were available. Except in cases that required immediate attention, or where the bee-keeper could not be depended on to properly carry out instructions, this work was done by the owners of the affected apiaries, who were required to notify the Department of the completion of the work within a stated time. From the results of our experience in previous seasons, this practice appears to work to advantage and allows the Inspector to cover more territory.

The following is a summary of the field-work done in this manner:—

Inspector.	District.	Examined.		A.F.B.	E.F.B.
		Apiaries.	Colonies.		
A. W. Finlay	General	284	2,431	189	16
J. F. Roberts	Okanagan	178	966	120	....
H. L. Johnson	Chilliwack	171	731	27	14
E. R. Freeman	Lower Fraser	334	1,788	158	42
W. J. Sheppard	Vancouver Island	81	437	.....	....
Totals	.....	1,048	6,353	494	72

In addition to supervision of the work of local District Inspectors, apiary inspection was carried on by your Provincial Apiarist in other parts of the Province, assisted by the various district representatives who co-operated as far as possible in this work. The Kamloops area was found to be free from disease. Very little around Salmon Arm, and from Revelstoke to Cranbrook only two cases discovered. An outbreak of disease was found in two apiaries in the Creston District which, though promptly dealt with, will require an early check-up next season to prevent further possible development. The Kootenay and Slocan Valleys were clean, with the exception of some of the apiaries in the Doukhobor settlements.

The Okanagan Valley was visited in July and again in August. Considerable disease appeared in the vicinity of Penticton and Vernon. A bee-keepers' meeting was called at Vernon, where your Inspector recommended certain measures to be taken for the control of disease in the district by co-operative efforts, which were adopted and put into operation. A detailed report of this was forwarded to the Department and the results will be closely checked next season.

On the petition of the Oliver Co-operative Growers' Association, the numerous small apiaries in the Oliver and Osoyoos Districts were reinspected in August and a very few cases of disease were found and destroyed. These cases had developed after the careful inspection of the District Inspector much earlier in the season and indicated the necessity for the extension of district inspection to allow at least a later check-up on apiaries where disease has been previously found, especially in districts where small apiaries are numerous, in close contact, and bees kept mainly for pollination as in the canteloupe-growing districts around Oliver.

OFFICE-WORK.

The transfer of the Provincial Apiarist's office from Victoria to the district office in the Court-house at New Westminster, including the apiary registration ledgers and accompanying

correspondence, has materially increased the work of this office. Six hundred and seventy-eight letters were received and 922 sent out, this being considerably more than double the correspondence for the previous year; 260 applications for registration of apiaries were received and five cancellations recorded, making a total number of 3,081 registered apiaries in the Province. Miscroscopic examination of 142 smears and samples of diseased comb sent in for bacterial diagnosis were made and reports sent out with instructions for treatment. Of these, *ninety-one proved to be affected with American foul-brood, thirty European foul-brood, and* twenty sac-brood or sterile.

EXHIBITIONS AND FALL FAIRS.

Exhibits of honey and apiary products at some of the larger fall fairs showed a decided decrease in the number of entries and attractive displays. At Vancouver only twenty-one entries were received, including one in the display class. Inquiries among bee-keepers regarding the poor showing indicated that the reduction of the awards in the prize-lists did not allow sufficient compensation for the preparatory work and cost of transportation for large honey displays to and from the fair.

At Victoria a very good honey exhibit of fifty-four entries was displayed. Competition here was keen, *though not quite as good as last year. The honey was of excellent quality.* These and several smaller fairs were attended in an official capacity.

At the Imperial Fruit and Honey Show held in Leicester, England, British Columbia honey was awarded first place in the most important class, open to the Dominions, a market case of honey. Only two exhibitors from British Columbia competed at the Empire Show this year, securing one first and two third prizes against strong competition. The falling-off of British Columbia entries to the Imperial Show was due to dissatisfaction over the disposal of last year's honey exhibits, the returns from which have not been accounted for to date.

THE HONEY-CROP.

The total honey of the Province for 1934 is estimated at 1,512,075 lb., the largest recorded to date for British Columbia and an increase of more than 250,000 lb. over that of last season. This record is partly due to favourable weather conditions this season and, to a less extent, the steady increase in number of bee-keepers and expansion of apiaries. Owing to a short crop in a large part of the honey-producing States and other Provinces, due to drought, importations of honey into this Province are considerably less this season, while market prices are firm, from 1 to 2 cents higher than for several previous years, a condition encouraging to the British Columbia producers.

REPORT OF LIVE STOCK COMMISSIONER.

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

Live-stock production for the year was a good average. The winter of 1933–34 was quite severe if judged by its effects upon range live stock. Beginning during the 1933 Christmas week over a large area of the range country, severe virulent outbreaks of disease hit with paralysing suddenness. Repeated calls for your Commissioner called for immediate consideration. The report of this epidemic with recommendations will appear later in this report.

Market conditions for the year for live stock and live-stock products continued poor, with perhaps one exception—namely, swine. Prices for swine during 1933 were so very low and so entirely out of line with even the low prices received for other classes of live stock that production naturally dropped off slightly and of course consumption markedly increased. The result was a strong advance in prices in early 1934. Prices fell back somewhat in mid-summer, but still remained at the end of the year at a considerably higher level than that obtaining at the end of 1933.

Generally, the feeling throughout the country amongst live-stock men showed more optimism even though prices for beef and lamb were much the same. In many parts of the country, however, deplorable conditions exist, with the producer being borne down with the weight of good-time obligations and demands and continued high overhead, and being compelled to take prices far below the cost of production. Producers are showing evidence of recovery from the first stunning blow of the depression. During 1934 they have shown an

inclination to take an inventory of the situation. Speaking generally, they have in part looked hopefully towards relief through the marketing legislation passed during the 1934 Federal and Provincial sessions. In their stock-taking they have come to see the necessity for intelligent production methods. During years of high prices the producers are able to get by even with poor practices, but that is impossible to-day, and as a result they are turning to this department for assistance in the solving of these problems and for general direction.

HORSES.

The year 1934 saw a sudden awakening of interest in horse-breeding. The support given the draught-stallion owners through the Federal-Provincial premium policy contributed greatly to the interest taken. The instituting of this policy necessitated an inspection of all stallions applying for premium. The work took considerable time and necessitated some travelling. Every effort was made to eliminate horses carrying hereditary unsoundness and thus advance the quality of our commercial horses. There were in all fourteen horses inspected, with seven classing A, four of these for only one year. There were three given B classification and four refused classification. In all, ten Clydesdales were presented and four Percherons.

It might be explained that for the most part horses classing A for one year are young horses and the Inspectors felt it advisable to require another inspection again in 1935. While your Commissioner was very well pleased with the stallions reviewed, he is sorry to report that the good old breeding horse "Craigie Maxwell" was allowed to be sold to go to Alberta. Your Commissioner tried persuading against this, knowing that British Columbia needed this horse. Your Commissioner has been able to place several stallions where they will do a lot of good and has at present an order for several more horses.

The annual meeting of the British Columbia Horse-breeders' Association held in Vancouver was the best meeting since the formation of the association. It was quite evident from the nature of the discussion that all branches of agriculture are anxious to advance the industry.

BEEF CATTLE.

Prices continued very disappointing, with many cattlemen facing bankruptcy. Hope for relief through the recent marketing legislation gave encouragement. British Columbia's opportunity still continues to be in the production of early grass cattle. In this way they can reach the only market at all bare of Prairie cattle. British Columbia range conditions encourage this type of production, in that there is early grass and of course not sufficient grain for winter finishing.

The 1933 report called attention to the great losses resulting from timber milk-vetch (*Astragalus campestris*) poisoning. There was much less trouble this year, but this does not at all indicate a permanent reduction in the danger. All that is needed for another bad season is the proper combination of circumstances. Knock-heel cows, which are the partially recovered cases, are a great problem to the rancher. If they do breed they invariably drop late calves, which does not contribute towards early grass-cattle production. Again, late calves are the best subjects for outbreaks of coccidiosis and hæmorrhagic septicæmia. These calves also winter poorly at best.

During the Christmas week, 1933, your Commissioner was called to the Cariboo range country to deal with what ranchers all agree was the worst outbreak of disease in years. It was found necessary, due to deep snow and very cold weather, to work between a few ranches and keep in touch with others in trouble by telephone, passing on the results of the day's findings. Many post-mortem and microscopic examinations showed the trouble to be largely coccidiosis, with some hæmorrhagic septicæmia in herds not inoculated against this latter disease. Treatments previously suggested required distinct modification. Additional treatments and control practices had also to be used.

The epidemic was finally controlled in herds where our suggestions were followed out. During the summer Circular No. 27 was prepared dealing with Coccidiosis, and this was distributed, together with Circular No. 23 on Hæmorrhagic Septicæmia, Circular No. 26 on Deficiency, and Circular No. 24 on Necrotic Stomatitis, to stockmen and ranchers all over the susceptible area. With this information definite improvement should be expected. Reports to date this year seem quite encouraging. Of course the dangerous season is just approaching, and again there is the possibility that without treatment conditions this year might not produce an epidemic of any magnitude, but over a period of years we will be able to judge.

Hæmorrhagic septicæmia, its treatment and control, seem to be fairly well understood by at least the better rancher. Necrotic stomatitis has been making its appearance for the last few years much more extensively, but from reports of last year's outbreaks, where handled according to our suggestions in Circular No. 24, I think we need not worry about this disease.

Experience extending over several years and during all seasons seems to point very strongly to the possibility of a malnutritional background to many of these problems. Although more work will have to be done before we can make definite statements, it would seem that certain mineral deficiencies, such as lack of salt, iodine, phosphorus, and perhaps calcium, at least contribute to the trouble. These elements have been lacking during the summer and of course in some cases during the winter months also. Observations made this summer would seem to point to this being responsible for certain summer losses. These different conditions seem to be interdependent. With the assistance of G. A. Luyat, District Agriculturist, Williams Lake, who is co-operating fully in the carrying-out of the work, it is hoped that many of these problems which are to-day contributing to the low calf-crops and high losses will be at least greatly modified.

The general feeding methods and the condition of the ranges is very seriously modifying the range live-stock situation. Observations made definitely point towards faulty nutrition being a primary and contributory factor towards much of the range live-stock troubles. Faulty nutrition is also responsible for the slow maturing qualities and the lack of scale shown by live stock in certain sections. This problem is being attacked on the area plan and, with the help of the Field Crops Commissioner and the district men, it is hoped to correct this situation. Better field crops and greater variety in the crops grown, with consideration given to silage-crops, is part of the programme. Another very serious situation obtains to-day throughout a large part of the range-cattle country. Winter-killing of alfalfa on the irrigated land occurs often two or even three years out of five years, and the extent of kill varies from 10 or 15 per cent. to as high as 50 or 60 per cent. Where a severe loss occurs over large areas two years in succession the winter-feed situation becomes serious for the rancher. Some very encouraging results have been secured with new resistant alfalfa varieties. Greater attention is being given to late irrigating by many of the ranchers and the advisability of using snow fences to keep the snow from drifting off the larger open spaces, and when the usual January thaws hit the entire snow covering may not be removed, exposing the alfalfa-crowns to severe freezing. A study of air-currents is also being made. Some general range-improvement work is being done by introducing where possible crested wheat-grass for reseeding. Encouragement is being given where feasible to the idea of deferred and rotated grazing. Along with this is being done work on the eradicating of certain diseases on the area plan. Better sires are being used even although the price of cattle is very low.

BRANDS.

At this time it is not possible to give a complete report for the calendar year, but George Pilmer, Recorder of Brands, reports that:—

"As far as can be seen at present, shipments of cattle from the Cariboo District will be practically the same as in 1933. Kamloops-Nicola may show an increase of perhaps 30 per cent. over 1933. The other parts of the Province will be about the same as in 1933, except the Peace River Block, which will be double the 1933 shippings. This area is of only minimum importance in the cattle-shipping business as yet. To date this year some 800 head have gone out of the area.

"Since all old stocks of hides went out last year, with sudden improvement of prices, hide shipments will again be about normal and of course lower than in 1933.

"There seems to be little criticism of the 'Stock-brands Act' by the stockmen. Range riders may be objected to by certain people, but only by the use of experienced riders will we ever get away from the cattle-stealing that is going on steadily. Cattlemen are helpless in the hands of these outlaws, being afraid of their retaliating.

"Convictions were secured as follows: Slaughter on the range at Invermere, illegal branding at Williams Lake, and one at Hanceville, and a case of cattle-stealing at Merritt. It was not deemed necessary for the Brand Commissioners to meet during the year. Registrations show an increase of more than 50 per cent. over last year. Renewals are coming in more freely this year, about 30 per cent. having been received to date. The usual annual supplement of

the Brand Book for 1933 was printed and distributed, as well as the regular monthly lists of brands issued."

DAIRY CATTLE.

The dairy industry, like most branches of agriculture, suffered from low prices for milk and milk products. Adjacent to the larger centres there is of course a surplus of milk being produced and the producers are endeavouring to force their product on the market. The only way to correct much of this is for more of our farmers to turn to mixed farming with hogs or poultry and perhaps a cash crop to balance the programme. Experience has taught that on farms where there are a few good cattle, a few brood sows, and perhaps a few hundred chickens, there seems to be a minimum of production losses, and invariably there is some profit in at least one line of activity to carry the farmer through.

Replacement cattle to quite an extent resulting from breeding problems furnishes a very serious problem. Since dairy-farmers have not taken due consideration of the problem of disease, they are to-day paying a very heavy toll in animal replacements running from perhaps 8 per cent. to as high as 35 per cent. The producing lifetime of the average dairy cow to-day has been so shortened that it very greatly adds to the cost of milk production. Most certainly dairy-farmers should give consideration to the genetical side of this subject and try to build up strong vigorous strains, with of course reasonable type and production. These replacement cattle bring very little when marketed and without a doubt very seriously injure the beef industry. This cull beef goes on the market to set the price for the better grades, and unfortunately places Canada in the export field in beef, and this always means that a world price applies.

WARBLE-FLY CONTROL PROJECT.

The warble-fly programme of the Branch in the Deep Creek area was supervised by H. E. Waby, District Agriculturist, Salmon Arm. Our first year's work in 1933 showed nearly 1,000 warbles on some 400 cattle in the first examination in early February. On the February, 1934, visit our Inspectors only found three warbles on the first 200 head of cattle examined, which shows very conclusively the progress that we are making. Our March, 1933, count showed 1,850 warbles and the March, 1934, count but a very few warbles, which shows progress. The Deep Creek area was extended for 1934 to take in a further territory including the town of Salmon Arm. This added some 200 head more cattle to the area. The small herds within the town did not have many warbles, since many of the owners had been expelling the warbles and destroying them.

Under the supervision of G. W. Challenger, District Agriculturist, Kamloops, an area containing some 500 head of cattle in the Upper Louis Creek Valley was treated. In this area the February treatment was dispensed with and the March treatment showed some 3,500 warbles, averaging 7.4 warbles per animal. The April treatment saw the average of 3.7 warbles per animal. This area is going forward again during 1935 and may be extended somewhat.

The farmers in all these areas are highly pleased with the results secured to date and report cattle grazing much more quietly with little or no gadding.

Up to the present in the areas considered we very fortunately have not been troubled to any great extent with the late warble-fly, which makes it unnecessary to treat more than three times, and oftentimes only two treatments seem necessary. When finally trying to get the last warble it may be necessary to give a late treatment.

Experiments conducted with British Columbia prepared Derris powder in comparison with the best of the imported product in our 1933–34 work showed that the local product could safely be used at half the strength of the outside product and would secure a perfect kill. This is going to reduce very materially the cost of the work and, as well, increase its efficiency.

SHEEP.

Sheep-ranchers do not seem to be supporting the annual sheep sale held in Kamloops in the way they should. Good rams were passed in and out of the ring to later be purchased by private treaty at fair prices. If the sale has to be discontinued, sheepmen will have to do much of their buying by correspondence and of course will have to pay transportation. The average of the 1934 sale was $23.65. Average for four Rambouillet was $23.12, for fifteen Hampshires $23.35, for two Suffolks $71.25, for one Shropshire $20, for one Cheviot $15, for

three Ronmellet $18.66, and one Oxford $15. The top price of the sale was $127.50, paid for a Suffolk shearling ram.

Price of lamb was up somewhat from 1933. The average price for choice lamb for January and February was from $6.25 to $6.75, March $7.25, and April $7.75. The peak for the year of $10.50 was reached during middle May. June first saw prices $9.50, and by the end of June $8.50, early July $7.75, and the end of July $6.50. The middle of August saw prices at $5.75, with the low point of the year, $5.25, coming towards the end of September. October and November averaged $5.50 and the end of December saw choice lambs selling for $6. The prices for butcher ewes started off in January at $2.75, gradually rising to a peak of $5 by the middle of May, and gradually going down by the end of December to the $2.75.

Your Commissioner can report some very encouraging improvement in the area sheep plan mentioned in previous reports. This area-work for the present has been largely confined to the islands. The foundation-work beginning with cleaning-up of the flocks and premises has been now largely taken care of and definite advancement has been made in the way of improvement in type and quality. Some twenty choice rams were placed in this area under the Farmers' Institute sire policy of the Provincial Department of Agriculture. The next piece of work to be undertaken for the improvement of this area has to do with better crops and especially better pastures. The plan is to have certain slashing done and as soon as it is burned off seed down in time to catch the early rains. This plan, it is felt, will ensure tame pasture and yet not reduce the often limited acreage being used for the growing of cultivated crops and grain.

The active executive and members of the Saltspring Island Sheep-breeders' Association staged their second annual sheep field-day on June 4th, 1934. This event brought out perhaps 1,200 people from all parts of the adjacent islands and the Lower Mainland. In addition to it being one of the largest and best sheep shows, it was a real outing for every one, with amateur and professional sheep-shearing contests, sheep-dog trials, and sports events. There was also a particularly fine display of wool and woollen handicrafts.

Predatory animals still continue to take a toll from the sheepmen. Sheep losses from dogs is still one of the great problems. In 1933 there were 229 sheep killed, for which $842.10 was paid in compensation, 111 chickens valued at $40.65, two geese valued at $4, eighteen turkeys valued at $60, and one goat valued at $9. Up until December 31st this year there have been 199 sheep killed, valued at $1,077.40, 122 chickens valued at $155.15, and 159 turkeys valued at $82.50. In all, for 1933 some 361 animals were killed, valued at $955.75, and in 1934 480 animals were killed, valued at $1,315.15. Some of this increase in cost may be attributed to a small increase in value of live stock, but is largely due to the fact that many of the sheep destroyed were registered animals.

Department assistance was again given in support of Lamb Week in early September. The Williams Lake Annual Fair and Sheep Show and Sale was an outstanding success, with a decided improvement in quality and numbers even over last year's standard. This event is to-day receiving the support of the stockmen of the entire surrounding territory.

The Canadian Legation in Japan put us in contact with certain Japanese groups interested in Shropshire sheep. The Japanese firm purchasing required departmental supervision and selection in the purchase. The order was divided between five of our better breeders of pure-bred Shropshires. Judging from letters received through the Canadian Legation, the purchasers are entirely satisfied and highly pleased with the selection. They furnished us with photographs of the shipment on pasture in Japan and reported them in good health and condition.

SWINE.

British Columbia continues to be an importer of over 150,000 head of hogs yearly from the Prairie Provinces, especially Alberta. With a good market for this product, it is to be expected that Prairie breeders will continue to produce this class of stuff. This type of hog frequently carries considerable disease and is undoubtedly responsible for much of our swine-trouble.

At the present time certain insidious disease-like conditions are making severe ravages in many of the larger herds. This is further evidence of the results of extreme specialization. This still unnamed condition seems to hit pigs shortly after weaning, and with winter litters commonly results in 100 per cent. losses.

Pneumonia is the prominent symptom, and while some cases seem to live through the attack there are some more or less chronic cases which take eight to ten months to make the marketable weight of 200 lb. While infection of a low type is present, together with the germ of hæmorrhagic septicæmia, there is a primary contributing factor which enables these secondary invaders to gain a foothold. Where this disease hits a large herd it is advisable for the swineman to farm out his sows and take back the weanlings at, say, a month after weaning. Where sows are to farrow on the home ranch, only summer litters should be raised and these produced in individual colony houses on alfalfa or clover pasture. All colony houses should be thoroughly cleaned up and sows well scrubbed before being placed in these houses. Young pigs should not be allowed access to the sow's trough under any circumstances, and should not be weaned before 5 or, better, 6 weeks of age, and then alfalfa pasture should form a good part of the ration.

JUNIOR LIVE STOCK CLUBS.

There were in the Province the following junior clubs:—

	1933.	1934.
Swine—		
Number of clubs	12	9
Total membership	94	88
Number of pigs exhibited	188	176
Calf—		
Number of clubs	25	21
Total membership	208	197
Number of calves shown	208	197
Poultry—		
Number of clubs	29	31
Total membership	239	216

Prize-money for Swine Clubs amounted to $294, with the Provincial and Dominion Departments of Agriculture and the local organization contributing equally. Prize-money for the Calf Clubs amounted to $672, with the Provincial Department of Agriculture contributing one-half the prize-money and the local organization contributing the other half. Poultry Club prize-money amounted to $183, contributed entirely by the Provincial Department of Agriculture.

British Columbia again competed in Toronto in the interprovincial competition staged under the direction of the Canadian Council on Boys' and Girls' Club Work, with a dairy-cattle team, a swine team, and a poultry team. Our dairy-cattle team, made up of George Lockhart and Sam McCallum, of Armstrong, competed against teams from six other Provinces and placed fourth. George Lockhart came forward with a score of 87 points in the Jersey division to tie with the best man in the winning team from Ontario. George made a perfect placing in the judging of Jerseys, three points above the nearest competitor, the only perfect score made. Sam McCallum made very excellent scores in both Ayrshires and Holsteins.

In the swine competition British Columbia was represented by Charles Frolek and Wm. Belcham, of Kamloops, placing seventh in a very stubbornly contested competition with eight Provinces competing. In the poultry competition British Columbia was represented by Cyril Joyce and Glen Jordan, of Salmon Arm, placing fourth with four teams competing.

REPORT OF DAIRY COMMISSIONER.

HENRY RIVE, B.S.A.

Production of milk has been uniformly high throughout British Columbia. Dairy crops and fodders have yielded well, and food stocks at the end of the year are good. Mild weather has appreciably lengthened the season, but while volume is greater than usual, prices for all dairy products remain low. Mill-feeds are considerably higher in price.

DAIRY-FACTORIES.

Milk plants, creameries, cheese-factories, and other manufacturing establishments have been visited regularly during the year. The grading and testing of milk and cream, sanitation, methods, and general conditions at each of these were duly inquired into and corrective advice offered where necessary. The factories of the Lower Mainland were attended to by F. Over-

land; those of the Southern Interior by F. C. Wasson, with calls made intermittently on the plants of the Islands and of the Central Interior.

CREAMERIES.

Checking of grading and testing practices has been regularly carried out, with numerous calls on producers. Improvement of methods and of product may be claimed for the creameries of the Province, which still produce far less butter than is required for local consumption. Sale of butter in the retail package labelled according to grade is eagerly awaited by all concerned. With the necessary amendment to the "Dairy Industry Act" (Federal) in effect, similar provision when made by the Provincial Legislature should shortly result in fully established control. It is felt that many grievances may be removed by the enforcement of this measure, which should assist greatly in maintaining prices.

CHEESE.

A relatively considerable increase in cheese-manufacture has occurred during the year, again due largely to milk-supplies being diverted from other channels. The increase is largely of cheddar cheese, which naturally preponderates. Demand increases slowly for Roman, Kingston, and Monterey. Farm dairies make small quantities of Cheshire, Swiss Brick, and Camosun. The demand for local products is fair and could be further built up. Much cheese is brought in from outside points.

A six-day demonstration of farm cheese-making was held at Wistaria, Ootsa Lake. A simple type of cheese suited to the purpose, ripening sufficiently for consumption in six weeks or thereabouts, was dealt with. Twelve women of the district took part, some attending regularly throughout the course.

CONDENSED PRODUCTS.

Evaporated milk, in common with other dairy products, has remained unfavourably low in price. Less has been made than usual. The condensery at South Sumas (Borden's, Ltd.) and that at Delair (F.V.M.P.A.) have operated much as usual. The former during the season, the latter more continuously. The manufacture of powdered milk and casein has not met much financial encouragement. These products give this Province the right to the name of exporter of dairy produce, evaporated milk and powdered milk being shipped to Britain, to the Orient, or elsewhere, as opportunity affords. The total exported is not great, but provides a much-needed outlet. Of powdered milk, much more is imported than is locally manufactured; of evaporated milk, our production more nearly equals consumption, but competition from other Provinces occurs.

It is necessary to bring condensed sweetened milk into British Columbia, none being made within the Province.

ICE-CREAM.

Due mainly to a longer and warmer season, more ice-cream has been made than for several seasons. Late in the year registration of several new firms of Vancouver as ice-cream manufacturers has taken place.

TOTAL OF DAIRY-FACTORIES.

Operating in British Columbia there are twenty-six manufacturing creameries, three cheese-factories, two condenseries, fourteen wholesale ice-cream factories, with many small ice-cream plants, and one plant each for milk-powder, casein, and semi-liquid buttermilk.

HERD IMPROVEMENT.

There continue twelve Cow-testing Associations with fifteen routes. Membership in these associations, which decreased in numbers in 1931 and 1932, increased, however, during the year following and has gained substantially in 1934. A 10-per-cent. rise in the number of herds on test with over 400 additional cows is reported. Subsidies to all associations have gone on as heretofore. Extension of the work may be expected as times improve.

The Fourth List of Dairy Sires is now in the press. For the first time, in addition to chronicling simply the performance of daughters and their dams, index figures for each sire are given (Modified Mount Hope System), affording valuable information as to the transmitting

qualities of the dairy bulls of the Province. These calculations take much time, but the end in view, that of controlled, progressive, profitable breeding operations, is worthy of all possible effort. The work of herd improvement continues under the supervision of G. H. Thornbery.

CREAM-GRADERS' LICENCE COURSE.

The course for 1934 was held January 22nd to February 8th at the premises of the Associated Dairies, 1170 Hornby Street, Vancouver. Concurrently, on account of testing facilities, the course for intending supervisors was held. Fifteen in all lines attended. Eight passed the tester's licence examination successfully, three of these in the supervisors' course. Six have been issued cream-graders' licences. One is withheld until factory experience is secured. The course for 1935 is to be held in the same premises, commencing February 4th.

LICENCES ISSUED.

During the year seventeen applicants were examined. Sixty-four licences were issued. Forty-five combined cream-graders' and milk-testers' licences were issued. To fifty-six persons, firms, companies, or associations, buying milk or cream on the basis of the butter-fat content, licences were issued.

Details covering licences issued in 1934 are on file in the office of the Dairy Commissioner, Victoria, B.C., and particulars are available upon request.

REPORT OF CHIEF VETERINARY INSPECTOR.

A. KNIGHT, V.S.

Owing to the limited number of Inspectors the year has been an arduous one. Sections of the Province not previously covered by your Inspectors have called upon us to investigate various diseases and carry out tuberculin testing. This has entailed considerable time over and above the work that has been carried out in previous years. As new sections are opened up and new settlers take up the land they call upon the Veterinary staff for certain information relative to stock-raising. Also outbreaks of diseases have occurred which have taken up considerable of the time of your Inspectors, but no extensive outbreaks have occurred to cause any general serious loss. A number of isolated settlers have suffered from the loss of a few head of cattle, but it has not assumed serious proportions. I beg to submit a list of the diseases under their various headings which have been investigated throughout the year.

HÆMORRHAGIC SEPTICÆMIA.

Small losses have occurred, especially among young stock, through the onset of this disease. In the Ootsa Lake area one settler lost six calves out of seven. Other losses have occurred, but I am not satisfied that these are due to hæmorrhagic septicæmia, and I am of the opinion that they were due to some form of plant-fungus which may have caused the disease known as botulism. Owing to climatic conditions some years this trouble has been found to occur, as temperature and moisture are factors in producing this disease, especially on some classes of fodder or forage plants. When prophylactic measures are adopted, such as the treatment for hæmorrhagic septicæmia, this disease can be kept in check, and the settlers, where they have had trouble, have been so advised.

FOOT-ROT IN SHEEP.

During the year Dr. McKay has inspected some 19,000 head of sheep. The disease appears to be more prevalent in sections of the Okanagan and the chief trouble has occurred on certain range areas. This disease is amenable to treatment, but to thoroughly disinfect and cleanse the bedding-grounds of sheep is rather a difficult matter. I am satisfied that the continued source of infection occurs from infected bedding-grounds or corrals, and treatment includes thoroughly cleansing such pens of manure and removing same, together with the top soil, before the disease can be checked. Usually we find on the open range under severe winter temperatures

that such ranges are considered safe the following year. Where the bedding-grounds have not been thoroughly cleansed there may still remain sufficient of the virus that it only awaits the coming of warm weather or suitable temperatures before we have another outbreak.

It is the practice to inspect all sheep on their home ground before they are allowed to move along a public highway or open range, and your Inspectors are endeavouring to carry this out in the most effective manner. In past years minor outbreaks of this disease have occurred amongst cattle, but at no time has it assumed any serious proportions. Purchasers anticipating stocking up with sheep could protect themselves to a great extent by looking into the general health of the flocks before they purchase. If any number of sheep are lame it would not be advisable to purchase from such flocks until they had been thoroughly inspected.

ACTINOMYCOSIS (LUMP-JAW).

Only isolated cases of this disease have been found by your Inspectors this year. Where such cases are found, especially in milk herds, the milk from such cows is prohibited from sale and the animal is quarantined so as to prevent contact with outside cattle. In the early stages treatment is advised which can be carried out fairly successfully, but in the advanced stages there is no successful remedy.

ABORTION IN CATTLE.

This trouble is continually with us and is somewhat prevalent throughout the Province, but not any more noticeable this year than in former years. Your Inspectors have always advised farmers as to sanitary measures to adopt so as to control the spread of this disease as much as possible. A number of the practising veterinarians throughout the Province are equipped to make blood tests for this disease, and if instructions are carried out thoroughly the losses can be kept down to a minimum. The advice rendered by your Inspectors has been of considerable help to the farmers and dairymen in the control of this disease.

JOHNE'S DISEASE.

The above disease is somewhat new to this Province and only one outbreak has been brought to our attention during the past year. This disease is incurable and is spread to healthy cattle when they are on contaminated ground or in surroundings where a previous case of the disease has existed. It may also be introduced by purchasing cattle from diseased herds. The Abian form of tuberculin can be used as a diagnostic agent; also injecting Johnin into the blood-stream, following the injection with the taking of temperatures, has proved successful as a means of diagnosis. A thorough cleansing of the yards and premises and quarantining against admission of healthy cattle for a prescribed period is also essential to the control of this trouble.

Since this is a new disease to this Province I would recommend that active measures be taken towards its control.

LEUKÆMIA IN SHEEP.

One party in the Francois Lake area suffered the loss of twelve head of sheep, and although the post-morten results were somewhat obscure the lesions would indicate that the animal examined was suffering from the above disease. The symptoms exhibited were anæmia and enlargement of the lymphatic glands throughout the system. The cause of this disease is unknown. There is a depreciation of the red corpuscles of the blood and an increase of the leucocytes, probably caused by deficiencies in the food-supply. The cause being unknown, it is rather difficult to prescribe treatment.

PLANT-POISONING.

Some loss has been occasioned both in cattle and sheep by poisonous plants. This is more pronounced in the area south of Burns Lake. This area lends itself to the growth of water-hemlock and larkspur, and it is these two plants which have caused the greater losses.

The loss through larkspur-poisoning has been more severe this year than for some years past. On some farms, especially where sheep are grazed, the natural forage-plants are eaten very close to the ground, leaving only the larkspur-growth. Where animals have to travel some little distance to obtain water-supply there is a tendency for them to harbour around the watering-place during the night, and in the morning, being hungry, they eat the herbage that

is easily available, and where larkspur-plants are numerous severe losses often occur. This could be avoided by the settlers to a great extent if they opened up a wider range of water-supply so that the animals would not be in a congested area. When sufficient of this plant is eaten there is little hope for a cure unless the owner is on the ground in the early stages of the poisoning, which is not often the case.

Fungi-poisoning also occurred in the vicinity of Hixon Creek. Owing to climatic conditions the growth of certain fungus-plants was very pronounced. On an area some 1½ miles long by ½ mile wide, set in between hills partially cleared, there was an excessive growth of mushrooms. Certain of these mushrooms are quite poisonous and, when eaten in sufficient quantities by cattle, poisoning occurs. The settlers were advised to endeavour to keep their cattle off such areas during the latter part of July and August, as the losses in the past have occurred within these dates.

MINERAL DEFICIENCY.

Symptoms of mineral deficiency were quite pronounced throughout the Peace River area and in the Francois and Ootsa Lake Districts, also to a lesser extent along the Bulkley Valley as far west as Smithers. There is a tendency in the settlers to provide a very limited range of feed for all classes of live stock. To make a success in the raising of live stock, whether beef or dairy cattle, it is essential that more variety in feeding be provided, especially legumes for feeding during the winter months. Although mineral deficiency can be to a great extent corrected by feeding mineral compounds, this is expensive when spread over several months, and I am satisfied that if leguminous feeds were provided this deficiency would be prevented. Throughout the Peace River area especially, cattle and horses are kept on a one-sided diet such as oat-sheaves from the month of November until the grass opens up in the spring. Mineral deficiency was also quite noticeable amongst swine throughout the Peace area, especially during the winter months, when, the ground being frozen, the pigs cannot obtain sufficient mineral from the soil by rooting. Alfalfa or clover hay appear to supply the mineral essential for the correcting of this trouble. Lime, bone-meal, and a little sulphur are also beneficial and could be provided at a reasonable cost.

PARASITIC DISEASES.

The reported cases in regard to parasitic diseases have been much less this year than in former years. In past years your Inspectors have been active in advising the farmers as to the control of parasites in sheep and swine. No doubt the few reports that have come in have proven that the advice given by your Inspectors has been beneficial to the stockholders in giving them information as to the control of internal parasites, and therefore very few reports have come into the office during the past year.

LIVE-STOCK CONDITIONS IN PEACE RIVER BLOCK.

Considerable time has been spent in the Peace River Block. Outside of the testing of 104 herds, some little time was spent in advising farmers as to feeding methods, etc. The one-way diet of feeding sheaf oats does not tend to the improvement of animal health conditions throughout the Peace area, and we find considerable trouble amongst cattle and swine owing to the lack of minerals. There is a general interest being taken in the improvement of cattle throughout the district. The Dominion Government has put in a number of good Shorthorn bulls. The majority of these bulls were exhibited at the North Pine Fall Fair and made a very creditable exhibit.

The horse trade has been stimulated by enhanced values, buyers from the East having visited the Block on a number of occasions for the purpose of purchasing heavy draught horses. The stallions in use at the present time, however, are rather underweight, and so far as my knowledge is concerned only two registered stallions are standing for service throughout the district and one of these is aged. The general trend is towards Percheron or Belgian, although one registered stallion, somewhat underweight, was in service during this past season. There are quite a number of heavy draught mares in the area that could be used for foundation stock if stallions of sufficient quality and weight were provided. The district lends itself to the production of horses and other domestic live stock.

The sheep flocks that I visited were in good condition and well grown, but an inferior grade of rams was being used, which does not tend to maintain quality. I understand, however,

that the Dominion Government this fall has been active in supplying the district with a number of Hampshire Down rams on easy terms of payment.

TUBERCULOSIS.

Your Inspectors have devoted considerable time to the testing of cattle for tuberculosis, especially those herds supplying the towns with milk. Practically every town throughout the Province is now demanding a Grade A certificate from the producers of milk, which means that the herds supplying such towns are required to have their cattle T.B.-tested before a Grade A certificate can be allotted.

During the year 1,154 premises have been visited, 10,736 cattle tested, with the uncovering of 139 reactors. Of these, seventy-four reactors came from five herds.

To eradicate tuberculosis from these herds it is necessary that they be retested as early as possible, although in two or three herds very few cattle remain from these infected premises. It should be a comparatively easy matter to eradicate or clean up these five infected herds. Of the total, forty-four herds were found to contain tuberculosis, which leaves 1,110 herds free of tuberculosis.

There is a general improvement in the standard of the dairy premises throughout the Province, and it has been a matter of general improvement spread over a period of time, avoiding any particular hardship on the individual. Your Inspectors have endeavoured to make the inspection of dairies and the health of the herds an educational matter rather than coercive, and we are gratified to state that this system has proven satisfactory to the Medical Health Officers, Inspectors, consumers, and producers of milk.

The following table shows the number of premises inspected for grade and cattle kept on same:—

	Number of Premises.	No. of Cattle.	Grade.			Ungraded.
			A.	B.	C.	
Vancouver Island	344	4,992	140	91	55	58
Fraser Valley	2,054	40,740	153	1,318	583	.....
Okanagan Valley	58	673	5	31	2	20
Interior points	69	949	3	56	1	9
Coast points	131	448	3	10	52	66
Gulf Islands	66	379	1	16	5	44
Cariboo	4	43	1	1	1	1
East Kootenay	206	2,086	29	69	....	108
West Kootenay	34	202	3	8	1	22
Central British Columbia	55	519	8	10	6	31
Peace River Block	108	470	.....	1	1	106
Totals	3,129	51,501	346	1,611	707	465

The table given below shows the total number of premises visited, cattle tested, and reactors uncovered:—

	No. of Premises.	No. of Cattle.	Reactors.
Central British Columbia	50	480	2
Cariboo	4	43	.....
Coast points	179	788	1
East Kootenay	206	2,086	51
West Kootenay	34	202	3
Interior points	66	801	3
Okanagan Valley	52	535	2
Peace River	108	470	4
Vancouver Island	455	5,331	73
Totals	1,154	10,736	139

REPORT OF POULTRY COMMISSIONER.

J. R. TERRY.

Owing to exceptionally mild weather throughout the Province egg production was unusually heavy during the late winter and early spring. In many sections of the Interior and northern part of the Province winter-egg production approximated ordinary spring totals. The price of eggs at this period was depressed somewhat, but many ranchers were satisfied as the yields were unexpected.

Price of grains and other feeds showed a further rise, starting early in the year and continuing throughout. This undoubtedly checked increase in young stock, as many breeders held over mature stock another year instead of replenishing with young birds.

It is safe to say that there has been very little increase in young stock this year. Last year there was a decrease of about 15 per cent., but the total poultry population just about held its own during the past season. The export of eggs was again curtailed and early in the season imports of Prairie eggs were recorded. The prophecy of the Dominion Markets Commissioner made to the writer in 1920 has indeed come true. He stated then that in about fifteen years we would need to be concerned about cheap eggs from the Prairies.

COMPARATIVE EGG PRICES.

The prices below are those paid to the producer and are averaged for the whole of the Province.

	Cents.		Cents.
1906	29¼	1921	39½
1907	31	1922	32½
1908	31½	1923	28
1909	33¾	1924	32
1910	34¼	1925	32
1911	34¾	1926	30
1912	41	1927	29
1913	35	1928	29
1914	35	1929	30
1915	32½	1930	24½
1916	34	1931	20
1917	41	1932	15
1918	50	1933	15
1919	60¼	1934	15
1920	57½		

BREEDING OPERATIONS.

Despite the heavy yield made during the winter by the fowls used later on for breeding purposes the hatching results were possibly a little above the average. No doubt some credit is due the breeders because of the stricter culling of stock which always accompanies times of stress and depression.

An alarming situation arose in the spring in connection with the export of chicks to the Prairies, where efforts were made to place an embargo on chicks from any source where an official blood-testing policy was not in force. It is only fair to state that the complaints regarding chicks supplied some of the Prairie breeders were from Eastern sources, but as a result our own shippers had to suffer. The matter was taken up with Dominion authorities by executive officers of our Department and a stay of the embargo for a season was secured.

APPROVAL POLICIES.

Arising out of this matter and from the determination of Federal authorities to launch new poultry policies, a committee was formed composed of delegates from the British Columbia Registered Breeders' Association, the R.O.P. Association, and the British Columbia Poultry Association. Later on representatives of the hatcherymen were added and frequent meetings with the Honourable the Minister of Agriculture and officials of the Department were held. As an outcome of these meetings a representative of the Federal Department of Agriculture was sent out from Ottawa and a series of meetings was held.

Following these meetings, at which it was clearly indicated that the poultrymen of this Province desired that Proclamation of the proposed poultry policies be deferred until next year, a resolution stating the attitude of the poultry interests of British Columbia was sent to Ottawa. The Provincial Department of Agriculture maintained its position and recommended to the Federal Department the present inadvisability of bringing the proposed regulations into force here.

MARKET DEMANDS.

The 1934 season proved satisfactory for growing stock, but it is unfortunate that the rise in the price of feedstuffs caused a slight decrease in hatching.

The holiday trade again called for the medium to large carcasses, but during the rest of the year fowls between the weights of 3½ and 4½ lb. were in great demand. Many inquiries *re* cross-breeding for table purposes were received during the year.

The chick-sexing operations were carried out on a large scale this year, mostly by Japanese experts, and both hatcherymen and buyers appear to be satisfied with the new order of things. In Eastern Canada and the United States, however, there appears to be a division of opinion regarding the value of the work. In some States laws have been passed against the selling of pure-bred day-old chicks separately. A few residents of this Province have taken courses in chick-sexing work.

BOYS' AND GIRLS' POULTRY CLUBS.

A total of forty-two Poultry Clubs was organized this year, about the same total as last year. Most of the clubs were in southern sections of the Province.

The results of the hatchings were uniformly good, and in most of the clubs the chicks obtained by each member were the most numerous on record. Rhode Island Reds were the favourite breed, followed closely by Barred Rocks, Wyandottes, and White Leghorns.

In many sections the competitors entered fowls in local fairs, and in all cases, particularly at Invermere in East Kootenay, very creditable displays were brought out. Many of the children report sales of surplus male birds to local farmers at good prices.

At most of the principal fairs—Victoria, Vancouver, Mission, Ladysmith, and Armstrong—besides exhibiting, the children entered the judging competitions. At Vancouver the children, all under 16, were again coached by Fraser Valley breeders of experience, and their work at judging and selection of utility stock was very commendable.

At Armstrong, as usual, the elimination trials for the Dominion poultry-judging competition were again held, and the Salmon Arm team, coached by Mr. Waby and local breeders, were successful in earning a trip to the Toronto Fair. There they succeeded in winning fourth prize against other Provincial contestants.

TURKEYS.

Owing to the very favourable weather many turkeys were hatched out earlier than usual, and with the resultant weather conditions again proving propitious, some fine stock has been produced and marketed.

The hatching season did not bring forth so many complaints concerning the usual scourge, "blackhead," and evidently this disease is gradually being overcome. This is partly due to the improved methods of sanitation, feeding, and holding back of the best-developed stock instead of marketing as in the past. Possibly the fact that a lighter-finished turkey is now more popular has also helped.

Many Provincial breeders have heeded the advice to market a percentage of the stock at Thanksgiving, so as to obviate so much competition later on from Prairie-raised turkeys.

The prices obtained have been fractionally higher, but this advantage has been offset by the higher cost of feedstuffs.

Most of the successful raisers now use the sun-porch during the first eight or ten weeks of the poults' lives. The porch is either wire or board bottomed and is attached to the south side of the house. It is generally about 8 or 10 feet deep, and in length according to the size of the brood and house.

Turkey poults were again sold as day-olds in fairly large numbers. This method of sale introduced by a Cowichan breeder is proving popular.

The Department again urges breeders to endeavour to change their place of rearing as often as possible and also to prevent overcrowding of such land.

WATER-FOWL.

The water-fowl population has slightly increased during the year, the increase being principally among the small, active varieties of ducks, which are noted for high egg production. Khaki Campbell and Indian Runner ducks excel in egg production, and the former breed also has a medium carcass for disposal. The Pekins are again the most numerous breed, being good egg-producers and also excellent for table purposes.

Geese, mostly Toulouse and Embden, have again held their own. The Toulouse, particularly in the Okanagan, is the favourite breed. African and the wild Canada geese are also kept in fairly large numbers. It is not generally known that in every instance a permit has to be secured to keep either Canada geese or any variety of wild duck.

Prices for market-geese average 22 cents per pound, with hatching-eggs averaging 10 to 15 cents each.

RABBITS.

The interest taken in wool-producing rabbits abated somewhat during the year owing to a slump in wool prices, particularly in Great Britain, but many inquiries were received during the year from both beginners and old hands. Again purchasers of stock are warned that they should endeavour to get a veterinarian's certificate from the seller when high prices are asked. It is very necessary that beginners investigate and reflect as to their own fitness as successful breeders before risking large sums. Farm-magazine write-ups generally cause a demand so great that oftentimes poor-grade stock may be sold at advanced prices to inexperienced persons.

There are several clubs and associations, all having more or less supervision of their members, and directories of names and breeds kept by members are published by this Department for the benefit of new breeders.

PROVINCIAL ASSOCIATION.

The twenty-fourth annual meeting of the British Columbia Poultry Association was held at the same time and place as the Provincial Poultry Show, Vancouver Fat Stock Show, December 10th, 11th, and 12th.

The show itself was a little below last year's number of entries, but it was the consensus of opinion that the quality was never as high as at this show.

The utility and general-purpose breeds—Rhode Island Reds, Barred Rocks, Wyandottes, Sussex, Barnevelders, and Jersey Giants—were quite up to the best seen here. Game fowls, especially useful for crossing for table-chickens, were also numerously shown. The children's classes of popular fowls and bantams were well patronized.

The Registered Breeders' Association of British Columbia, with H. E. Upton as Secretary, again supported the show with some excellent exhibits. Many birds with high records were sold at remunerative prices. Breeders from the Interior and the Pacific sections of the United States also exhibited.

Local affiliated shows were held at South Vancouver, Nelson, and Ladysmith.

The annual meeting of the general membership of the association was again held without the benefit of a grant, and despite this delegates were present from Ladysmith, Cobble Hill, Chilliwack, Kamloops, Enderby, Penticton, Revelstoke, Port Kells, and South Vancouver. The meeting was the largest assemblage of members for the past three years, and much interest was shown, especially in all matters dealing with the proposed new poultry policies.

DISEASE PROBLEMS.

The usual outbreaks of breeding-stock troubles were experienced during the year—ovarian, tumour, and paralysis. It is satisfactory to note that, owing possibly to the heavy mortality in recent years and partly due to more severe culling, the number of reported cases was less this past season. During the fall, however, fairly heavy mortality was experienced amongst laying pullets, due to sarcometosis. The tumours in some cases were external and others principally showed the spleen and liver as the seat of infection.

Paralysis appeared in several flocks of Leghorn pullets in one section reported, and, as usual, the cockerels affected were immediately killed; but the pullets—nearly all hopeless cases—were kept and advice sought as to drugs needed for cure. Many so-called breeders have yet to learn that it is not good or profitable practice to doctor sick fowls, especially when healthy specimens of the same breed have to be sold for as low as 25 or 30 cents each for market. In one instance the writer was asked for advice regarding a breeding cockerel found sick right in the midst of the breeding season. The inquirer supposed that he could be again used for breeding purposes. The unfortunate part is that so many breeders are unable to detect disease amongst their flocks. The advice, "It is cheaper to build an incinerator than a hospital on a poultry-farm," is still worth considering.

Many specimens of dead fowls were sent to the Department for diagnosis, and in some doubtful cases the fowls were passed on to the Dominion Pathologist (Dr. E. A. Bruce) at the laboratory, Experimental Farm, Saanichton, for post-mortem examination. The writer desires to testify regarding the real co-operative way in which Dr. Bruce has assisted in this work during the year.

It is encouraging to note, in regard to prevalent poultry-diseases, that in the Provincial periodical devoted to the industry many articles and letters have been published recently. Most of these have been very frank warnings from practical men regarding the state of health of many flocks in the Province.

OFFICE AND FIELD WORK.

During the year many visits have been made to breeders regarding problems of breeding, rearing, and disease. It is still very difficult to persuade breeders to cull or market unthrifty stock and particularly to provide a regular daily feed of greenstuffs to fowls.

Meetings were addressed during the winter at Mission, Langley, Hazelmere, Ladysmith, Victoria, and at each place the Branch's poultry films were exhibited. The films are undoubtedly the means whereby larger attendances are secured.

Killing and plucking demonstrations were given at Metchosin, Saturna Island, Saltspring Island, and Comox. Judging engagements were fulfilled at Courtenay, Cobble Hill, Armstrong, and Kamloops.

Many callers at the office were met, and several bulletins—"Poultry Manure," "Poultry Feathers"—and rabbit circulars were published.

During the year James Allen, located in the Fraser Valley on part time, has again rendered very efficient service to the Branch. His experience on his own ranch with fowls, ducks, and rabbits is of great assistance.

The writer desires to acklowledge also the real co-operation of the various District Agriculturists, particularly Messrs. Waby, Landon, and Sandall, and also Mr. Hourston, mechanician.

REPORT OF FIELD CROPS COMMISSIONER.

C. Tice, B.S.A.

As a result of the winter of 1933–34 being the mildest for several years, clovers and other crops came through well and spring seeding was earlier than usual. The hay-crop was one of the heaviest produced during recent years and many districts reported a surplus. Pastures in several parts of the Province suffered as a result of dry weather.

Grain-crops gave an average yield, but peas turned out very poorly in some sections, particularly in the Fraser Valley. Weather conditions at time of harvest in the Peace River District were again unfavourable. Potatoes were attacked by late blight in the Fraser Valley. Root and silage crops generally produced good yields. The acreage of timothy and red clover saved for seed was much larger than usual. In the case of alsike clover, however, the acreage saved for seed was smaller, due to winter-killing in Central British Columbia.

Projects undertaken by this Branch in connection with range-improvement activities will be reported upon by the Live Stock Commissioner.

FIELD CROP UNION.

The Field Crop Union, which was organized in British Columbia in May, 1933, had a membership of 130 for the year 1934. Your Commissioner has carried on the secretarial work of the association since its inception. Thirty-seven tests were drawn up and each member of the Union was given the opportunity of conducting one test. At the time of preparing this statement a report on the tests conducted has been received from the majority of the members. The first annual meeting of the association was held at the time of the Vancouver Winter Fair, December 10th to 12th.

The Union has received the fullest co-operation from the Federal Department of Agriculture, particularly of Dr. L. E. Kirk, Dominion Agrostologist, and L. H. Newman, Dominion Cerealist, also from Dr. G. G. Moe, of the Agronomy Department of the University of British Columbia, since it was organized.

WEED-CONTROL WORK.

Two Weed Inspectors—namely, Messrs. Cushway and Hingley—were appointed temporarily for weed-inspection work in the Peace River Block. In the remainder of the Province the work was carried on through the co-operation of the Provincial Police and District Agriculturists. The assistance rendered by both of these groups of officials is very much appreciated.

RELIEF SEED-GRAIN.

Your Commissioner was assigned the duty of purchasing relief seed-grain for Central British Columbia and the Peace River District. This work entailed much additional correspondence and record-keeping. Several cars of oats and barley purchased from the Peace River Co-operative Association at Grand Prairie were sent into the Peace River Block, and several cars of oats purchased through the Alberta Seed Growers' Association at Edmonton were sent into Central British Columbia. The seed purchased was the best obtainable, outside of registered or certified seed.

ALFALFA DEMONSTRATION-WORK.

Arrangements have been made by this office for the conducting of alfalfa demonstration plots in the Nanaimo-Cedar District on Vancouver Island. This project is being carried on in conjunction with the local Farmers' Institute. Your Commissioner attended a meeting called to discuss the matter and an official of the Branch personally visited the farmers who had expressed a desire to take part in the undertaking. S. S. Phillips in his report states that he tested the soils for acidity and gave advice regarding the proper liming of the soil.

FIELD-CROP SEED PRODUCTION.

This office has continued to give assistance in the promotion of field-crop seed-growing in the Province. In this connection there has been close co-operation with the Dominion Seed Branch officials. The year 1934 has been a very satisfactory one for the production of timothy, red clover, and alfalfa seed. Due to drought and other factors in the United States and in parts of Eastern Canada, the total volume of seed available of these crops is much smaller than usual. As a result the prices to our growers will be higher than they have been for some time. This statement applies particularly to timothy-seed. Every effort is being made to increase the production of alsike-clover seed in Central British Columbia. The following table shows the amount of field-crop seeds produced in British Columbia in 1933:—

	Lb.
Mangel	10,155
Turnip, swede	480
Alfalfa	46,000
Clover, alsike	20,000
Clover, red	48,000
Meadow-fescue	2,000
Timothy	494,415

The figures for 1934 are not yet complete.

The various seed-cleaning machines purchased by the combined Provincial and Federal Departments of Agriculture and located at points throughout the Province continue to render most useful service.

CROP COMPETITIONS.

Two combined field-crop and cleaned-seed competitions were held during the year, the one with potatoes at Pemberton and the other with oats in the Delta. Standing crop competitions were conducted by the Kamloops Farmers' Institute and by the Stewart Flats Farmers' Institute in the Peace River District. The former competition was with corn and the latter with green oats.

BRITISH COLUMBIA SEED FAIR.

Two Provincial seed fairs were held during the year. The 1933 fair was held in the Crystal Garden, Victoria, from February 28th to March 3rd, 1934, whilst the 1934 seed fair was held in conjunction with the Winter Fair, Vancouver, December 10th to 12th, 1934. Exhibits were received from all parts of the Province for both of these fairs. The quality was of a very high standard and the number of entries quite satisfactory. An enthusiastic meeting of those interested in improving the seed-fair prize-list was held during the fair and many valuable suggestions were received.

DISTRICT SEED FAIRS.

Two district seed fairs were successfully held, the one in conjunction with the Interior Exhibition at Armstrong; the other, which covered Central British Columbia, was held at Prince George.

FORAGE-PLANTS.

Alpha Sweet Clover.—Tests with Alpha sweet clover, the new type of sweet clover introduced by Dr. L. E. Kirk, Dominion Agrostologist, have continued during the year. This plant appears to be much superior to the common biennial sweet clover.

Ladak Alfalfa.—This alfalfa was tested for the first time this year, but it is too soon to give definite information regarding its suitability. Ladak alfalfa was introduced into the United States from the desert plateaus of India and from there it was brought into Canada. It is claimed that this is the longest-lived, the most drought-resistant, the leafiest, the hardiest, and the highest yielding alfalfa for all the high-elevation, short-water regions of the United States.

GRAIN SCREENINGS.

In compliance with the Provincial "Noxious Weeds Act" and regulations pertaining thereto, grain screenings which contain more than 3 per cent. by weight of weed-seeds other than wild oats are not allowed to be moved 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 a dealer or grain merchant, and one to stock-feeders conditional to prescribed regulations. Before granting a permit the premises of the applicant are inspected and the facilities for handling the screenings to comply with the regulations are examined. The premises of the holders of screenings permits are subject to occasional inspections for the purpose of checking up. Permits are refused to applicants whose premises are so situated that the use of screenings would, in the opinion of the Inspector, cause a weed menace.

Dealing with the matter of grain-screenings disposal, Walter Sandall, District Field Inspector at Vancouver, states:—

"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 purchase screenings from only one dealer or grain-elevator as stated on permit. A car-load of grain screenings equals approximately 30 tons.

"Twenty-nine permits to remove screenings were issued to five different firms of feed merchants, granting the movement of a total of 567 car-loads; of this amount, approximately 425 car-loads were actually consumed. Twenty-two feeders' permits, including one cancelled,

were issued to nine applicants for the equivalent of 50 car-loads and 7 tons, of which 13⅓ car-loads were for fuel purposes, the actual consumption being 21 car-loads, used for the following purposes: 16½ car-loads for stock-feed and 4½ car-loads for fuel."

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 grain-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 following table will show the quantity of screenings removed from grain-elevators each month, as compiled by Mr. Sandall from the managers' reports:—

TABLE SHOWING AMOUNT OF GRAIN SCREENINGS REMOVED FROM B.C. ELEVATORS, 1934.

Month.	For Use in British Columbia.				Export to U.S.		Total per Month.	
	Recleaned or Grade A.		Uncleaned or Grade B.		Uncleaned. or Grade B.			
	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.
January	338	460	1,059	600	672	0	2,069	1,060
February	90	640	1,242	430	270	200	1,602	1,270
March	103	80	981	40	218	1,000	1,302	1,120
April	75	350	815	1,790	254	1,700	1,145	1,840
May	78	800	734	100	249	1,550	1,062	450
June	56	1,250	581	840	216	400	854	490
July	72	1,970	894	1,920	597	850	1,565	740
August	42	1,700	699	1,280	240	0	982	980
September	219	1,600	1,258	1,030	532	650	2,010	1,280
October	205	100	1,371	730	388	1,000	1,964	1,830
November	111	1,520	1,633	1,430	370	1,500	2,116	450
December	70	990	1,485	1,620	130	0	1,686	610
Totals	1,464	1,460	12,757	1,810*	4,140	850	18,363	120

* Of the 12,757 tons 1,810 lb., an additional 3,639 tons 1,160 lb. was exported to the United States by Vancouver merchants.

SOIL ANALYTICAL WORK.

A large number of samples of soil have been submitted to the Provincial Analyst for examination, and the results have been interpreted by Paul C. Black, who has been handling this phase of the work. In addition to this, a number of soil analyses were made, using the Spurway method. This is a simple analysis which shows the proportion of soluble elements in a sample of soil. These latter analyses have been made by S. S. Phillips, Assistant Field Crops Commissioner. The correspondence in regard to soils has been dealt with by P. C. Black, who has advised the farmers on how to build up the soil by cultural methods and fertilizers.

CHICAGO INTERNATIONAL AND TORONTO ROYAL

Exhibitors from this Province participated in both the Chicago International Hay and Grain Show and the Toronto Royal Winter Fair and carried off several championships. W. G. Gibson, of Ladner, distinguished himself by capturing the hard red spring-wheat prize at Toronto with an exhibit of the Reward variety. This winning caused much surprise, more particularly because Mr. Gibson was competing against the leading hard red spring-wheat growers in Canada. Others who won championships at Toronto were E. Ronayne, of Pemberton, with field peas of the Stirling variety, and William Rogers, of Tappen, with Durum wheat of the Mindum variety.

At the Chicago International W. G. Gibson captured the championship in the field-pea section with the Stirling variety, and William Rogers again repeated his Toronto success with Mindum wheat.

REPORT OF SOIL SURVEY BRANCH.

Owing to his recent serious illness, C. C. Kelley, in charge of the soil-survey work, has been unable to prepare the usual annual report covering the activities of his Branch; however, his progress reports, periodically submitted to the office of the Deputy Minister, contain detailed information from which the particulars in the following paragraphs are taken.

The report to accompany the soil map of the Glenmore District has been completed. It is more extensive than previous ones, as space has been given to the geological sequence of the events responsible for the deposition of the soils of the Okanagan Valley. The geology of the Okanagan Valley is somewhat complicated, but satisfactory progress is being made in collecting data on this subject, and that part of the Glenmore report dealing with the geology of the area provides useful information respecting the origin of the soils in that district.

Another innovation to our soil reports is the introduction to soil series added to the Glenmore report. The naming and defining of soil series is a problem that requires close familiarity with all of the soils of the Interior and with the related geology, and it was believed that by provisionally describing some of the series a better understanding of soil-survey work would be gained.

The Okanagan Centre-Winfield soil maps, together with reports to accompany these maps, have been completed.

Following the soil survey of the Coldstream-Lavington area completed two years ago, it has been found advisable to finish the survey of 18,000 acres in the Vernon Irrigation District, and accordingly this has now been accomplished. The previous experience in the district materially assisted in speeding up the work. The map dealing with this area occupies five sheets: (1) Coldstream-Lavington; (2) B.X. Area; (3) Swan Lake (North); (4) Swan Lake (West); (5) Okanagan Landing.

The tracings of these maps have been completed and reports are in course of preparation.

Upon request of the Provincial Department of Lands, the Forestry Branch was assisted in the examination of areas within the Elk Forest Reserve of the East Kootenay. Nineteen properties were inspected and reported upon with recommendations which the Department of Lands has seen fit to act upon. While in the East Kootenay District a superficial inspection of Crown lands was made outside of the Elk Forest Reserve; notably at Baynes Lake and Buckskin Flats. This examination indicated the advisability of undertaking soil survey and classification before any settlement of the areas was permitted. By this means settlement of sub-marginal lands could be prevented.

A preliminary examination of a proposed irrigation project was made at Okanagan Falls, where the soils appear to be light texture and of low drought resistance, making a reliable and adequate irrigation system essential for normal crop production. It was suggested that a survey of the soil and water resources should be made before further development is undertaken.

A number of soil problems have been studied in addition to the regular field and laboratory work of the Soil Survey Branch. One of these is a greenhouse problem apparently brought about by an alkaline soil condition. A series of tests undertaken have produced positive results during this first year, and it seems advisable to continue these tests to confirm the results already obtained.

The second, a seepage problem in an irrigated orchard near Vernon, where the examination of soils by means of pits and auger-holes reveals water-bearing silt layers lying horizontally in a heavy clay profile. The water in these strata was under pressure which, when tapped by tree-roots, was sufficient to permit of the upper soils being saturated to such an extent that root-injury resulted. Levels were taken on the property and a drainage scheme laid out to enable the owner to relieve the sub-surface water-pressure. In this case there is evidence of the advantage of being familiar with this clay profile, for it was the knowledge of the presence of the silt layers that immediately gave a clue upon which to base the remedial measure.

While alkali problems are not widespread in the Okanagan Valley, they are occasionally encountered, and one of the most serious problems is the degradation of the heavy clay profile, such as was dealt with in the Glenmore District. In co-operation with the District Field Inspector at Kelowna, reclamation experiments on affected lands have been designed with a view to proving the efficacy of gypsum to correct the condition.

After a lapse of one year the Federal Department of Agriculture, through the Experimental Farms Branch, again contributed to the support of soil-survey work in British Columbia. This made possible the employment as assistant of R. H. Spilsbury, who during the year was successful in securing the advanced degree of M.S.A. from the University of British Columbia.

A paper entitled "Soil Survey: A Basis for Land Utilization in British Columbia" was prepared jointly by Dr. D. G. Laird, of the Provincial University, and C. C. Kelley. This paper was presented to the Soils Group of the Canadian Society of Technical Agriculturists at a meeting in Winnipeg. It deals with a systematic classification of lands with the object of segregating them according to their best uses.

All of which is respectfully submitted.

J. B. MUNRO,
Deputy Minister.

APPENDICES.

APPENDIX No. 1.

COMPARATIVE VALUES AND RESULTS OBTAINED IN APPLE-SCAB SPRAYS AT LAVINGTON, B.C.

Liquid lime-sulphur used, and in the table is quoted on a gallonage dilution. All dry materials quoted on a poundage basis. The table indicates results obtained. Fruit in light-scab column could be marketed as bulk. Heavy scab represents culls.

Plot No.	No. of Trees.	Spray Periods.	Materials and Proportions used.	Spray-injury observed to Tree and Fruit.	No. of Apples counted.	Scab Free.	Light Scab.	Heavy Scab.
						Per Cent.	Per Cent.	Per Cent.
1	10	Pre-pink	Lime-sulphur 1–30; Calc. Arsenate 2 lb.–40	Marginal and body leaf-burn slight; no fruit russeting	3,436	73.4	11.5	15.1
		Calyx Cover	Lime-sulphur 1–40; Calc. Arsenate 2 lb.–40					
2	10	Pre-pink	Lime-sulphur 1–70; Calc. Mono-Sulph. ....4 lb.–40 Calc. Arsenate 2 lb.–40	No foliage or fruit injury.....	2,296	52.0	17.1	30.9
		Calyx Cover	Lime-sulphur 1–80; Calc. Mono-Sulph. ....4 lb.–40 Calc. Arsenate 2 lb.–40					
3	5	Pre-pink	Lime-sulphur 1–35; Ferrous Sulph. .....1 lb.–35 Calc. Arsenate 2 lb.–40	Marginal leaf-burn slight; very slight russet on some apples	2,595	67.9	11.2	20.9
		Calyx Cover	Lime-sulphur 1–40; Ferrous Sulph. .....1 lb.–40 Calc. Arsenate 2 lb.–40					
4	5	Pre-pink	Lime-sulphur 1–35; Ferrous Sulph. .....4 lb.–35 Calc. Arsenate 2 lb.–40	No foliage or fruit injury noticeable; heavy drop of fruit noticed after calyx-spray	1,936	66.5	12.8	20.7
		Calyx Cover	Lime-sulphur 1–40; Ferrous Sulph. .....4 lb.–40 Calc. Arsenate 2 lb.–40					
5	5	Pre-pink	Lime-sulphur 1–40; Calc. Arsenate 2 lb.–40	No foliage or fruit injury.....	2,950	76.5	14.3	9.2
		Calyx Cover	Lime-sulphur 1–80; Calc. Arsenate 2 lb.–40					
6	5	Pre-pink Calyx Cover	Cuprous Oxide.....2 lb. Bentonite Clay.....2 lb. Hydrated Lime.....2 lb. Calc. Arsenate.....1 lb. Water 40 gals. in all sprays	Considerable injury to leaf-body after calyx-spray in form of small spotting; heavy russeting of fruit	3,065	80.0	13.0	7.0
7 Check	3	No spray	.....	Foliage stunted from effects of bad scab-infection; some defoliation	2,020	1.6	26.7	71.7

APPENDIX No. 2.

Results of Codling-moth Spraying, East Kelowna, 1934.

Infestation, 1933, over 50 per cent.

A. of L. used at 1½ lb. to 40 gals. water; Fluxit, 1 lb. to 240 gals.; Calcium Arsenate, 1 lb. to 24 gals. water; Oil, ¾ gal. to 100 spray. A. of L. when used with oil, 1 lb. to 40 gals spray.

Plot.	Sprays applied					Variety.	No. of Apples counted.	No. of Stings.	No. of Worms.	Stings.	Worms.	Total S. and W.
	May 3.	May 17.	June 4.	July 27.	Aug. 13.							
										Per Cent.	Per Cent.	Per Cent.
1	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	.....	McIntosh	6,260	130	42	2.07	0.67	2.74
						Jonathan	5,360	176	14	3.02	0.24	3.26
						Stayman	2,700	64	7	2.37	0.26	2.64
						Totals	14,320	370	63	2.58	0.44	3.02
2	A. of L. and Fluxit	A. of L. and Fluxit	.....	A. of L. and Fluxit	A. of L. and Fluxit	McIntosh	5,124	165	65	3.22	1.07	3.29
						Jonathan	3,568	75	8	2.10	0.23	2.33
						Stayman	1,734	21	3	1.21	0.17	1.38
						Totals	10,426	261	76	2.50	0.73	3.23
3	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	McIntosh	5,711	120	30	2.10	0.52	2.62
						Jonathan	3,016	60	20	1.90	0.69	2.59
						Stayman	2,646	33	4	1.20	0.15	1.35
						Totals	11,373	213	54	1.87	0.47	2.34
4	.....	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	McIntosh	6,020	130	20	1.86	0.33	2.19
						Jonathan	3,616	43	15	1.20	0.40	1.60
						Stayman	2,421	42	2	1.77	0.82	1.852
						Totals	12,057	215	37	1.78	0.30	2.08
5	A. of L. and Fluxit	A. of L. and Fluxit	.....	A. of L. and Fluxit	.....	McIntosh	5,557	253	59	4.50	1.06	5.56
						Jonathan	3,594	93	19	2.60	0.53	3.13
						Stayman	2,001	58	10	2.89	0.50	2.94
						Totals	11,152	404	88	3.62	0.798	4.42
6	A. of L., no spreader	A. of L., no spreader	A. of L., no spreader	A. of L., no spreader	A. of L., no spreader	McIntosh	3,480	164	38	4.70	1.09	5.79
						Jonathan	2,880	26	.....	0.90	0.00	0.90
						Totals	1,143	9	3	0.78	0.26	1.04
						Average	7,503	199	41	2.65	0.54	3.19
6A	A. of L., no spreader	A. of L., no spreader	A. of L., no spreader	A. of L., no spreader	.....	McIntosh	4,391	115	77	2.60	1.75	3.35
						Jonathan	2,337	64	23	2.70	0.97	3.67
						Stayman	1,030	26	2	2.50	0.19	2.69
						Totals	7,758	205	102	2.64	1.31	3.95

										Per Cent.	Per Cent.	Per Cent.
7	A. of L.	C.A.	C.A.	C.A.	C.A.	McIntosh	5,522	228	82	4.12	1.48	5.60
						Jonathan	2,156	175	58	8.10	2.60	10.70
						Stayman	1,825	75	12	4.10	0.65	4.75
						Totals	9,503	478	152	5.03	1.59	6.62
8	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Oil	A. of L. and Oil	McIntosh	6,776	179	28	2.64	0.41	3.05
						Jonathan	1,469	15	1	1.02	0.07	1.09
						Stayman	1,698	20	2	1.20	0.12	1.32
						Totals	9,943	214	31	2.25	0.31	2.55
9	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Fluxit	A. of L. and Oil	.....	McIntosh	2,184	70	14	3.20	0.64	3.84
						Jonathan	.....	.....	.....	.....	.....	.....
						Stayman	1,558	49	7	3.14	0.44	3.58
						Totals	3,742	119	21	3.18	0.55	3.73

Legend: A. of L., Arsenate of Lead; C.A., Calcium Arsenate.

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