PROVINCE OF BRITISH COLUMBIA

# TWENTY-EIGHTH ANNUAL REPORT

OF THE

# DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1933

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

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1934.

*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 1933.

K. C. MACDONALD,

*Minister of Agriculture.*

*Department of Agriculture,*

*Victoria, B.C., February 20th, 1934.*

# REPORT OF THE DEPARTMENT OF AGRICULTURE.

## REPORT OF THE 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, 1933.

The price of many agricultural products has advanced over the low returns of 1932 and the featuring of agricultural commodities by departmental and chain stores at less than cost of production has declined. However, the total value of agricultural production for the year 1933 has not shown any material increase over last year. Full details of production and returns will be given in the report of the Departmental Statistician.

### SEED-GRAIN SITUATION.

Owing to scarcity of suitable seed-grain and inability of settlers to raise funds for the purchase of their seed requirements in the spring, the Department of Agriculture supervised the distribution of seed-grain, of which the bulk was oats. These seed-grain advances were made under authority of the "Seed-grain Act" of 1918.

In addition to this assistance to settlers in the remote districts, more than 2,000 collections of garden vegetable-seeds, comprising 14,000 packets, were distributed through relief agencies, with the co-operation of Farmers' Institutes and officials of this Department.

Owing to early fall frosts in the Peace River Block and Central British Columbia, together with unsatisfactory climatic conditions at harvest-time, a number of districts report that there will be a shortage of seed-grain and large quantities are already being requested for sowing next spring.

Many samples of seed-grain have been sent from the Peace River Block to the Dominion Seed Laboratory at Calgary, Alberta, and a large percentage of these indicate that there will be very little viable seed of oats, wheat, and barley available from the 1933 crop in that portion of the Province.

It is also reported that there will be a scarcity of seed-potatoes throughout the Peace River Block and the Central Interior of the Province. In fact, a preliminary survey of the potato-crop indicates that the total yield for the Province is below the average for a number of years and settlers in those sections, where a shortage is apparent, are being advised to retain sufficient of their crop for planting next spring. This recommendation has been made because it is believed that sufficient quantities of certified seed-potatoes will not be available to fill planting requirements.

### DISTRICT AGRICULTURISTS' ACTIVITIES.

According to the report of James Travis, District Agriculturist, there will not this winter be a repetition of last year's shortage of feed for live stock. It was found necessary, during the early months of this year, to provide not only seed-grain for the Peace River Block, but feed for live stock in that region. This was made necessary owing to the winter having set in earlier than usual. The deep snow, which lasted until late spring, prevented cattle from getting out and rustling for themselves. The experience of the settlers during the past winter has emphasized the necessity of harvesting abundant stores of feed. As a result of this experience, and owing to early fall frosts that rendered it necessary to cut grain in the green stage, an ample supply of feed has been provided for live stock for this winter's requirements.

In the Bulkley, Nechako, and Lakes District of Central British Columbia, the Farmers' Institutes, in co-operation with the District Agriculturist, Donald Sutherland, who is also Secretary of the District Institute, have made satisfactory progress in spite of difficulties. They have this year organized with a view to carrying through a definite agricultural production and marketing programme next year. This should enable the settlers along the line of the Transcontinental Railway to share in supplying fresh fruits, vegetables, dairy and poultry products to the markets of Prince Rupert and Prince George.

The District B Farmers' Institute Secretary has issued monthly circular news-letters to all institutes within his territory. These exchange news-letters have kept the various local bodies informed of market conditions, agricultural developments and opportunities, and have enabled them to develop trade among themselves. The example of the District B Farmers' Institutes in arranging for a regular and informative exchange news-letter each month is being considered by other district institutes.

H. S. French, District Agriculturist, reports that the establishment of a creamery, which is now in operation at Prince George, has focused the attention of the settlers in that area on the importance of the dairy industry. Farmers generally are endeavouring to improve their herds and a number of dairy heifers, including individuals of the Shorthorn and Red Poll breeds, have been imported. The Federal Department of Agriculture has co-operated with the farmers by providing pure-bred sires under their "Sire Loan Policy."

Along with improvement in the dairy industry, there has been increased interest in swine production and advantage of the Federal brood-sow policy has been taken by a number of farmers with satisfactory results. Farmers of the Central Interior have been assisted in their live-stock endeavours not only by representatives of this Department and the Federal Department of Agriculture, but by Harry Bowman, the Agricultural Agent of the Canadian National Railways.

The settlers in the Prince George section were successful in having a lime-deposit reserved for their general use. The deposit is located about 20 miles south-west of the city and contains a large quantity of high-grade limestone, which, with proper development and use, will benefit the soils of the district, where the growing of clover for seed production is becoming an important phase of the agricultural industry.

Owing to G. A. Luyat, District Agriculturist, Williams Lake, having resigned at the end of September following six months' leave of absence, the district was without a resident representative of the Department for a part of the season. However, arrangements were made whereby Dr. W. R. Gunn, Live Stock Commissioner, spent a considerable part of the summer in the range country, giving attention to animal-disease problems and a study of animal parasites and poisonous plants in the district. Particular reference to this phase of live-stock work will be found in the report of the Live Stock Commissioner.

Of necessity, the Live Stock Commissioner has had to include in his report many of the undertakings of certain District Agriculturists who have local supervision of policies directed by the Live Stock Branch. The work of G. W. Challenger in connection with the live-stock industry and range problems; the work of H. E. Waby in dealing with warble-fly eradication, advanced swine-club projects and live-stock activities; the work of G. L. Landon, who co-operated in carrying out live-stock policies in the Boundary District, and the extension of Boys' and Girls' Club undertakings of R. G. Sutton in the Lower Mainland, all constitute a part of the programme under the direction of the Live Stock Branch; consequently, the reports of these officials have been used by the Live Stock Commissioner in summing up the progress of live-stock work during the year.

Similarly, reports of those officials responsible for the application of agricultural policies in districts where fruit and vegetable production is particularly important have been used by the Provincial Horticulturist, who has embodied in his report a statement of the horticultural activities of a number of the fieldmen, including, G. E. W. Clarke, District Agriculturist, Abbotsford; H. H. Evans, District Agriculturist, Vernon; Ben Hoy, District Agriculturist, Kelowna; R. P. Murray, District Agriculturist, Penticton; E. C. Hunt, District Agriculturist, Nelson; and C. B. Twigg, District Agriculturist, Creston.

In addition to their usual participation in horticultural and live-stock production, practically all of the above-named fieldmen have taken more than passing interest in bee-keeping. They have co-operated with A. W. Finlay, Provincial Apiarist, in such a way as to enable him to render efficient apiary inspection service to the bee-keepers of the Province at the minimum of cost to the taxpayers.

## RESIGNATIONS, RETIREMENTS, AND TRANSFERS.

On August 1st of this year plant-quarantine inspection-work was transferred from the Province to the Dominion after this Department had exercised for nearly forty years' close supervision over this protective service to plant industry. Mr. Lyne and his staff are to be

commended on the splendid service they have rendered to agriculture in this Province over many years.

By arrangement with Federal authorities the following members of the Plant Quarantine staff were transferred to the staff of the Dominion Department of Agriculture: H. F. Olds, W. G. Graham, J. Noble, R. DeLisle, W. de Macedo, and Miss A. L. Sjodin.

W. H. Lyne, Chief Plant Quarantine Inspector, and M. L. Bird, Plant Quarantine Officer, having attained superannuation age, were both retired on pension from the Provincial Department, and Walter Sandall, Plant Quarantine Officer, was transferred to the Field Crop Branch of this Department.

Other retirements by superannuation from the departmental staff include: Dr. S. A. K. White, V.S., Provincial Veterinary Inspector; W. T. Andrews, Chief Clerk and Accountant; and Paul C. Black, Assistant Field Crops Commissioner. Those retiring from the permanent staff by resignations include: G. A. Luyat, B.S.A., District Agriculturist, Williams Lake; Miss M. Larkcom, Stenographer, Victoria; and Miss Thelma M. Suffa, Stenographer, Kamloops. Miss M. Corcoran was transferred to the Taxation Office in the Department of Finance.

## REDUCED FEED RATES.

In March of this year the Canadian Railway Commission, by Special Tariff No. 145, gave approval to reduced transportation rates on feed grades of certain grains shipped from Prairie points to Lower Mainland and Vancouver Island destinations. From the latter part of March to the end of December approximately 600 certificates covering shipments of feed-grain and screenings were issued. Most of the shipments were of feed grades of wheat, which made up nearly 70 per cent. of the total tonnage brought in under the special arrangement. The other 30 per cent. was almost equally divided in tonnage between feed-oats and feed-barley, along with a small number of car-loads of screenings and mixed cars of feed-grains.

Approximately 500 of the shipments of feed-grain were made to Lower Mainland points and 100 to various sections of Vancouver Island.

## RADIO BROADCASTING.

Increased use of the radio for the dissemination of agricultural information has been evident during the year. In addition to the regular weekly farm-lecture series over Vancouver and Chilliwack stations, as well as at Kamloops, there has been inaugurated at Kelowna a weekly agricultural broadcasting service in which members of the Okanagan Agricultural Club are co-operating with radio station CKOV. The Okanagan Agricultural Club, which consists of Federal and Provincial officials and others engaged in agricultural pursuits, have not only maintained an interesting and instructive broadcasting service, but are furnishing to the press regular agricultural contributions.

Local newspapers circulating in many of the agricultural districts of the Province have supported the Department in its efforts to render useful service to the farmers. Particular mention might be made of publicity given to methods of control of apple-scab in the Kootenays, codling-moth in the Okanagan, and grasshoppers in range districts. Also soil-survey and crop-improvement policies have been given material assistance, while special attention in some quarters has been given by the press to measures aimed at control of pests and diseases injurious to farm animals. The Department of Agriculture appreciates the very generous assistance of the press in our extension work.

## RODENT-CONTROL.

The problem of rodent-control has been given close study by farmers' organizations in almost all sections of the Southern Interior and Lower Mainland. Gophers and ground-hogs in the range areas and throughout the agricultural districts between the Rocky Mountains and the Coast Range constitute not only a destructive pest as far as crop production is concerned, but are a general nuisance even on the unoccupied lands.

The stockmen and veterinarians regard them as a menace to the animal industry because of the fact that they are the hosts of ticks, which cause serious losses to live stock. In the Lower Mainland the moles and voles are responsible for losses, particularly in small-fruit plantations, and methods of eradication of these burrowing pests have been applied in a limited way under the supervision of departmental officials.

The field demonstrations conducted under the direction of G. L. Landon and H. E. Waby, working in co-operation with F. A. Marsack, in the south-eastern portion of the Province, have produced positive results. The Farmers' Institutes in that area have given good support to these undertakings and have expressed their appreciation of the preliminary work that has been done toward gopher-control, particularly in the East Kootenay District.

Requests have come in from many of the Farmers' Institutes asking that a definite rodent-control policy be laid down by the Department and that a programme of field demonstrations be carried out next spring. The Department has taken immediate action on these suggestions and is now in communication with agencies through which supplies of Cyanogas and various other poisons may be secured.

## FARMERS' INSTITUTES.

Farmers' Institutes now number 211 and have a membership of 6,500. Many of these agricultural bodies have found it very difficult to retain their membership this year, as farmers found it almost impossible to spare the annual subscription of $1 which is required by law for membership. The Department again assisted all institutes by absorbing the annual registration fee and paid the incorporation fees for all new institutes formed. Although funds were not sufficient to permit of the reinstatement of the *per capita* grant to Farmers' Institutes, a flat grant of $10 for promotion and extension of agricultural and other educational work was paid to each institute in good standing, while the ten district institutes each received the usual grant of $25.

The Farmers' Institutes Advisory Board was called together in January, during the period of the Provincial Seed Fair at Victoria. Unfortunately, the opening of the Legislature having been delayed until later than was generally expected, it was impossible for the Advisory Board to meet with the Select Standing Committee on Agriculture of the Legislature. By special arrangement, however, several members of the Board were called in to confer with the Agricultural Committee of the House during March.

## NEW LEGISLATION.

Under this heading there was passed at the Fifth Session of the Seventeenth Legislature five agricultural amendments. Among the Bills dealt with were:—

"*Stock-brands Act Amendment Act*" provides that in stock-raising districts where the Act is in operation hides must be inspected before being destroyed or buried. No fee is chargeable for the inspection service.

Where a shipper of cattle fills in a form, for shipment, showing cattle to be branded with an unregistered brand, he becomes liable for unregistered branding.

Time for laying an information under the Act has been extended to two years, as under the "Summary Convictions Act" prosecutions must be entered within six months.

Where horses are purchased for slaughter, for fox-feed or otherwise, a book must be kept to record such purchases, with descriptions of the horses and the brands and with particulars as to prior ownership.

"*Pound District Act Amendment Act.*"—It is now provided that officers or constables of the Provincial Police Force shall have authority to drive estray animals to the pound. Formerly under the Act only the pound-keeper or a proprietor of land had authority to do so.

"*Lower Mainland Dairy Products Sales Adjustment Committee Indemnity Act.*"—Owing to the judgment of the Imperial Privy Council that the Act was invalid, the Bill was introduced to protect the Committee of Adjustment against any action which might be taken against the members for things done in good faith but which the Privy Council judgment ruled were *ultra vires*.

Another section provided for the winding-up of the affairs of the Committee in similar manner to that provided in the "Companies Act."

"*Fruit Act (British Columbia).*"—This was enabling legislation to avoid any question of jurisdiction in the matter of intra-provincial shipments of commodities under the regulations of the Federal "Fruit Act."

The Federal "Fruit Act" deals with the grading of fruit and the marketing of containers.

"*Sales on Consignment Act Amendment Act*" merely adds cut flowers and potted plants to the list of products which will come under the Act now the same as fruits, vegetables, and berries.

## NEW PUBLICATIONS.

The publications issued by the Department of Agriculture during the year are shown in Appendix No. 12. One of the outstanding publications is that entitled "First Studies in Mendelism," by W. R. Foster, Geneticist. In recent years, largely through the work of the Dairy Branch in conjunction with the Supervisors of Provincial Cow-testing Associations, dairy-farmers have been taking an increased interest in breeding problems and the above-mentioned bulletin has been produced as a result of popular demand for further light on this important subject.

The activities of the General Office of the Department of Agriculture for the current year included the mailing of 60,000 circular letters and more than 44,000 bulletins and circulars, many of which were sent on request of settlers or those who contemplate taking up residence on farms in British Columbia.

During the present year British Columbia was visited for the first time, in his official capacity, by the Honourable Robert Weir, Minister of Agriculture, Ottawa, who came to this Province immediately following the World's Grain Exhibition and Conference, and while here officially opened the Vancouver Exhibition on August 30th.

Among Provincial Ministers of Agriculture visiting British Columbia were the Honourable W. C. Buckle, Minister of Agriculture for Saskatchewan, who spent several days here in April; the Honourable George Hoadley, Minister of Agriculture for Alberta, came here in July and spent several weeks at the Coast; and the Honourable Adelard Godbout, Minister of Agriculture for Quebec, who spent several days here in August, accompanied by J. Antonio Grenier, Deputy Minister of Agriculture for Quebec.

## AGRICULTURAL CONFERENCES.

At the call of the Federal Minister of Agriculture the second National Conference on Agricultural Services was held at Regina, Saskatchewan, in July. British Columbia was represented by the Honourable Premier Tolmie in his capacity as Minister of Agriculture and by the Deputy Minister, together with three other members of the Provincial Advisory Committee—namely, G. M. Stewart, W. H. Hicks, and Dr. G. G. Moe. A complete report of the proceedings is on file in the Department.

The Provincial Advisory Committee named for British Columbia following the first conference at Toronto in 1932 was called together by the Minister on January 20th, 1933, at which time thirteen sub-committees were appointed to deal with specific agricultural problems. A further conference was held at Victoria on May 31st, when advantage was taken of the occasion to present an illuminated address to the Honourable William Atkinson, who was on that day relinquishing the portfolio of Agriculture.

## WORLD'S GRAIN CONGRESS.

Reference to British Columbia's outstanding achievement at the first World's Grain Exhibition and Conference held in Regina this year will be found in the report of the Field Crops Commissioner, but it might here be mentioned that this Province captured thirteen first prizes, which was more premier awards than was secured by any other of the forty countries, States, and Provinces from which exhibits were entered in the competitive classes. These winnings, together with the excellent publicity which that world event provided, has given great encouragement to the seed-growing industry of British Columbia.

All of which is respectfully submitted.

J. B. MUNRO,
*Deputy Minister.*

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# REPORT OF CHIEF PLANT QUARANTINE OFFICER.

W. H. LYNE.

This is my final report of work performed by the Plant Quarantine Branch of your Department during the seven months of this year, January 1st to July 31st. After this period the Division of Foreign Pests Suppression, Department of Agriculture, Ottawa, will assume administration.

During the seven months referred to, all plant products, consisting of fruit, vegetables, rice, corn, peas, beans, etc., imported into the Province were inspected at the entry-ports where Provincial Inspectors were stationed as specified in my previous annual report. No such products were permitted to enter the Province by way of any port where Provincial inspection was not provided, as stipulated by the Dominion Minister of Customs, September, 1926, immediately following the ruling that Customs officials must cease undertaking that work.

Imported nursery stock, consisting of trees, shrubs, plants, and bulbs, was as usual inspected at the Inspection and Fumigation Station, specially provided at Vancouver for that purpose, with the exception of that from Prairie Provinces in Canada inspected at other points in the Province when special permits had been granted.

Plant products for export were inspected to ensure freedom from pest or disease.

Other official duties performed by or through the Plant Quarantine Office at Vancouver were as follows: Collaboration with Division of Foreign Pests Suppression, Department of Agriculture, Ottawa, in the administration of regulations under the Dominion "Destructive Insect and Pest Act" regarding imported and exported plant products; administration of regulations under Provincial "Noxious Weeds Act" pertaining to movement of elevator grain screenings; administration pertaining to issue of feed-grain certificates for special freight rate to importers of feed-grain for cattle and poultry within the Province under special C.F.A. Tariff 145; and administration of Provincial "Eggs Marks Act" pertaining to foreign eggs imported.

On May 31st, 1933, Geo. L. Learne, Provincial Inspector of Imported Plant Products at Waneta, resigned from that duty and on June 1st left for his new home in Marron Valley, near Penticton, B.C. Practically no plant products from the United States have arrived by way of Waneta for several months, except those in bond to Nelson, B.C., which are inspected at that point by J. S. Goulding. In view of those circumstances and the fact that there is no one residing at Waneta to take Mr. Learne's place, that port automatically closes to the importation of plant products except those going through to Nelson in bond.

Inspectors of imported plant products whose duties will cease after July 31st, when the Dominion Government assumes administration of the plant-quarantine work, are F. Wilson at Nanaimo, B.C., and Wm. Darling, at Revelstoke, B.C. Geo. M. Thrift will cease serving the Pacific Highway and Douglas ports of importation and confine his duties to inspection of imported plant products entering the Province by way of White Rock, where he resides. By that arrangement inspection will be maintained at the following ports only: Victoria, Vancouver, Prince Rupert, New Westminster, White Rock, Huntingdon, Grand Forks, Nelson, Kingsgate, Newgate, Cranbrook, and Fernie. Officers at these ports have been notified that on and after August 1st their duties as Provincial officials will cease and they will receive their instructions from the Federal Department as Federal officials. That order, however, does not apply to W. Sandall on the Vancouver staff, who will remain a Provincial official, or to M. L. Bird and myself, owing to our superannuation on that date.

With regard to my retirement from the Government service, I would like to express my regret that it is necessary for me to cease performing the duties with which I have been associated during twenty-eight years. In that time I have learned to appreciate the congenial co-operative atmosphere that has always prevailed during my association with colleagues and other Government officials.

In concluding my report, it is a pleasure to refer to my staff, whose loyal and efficient support and faithful adherence to duty has been the means of this Branch of your Department rendering good service to the Province by protecting it against many of the major economic insect pests and diseases that have arrived at various times with importations of nursery stock and plant products. They have also rendered good service in protecting the reputation of plant products of this Province exported to many countries throughout the world by careful inspection of same to ensure their freedom from pest or disease.

Respectfully submitted.

W. H. Lyne,
*Chief Plant Quarantine Officer.*

(NOTE.—For purpose of record the following brief statement by A. J. Fuller, of the Plant Inspection Service at Vancouver, is appended to the report of the Chief Plant Quarantine Officer, and a complete summary of horticultural importations at various points of entry is on file in the Department of Agriculture at Victoria for reference purposes.)

For many years this important service has been under the jurisdiction of the Provincial Department of Agriculture, with W. H. Lyne in charge as Chief Quarantine Officer. On August 1st this work was transferred to the Federal Government, and is now controlled by the Entomological Branch, Division of Foreign Pests Suppression, with H. F. Olds, District Inspector, in charge of the work in this Province. With the exception of Mr. Lyne and Mr. Bird, who were superannuated, and W. Sandall, who remained as District Field Inspector, the former Provincial staff was transferred to the Federal Department. Under this arrangement John Noble continues to look after the Port of Victoria.

The situation regarding the Boundary ports in this Province has also been revised. Cranbrook, Fernie, Nanaimo, Revelstoke, and Waneta have been closed. Grand Forks, Huntingdon, Kingsgate, Nelson, Newgate, Prince Rupert, and White Rock remain ports of importation under the supervision of the Federal Department. Compensation for the services of the Quarantine Officers has been temporarily provided by the Provincial Department for the present fiscal year.

Monthly reports from these ports are rendered to this office as heretofore, and I post them in the Provincial recording-books provided.

Interprovincial shipments of nursery stock and plant products continue to be inspected by the Federal officers. How necessary this is is revealed by the fact that during the year nearly 3,000 various plants from other Provinces were condemned for various pests and disease. Two boxes of peaches were also intercepted and destroyed and one barrel of apples from Ontario was found infested with San Jose scale, codling-moth larvæ, and scab. All inspections and interceptions are posted in Provincial books provided for that purpose.

All nursery stock from the United States and foreign countries consigned to this Province is inspected at Vancouver or Victoria, with the exception of small individual shipments for the Interior arriving in Canada by way of Eastern ports. These are inspected at the port of importation and transhipped to the various consignees as free goods and no records of the importations are available at this office.

From the first of the year until the end of July fresh and dried fruit, nuts, and grains were fumigated for various pests as in the past. Since the transfer, however, most of this work has been handled by Johnson Storage Company, which operates an up-to-date commercial plant under the supervision of the Federal Department of Agriculture.

## ITEMS OF INTEREST.

In January the first shipment of tomatoes from the Bahamas arrived in good condition.

In February two nests of the brown-tail moth larvæ were intercepted in a shipment of roses from Holland. Inspectors are ever on the alert for this dangerous pest. In England during the summer of 1782 this insect created great alarm over the country, subscriptions were opened in many parishes, and poor people were employed to cut off the webs from trees, etc., for the sum of one shilling per bushel, which were burnt under the inspection of the churchwardens and beadles. Prayers were even offered up in some of the churches to deliver the country from the calamity. The hairs of the caterpillar are finely barbed, and after moulting the hairs are blown around in the air and often settle on the face, getting into the mouth, eyes, etc., and cause great annoyance and some danger to the afflicted person.

In March we had our first shipment of paddy rice from Egypt.

In May 5,500 tons of corn arrived from South Africa in excellent condition.

On the last day of the year we received the first commercial shipment of tomatoes from Japan.

## ADMINISTRATION.

The Plant Inspection Service still occupies the same offices situated in the Court-house, which is shared with J. W. Eastham, the Provincial Plant Pathologist, and Mr. Sandall, District Field Inspector. Dominion office furniture is gradually replacing that which was under the old regime. Inspection charges ceased on the date of transfer. Daily reports continue to be

received from various transportation companies regarding the arrival of nursery stock and plant products by boat, train, express, or mail. Special reports relating to the condition of importations are issued to importers, shippers, or transportation upon request.

Provincial horticultural and agricultural bulletins are always on hand for public distribution. This service is greatly appreciated, for many apply during the year for information relating to pests and disease, spraying, pruning, etc.

The Fumigation Station, jointly owned by the two Governments, is not used so much as heretofore. All mail parcels are now inspected at the post-office, and shipments from countries other than the United States arriving by express, rail, or boat are either inspected at the point of arrival or forwarded to the importer for inspection at destination. Deciduous nursery stock from the United States and the Orient is still inspected at the station, as this class of stock is subject to fumigation, as is also that emanating from Ontario. Imported plant products are inspected and recorded as usual, but no certificates issued.

Nursery stock and plant products for export continue to be inspected at Vancouver, Victoria, and Interior points. Dominion certificates for fruit and vegetables have replaced those previously issued by the Provincial Department. In connection with the export of plant products, may I take the liberty of drawing to your attention the small amount of common vegetable exported to the Orient. The border States of America are making a bold bid for this trade. Large quantities are being shipped from Seattle via Vancouver by the C.P.R. boats for distribution at Hong Kong, Shanghai, etc. British Columbia appears to have made only a feeble attempt to capture this class of export trade, which in the near future may develop into big business. The situation might be taken more seriously. Could not British Columbia grow and ship many of the varieties at competition prices?

## OCEAN TRAFFIC.

During the year 2,170 deep-sea and coastwise boats docked at Vancouver. This is a decrease of 183 compared with last year. Sixty-six boats brought assorted nursery stock and 812 contained plant products, all subject to inspection.

All passenger-boats and the deep-sea freighters are attended by an Inspector and all manifests carefully scrutinized. One hundred and sixty-seven passengers were found to be in possession of 1,065 assorted trees, plants, and bulbs and one case of bulbs; also the following plant products:—

| | | | |
|---|---|---|---|
| Pineapples (crates) | 46 | Oranges (boxes) | 77 |
| Pears (boxes) | 3 | Bananas (boxes) | 9 |
| Sand pears (boxes) | 5 | Avocados (boxes) | 1 |
| Mangoes (boxes) | 1 | Dried fruit (boxes) | 3 |
| Grapefruit (boxes) | 2 | Persimmons (boxes) | 4 |
| Nuts (assorted) (boxes) | 9 | Yams (boxes) | 1 |
| Beans (boxes) | 1 | Taro (boxes) | 4 |
| Cocoanuts (boxes) | 2 | Quantity of cut flowers. | |

A few ornamental trees were prohibited entry into Canada and several infested with pests and disease, which were destroyed. All plants and plant products that passed inspection were released.

## IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER.

| | |
|---|---|
| Fruit-trees (assorted) | 12,916 |
| Small fruits (grape-vines, raspberries, etc.) (assorted) | 80,243 |
| Ornamental shrubs and trees (assorted) | 41,833 |
| Rose-bushes | 33,994 |
| Fruit seedlings (assorted) | 215,399 |
| Ornamental seedlings (assorted) | 119,951 |
| Bulbs (assorted) | 1,935,523 |
| Perennial roots (assorted) | 43,603 |
| Plants (herbaceous) (assorted) | 8,775 |
| Miscellaneous (scions, etc.) | 5,353 |
| Peach-pits (lb.) | 2,007 |

The above stock was imported from the following countries: England, Scotland, Wales, Ireland, Holland, Belgium, France, Denmark, Hungary, Switzerland, Austria, Germany, Norway, Italy, Czechoslovaki, Japan, China, New Zealand, Australia, West Indies, United States of America, and various Provinces in Canada.

Compared with 1932, there is a decrease of 20,782 fruit-trees, and increase of 42,309 small fruits, a decrease of 11,603 ornamentals and shrubs, an increase of 5,872 rose-bushes, a decrease of 84,001 roots, a decrease of 6,820 herbaceous plants, and a decrease of nearly one and a quarter million bulbs.

NURSERY STOCK INSPECTED AT VICTORIA.

| | |
|---|---|
| Fruit-trees | 6 |
| Ornamental shrubs and trees | 94 |
| Rose-bushes | 10,002 |
| Bulbs (assorted) | 392,089 |
| Perennial roots | 195 |
| Plants (assorted) | 1,022 |

It will be observed that more nursery stock is inspected at Victoria under the new system than heretofore.

INTERPROVINCIAL PERMITS ISSUED TO IMPORT NURSERY STOCK FROM OTHER PROVINCES TO INTERIOR POINTS IN BRITISH COLUMBIA.

In addition to nursery stock from other Provinces inspected at Vancouver, 213 permits were issued at this office to importers living in the Interior, granting permission to bring in the following plants:—

| | |
|---|---|
| Fruit-trees | 466 |
| Small fruits | 3,623 |
| Ornamental trees and shrubs | 13,097 |
| Rose-bushes | 174 |
| Fruit seedlings | 74 |
| Bulbs (assorted) | 5,421 |
| Roots | 935 |
| Plants (assorted) | 768 |

It is not possible to state what percentage of the above plnts entered this Province, as only a small number of the permits were returned endorsed inspected. Furthermore, there is no evidence available in this office that any plants were condemned, although a large number of plants were condemned at Vancouver.

NURSERY STOCK INTERCEPTED.

During the year 11,310 assorted fruit-trees, small fruits, ornamental shrubs, roses, fruit seedlings, bulbs, plants, and scions were intercepted from 133 shipments, and for convenience are placed under the following headings:—

There were thirty-three fruit-trees condemned for scale, *Aspidiotus perniciosus*, *Aspidiotus ostreæformis*, woolly aphis, pear-root aphis, root-galls, and sour-sap; condemned for *Aspidiotus ostreæformis*, *Aulacaspis rosæ*, *Phylloxera vastatrix*, crown-borer, Nematodes, and root-gall, 2,540 small fruits (raspberry-canes, grape-vines, etc.).

Assorted ornamental shrubs and trees to the number of 498 were condemned for scale, *Lecanium hesperidum*, *Lepidosaphes ulmi*, *Diaspis camellii*, *Aspidiotus forbesi*, *Aspidiotus perniciosus*, *Aspidiotus rapax*, holly leaf-miner, Millapedes, Buprestidæ, Anomala larvæ, and Nematodes; twelve rose-bushes for crown-gall.

Fruit seedlings rejected for scale, *Aspidiotus ostreæformis*, woolly aphis, and sour-sap numbered 439 in all.

Assorted bulbs condemned for *fusarium* rot, *Penicillium* mould, *Bacterium marginatum*, *Septoria gladioli*, *Selerotium*, *Botrytis tulipæ*, *Rhizopus necans*, bacterial decay, and the larvæ of the large narcissus-fly (*Merodon equestris*), were 6,156.

Scions condemned for scale, *Aspidiotus perniciosus*, *Aspidiotus forbisi*, and woolly aphis, totalled 1,171 and a total of three plants for mealy bug, *Aspidiotus rapax*, and *Chionaspis* scale.

## PROHIBITED ENTRY INTO BRITISH COLUMBIA.

| | |
|---|---|
| Plants prohibited entry under Dominion Regulation No. 4, Foreign | 2 |
| Five-needle pine prohibited entry under Dominion Regulation No. 6, Foreign | 1 |
| Sweet-chestnut trees prohibited entry under Dominion Regulation No. 7, Foreign | 12 |
| *Berberis* prohibited entry under Dominion Regulation No. 9, Foreign | 5 |
| *Tsuga Canadensis* prohibited entry under Dominion Regulation No. 13, Foreign | 4 |
| Gladiolus corms prohibited entry under Dominion Regulation No. 19, Foreign | 105 |
| Peach-trees prohibited entry under Dominion Regulation No. 6, Domestic | 24 |
| Gladiolus corms prohibited entry under Dominion Regulation No. 10, Domestic | 241 |

## CONFISCATED.

As consignees refused to comply with regulations, there were sixty-seven assorted shrubs, two rose-bushes, and 3 plants confiscated.

All condemned nursery stock was either destroyed in the presence of a Customs officer or returned to the shipper.

Respectfully submitted.

A. J. FULLER.

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(NOTE.—With the transfer of the plant-quarantine work to Federal auspices, certain duties of a Provincial nature were delegated to Walter Sandall, who has been retained as Field Inspector in the office of this Department at the Court-house, Vancouver. His report on the administration of the "Eggs Marks Act," "Noxious Weeds Act," etc., is here reproduced as a supplement to the interim report of W. H. Lyne.)

## "EGGS MARKS ACT."

Complying with the "Eggs Marks Act," chapter 74, R.S.B.C. 1924, and amendments thereto, a careful watch has been maintained by Inspectors appointed to see that all foreign eggs imported into the Province duly comply with the regulations of the "Eggs Marks Act." Very few imported eggs have arrived into British Columbia during the year, the greater proportion coming from China. Chinese eggs in the shell are preserved in mud, and are used exclusively by the Orientals for flavouring and medicinal purposes. A total of 285 cases of preserved eggs from China and 29 cases at 30 dozen per case commercial eggs from Australia were imported into Vancouver during the year 1933, and a total of 51 cases of preserved eggs from China and 8 dozen hatching-eggs from the United States arrived into Victoria during the same period. There were also 60 dozen commercial eggs from the United States arrived into Trail early in December.

The following persons were appointed Inspectors by the Provincial Department of Agriculture to carry out the provisions of the "Eggs Marks Act" in addition to other duties: Walter Sandall, Chief Inspector, Vancouver, B.C.; J. Dennis Allen, Inspector, Prince Rupert, B.C.; John S. Goulding, Inspector, Nelson, B.C.; Earl C. Hunt, Inspector, Nelson, B.C.; Richard Williams, Inspector, Newgate, B.C.; Mrs. Evelyn Campbell, Inspector, Kingsgate, B.C.; Percy H. Dawson, Inspector, Huntingdon, B.C.; George M. Thrift, Inspector, White Rock, B.C.

## SCREENINGS AND FEED-GRAIN.

In compliance with the Provincial "Noxious Weeds Act," assented to April 1st, 1931, being chapter 69, section 17, Part II., 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 on 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 either permit the

premises of the applicant are inspected and the facilities for handling the screenings according to regulations examined. Occasional inspections are made of the premises of the holders of screenings permits 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, create a weed menace.

During the year forty-two permits to remove screenings were issued to eight different firms, granting the total movement of 752 car-loads and 10 tons; eighteen feeders' permits were issued to nine applicants, granting the removal of 50 car-loads and 15 tons of screenings, 7 car-loads of which was solely for fuel purposes.

The permits were issued for various quantities, from 10 tons to 100 car-loads. One car contains approximately 30 tons. A large quantity of the uncleaned screenings purchased by various dealers is recleaned and ground by them and sold as ground recleaned screenings or used for blending with other feeds; the refuse is sometimes used for fuel, bedding for cattle, or is exported.

## 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, and whether for home use or export.

The following table will show the amount of screenings removed from grain-elevators each month.

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

| Month. | For Use in British Columbia. | | | | Export. | | Total per Month. | |
|---|---|---|---|---|---|---|---|---|
| | Recleaned or Grade A. | | Uncleaned or Grade B. | | Uncleaned or Grade B. | | | |
| | Tons. | Lb. | Tons. | Lb. | Tons. | Lb. | Tons. | Lb. |
| January | 84 | 1,760 | 1,734 | 950 | 390 | ..... | 2,209 | 710 |
| February | 103 | ..... | 1,946 | 900 | 440 | 1,000 | 2,489 | 1,900 |
| March | 375 | ..... | 1,935 | 1,830 | 710 | ..... | 3,020 | 1,830 |
| April | 460 | ..... | 1,108 | 30 | 89 | 1,000 | 1,657 | 1,030 |
| May | 171 | ..... | 977 | 1,500 | 30 | ..... | 1,178 | 1,500 |
| June | 176 | 1,900 | 823 | 1,740 | 90 | ..... | 1,090 | 1,640 |
| July | 218 | 1,810 | 703 | 660 | 236 | 1,150 | 1,158 | 1,620 |
| August | 30 | ..... | 688 | 630 | 208 | 1,870 | 927 | 500 |
| September | 19 | 470 | 773 | 1,700 | 60 | ..... | 853 | 170 |
| October | 172 | 1,000 | 1,006 | 810 | 364 | 650 | 1,543 | 460 |
| November | 41 | ..... | 1,998 | 1,570 | 210 | ..... | 2,249 | 1,570 |
| December | 82 | ..... | 1,586 | 850 | 180 | ..... | 1,848 | 850 |
| Totals | 1,934 | 940 | *15,283 | 1,170 | 3,009 | 1,670 | 20,227 | 1,780 |

* Of the 15,283 tons 1,170 lb. of B Grade screenings recorded for home consumption, a percentage was recleaned by the dealers and 3,965 tons of refuse was exported by them.

## FEED-GRAIN CERTIFICATES.

Commencing March 27th, 1933, a total of 499 feed-grain certificates have been issued from the office, Court-house, Vancouver, up to December 31st. With a few exceptions, each certificate represents one car of grain. Of the above number of certificates issued, seven were returned to the office where issued and cancelled for the following reasons: Two were issued for two cars each which was not acceptable to the transportation companies; the remaining five missed diversion or was exported.

Respectfully submitted.

W. SANDALL,
*District Field Inspector.*

# REPORT OF MARKETS COMMISSIONER.

J. A. GRANT.

The marketing season of 1933 went off to a rough start, mostly due to the depreciation of the pound sterling, leaving the shippers who held their apples for an expected spring rise in a depressed condition. Fortune again favoured those who sold at firm prices ahead. This condition forced the Associated Growers of British Columbia to change their selling policy in England, which involved a change of agents. In their new selling plan they have an assurance of a fair share of advance selling orders.

The Apple Cartel that was created during 1932 and successfully controlled volume did not try to control prices. The result was discontent, as volume-control alone was not sufficient to warrant the expense of carrying it on. The same Board could have controlled prices as well as volume, but that did not meet with the approval of shippers who catered to special Prairie interests. This deadlock remained unbroken until the 1933 apple season started.

## FORCED RHUBARB.

The forced-rhubarb growers for the first time were united and marketed through one distributer. The result was a record volume movement and a satisfactory price to the growers. The Prairies took twenty straight cars and 400 40-lb. cases L.C.L., which netted the growers $13,654.32. Vancouver and Victoria took about 10,000 cases.

## FIELD RHUBARB.

The field-rhubarb organizations, including Dewdney, Pacific, Associated, Central, and Fraser Valley, controlling about 140 cars, agreed to use the same distributer as handled the forced-rhubarb deal. Yarrow growers, who had made other arrangements, had ten cars. Painstaking arrangements as to the tonnage each organization could ship were made. The first two cars were shipped by Dewdney on April 15th, four days later than in 1932 and eleven days later than 1931. The quota became effective on April 17th. By April 20th there was a deluge of supplies with no demand. When the twenty-third car was shipped jobbers reported they had heavy carry-overs, with cold, wet weather and a poor demand. This was in reply to appeals for more business, as growers were clamouring for orders and shippers had agreed not to load until orders were given. Just then Vancouver brokers, both white and Chinese, commenced quoting to Prairie jobbers at lower prices. It was only a few days later that some of the organizations in the pool were reported as quoting direct, and prices as low as 60 cents for a 40-lb. crate were made. By May 11th the price had dropped to 50 cents and by the 15th the deal was over, with the organizations only shipping forty-eight cars—leaving about 100 cars to rot in the fields.

## ASPARAGUS.

Asparagus supplies from British Columbia are becoming a factor in Calgary and Edmonton markets. Calgary housewives paid 35 cents per pound for California asparagus from April 10th until May 6th, when British Columbia commenced to ship, and prices slipped to 22 cents per pound, then advanced on May 10th to 25 cents, and remained at that price for the balance of the season. (These are retail prices.) Favourable comments were made on the quality of British Columbia asparagus; most of it compared favourably with California importations. During the last three years the British Columbia acreage has increased from 100 to 400 acres.

## SMALL FRUITS.

Frost during November, 1932, had frozen the respberry-buds, and that crop, already hit with some disease or physical trouble, was reduced to a very small tonnage. The introduction of a 2-cent duty on sugar threatened the pack of strawberries, and up to the time that the crop was well under way in shipping no jam contracts had been made. Growers through their agent, knowing that the season was late, resolved to sell at extremely low prices on the fresh-fruit Prairie market. The low prices quoted greatly increased the demand, and as the season was favourable to berries arriving in good condition the cannery and jam manufacturers found that they were not going to be able to get berries at the low prices they had anticipated and

stepped out to secure supplies at fair prices to the growers. The Prairie movement in one week was over forty cars—a record for all time. Towards the close of the season the weather broke and remained wet for the balance of the shipping season, so that canners were able to get all the supplies they wanted. While raspberries were short, the abundant supply of strawberries prevented them realizing the price expected.

## BERRY SHIPMENTS.

The value of selling berries through one distributer was again amply demonstrated. Eighteen cars moved by freight to Alberta points—all arriving in good condition at an advantage of 20 to 23 cents per crate to the growers.

The following figures represent the car-lot shipments of strawberries from the various associations:—

| Associations. | Crates. |
|---|---|
| Central Fruit | 15,686 |
| Maple Ridge Co-op. | 11,922 |
| Associated B.G.A. | 4,235 |
| Fraser Valley Co-op. | 4,014 |
| Pacific Co-op. | 12,979 |
| Surrey (south side) | 6,990 |
| Saanich F.G.A. | 11,176 |
| Keating Co-op. | 1,704 |
| Gordon Head F.G.A. | 1,456 |
| Vancouver Island Co-op. | 3,888 |
| Wynndel Co-op. | 784 |
| Total | 74,834=91 cars. |

Total to growers, $97,029.59. Average per crate, $1.2965.

The following is the recapitulation of the cars partially mixed—some with raspberries, strawberries, loganberries, blackberries, and Everbearing strawberries:—

| Associations. | Crates. |
|---|---|
| Central Fruit | 6,126 |
| Maple Ridge Co-op. | 2,826 |
| Associated B.G.A. | 4,745 |
| Fraser Valley Co-op. | 5,551 |
| Pacific Co-op. | 14,386 |
| Wynndel Co-op. | 3,321 |
| Total | 36,955=46 cars. |

Total to growers, $55,122.31. Average per crate, $1.4916.

In addition to the berries listed herein, Manitoba bought five cars of Ontario strawberries. These sold at 50 cents per crate below British Columbia berries.

L.C.L. shipments of strawberries to the Prairies amounted to 74,036 crates, or equal to ninety cars. These were mostly consumed in Alberta and Saskatchewan—few reached Manitoba. Of these L.C.L. shipments, 75 per cent. were sent on consignment. Car-lot shippers to Alberta had to meet prices set by jobbers and retailers who were receiving L.C.L. berries, and lower prices than were necessary were created by the action of the growers participating. Orderly marketing under control is the only way to prevent this unprofitable mix-up; every other way has failed.

A striking example of handing over perishable fruit on consignment was called to the notice of this office. A Japanese grower in Huntingdon shipped through a firm at that point. Berries were shipped by this firm to Saskatoon, much too far for safety in L.C.L. shipping, and were reported to have sold at little over express charges. We investigated this deal and found that the shipping concern deducted their percentage, which in some cases was equal to the net return to the grower. Car-lot berries averaged close on $1.29 per crate to the grower. This L.C.L. shipper shipped over 800 crates and only averaged 60 cents per crate.

## LOGANBERRIES.

The fresh-loganberry marketing is still confined to a small home market and cannery demand for the British trade. Over 38,000 cases have been sold in the United Kingdom this year and prices realized leave the grower about 3½ cents per pound. The winery demand is expected to be again a factor in taking care of some of the 1934 crop.

H. Beach was sent to England to specialize on marketing berries, but to date the result has not been up to his or the growers' expectations. The United Kingdom trade seek consignment of goods without a set price, while the British Columbia grower insists on a firm price being made before shipment takes place. Oregon loganberry-growers are the chief competitors in the United Kingdom and reports from there are to the effect that the acreage is being greatly reduced. Their shipments this year, however, exceed last year's, and this does not tally with the information received from Oregon on reduction of acreage. The British preference gives British Columbia a distinct advantage on that market, and this advantage will wear out Oregon's competition in time if British Columbia growers can only hang on long enough to secure the market. The reputation gained by British Columbia loganberries is good, but they have not been established long enough to secure the full benefit of their quality.

## STONE-FRUITS.

There has been rivalry in the Okanagan amongst shippers as to the division of stone-fruit supplies during the past two years, and prices have not been as good as under the pooling system through one distributer, as it stabillzed prices and pooled the unwanted supplies that were sent to other markets. If growers continue to spread their stone-fruits amongst the various shippers who are competing against one another they will not be able to stabilize prices long, even if the demand is greater than the supply.

The supply of Italian prunes, apricots, and peaches is still under the market's demand. Apart from one or two growers offering prunes 10 cents per crate under the market, no difficulty was experienced in cleaning up the whole stone-fruit crop, except cherries.

Some good advertising, earned through shipping tree-ripened stone-fruit in 1932, was lost in 1933 through shipping much too green fruit (especially prunes). This was more noticeable in Saskatchewan and Manitoba, where, no doubt, the semi-ripes were shipped owing to expectation of ripening in transit, which under refrigeration ripens very little. A shipper in Penticton has a trade larger than he can fill because of his care in packing and watching that the sugar content has developed in his stone-fruits before picking. His care might be too much to give to a commercial pack, but the fact remains—stone-fruits were shipped on the green side in 1933.

## PEARS.

There is every appearance that pears are planted in abundance for the demand. They move very slowly in commerce, and while fair prices usually rule the demand is light. The only exception to this is the Bartlett pear, as the canning demand for this variety is still greater than the supply.

## APPLES.

Wealthy apples in bulk were rolled as low as $15 per ton, with lower prices in prospect. By this time growers were in a determined mood and a campaign was started in Kelowna to refuse shipment of apples that did not bring back something more than selling charges. A slogan was adopted, "A cent a pound or on the ground," and it spread all over the Okanagan Valley and main-line points. Shippers were forced to get behind the campaign and from then on some control of prices was established.

Time did not allow Kootenay growers and shippers to participate in the new slogan, but it was generally believed that they would co-operate. This, however, did not materialize and Prairie jobbers soon found this weakness and commenced to wire Kootenay shipping organizations for supplies of apples. The price offered was about 15 cents a box below the Okanagan price decided upon, and as Kootenay had a lot of well-coloured apples they were able to command over 75 per cent. of the Prairie apple business. Consternation developed in the valley owing to the lack of movement from there, especially as the McIntosh crop exceeded that of 1932 by over 100,000 boxes and their prime moving season was passing. The new Stabilization Board set household McIntosh prices about 15 cents a crate too high and this helped Creston and Kootenay

shippers to get 75 cents per crate. Had they set the price at 75 cents the Kootenay growers would not be as well off to-day as they are, as that would have meant 15 cents a box less for them. The Board stuck to their price long enough to create a wholesome respect for their determination.

Your Markets Commissioner was requested to report conditions from the Prairies, and several reports were made pointing out the need of patience, as Kootenay had to run its course to a finish before stability could be established. We found that the 400-odd cars of Kootenay apples were about all sold; this included fall and winter varieties. When we reached Kelowna we advised the growers at a public meeting that the situation was one of "who could clean up first," and that apart from the delay in marketing McIntosh they would not have enough apples of winter varieties to carry them through the season, and not to be surprised if in February and March large importations of Washington Winesaps took place to fill the Prairie demand. This news had a stimulating effect. Next day the price of winters went up on our recommendation. We also informed them that dumping apples would not be needed this year and the only loss would be shrinkage on overripes.

It was known that the 1933 apple-crop had run heavy to export sizes and during the time that Prairie jobbers passed up the Okanagan supplies the export market was heavily supplied. Advice from our Markets Representative, London, was that they were far too heavily shipped and the low prices ruling there bore out his contention. The net result of the growers' campaign has been to transfer a rout in prices to more or less stability. It would seem from present indications that at the end of 1933 growers will show a profit instead of a loss, but whether they will average the 1 cent a pound is not yet established.

The heavy export of British Columbia apples to the United Kingdom, especially McIntosh Red, coming on that market at a time when the British and Nova Scotia apples were being marketed, together with a cold-storage carry-over from Australia and New Zealand, had a "bear" effect on prices, and much loss is anticipated by British firms who bought on a f.o.b. shipping-point or c.i.f. basis. Exports of British Columbia apples for 1933 are already over 100,000 boxes more than 1932. Our shipments of apples this year to the United Kingdom on November 25th were 1,267,000 boxes. At same date last year shipments were 1,104,000 boxes. This is in view of the fact that the interior-grown apples are estimated at over 1,000,000 boxes short of 1932 production.

The following figures show that on December 30th, 1933:—

| | |
|---|---|
| The percentage of McIntosh sold was | 76.7 |
| The percentage of McIntosh sold same date, 1932 | 78.6 |
| Other varieties sold to December 30th, 1933 | 71.3 |
| Other varieties sold to December 30th, 1932 | 67.2 |

## CANTALOUPES.

The special campaign to supply vine-ripened cantaloupes was a success. Vine-ripened cantaloupes were stamped and inspected and arrived at destination in good condition and sold readily. Those not inspected, and unstamped, were in the discard and sold at low prices. In future the trade will demand cantaloupes stamped and vine-ripened. There was a big volume consumed and fair prices were realized.

## VEGETABLES.

Importation of produce from the United States of a kind that can be grown in Canada has fallen off greatly during the past two years. The prospect of enlarging the sale of vegetables on the Prairies is lessened by the extending acreage planted to vegetables at numerous points there. Lethbridge and Medicine Hat are keen rivals of British Columbia in the growing of Netted Gem potatoes. Sweet corn from Medicine Hat is usually on the Calgary market as early as from British Columbia. Cucumbers, head-lettuce, cabbage, and all early vegetables are only a matter of two weeks later. This year Medicine Hat District produced about thirty-five cars of fine Yellow Globe onions—equal in every respect to the onions grown in the Interior of British Columbia. Similar advances in vegetable-growing are being made in Manitoba. In Calgary and Medicine Hat, also Edmonton, glass houses are increasing and they are turning out a lot of hothouse tomatoes and cucumbers every year.

## POTATOES.

The potato-crop for 1933 is below normal and fair prices have ruled during the season. The amount in storage at end of December is at least 5,000 tons less than at same date last year. Advancing prices are due early in spring.

## EXPRESS RATES.

Following a resolution passed at the British Columbia Fruit-growers' Association meeting held in Penticton asking for a 25-per-cent. reduction on express rates on car-lots to Prairie and Eastern points, a committee, including your Markets Commissioner, discussed this matter with Express Company officials in February, who in turn forwarded the request with their notes and recommendations to headquarters for consideration. A decision was received just before berry-shipping time refusing the request, at least for 1933, when a short crop was expected. The short-crop prediction was not attained; instead, an increase in strawberries from sixty-six cars shipped in 1932 to ninety-one cars in 1933. Growers protested the decision by shipping eighteen cars by freight to Alberta points.

On February 4th the Committee on Transportation met the officials of the railway companies and applied for a special rate on the long haul to Toronto and Montreal of $1.50 per 100 lb., to apply from April 10th to May 10th. This request was forwarded to Eastern officials and was granted, but owing to the late season was not used.

## MEETINGS.

The Coast fruit and vegetable growers decided to organize a Coast association similar in scope to the British Columbia Fruit-growers' Association, so that more discussion of local problems, especially small fruit, would be possible. A resolution was passed by the British Columbia Fruit-growers' Association authorizing the formation of this body, whose intention is to co-operate with the British Columbia Fruit-growers' Association financially and in all matters where their interests are in common.

A meeting was held on February 2nd to consider the marketing of early vegetables. Later many meetings were held, including a visit to points between Seattle and Tacoma to investigate packing and icing of head-lettuce. G. E. W. Clarke led this movement, which resulted in the formation of a strong group of vegetable-growers, with headquarters at New Westminster Cold Storage Plant, where all modern facilities are available to growers. Many cars of vegetables have been shipped by the new organization this year. This organization has a membership of over 1,000. They are holding their first convention on January 12th and 13th, 1934, at New Westminster.

## PUBLIC MARKETS.

The campaign started by this Branch, aimed at starting a public market in Nanaimo, was brought to a head by the opening of a market there last May. A visit was made in August, when the stall-holders decided to have two market-days weekly instead of one. All were highly pleased with the venture. It had the effect of stimulating the production of local vegetables, etc., for local use and providing farmers with ready money weekly.

## MARKETING INFORMATION.

The intelligence-work of the Markets Branch has been carried on in a limited way. Two bulletins were published weekly, and apart from the leaders in the organization movement, who were placed on the mailing-list, this information did not reach the growers direct. The daily and weekly press did not co-operate to any extent, as the Market News Letter, excepting to those interested, is not popular. This office co-operated closely with the car-lot distributers as well as keeping the chairman of the Stabilization Committee informed every Monday by wire regarding the British prices cabled by our Markets Representative from London. With very little extra expense, bundles of weekly bulletins can be circulated amongst growers by sending them in charge of organization for distribution. These bulletins have value as a file record of the Prairie and domestic markets.

The Chief of the Fruit Branch, Ottawa, instructed his local Inspectors at main distributing centres to furnish a weekly letter covering major market news and an occasional telegram. We appreciate this co-operation.

## MARKETING ORGANIZATION.

The time for an active marketing campaign to include all farm produce is at hand. So far the farmers' organizations, outside of fruit and milk, are without the necessary marketing data upon which to organize an orderly scheme, and much spade-work is needed to make their industry fit for marketing "by time and place." Few of the organizations have an all-year-round supply, without which the trade will buy elsewhere. Poultry and live stock is being imported heavily into British Columbia and it will take time and some money to change this condition.

Respectfully submitted.

J. A. GRANT,
*Markets Commissioner.*

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# REPORT OF PROVINCIAL HORTICULTURIST.

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

The winter was marked by abundant snowfall and rain in all districts, which ensured a satisfactory supply of water in the irrigated sections. The spring was late, with a resultant late ripening of spring and early summer crops. Summer temperatures were on the whole uniform and excellent from a growing standpoint. The fall, however, was very wet in most districts. This did a great deal to retard the ripening and harvesting of the late seed-crops and interfered materially with the tree-fruit picking in the Interior districts. Heavy rainfall and snow was recorded in all districts during the early winter months.

## TREE-FRUITS.

The total production of apples in 1932 was the largest on record, amounting to 5,192,000 boxes. The 1933 production, as was expected, was somewhat lower. At this date it is impossible to give the actual number of boxes, but the total crop is estimated at 4,366,000 boxes. Some idea of the tree-fruit production in comparison with 1932 may be obtained from the following figures:—

| | 1932 Production. | Estimated 1933 Production. |
|---|---|---|
| Apples (boxes) | 5,192,000 | 4,366,000 |
| Crab-apples (boxes) | 134,000 | 131,000 |
| Pears (boxes) | 166,000 | 167,000 |
| Plums and prunes (crates) | 363,000 | 255,000 |
| Peaches (crates) | 250,000 | 181,000 |
| Apricots (crates) | 168,000 | 78,000 |
| Cherries (crates) | 210,000 | 193,000 |

The lighter crop this year, particularly in the case of stone-fruits, was undoubtedly due to severe winter conditions which prevailed and caused considerable bud-injury to trees in the southern sections. In the case of cherries heavy rains in the Kootenay districts during the picking season materially lightened the marketable crop. The processing of cherries was again undertaken in the Okanagan with very satisfactory results. This method of handling the light-coloured cherries, such as Royal Anne, etc., which are difficult to market on the fresh-fruit market, gives promise of further extension not only in the Okanagan but in the Fraser Valley. At Chilliwack this year approximately 10 tons were marketed in this way, and with an increased demand there is no reason why a large proportion of the Royal Anne crop of the Kootenays could not be marketed in a similar manner.

## SMALL FRUITS.

Strawberries, which are the principal small fruit grown in the Province, were on the whole a lighter crop than in 1932. Severe winter conditions in some districts, coupled with unsatisfactory weather conditions during the picking season, tended materially to shorten the crop. Prices also were lower than those of the previous year.

Due to severe winter conditions during the month of December, 1932, the raspberries, particularly in the Fraser Valley, were badly winter-killed. The result was that the crop was very short. Many of the patches have to a large extent recovered and, given favourable winter conditions, there should be practically a normal crop in 1934.

Loganberries, like many other small fruits, were later in maturing than in 1932 and the crop was smaller. This crop is not satisfactory from a fresh-fruit standpoint, particularly where distant shipments, such as to the Prairie markets, have to be made. For the most part the major portion of the loganberries produced are used by the local jam and canning plants. This season a large quantity was canned and exported to the British market. In the past a large portion of the crop was used for wine-making purposes. This year, however, very little of the crop was used in this way. The future for this crop seems doubtful unless the wineries are able to take more than they have in the past two years and the growers are assured of better returns than were received in 1932 and 1933. The average return to the grower during the past two seasons varied from 3½ to 4 cents per pound.

With regard to other small fruits such as blackberries, currants, gooseberries, etc., there is very little change from year to year, both with regard to acreage and production. There is usually sufficient to meet the demand.

Grape-growing in the Province is undertaken principally in the Kelowna District. The grapes produced are used for shipping as fresh fruit, although a limited tonnage is manufactured into wine in the Coast wineries. As this industry is comparatively young, it necessarily follows that some experimental work has to be done, particularly from the standpoint of securing satisfactory varieties. Reporting on this particular crop, B. Hoy, District Agriculturist, Kelowna, makes the following statement:—

"With the exception of a few vines here and there throughout the district, there was no increased plantings this year. The crop was considerably larger than in 1931 owing to a good set and young plantings coming into bearing. Owing to the cool weather in spring and poor ripening weather in September the crop was later than usual and quality not quite up to normal.

"Of the early American varieties being tried out, Moore's Early ripens first, but is a poor grower, small yielder, and not of high quality.

"Portland is a strong grower, good yielder, and of good quality, but hard to sell because of the green colour.

"Patricia is a blue grape, grows well and yields well, but is of poor quality.

"Freedonia is a blue grape that grows and bears well, is of good quality, and to date seems to be the best of the early varieties. Vines of this variety are at present difficult to obtain and are expensive.

"Sheridan continues to be outstanding as a good late grape, but should be planted on early sites.

"The experimental work being done by Rittisch Bros. continues to be of much interest to the Okanagan. They have been growing European grapes for three years, and last year produced a large enough quantity to see something of the possibilities of these grapes in this country. The vines wintered well and several varieties were brought to maturity. Pearl of Csaba was in prime eating condition on August 30th. Golden and Blue Chasselas and Ferdinand de Lesops were ripe on October 11th. All of these varieties are of good quality. Whether or not this type of grape will become commercial in this valley cannot be predicted, but undoubtedly some of these varieties will make an excellent addition to the home-gardens."

The following figures show the total production of the four principal small fruits in the Province in 1932 and the estimated production for 1933:—

| | 1932 Production. | Estimated 1933 Production. |
|---|---|---|
| Strawberries (crates) | 310,000 | 230,000 |
| Raspberries (crates) | 136,000 | 69,000 |
| Loganberries (crates) | 115,000 | 75,000 |
| Grapes (lb.) | 694,000 | 1,025,000 |

## VEGETABLES.

The vegetable situation during the past season was very similar to that which prevailed in 1932. Greenhouse production was as heavy if not heavier than in 1932. The grower of hot-house tomatoes, however, received a lower price than was obtained the previous year. This was undoubtedly due to the fact that the date on which the dump duty went into effect was changed from May 15th to June 10th, thus allowing the importation of large quantities of Mexican and Southern United States tomatoes. In the Lower Mainland districts there is a marked tendency to increase the quantity of vegetables produced with a view to supplying home

markets, as well as for shipments to the Prairies. The situation in this district is perhaps most clearly summarized by G. E. W. Clarke, District Agriculturist, in his annual report, from which the following is taken:—

"While the greater acreage in truck-crops is grown by Chinese, others are becoming interested, but there is considerable to be learned as to variety, packing, and seasonable growing. The movement is being given careful consideration by many growers who in past years were doing well in one or two lines of farming and are now finding it necessary to have supplementary lines of endeavour.

"It is, however, not only a case of growing vegetables, but rather growing in order to be ready for certain markets with the kind, quality, and quantity required.

"British Columbia is practically the earliest vegetable-producing area in Canada and many markets, both local and distant, should be ours that are now being supplied from elsewhere.

"Mixed cars of vegetables have been advocated for years, and while many growers realized the truth of the statement they were unwilling to attempt growing vegetables. To-day it is a considerably easier matter to arouse interest and action.

"The Fraser Valley is equally well adapted and in many respects has better opportunities for the production of vegetables than the areas immediately to the south in Washington, which during the past twelve years have been making rapid progress. The Fraser Valley should have a good market in Vancouver and New Westminster, as well as the seasonable markets, both early and late, on the Prairies and in Eastern Canada. Growers are also beginning to realize that certain districts can produce vegetables as early as is possible 100 to 150 miles south of the 49th parallel on the Pacific Coast."

In the Interior districts there was a reduction in the plantings of certain crops and an increase in others. The estimated acreage of lettuce was 85 acres, as compared with 132 acres in 1932. A great deal of this crop was not harvested, due to unsatisfactory marketing conditions. Onions also showed a decrease of approximately 190 acres. Difficulty in harvesting this crop was experienced, due to unsatisfactory weather conditions. On the other hand, there was an increase in tomato plantings of over 600 acres. Cantaloupes also showed an increase of approximately 80 acres. While this crop was late the quality was excellent, due largely to the supervised picking which was instituted by the shippers. This crop is largely grown in the Oliver-Osoyoos District of the Southern Okanagan. R. P. Murray, District Agriculturist for the Southern Okanagan, makes the following statement regarding this crop in his annual report:—

"The cantaloupe-growers in the Oliver-Osoyoos District have had a very good season, and although prices have not been high, the improved methods of handling moved the largest crop in years without any difficulty. The district has gone to a great deal of trouble to put a first-class cantaloupe on the market, and it is interesting to note that the district has moved a crop of some 40,000 crates without a rebate being made for condition on arrival."

The acreage devoted to the growing of asparagus shows a decided increase. At the present time there are over 400 acres devoted to this crop, as compared with 119 acres planted previous to 1931. The following table shows the plantings for the last four years and segregated according to districts:—

British Columbia Asparagus Acreage, 1933.

| District. | 1933. | 1932. | 1931. | Previous. | Total. |
|---|---|---|---|---|---|
| Vancouver Island | 3 | 1¼ | ¾ | 20 | 25 |
| Fraser Valley | 50 | 44 | 30 | 62 | 186 |
| Salmon Arm | 1 | 1½ | 1 | 6½ | 10 |
| Kamloops | 4 | .... | .... | .... | 4 |
| Vernon | 6½ | 6⅞ | 10½ | 16⅝ | 40½ |
| Kelowna | 5 | 85 | 40 | 10 | 140 |
| Summerland | .... | .... | .... | ⅔ | ⅔ |
| Penticton | .... | .... | .... | ½ | ½ |
| Oliver | .... | .... | .... | .... | .... |
| Grand Forks | .... | 1 | 1 | .... | 2 |
| Kootenay and Arrow Lakes | ¼ | ¼ | .... | ⅞ | 1⅜ |
| Creston | ½ | ½ | .... | 1⅞ | 2⅞ |
| Totals | 70¼ | 140⅜ | 83¼ | 119 1/24 | 412 11/12 |

## OTHER CROPS.

There are a number of other crops which, while not being classed as either fruit or vegetable crops, nevertheless may be considered as coming under the supervision of your Horticultural Branch. As most of these crops are produced in the Lower Mainland District, they are mentioned specifically in the report submitted by G. E. W. Clarke, District Agriculturist, Abbotsford. The following is quoted from Mr. Clarke's report:—

"*Tobacco.*—The Sumas Reclamation area is growing the largest acreage of this crop in British Columbia and there are also several small plantings in other sections of the Lower Mainland. The acreage in the Sumas area totalled over 800 acres and more buildings have been erected and equipped for the handling of the increased production.

"*Mushrooms.*—The supplying of the steady demand for this crop has been handled very effectively during the past few years. The production of between 250 and 400 lb. daily is required for the Vancouver market. Prices, though comparatively low, average a little better than cost of production.

"*Canning-peas.*—In view of the uncertainty of markets, the canneries were somewhat undecided at the beginning of the year the extent of the acreages in vegetable-crops to be contracted. The acreage in peas for canning purposes consequently showed very little increase over 1932. Prices for the crop were on the same basis as in 1932 and these are not very encouraging. The past season was not very favourable for the best results, but in spite of several setbacks and adverse conditions during the harvest the pea-pack was very good.

"The fieldmen of the canneries are extending the work as started a few years ago regarding the use of fertilizers, and growers are averaging better yields. It is contemplated that soil-analysis work will be undertaken in order to obtain further data as to the best conditions for growing peas for canning purposes. There are several factors that apparently enter the growing of a canning-crop in order to increase the yield.

"*Dried Peas.*—British Columbia and particularly some districts in the Fraser Valley are well suited for the growing of peas. There is a large market which could be developed in British Columbia, other parts of Canada, and the export market for a cooking or boiling pea for culinary purposes.

"Since 1929, when the acreage was approximately 500 acres, there has been an increase until the present plantings are over 2,000 acres. This should mean an annual return to the growers of between $75,000 and $100,000.

"The various markets available require peas of different types. At the present time the Japanese Wrinkled, the Bluebell, Idakel, and the Victoria are the varieties grown.

"Considerable effort has been made to have growers recognize the value of good seed, proper harvesting methods, and the value of grading.

"This move has had some measure of success, as the growers, with a large acreage in crops, realized that a good grade and quality product was necessary to obtain and retain markets.

"The Fraser Valley Pea-growers' Association has been formed and an attempt made by this organization to have peas graded and also to stabilize the price as to grade.

"In the past there have been no recognized grades for peas, but on August 1st, 1933, the United States Department of Agriculture published 'Tentative United States Standards for Dry Peas.' It was agreed to adopt, as far as possible, grades as tentatively published, and note whether satisfactory, before requesting the assistance of the Government to establish definite grades on dried peas.

"A number of stencil copies were made by the Department of Agriculture at Victoria and given to interested growers."

## BULB SURVEY.

Many sections of British Columbia are well suited to the production of bulbs. In view of this, and when it is remembered that large quantities of bulbs are imported each year from foreign countries, it would seem as if more could be done in British Columbia along this line. In order to keep a close check on crops we make a biennial survey of all horticultural plantings. Such a survey was made this year and is similar in nature to the surveys made in previous years. The 1933 survey shows that there are 203 acres planted to bulbs in the Province, as compared with 200 acres in 1931 and 159 acres in 1929. Full details showing acreages planted according to kind and district in 1933 and in comparison with the last two surveys are given in table form. This table is submitted as Appendix No. 1.

## GREENHOUSE SURVEY.

A survey of the area under glass was made this year. This makes the sixth biennial survey of this kind which has been made in British Columbia. It is interesting to note that the total area under glass as shown by the survey this year is 4,152,664 square feet, in comparison with 1,905,180 square feet as shown in the 1923 survey. Full details of all surveys conducted since and inclusive of 1923 are shown in the table submitted as Appendix No. 2.

## STONE-FRUIT SURVEY.

The last complete tree-fruit survey in the Okanagan was made in 1930. Each year since an estimate of stone-fruit plantings in the valley has been made. The total plantings in stone-fruit at the present time are as follows: Peaches, 98,280 trees; apricots, 57,341 trees; plums and prunes, 58,691 trees; cherries, 38,070 trees. During the past three years the plantings of stone-fruits show the following increase: Peaches, 52 per cent.; apricots, 23.6 per cent.; plums and prunes, 18.6 per cent.; cherries, 19.3 per cent. Further details as to total plantings according to varieties and districts are to be found in the table submitted as Appendix No. 3.

## DEMONSTRATION-WORK.

As in the past, demonstration-work with various horticultural crops, as well as with different sprays for pest-control, has been undertaken. This work, while under the supervision of this Branch, was in charge of the District Agriculturist in whose district the work was undertaken.

*Sixty Day Golden Corn.*—This corn was introduced from the East and had given excellent satisfaction in some sections of the Province. This year a few pounds were sent out to the various agricultural offices in the southern section of the Province. Practically all officials report that this corn has proven very satisfactory indeed, both from the standpoint of earliness and quality.

*Lettuce Strains Test.*—For a number of years officials of your Branch have been endeavouring to secure a strain of lettuce better suited to commercial plantings than those at present obtainable. The plots covering this work were in Armstrong under the supervision of H. H. Evans. With regard to this work the following, taken from Mr. Evans's report, is brought to your attention:—

"This is a continuance of previous work endeavouring to find the most suitable strains of head-lettuce for commercial production in both spring and fall crops. For the spring tests duplicate plots were planted on the properties of M. O. Lane and W. C. Boss at Armstrong. In the fall-crop tests a duplicate of the spring plots was made at M. O. Lane's and on the W. C. Boss property, a distinct series carrying different strains from the previous sets and from seed supplied by A. W. McMeans, Dominion Seed Inspector. Growing conditions for lettuce were excellent in both spring and fall periods.

"Records taken from M. O. Lane's plots. Spring plantings, April 7th. New York strains:—

"*Plot A, Strain No. 12.*—Fit to cut June 18th; heads uniform and firm. June 28th, plot showed 10 per cent. tip-burn and slime-rot. Approximately 90 per cent. of heads were solid.

"*Plot B, Special.*—Comparative in all essentials to Plot A.

"*Plot C, Imperial No. 26982.*—Fit to cut June 28th; approximately 60 per cent. of firm heads, coarse in texture; 100 per cent. tip-burn and slime-rot; no use for spring crop.

"*Plot D, Imperial No. 26795.*—Fit to cut June 20th; strain appeared badly mixed. June 28th, only 40 per cent. of heads firm, others slack or bolted; 70 per cent. tip-burn and slime-rot; cannot compare with A or B.

"Spring plots on W. C. Boss's lot comparative in all essentials to the above.

"Fall crop, M. O. Lane's plots. Field seeded July 20th. Records taken October 3rd:—

"*Plot A, Strain No. 12.*—Heads fit to cut 80 per cent., balance filling slowly.

"*Plot B, Special.*—Heads fit to cut 50 per cent., about 20 per cent. filling slowly; the balance of 30 per cent. very loose and bolting.

"*Plot C, Imperial No. 26982.*—Heads fit to cut 50 per cent., about 35 per cent. filling; the balance of 15 per cent. too slack to make cutting heads. This strain later than all others but very promising for a fall crop.

"*Plot D, Imperial No. 26795.*—Heads fit to cut 60 per cent.; all others slack or bolting, badly mixed.

"Though 6° to 8° of frost had been recorded previous to October 3rd, only a slight discolouring of outer leaves had occurred.

"Fall crop, W. C. Boss's plots. Field seeded July 20th. Records taken October 3rd:—

"*Plot Imperial F.*—Heads fit to cut 60 per cent., filling slowly 20 per cent.; balance slack and blown; no frost-damage.

"*Plot Imperial 6 D.*—Heads fit to cut 80 per cent., filling freely 15 per cent., and only 5 per cent. not heading. This strain had very solid heads, was coarse in texture, and was undoubtedly much the best plot of the series. No frost-damage.

"*Strain No. 250.*—Heads fit to cut 50 per cent., filling freely 30 per cent., balance of 20 per cent. slack or bolted; comparable to Imperial F. No frost-damage.

"*Strain No. 12.*—Heads fit to cut 15 per cent., filling slowly 60 per cent., not heading or blown 25 per cent. Slight frost-damage on outer leaves.

"*Strain No. 5.*—Heads fit to cut 10 per cent., filling freely 50 per cent., balance of 40 per cent. too loose and would never form heads. This plot severely damaged by frost.

"*Strain No. 01.*—Comparable to Strain No. 5 in performance, but not so severely damaged by frost.

"The first three plots of this series were retained intact until November 4th to note their frost-resistance qualities. There were several nights of low temperatures between October 3rd and November 4th, with one night registering 14° of frost. On the final examination a check was made of frost-damage that had injured the heads sufficiently to make them unsaleable, and the following was recorded:—

"*Imperial F*, heads fit for use, 25 per cent.; *Imperial 6 D*, 50 per cent.; *Strain 250*, 10 per cent.

"In summarizing these lettuce tests, we believe at the present time New York Special No. 12 to be particularly good for spring crops, providing seed-supply sources can maintain purity of the strain. This strain is also excellent for the main fall crop. Further tests, however, should be carried with the strains Imperial F, Imperial 6 D, and No. 250, as these show good promise of extending the fall cutting season considerably."

*Other Vegetables.*—Certain vegetable-crops were tried out in the Oliver District under the supervision of R. P. Murray, District Agriculturist. Mr. Murray reports as follows:—

"The early cabbage used in the tests was Golden Acre and it has proved a suitable variety for the early-vegetable sections in this district. Cutting commenced about June 1st and the crop finished before much competition occurred from other districts. Snowball, the variety of cauliflower used, was unsatisfactory. The heads were small, 'riced' very quickly, and discoloured even when tied. Apparently the weather is too hot for this crop. Some Yellow 60 Day Corn seed was distributed, but unfortunately most of this was eaten by pheasants and the stand was very uneven. The corn that did survive was very satisfactory. The cobs were a good size, the kernels deep, and of good quality. This corn apparently does not go tough as quickly as some of the early varieties that have been grown in the district, and was ready for eating approximately 62 days after planting."

*Strawberry-plant Selection-work.*—This work was undertaken during the past season in the Keating and Gordon Head Districts by E. W. White, Assistant Horticulturist. The following report has been prepared by Mr. White:—

"A start was made this year on a project of plant-selection with the object of trying to improve the Magoon strawberry. This variety has come in for a great deal of criticism during the past few years, owing principally to the malformation of the fruit.

"It was thought that if during the fruiting season 100 of the best plants in each planting were selected and staked, it would be possible to grow a few plants from these selected plants and use them for a propagating-bed in 1934.

"Subsequently the following growers undertook to carry on the work as outlined: G. A. Vantreight and W. J. Houlihan, of Gordon Head; Bickford & Sons, C. B. McCarthy, W. H. McNally, and A. Sutherland, of Keating.

"The exceedingly dry weather which followed the completion of strawberry-harvesting and the cleaning-up of the patches was not conducive to a good growth of young plants, and the results on the staked plants have been somewhat disappointing, but it is hoped to secure a number of plants to start small propagating-beds in the spring."

*Raspberry Variety Tests.*—Raspberry trials were in some cases started this year, while in certain sections they have been in progress for some time. On the trials at Salmon Arm C. R. Barlow, District Agriculturist, reports as follows:—

"Six varieties of raspberries were secured from the Dominion Experimental Farm at Agassiz last spring and were planted out on the farm of Captain F. Cox at Salmon Arm with a view to ascertaining their respective values and behaviour under local conditions. The following are the varieties planted: Count, Brighton, Viking, Newman 23, Latham, and Lloyd George. Of these varieties, Latham and Lloyd George have made good growth, Count and Brighton a fair growth, while Viking and Newman 23 are poor. Considerable difference in maturity was noticeable this fall between the different varieties. Latham, Viking, and Newman 23 were well matured, while Lloyd George, Count, and Brighton were not so well matured, showing a high percentage of green tips. No fruit, of course, was picked this year, so not until next season can any comparison of the fruits be made."

In the Vernon District the plots were established in 1932. The following, taken from the report of H. H. Evans, District Agriculturist, Vernon, gives an excellent idea of findings to date:—

"This test was started in 1932 with the object of obtaining if possible a variety of raspberry which would prove in winter hardiness and yield superior to commercial varieties being grown at present in the Okanagan.

"W. H. Baumbrough is co-operating with the Department on this work in carrying the test under our guidance. Seven varieties are included; a light crop of fruit was borne the past season and the following table indicates their performance. No report on yields was obtained this season as plots were patchy in crop. The column on winter-killing is significant, in that the freeze of December, 1932, was a severe test for all raspberry plantations. Powdery mildew was severe on two varieties; this indicates predisposed susceptibility, as our standard varieties are rarely affected under Okanagan conditions.

| Variety. | Cane-growth. | Winter-injury. | Diseases. | Fruit Quality. |
|---|---|---|---|---|
| Brighton | Free in new canes, medium in strength | Tip-kill medium; bud-kill slight | Powdery mildew, medium infection | Early, quality good; drupes fairly firm. |
| Count | Cane-growth free, medium strength | As above | Free | Quality poor. |
| Newman 23 | Cane-growth very free, sturdy | As above | Mildew-infection medium | Quality somewhat insipid; berries uneven in size and crumbly. |
| Lloyd George | Cane-growth very free, very sturdy | Medium injury at base of cane | Free | Quality excellent; berry very large, soft, and sub-acid. |
| Latham | Cane-growth very free, very sturdy | No injury | Mildew very bad, caused check in growth | Quality very good; berries large and firm. |
| Adams 87 | Very shy cane-bearer, growth very sturdy; might prove shy bearer | No injury | Free | Quality very good; berries large and firm. |
| St. Regis Everbearing | Cane-growth free, medium strength | No injury | Free | Quality medium; berries medium in size and firmness. |

"These plots will be in full bearing in 1934 and can then be checked against Cuthbert and Viking for yield performance. There will be extension of plantings of Lloyd George, Adams 87, Brighton, and Latham, as these appear most promising."

*Broom-corn Variety Test.*—Work with broom-corn has been carried out only in the Kamloops District. As to whether it will be a financial success has yet to be proven. A complete report is submitted by C. R. Barlow, District Agriculturist, Salmon Arm:—

"In the spring of 1931 a small amount of seed of the California Golden variety of broom-corn was obtained by your assistant from R. L. June, who, in addition to farming, manufactures brooms at Salmon Arm on a limited scale. This seed was planted on the farm of Captain G. H. Hilliard at Kamloops, and the results obtained from the standpoint of growing the 'brush'

were sufficiently encouraging to warrant some further work being carried out in 1932. It was found, on inquiry from W. W. Duncan, then Director of Markets, that the 'brush' used in the manufacture of brooms in Vancouver was largely imported from the Argentine Republic and the United States of America, and that the value of the imported material was considerable, and it is in an endeavour to test the feasibility of replacing the imported product with a home-grown one that the work with broom-corn has been carried out. In 1932 seed of the 'Improved Evergreen' variety was secured, and a quarter of an acre was planted, under field conditions, on Captain Hilliard's farm. The seed proved to be a somewhat inferior strain, and while the yield was fair the quality of the 'brush' was not so good as that grown in 1931. This material was, however, all used in the manufacture of brooms by R. L. June, of Salmon Arm. From the great difference in results obtained by using different varieties or strains it was deemed advisable to secure as many varieties as possible this year and therewith make comparative tests. Accordingly seed of six varieties was secured, and two rows of each, 180 feet long and 3 feet apart, were again planted on Captain Hilliard's farm. The following are the varieties tested: Aksarben, Imperial Evergreen, Black Spanish, California Golden, White Italian, and Illinois Favourite. The seed was planted on May 12th in a silty loam soil, the land having been irrigated before seeding. Owing to the cold and backward conditions which prevailed in the early summer, germination and growth were at first retarded, but by the beginning of July the plants began to make rapid growth, and by September 16th the 'brush' in all varieties was ready for cutting. Frequent cultivations were made during the growing season, the crop being handled in a similar manner to an ordinary corn-crop, except as regards thinning of the plants. As regards this operation some experimental work was attempted. The crop was divided transversely across the varieties into four 45-foot strips, the first being thinned to hills 15 inches apart, with five plants to the hill; in the next the plants were left 4 inches apart in the row, the next 6 inches apart, and the last 9 inches apart, the object being to discover what advantage, if any, in yield or quality resulted from the different methods tried. It was found, however, that yield and quality were very similar at all four distances, and as the method of leaving the plants in the row at 4 inches apart makes for cheapness in operation this is probably the best method to adopt. With reference to the comparative merits of the different varieties tested, it will be seen by an examination of the table given below that in the matter of yield and quality the White Italian and Illinois Favourite varieties appear to stand out from the others, although somewhat later in reaching maturity; Imperial Evergreen proved fairly satisfactory, while Black Spanish, California Golden, and Aksarben were distinctly inferior both in yield and quality. The last-mentioned variety, though earliest to mature, produced a poor yield of 'brush' of an inferior quality, the heads being of an undesirable branched type and the 'brush' short. Owing to the fact that the crop was put in on somewhat rich land the growth of stalk of all varieties was unnecessarily tall, the average height being about 11 feet, and in any further work which may be done with this crop a less fertile soil should be selected, as the extreme fertility of the soil used probably had the effect of retarding maturity to some extent, also the coarse long stalks made the disposal of the debris more difficult. Some slight trouble was experienced owing to plants going down during wind-storms, but this could probably be remedied by hilling up to the first node on the stalks above the ground-level at the time of the last cultivation, a practice which was not followed this year.

"*Broom-corn Experiment.*

| Variety. | Date of Maturity. | Yield. | Quality. |
|---|---|---|---|
| White Italian | Sept. 16th | Very good | Good; brush long, straight, and moderately fine. |
| Illinois Favourite | Sept. 14th | Very good | Good; brush long, straight, and fine. |
| Imperial Evergreen | Sept. 11th | Good | Good; brush medium long, straight, and fine. |
| Black Spanish | Sept. 11th | Fairly good | Fair; brush medium long, but inclined to be coarse. |
| California Golden | Sept. 11th | Fair | Fair; medium long and fine, but inclined to branched heads. |
| Aksarben | Sept. 8th | Poor | Poor; brush short, with many branched heads. |

"It is hoped that as a result of this work a beginning may be made at Kamloops next year in the cultivation of broom-corn commercially, though it will be necessary to carry out much further investigational work before any considerable development would be justified."

## DISEASE- AND PEST-CONTROL WORK.

*Codling-moth.*—Codling-moth is found at the present time in practically all of the important fruit-growing districts of the Interior. Information as to the time to spray, when to spray, and what to use is being constantly asked for by the growers. With this in mind a spraying project on a commercial basis has been started at Kelowna. A great deal of useful information has already been secured and it is hoped with a continuation of this work that more information will be obtained. The project is under the supervision of B. Hoy, District Agriculturist, Kelowna. Mr. Hoy's report on this season's work follows:—

"As this is the most important insect pest our fruit-growers have to contend with, and one in which spraying means the difference between a good crop or no crop at all, much time is taken up throughout the year in studying the seasonal activities of codling-moth and giving information to the growers.

"Each year sees an improvement in spraying. More growers are following instructions closely and getting good control. As will be noted in studying the results of the spraying tests included in this report, excellent control is possible with three sprays properly applied.

"Present conditions are excellent for the increase in codling-moth. With an improvement in conditions, undoubtedly there would be a faster increase in good spray equipment and more efficient work done. Poor control is usually the result of skimping spray and too hurried work.

"The Glenmore Municipal Spray Zone was dropped this year, but the City of Kelowna continued to spray the city area.

"Bait-pot records were kept daily during the emergence of the first- and second-brood worms and spraying tests on the property of Mr. Staples and F. W. Pridham were continued. Assistance in taking records was kindly given to us by the Provincial and Dominion Entomological Branches. For details regarding spray applications and materials used *see* Appendices Nos. 4 and 5."

*Apple-scab Spray.*—Demonstration spraying-work for the control of apple-scab was undertaken in the Kootenay, Salmon Arm, and Vernon Districts. The work in the Kootenay districts was carried out by E. C. Hunt and J. W. Eastham. Mr. Eastham in his annual report outlines fully the work done and his observations of the same. In the other districts the work was undertaken co-operatively with the Dominion Pathological Branch. In regard to Salmon Arm, the following, taken from the report of C. R. Barlow, District Agriculturist, gives some idea of the work done:—

"This work was carried out in collaboration with officials of the Dominion Pathological and Entomological Branches, arrangements for the plots and seasonal observations of a horticultural nature being made by your assistant, the application of the sprays and the counts being made by the Dominion officials. The work was conducted on B. H. Naylor's orchard at South Canoe. Ten plots comprising sixty-three trees were laid out and various materials and combinations of materials were used. The sprays were applied on all plots at uniform times; i.e., pre-pink, calyx, and cover. As reports from the Dominion officials are not yet to hand, your assistant is unable to give data at this time on the phases of the work covered by them, but from the standpoint of foliage-injury caused by different materials some interesting observations were made. Severe burning of foliage was found to take place where ferrous sulphate, lime-sulphur, and calcium arsenate were used in combination, and the effect of the injury was apparent during the entire season. The plot on which lime-sulphur only was applied showed severe burning, also that on which it was used in combination with lead arsenate, but the injury on these plots was somewhat less severe than on the first-mentioned plot. Very little burning took place, however, on the plots on which lime-sulphur was applied in combination with calcium arsenate or with calcium monosulphide. The plot sprayed with calcium monosulphide and calcium arsenate showed absolutely no injury throughout the season, and this combination of materials appears to have a stimulating effect on the foliage, the leaves being larger and of better colour than those on the check-plot. The same stimulating effect was observable, though in a less pronounced degree, on the plot on which lime-sulphur was applied in combination with the above materials."

In the Vernon District the work was under the supervision of H. H. Evans, District Agriculturist, who reports as follows:—

"The past season constituted the third year of this co-operative project by the Provincial Department of Agriculture and the Dominion Pathological Laboratory of the Summerland Experimental Station. The base of operations was moved from Vernon to Dr. S. W. Jackson's orchard at Lavington as being more suitable, apple-scab being much more prevalent and serious in that section. A slight change was also made in construction of the plots, with calcium arsenate being added to all plots excepting No. 1. The materials used were standard lime-sulphur, calcium monosulphide, ferrous sulphate, and calcium arsenate. These materials were used singly and in combination, with results obtained as illustrated by the following table:—

"*District, Lavington. Orchard, A. W. Jackson. Variety, McIntosh.*

"*Number of Trees.*—Plots Nos. 1 and 2, ten trees each; Plots Nos. 3 to 5, five trees each; Plot No. 6, two trees.

| Plot No. | Materials and Dilutions. | Application Dates. | Fruit Counts. | |
|---|---|---|---|---|
| | | | Clean. | Infected. |
| | | | Per Cent. | Per Cent. |
| 1 | Lime-sulphur: Cluster, 1–35; calyx, 1–40; cover, 1–40 | Cluster-bud, May 5th; calyx, June 2nd; cover, June 2nd | 99.3 | 0.7 |
| 2 | Lime-sulphur; calcium arsenate: Cluster, L.S. 1–35. Calcium arsenate 2–40: Calyx, L.S. 1–40; calcium arsenate 2–40; cover same as calyx | Same as above | 99.1 | 0.9 |
| 3 | Lime-sulphur; calcium monosulphide; calcium arsenate: Cluster-bud, L.S. 1–70; monosulphide, 10 lb. per 100 gals.; calyx and cover as above, with L.S. 1–80 | Same as above | 97.6 | 2.4 |
| 4 | Calcium monosulphide; calcium arsenate: Cluster, monosulphide, 20 lb. per 100 gals.; calcium arsenate, 2 lb. per 40 gals.; calyx and cover as above | Same as above | 97.0 | 3.0 |
| 5 | Lime-sulphur; ferrous sulphate; calcium arsenate: Cluster, L.S. 1–35; ferrous sulphate, 1 lb. per 35 gals.; calcium arsenate, 2 lb. to 40 gals; calyx and cover as above, with L.S. 1–40 | Same as above | 86.2 | 13.8 |
| 6 | Check | | 28.8 | 71.2 |

"Climatic conditions in 1933 were conducive to the spread of apple-scab as indicated by heavy infection of the check-plot. This condition was paralleled in other orchards of the district and severe losses sustained where poor spraying had prevailed.

"All sprays were applied with a power-machine under 450 lb. pressure. Plots sprayed with standard lime-sulphur alone and in combination with calcium arsenate, again showed serious effects of toxic action by foliage-burning and by restricted size and lighter colour of the same. The lime-sulphur and ferrous-sulphate combination gave very slight foliage-burn, but the leaves were much better in size and colour than on the previous plots. Calcium monosulphide alone or in combination with lime-sulphur showed no sign of toxic injury and the foliage was larger and much deeper in colour than on either of the other sprayed or unsprayed plots. There was every indication that these last-named mixtures will prove very beneficial from both the disease-control standpoint and general health of the tree.

"It appears essential that this work continue to finally work out not only the fungicidal values, but also the cost factors of the most promising materials. All spraying-work and recording of spray-injury was performed by the Vernon office, while fruit counts and records were compiled by the Dominion Pathologists."

*Fertilizer Trials.*—Work with fertilizers which have been under way for some years was continued in all districts. It is hoped that a continuation of this work will be possible in 1934.

*Pear Demonstration Orchard.*—This work, which was undertaken in 1932 at Sardis, was continued during the past season. The area under supervision was more extensive than in 1932, but unfortunately, due to climatic conditions at time of blossoming, the crop was materially shorter than that of the previous year. Returns, however, were sufficient to cover the major

costs and the orchard as a whole shows a general improvement. As an object-lesson of what might be done along the line of pear-growing in the Chilliwack Valley this orchard has justified any expenditures which the Department has made.

*San Jose Scale (Aspidiotus perniciosus).*—San Jose scale still persists in the Spences Bridge District, it having again been found on one tree in the Smith orchard. Necessary sprays will be applied next spring and careful inspections made from time to time.

In the Chapaka Reserve area the spring application of oil for the control of San Jose scale was very satisfactory. Mr. Ruhmann, who made a final inspection late in the fall, reports that excellent control has been secured and no extension of scale on new growth was found. He recommends that an oil spray in the spring be applied and hopes that this will clean up the outbreak.

At Kaslo this scale was again found in the same area in which it occurred about five years ago. This area will be sprayed in the spring, quarantine regulations with regard to shipment having been put into effect last fall.

*Codling-moth (Cydia pomonella).*—The codling-moth control-work which has been in effect in different sections of the Province over a period of years was again carried out. No new spray zones were organized, but it is felt that a reorganization of some of the zone areas will have to be effected in order to secure more satisfactory control. This should be carried out early in the coming year.

*Colorado Potato-beetle (Leptinotarsa decemlineata).*—Potato-beetle control-work was again carried out in the East Kootenay areas. F. A. Marsack was again in charge of the work and carried it out most satisfactorily. There has been no marked increase in the total area under control as compared with 1932. One or two small outbreaks occurred somewhat farther north than previously located. These were dusted with calcium arsenate, full strength, and at the last inspection no beetles were found. In view of the well-defined area in which this pest is found it is strongly recommended that the work be continued in 1934.

*Fire-blight (Bacillus amylovorus).*—The Okanagan Valley from Armstrong south to the International Boundary is the principal area in which fire-blight is found in the Province. In other fruit areas the presence of fire-blight is by no means general, but nevertheless it is kept under observation and well under control. In the Okanagan area a systematic inspection is made each year. The following table gives the details with regard to the 1933 inspection:—

| District. | Total Acreage inspected. | Passed. | Not passed. |
|---|---|---|---|
| Vernon | 5,951 | 5,681 | 270 |
| Kelowna | 4,200 | 4,125 | 75 |
| Summerland | 1,798 | 1,798 | ..... |
| Naramata | 441 | 426 | 15 |
| Westbank | 418 | 396 | 22 |
| Peachland | 233 | 233 | ..... |
| Penticton | 1,670 | 1,654 | 16 |
| Oliver | 86 | 72 | 14 |
| Totals | 14,797 | 14,385 | 412 |

*Nursery Inspection.*—Inspection of all nurseries was undertaken in the past year. Inspectors' reports show that a total of 158,639 trees were inspected, with a total of 2,185 or 1.4 per cent. condemned. During the past year eighty-six nursery sales licences were issued, as compared with eighty-nine in 1932.

## NEW ORGANIZATIONS.

A number of new organizations were formed in 1933, which will undoubtedly be of assistance to the fruit and vegetable industry of the Province. The British Columbia Fruit-growers' Association was reorganized and at the present time deals more specifically with the tree-fruit conditions of the Interior.

An entirely new organization called the British Columbia Coast Growers' Association was created. The membership in this organization is made up of Fraser Valley and Vancouver Island fruit and vegetable growers. While independent of the British Columbia Fruit-growers'

Association, it is affiliated with it to a certain extent, particularly when it becomes a matter of presenting the views of the fruit-growers of the Province on such matters as tariffs, freight rates, and other matters of common interest.

The Okanagan Stabilization Board was also formed to assist the growers in the marketing of their crops. Up to the present this Board has done a lot of foundation-work in the building-up of what may be a successful marketing organization.

### INSPECTION OF EXPORTS.

The issuing of export certificates on shipments of fruit has for a number of years been undertaken by Provincial departmental officials. This year the work was taken over by the Dominion Fruit Branch.

### PRUNING DEMONSTRATIONS.

The usual three-day pruning demonstrations which have been held in the Province for a number of years, and for which a fee of $1 per individual was charged, were this year changed to one-day demonstrations with no charge. In the four horticultural districts in which these demonstrations were held there was a total attendance of 882 people. Details covering these demonstrations are given in Appendix No. 6.

### SEED PRODUCTION.

Seed-production work in the Province was under the supervision of S. S. Phillips, Provincial Seed Promoter. His work includes the following: The placing of elite stock seed with growers; the distribution of commercial stock seed; a survey of seed conditions in the Province.

On the whole, the growth of seed production in the Province shows a most satisfactory increase. Eastern buyers are showing a marked interest in the possibility of seed production in British Columbia, and Old Country houses have also increased their contracts this past year for both flower and vegetable seeds. In his annual report Mr. Phillips makes the following recommendations, which are well worth consideration:—

"To obtain the best results the Department should continue its policy of careful direction. Certain lines of production may easily be pushed too far, which would result with overproduction, and this would be a reflection on the policy of the Department.

"For the protection of seed-growers producing varieties of seeds that readily cross with similar varieties the Provincial Seed Production Act, which has been annulled, should be re-enacted with changes to meet present conditions.

"I would also suggest that a portion of the seed-improvement vote be used to purchase seed-cleaning machinery next year. The present production of carrot-seed in the Province warrants the purchase of a carrot-cleaning machine.

"Furthermore, in order to ensure steady production of root-seed, the policy started this year should be continued and growers who received seed this year supplied with a further quantity of the same variety of seed so that the supply will be steady."

### ACKNOWLEDGMENT.

Before concluding this report your Horticulturist wishes to acknowledge the excellent co-operation which he has received during the past year not only from his own staff, but from the various officials of the Dominion and University staffs engaged in horticultural work in the Province.

Respectfully submitted.

W. H. Robertson,
*Provincial Horticulturist.*

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## REPORT OF PROVINCIAL PLANT PATHOLOGIST.

J. W. Eastham, B.Sc.

The work this year on apple-scab control in West Kootenay was in part directed along the lines developed by the work of preceding seasons. This included the determination by laboratory examination of the date of maturity of the first ascospores of the season and the giving-out of advance information to growers, by telephone and through the press, when each spray should be applied. The opportunity is here taken to thank the Nelson *Daily News* for its co-operation.

In addition, experimental work was continued in the search for a better spray material than those so far tested. Lime-sulphur, the most generally used fungicide, while efficient in controlling scab, is liable to cause serious foliage-injury under certain weather conditions. Calcium monosulphide, which was heralded as having solved the problem of both scab-control and spray-burn, has not proved satisfactory, with varieties susceptible to scab, under the exacting conditions of the Kootenay District. However, it was considered desirable to give it one more test in combination with lime-sulphur. In addition, a careful test was made of the *lime sulphur-ferrous sulphate-calcium arsenate* combination, which has found considerable favour with Nova Scotia apple-growers. This work was carried out in collaboration with E. C. Hunt, District Agriculturist at Nelson.

*Seasonal Conditions.*—Rainfall at Nelson for the months of April, May, June, and July was in each case lower than the thirty years' average. On the other hand, for August (2.77 inches) and September (3.70 inches) it was double the average. As a consequence scab was well controlled until late in the season, but there was a serious development of pin-head scab at picking-time, especially where the less adhesive sprays had been used.

Collections of apple-leaves were made by Mr. Hunt from time to time after the snow melted in the orchards and forwarded to the Vancouver office for microscopical examination. Mature ascospores were first found in leaves gathered April 24th, at which time McIntosh Reds were just beginning to show "green tip."

(N.B.—In making "counts" the entire crop of one tree in each test row or plot was sorted and counted. The trees selected were as far as possible representative of the general condition as far as could be ascertained by preliminary inspection. Trees in the corresponding position on adjoining sub-plots were also used as far as possible to ensure a better measure of uniformity in orchard conditions. In some cases, however, this could not be followed owing to a tree being off-crop or showing drought-spot. The records from these individual trees were also checked against counts of a number of boxes here and there during the course of the regular orchard picking. These figures are not, however, shown as they were in general agreement with the results here given.)

*Plot 1.*—Comparison of lime-sulphur alone and half-strength plus calcium monosulphide. S. G. Blaylock's orchard, near Nelson. Variety, McIntosh Red; five sprays given—May 2nd, 15th, 30th (calyx), June 19th, July 5th.

| Material. | Total Apples. | Clean Apples. | Scabby Apples. | Clean. | Scabby. |
|---|---|---|---|---|---|
| | | | | Per Cent. | Per Cent. |
| L.S. ½ gal. and CaS 3½ lb. to 40 gals. water.. | 2,591 (2 trees) | 1,323 | 1,268 | 51.1 | 48.9 |
| L.S. 1–40 | 1,285 | 1,160 | 125 | 90.3 | 9.7 |
| Check unsprayed | 168 | *Nil* | 168 | *Nil* | 100.0 |

The entire yield, 168 apples, on the unsprayed tree filled less than half an apple-box. Not one was marketable. The better results with straight lime-sulphur would seem to be due to better adhesiveness. Spray material was still visible on the foliage of the lime-sulphur plot at picking-time (September 25th), but not on the other. The actual spraying in this experiment was done by Mr. Hunt.

*Plot 2.*—Several materials tested. Appleton Bros., Sunshine Bay. Variety, McIntosh Red; five sprays given—May 3rd, 15th, June 1st (calyx), June 16th, July 3rd.

| Material. | Total Apples. | Clean Apples. | Scabby Apples. | Clean. | Scabby. |
|---|---|---|---|---|---|
| | | | | Per Cent. | Per Cent. |
| L.S. ½ gal. and CaS 3½ lb. to 40 gals. water.. | 1,637 | 1,464 | 173 | 89.5 | 10.5 |
| L.S. 1–40 | 1,536 | 1,371 | 165 | 89.3 | 10.7 |
| Iron sulphate 10 lb., L.S. 2½ gals., and 5 lb. calcium arsenate to 100 gals. water | 3,883 | 3,800 | 83 | 97.9 | 2.1 |
| As above, but home-made L.S. used instead of commercial liquid | 3,079 | 2,943 | 136 | 95.6 | 4.4 |
| L.S. 1–80 | 945 | 810 | 135 | 85.7 | 14.3 |
| Check unsprayed | 282 | 91 | 191 | 32.3 | 67.7 |

Actual spraying done by E. C. Hunt. At picking-time (October 3rd to 5th) a heavy rusty-red deposit was still present on the foliage of the iron-sulphate plot, although not noticeable on the fruit. Probably sufficient was present to prevent scab-infection, as late scab was practically absent on this plot, although frequent on all the others. Insect-injury was also noticeably less, though not estimated.

*Plot 3.*—J. D. McDonnell's orchard, Willow Point. Variety, McIntosh Red; five sprays given—May 2nd, 15th, 30th (calyx), June 19th, July 5th.

| Material. | Total Apples. | Clean Apples. | Scabby Apples. | Clean. | Scabby. |
|---|---|---|---|---|---|
| | | | | Per Cent. | Per Cent. |
| L.S. ½ gal. and CaS 3½ lb. to 40 gals. water.. | 1,876 | 1,452 | 424 | 77.4 | 22.6 |
| L.S. 1–40 | 2,414 | 1,686 | 728 | 69.9 | 30.1 |
| Iron-sulphate combination as in Plot 2 | 2,070 | 2,012 | 58 | 97.2 | 2.8 |
| Check | 3,620 | 934 | 2,686 | 23.4 | 76.6 |

The check-tree received one spray (No. 4); actual spraying done by owner.

*Plot 4.*—Attree Bros.' orchard, Queens Bay. Variety, Rome Beauty; five sprays given with iron-sulphate combination, six with others—April 25th, May 1st, 14th, 25th, June 10th, 26th.

| Material. | Total Apples. | Clean Apples. | Scabby Apples. | Clean. | Scabby. |
|---|---|---|---|---|---|
| | | | | Per Cent. | Per Cent. |
| L.S. ½ gal. and CaS 3½ lb. to 40 gals. water.. | 1,756 | 1,252 | 504 | 71.3 | 28.7 |
| L.S. 1–40 | 2,004 | 1,436 | 568 | 72.0 | 28.3 |
| L.S. 1–80 | 1,391 | 273 | 1,118 | 19.7 | 80.3 |
| Iron-sulphate combination | 2,304 | 2,155 | 149 | 93.5 | 6.5 |
| Check unsprayed | 115 | *Nil* | 115 | *Nil* | 100.0 |

*Plot 5.*—As for Plot 4, but variety Cox Orange.

| Material. | Total Apples. | Clean Apples. | Scabby Apples. | Clean. | Scabby. |
|---|---|---|---|---|---|
| | | | | Per Cent. | Per Cent. |
| L.S. ½ gal. and CaS 3½ lb. to 40 gals. water.. | 880 | 832 | 48 | 94.5 | 5.5 |
| L.S. 1–40 | 969 | 922 | 47 | 95.1 | 4.9 |
| Iron-sulphate combination | 1,143 | 1,117 | 26 | 97.8 | 2.2 |
| Check unsprayed | 490 | 262 | 228 | 53.5 | 46.5 |

Actual spraying done by owner. These two plots, 4 and 5, in adjoining rows in the same orchard, illustrate very well the differing results of the same sprays with varieties susceptible and resistent to scab. In the case of Cox Orange, which does not scab badly (unsprayed tree 53.5 per cent. of apples clean), any of the sprays used gave good commercial control; i.e., over 90 per cent. clean fruit. With Rome Beauty, however, a susceptible variety (unsprayed tree without a single clean apple), there was a marked difference in efficiency between these same sprays; 71.3 per cent. control with the calcium-monosulphide combination as against 93.5 per cent. control with the iron-sulphate combination. Not only so, but with the iron sulphate only five sprays were necessary to get this result in both plots, whereas six sprays were given with the other materials.

*Plot 6.*—A. Mackie's orchard at Boswell. Variety, McIntosh Red. Although on Kootenay Lake, Boswell has a somewhat different climate from the West Arm or Kaslo and scab is a much less serious problem. The average rainfall is consistently lower for each month of the growing season, the figures for the growing season (April–September, inclusive) at Boswell being 8.18 inches and at Nelson 11.10 inches. Three sprays only were given on this plot, the

first being lime-sulphur 1–50 in the pink stage; calyx and one later spray with the materials mentioned. Actual spraying done by owner.

| Material. | Total Apples. | Clean Apples. | Scabby Apples. | Clean. | Scabby. |
|---|---|---|---|---|---|
| | | | | Per Cent. | Per Cent. |
| L.S. ½ gal. and CaS 3½ lb. to 40 gals. water.. | 2,082 | 1,890 | 192 | 90.8 | 9.2 |
| L.S. 1–80 | 2,103 | 1,784 | 319 | 84.9 | 15.1 |
| Check unsprayed | 2,477 | 1,020 | 1,457 | 41.2 | 58.8 |

A similar plot was laid out with variety Cox Orange and received the same treatment. At picking-time the unsprayed check showed only 25 per cent. possibly scabby fruit. Most of the scab-spots were healed over, probably not over 5 per cent. of the apples having conspicuous scab-spots. It was not thought worth while, therefore, trying to make an estimate of scab on the sprayed trees. Looking them over, they appeared to be 100 per cent. clean and the fruit of very high colour and free from blemishes.

*General Conclusions.*—The results with the calcium-monosulphide and lime-sulphur mixture are in agreement with the findings of last season. Where sprays are applied not more than two weeks apart, good control will probably be obtained in most seasons on all but the most susceptible varieties. Its main fault is a lack of adhesiveness, so that in a wet fall much late infection may occur. It would hardly be safe to use it for the final spray on such varieties as McIntosh Red, Newtown, or Rome Beauty. On the less susceptible varieties and in localities where scab is less severe lime-sulphur alone at 1–80 may be satisfactory and would be considerably cheaper, but growers are advised to go very carefully in adopting such a dilution.

The iron-sulphate mixture, *in so far as conclusions can be drawn from one season's work*, would seem to be the most effective material that has been tried during several seasons' work. In preparing the spray the ferrous sulphate, in powder, is gradually sifted into the spray-tank as the water is put in (10 lb. to 100 imperial gallons); the lime-sulphur, 2½ gallons, is then added; and, lastly, 5 lb. of calcium arsenate. For the calyx and later sprays 4 lb. of calcium arsenate are sufficient. The spray is an inky-black liquid, which makes it possible to do very thorough work, as any unsprayed branch is very noticeable. Generally 100 gallons of this mixture sprayed two to four trees less than the same quantity of the other sprays, indicating more thorough work.

Unfortunately the cost is approximately double that of lime-sulphur, but it may be possible to reduce this by using other materials for a portion of the spray schedule or by reducing the strength for the earlier sprays. On the other hand, it may be possible to get good results with fewer sprays, as in Plots 4 and 5, thus reducing considerably the total cost.

The observations this season have been confined to scab-control. Lime-sulphur burning has been much less than usual, due probably to a drier atmosphere during May and June, with consequent quicker drying of the spray. The heavy deposit on the foliage when the iron-sulphate spray was used made it more difficult to estimate the condition of the foliage, but in a general way it appeared that the most vigorous foliage was on trees sprayed with the calcium-monosulphide mixture, the iron sulphate coming next and the lime-sulphur last.

## CALYX-ROT OF APPLES.

During the past two seasons some loss has occurred in the Queens Bay District from an unidentified calyx-end rot of the fruit. So far it has been found chiefly in the varieties Cox Orange and Rome Beauty, the loss reaching perhaps 5 per cent. The rot is present at picking-time as a small, brown, firm, rotted area in and around the calyx-end. In a few cases the rot seems to be arrested at an early stage and the rotted part dries out to a spongy mass. Usually, however, it extends slowly until the entire fruit is destroyed. What appears to be the same fungus has been isolated constantly from the rotted tissue in both Cox Orange and Rome Beauty and a study of its identity and pathogeneity is in progress.

## SAN JOSE SCALE AT KASLO.

Infestation was discovered in a number of small orchards in the fall of 1924. A quarantine was placed on the affected places and clean-up measures started in the spring of 1925. Spraying-

work was done by Department officials, a dormant oil spray being used. The area was kept under quarantine until the fall of 1926, all trees having a dormant oil spray in the spring of that year. At that time, after a thorough inspection of the area and no live scale found, it was thought advisable to lift the quarantine. "This was carried out with the understanding that the area be sprayed again in the spring of 1927. The 1927 operations were carried out on April 5th and 6th, using the Allover oil spray at an 8-per-cent. solution as in other years, and it is now felt that the scale is eradicated at least for some time." (Provincial Horticulturist's Report for 1927.) No scale was found from 1928 to 1932. In the summer of 1933, however, Mr. Hunt reported its reappearance. Identification of the scale, both in the original detection and in the 1933 reappearance, was confirmed by Mr. Ruhmann.

In October, in conjunction with Mr. Hunt, your Plant Pathologist made a survey of the infested area. This is confined to the farther part of the bench above the town. No increase in the infested area was found, the same orchards being affected as were covered by the 1924 quarantine. No infection was found on the wild bush. Infestation was found to be especially heavy on pears and some apple-trees, the fruit in many cases being conspicuously marked. A few trees were very heavily infested. There are some rather surprising things about this outbreak. Although cherry-trees are abundant, no infestation was found on them or on any stone-fruits, although they are all considered quite susceptible. In some instances the same trees infested in 1924 had become once more heavily infested in 1933, while just across the fence trees might have no sign of infestation, although having been exposed to it for nine years. Possibly the coolness of the nights, the temperature rarely rising over 60° F., may have something to do with restricting the spread of the insect, but the matter would seem to be worth further investigation.

## PEA-WEEVIL AT CRESTON.

Following the discovery of this pest an inquiry was made into the extent of the infestation (October 12th). The insect had been found only in the crops of two growers, one of whom has only a small amount of seed-peas and the other expects about 400 lb. No trace of it was found in the former case and in the other the peas were not yet threshed, so inspection had to be left to the District Agriculturist at a later date. The origin of the infestation in the latter case is not clear, as this crop has been grown from 1 lb. of seed purchased locally four years ago and showed no signs of the insect for the first two years. Only another grower of seed-peas was located who had about 300 lb., apparently free from weevil. Inspection at this time, however, is inconclusive, as the adults may not emerge unless the seed is stored in a warm place. As nearly all seed sold locally is sold by two merchants, these were interviewed and were willing to undertake not to distribute any seed from the infested places until they had received the assurance of the District Agriculturist that the seed had been found by him to be free from infestation or fumigated. While this will probably prevent the spread of the infestation and perhaps eradicate it, there is no guarantee in our present interprovincial methods of shipping seed against new infestations. The only apparent safeguard would be for the Dominion Government to insist on fumigation of all pea-seed by seed-houses before distribution.

## OFFICE AND LABORATORY.

Since 1915 the Plant Pathologist has shared a suite of offices in the Vancouver Court-house with the Provincial Plant Quarantine Branch, at that time under the direction of the late T. Cunningham, and later of W. H. Lyne. This arrangement has been very satisfactory, in that it has economized office-space, obviated the duplication of reference-books, specimens, microscopes, and other equipment, while the services of the Pathologist's laboratory have been immediately at hand for the determination of diseases that could not be satisfactorily diagnosed in the course of routine inspections. Moreover, with the combined staffs, some one was sure to be on hand to answer the numerous over-the-counter inquiries regarding common pests and diseases.

With the transfer of the Plant Quarantine work and staff to the Dominion on August 1st, there is the possibility of these two services being separated by the location of the Quarantine Office in some other part of the city after the close of the present fiscal year. Since a continuation of the present arrangement involves an agreement between the Dominion and the Province, it may be in order to point out the above-mentioned advantages of association. More-

over, owing to the distance of the port of Vancouver from Ottawa, it was arranged at the time of the transfer of the quarantine-work that the Provincial Plant Pathologist should continue to assist as formerly in the diagnosis of disease in imported material and in an advisory capacity regarding treatment and disposal of infected shipments. The carrying-on of this relationship will certainly be much facilitated if the two offices remain associated. Furthermore, the public have been coming to these offices for over twenty years on importation matters and a change of location will undoubtedly lead to much confusion and redirecting over a considerable period.

Although most of the quarantine-work formerly performed by the Province has been transferred to the Dominion, the regulation and inspection of certain interprovincial shipments of plants into British Columbia has been left, temporarily at least, to the jurisdiction of the Province and placed under the supervision of the Plant Pathologist, who has also been appointed to succeed Mr. Lyne as the representative of British Columbia on the Western Plant Quarantine Board.

By arrangement with the Federal Department of Agriculture, certain plant-disease investigations are carried on by this Branch at the Saanichton laboratory. The following is a summary of work done during 1933 by W. R. Foster, M.Sc., Assistant Provincial Plant Pathologist:—

"The work performed during the past season comprised both research and extension work. The following problems are under investigation:—

"*Fruit-blight of Loganberry and Raspberry.*—A fungus has been found constantly associated with this blight, infection being apparently through the stigma of one or more carpels at or around the blossoming period. The identity of the fungus has not yet been determined, but its pathogenicity has been established. It is expected that a paper on the manner of infection and the progressive histological changes which ensue will be published during the coming year. An extensive series of spraying experiments directed towards the prevention of infection was carried out, but the natural incidence of the disease was so low during the past season that the results were inconclusive. The problem of control is complicated by the suspected relation of thrips as inoculating agents, by possible injury to pollenization by spraying in bloom, and by the successive opening of blossoms over a considerable period.

"*Stinking Smut (Bunt) of Wheat.*—In the winter-wheat-growing areas of British Columbia —e.g., Armstrong—considerable damage is caused by stinking smut, regardless of whether the seed is treated or not. The most satisfactory solution of such a problem is the finding of a variety which has good commercial qualities, adapted to the district, and naturally resistant to the strain of the fungus existing in the Province or locality. To this end a collection was obtained of standard and new varieties, some of which have shown a high degree of smut-resistance elsewhere.

"These were tested for smut-resistance (by artificial infection) and for yield, at the Experimental Station, Saanichton, in the season 1932–33, with the following results: The varieties Albit, Ridit, Oro, Jen. x Ridit, White Odessa, Martin, and Hussar in this experiment are immune. Dawson's Golden Chaff, Sun, Golden Sun, Berkeley Rock, Kharkov, Minhardi, and Yeoman are resistant. Imperial Amber, A.O.C. 104, and Crail Fife are moderately susceptible. Hybrid 128 is very susceptible. Oro and White Odessa gave the highest yields.

"A similar experiment was conducted at Armstrong on the Illustration Farm with the co-operation of H. H. Evans and Dr. W. B. McKechnie. Unfortunately winter-killing destroyed all but Minhardi and Oro. Of these two varieties, which are apparently hardy, Oro proved immune to bunt at Saanichton. In continuation of this work nine variety plots (each in quadruplicate) were seeded at Armstrong this year with artificially infected seed.

"*Resistance by Chemicals.*—Since the wheat-plant is susceptible to this disease only during the short period between the first emergence of the young shoot from the seeds and its appearance above ground (approximately), it seemed theoretically possible that the germ might be artificially immunized for this length of time by forcing into the tissues some chemical which would prevent the entrance of the parasite without materially injuring germination. A preliminary inquiry was made into the quantitative absorption of water by the seed under atmospheric pressure and vacuum treatment respectively. It was found, for example, that with a vacuum of 27 lb. pressure the amount of water absorbed (39 per cent.) was equal to that absorbed at

ordinary pressures in three hours. A series of chemicals at different strengths have been tested for their effect on germination—among them Cheshunt compound (copper), copper nitrate, copper sulphate, copper acetate, potassium dichromate, potassium permanganate, malachite green, mercuric chloride, silver nitrate, and formalin. Of the copper compounds the acetate is apparently least injurious to germination, while silver nitrate is much less injurious than mercuric chloride.

"This stage of the work is being continued during the winter, while the effects on smut infection will be undertaken in the spring.

"Other investigations in progress are: (*a*) Measures for the control of *Sclerotinia* blossom-blight of cherries, a disease very destructive on Vancouver Island; (*b*) the nature and control of 'witche's-broom' in alfalfa; (*c*) a simpler treatment for preventing loose smut of wheat than the present hot-water method.

"*Publications.*—As mentioned in last year's report, a form of fruit-blight of loganberry was proved to be due to the fungus *Hapalosphæria deformans* Syd. This was the first record of this fungus in North America. It has been recorded in Europe on other species of *Rubus*, but this is the first record on loganberry. A paper entitled 'Anther and Stigma Blight of Loganberry,' by Professor J. Dearness and W. R. Foster, was published in the *Canadian Journal of Research* (9:43. 1933).

"A twenty-page circular entitled 'First Studies in Mendelism' was prepared during the year. This was intended for the use of agricultural classes in rural high schools and for the instruction of plant and animal breeders in some of the fundamental principles underlying their practice, and was published as Dairy Circular No. 24."

The above summary indicates the progress of investigations of economic importance to growers. The publication entitled "First Studies in Mendelism" has been well received, particularly by dairy-farmers, who are keenly interested in the practical application of the principles outlined.

## PACIFIC SCIENCE CONGRESS.

The Fifth Pacific Science Congress met in Victoria and Vancouver, June 1st to 14th. As a member of the Sectional Committee on Botany and Plant Pathology, the Plant Pathologist took part in the preparation of the programme and read a paper on "The Relation between Climate and the Incidence of Some Orchard Diseases in British Columbia."

## MISCELLANEOUS WORK.

Although raspberry certification is done under Dominion regulations and Inspectors, the Provincial Plant Pathologist has co-operated in the work in the Fraser Valley, having accompanied the Inspector on the field inspections in this area and in the investigation of various problems and difficulties in the production of certified raspberry stock.

As a result of the depression and unemployment a large number of people in and around the City of Vancouver are trying to raise at least part of their own food-supply by extending their gardens, cultivating vacant lots, renovating neglected orchards, etc. Being for the most part without experience in agriculture or horticulture, they naturally run into many unforeseen difficulties and disappointments, due to insect pests and plant-diseases. As a consequence there has been a considerable increase in office inquiries on these matters and a good deal of office-time taken up in giving advice on them.

A considerable number of botanical identifications have been made, comprising identifications of imported and exported plants for the Quarantine Service, alpines and other more or less uncommon plants for commercial or other gardeners, and weeds, flowers, and supposedly medicinal, poisonous, or economic wild plants from correspondents throughout the Province.

Reports on the prevalence of plant-diseases have been furnished, as usual, for the Dominion Plant Disease Survey.

Respectfully submitted.

J. W. Eastham,
*Plant Pathologist.*

# REPORT OF PROVINCIAL ENTOMOLOGIST.

MAX H. RUHMANN, B.A.

Two projects were carried on during the year:—

(1.) *Spray Tests for Codling-moth Control.*—This is a continuation of work which has been carried on for some years co-operatively by the Horticultural Branch at Kelowna and this office. The results have been excellent and show that satisfactory control can be obtained under our conditions with arsenate-of-lead sprays; thoroughness and timeliness of application being the important factors.

A preliminary test in the substitution of calcium arsenate to replace arsenate of lead was made. This is showing good promise; good control of the codling-moth was obtained and no burning resulted.

Our present recommendations are, subject to local conditions and extent of infestation, a maximum of five sprays, consisting of the calyx-spray and two cover-sprays for the first brood and two cover-sprays for the second brood. The dates for the application of all cover-sprays are subject to variation of moth emergence and flight. Observations of this are made by the Department of Agriculture and the cover-spray dates for all Interior districts are available in the local offices as soon as the dates are set.

(2.) *Tests of Substances which might act as Bee Repellents.*—Tests were again made during 1933 with new substances, the following being used: Naphthalene Ether-Beta, Chloroethyl Acetate-Beta, Chloroacetone, Furfural, Salicylic Aldehyde, Monobromonaphthalene Alpha, Pyridine, Oil of Cloves, Oil of Cade, Oil of Pine, Oil of Camphor, and Oil of Spruce.

All substances were prepared as 1-per-cent. solutions in water and applied to small blocks of white clover in full bloom, and observations made on the reaction of bees to the sprayed plants. Three of the substances gave distinct indication of repellent action in the following order: Oil of Spruce, Oil of Camphor, Furfural. More extended tests of these substances will be undertaken during 1934.

## ECONOMIC INSECTS NOTED DURING THE YEAR.

*Cutworms* caused considerable injury in the Kamloops District. Infestations were moderate in the Okanagan Valley, although a heavy flight of moths was recorded in 1932.

*Flea-beetles* were responsible for considerable loss of seedlings recorded. Tomato-plants were severely injured in the Winfield District.

*Mosquitoes*, due to high water in the summer of this year, were very much in evidence, although considerable oiling had been done.

*Granary-weevil.*—Some heavy infestations were noted in feed-stores in the valley.

*Wireworm* injury was not as heavy as in the past three years.

*European Red Mite (Paratetranychus pilosus).*—This mite is becoming more widespread and its distribution is general in the Okanagan Valley. Good control is being obtained with the oil sprays.

*The Two-spotted Mite (Tetranychus bimaculatus).*—An unusually heavy infestation by this mite occurred at Penticton.

*Bruce's Measuring-worm (Rachela bruciata).*—This moth has not been in evidence for some years. Its presence was noted in a number of orchards in Vernon and Kelowna, but distribution is not general.

*Blossom Syneta (Syneta albida).*—This insect was more prominent than usual, attacking apple-blossoms both at Vernon and Kelowna.

*Tarnished Plant-bug (Lygus pratensis)* was abundant in Vernon. In other sections of the valley it was present in moderate numbers. Alfalfa cover-crops are very attractive to this insect.

*Pear-thrips (Tæneothrips inconsequens)* is recorded for the first time at Vernon, where its distribution is fairly general. No serious injury was noted.

*Clover-mite (Briobia pratensis)* was very common in houses during the past winter.

*Cabbage-worm (Pieris rapæ)* was more plentiful than usual during the summer. Unsprayed cruciferous crops were severely injured in many districts.

*Rose Curculio (Rhynchites bicolor)* was unusually destructive in gardens.

*Rosy Apple-aphis (Anuraphis roseus)* was particularly noticeable at Kelowna, where some injury resulted.

*Turnip-aphis (Aphis pseudobrassicæ)* did considerable damage at Vernon and Kamloops.

*Cabbage-aphis (Aphis brassicæ)* was destructive at Vernon and Kamloops.

*Lesser Apple-worm (Laspeyresia prunivora).*—There is a slight increase of this insect in the Coldstream section of the Vernon District.

*Apple-tree Leaf-roller (Archips argyrospila)* has not been of importance in the Okanagan Valley for some years.

*Oblique-banded Leaf-roller (Archips rosaceana)* is of general distribution in the Interior. The distinctive scars on the fruit of the apple caused by this insect is quite common. Good control is maintained, however, where a regular arsenical-spray programme is employed.

*Eye-spotted Bud-moth (Spilonota ocellana)* has been unusually scarce during the past two years.

*Blister-mite (Eriophyes pyri).*—Good control of this insect is being maintained generally. Severe infections are now rarely seen.

*Red-humped Caterpillar (Schizura concinna)* was quite abundant at Salmon Arm, but quite rare in other parts of the Interior.

*Pear-slug (Eriocampoides limacina)* was less prevalent than usual.

*Fall Web-worm (Hyphantria cunea).*—A considerable increase of this insect was noted this year.

*San Jose Scale (Aspidiotus perniciosus).*—An outbreak of this scale has appeared at the Chapaca Indian Reserve and at Kaslo. Quarantine measures have been instituted at these points for the purpose of eradicating this scale.

## DETAILS OF CODLING-MOTH SPRAY TESTS AT KELOWNA DURING 1933.

The main project was continued on the Salome block in the orchard of F. W. Pridham at Kelowna. Results obtained will be found in the report of the Provincial Horticulturist and in Appendices thereto.

A preliminary test of calcium arsenate as a substitute for arsenate of lead was made on the orchard of J. J. Staples, of Kelowna. This consists of a block of 100 Salome trees of about 25 years of age. The block was divided into two plots for the purpose of this test. Each plot received three sprays, the first being the calyx, when each plot received the same spray of arsenate of lead at the rate of 3 lb. to 80 gallons (imperial) of water.

Two cover-sprays were applied for the first brood of codling-moth. Plot 1 received, at the first cover-spray, 5 lb. of calcium arsenate plus 5 lb. of hydrated lime to each 80 gallons (imperial) of water used.

Plot 2 received 3 lb. of arsenate of lead to each 80 gallons (imperial) of water used. This spray was repeated on Plot 2 for the second cover-spray.

Plot 1 received 5 lb. calcium arsenate without additional lime to each 80 gallons (imperial) of water used at the second cover-spray. Three average trees were selected in each plot for examination. All the fruit of each tree was examined and counted, with the following results:—

| Plot No. | Material used. | No. of Apples. | No. of Worms. | No. of Stings. | Worms. | Stings. |
|---|---|---|---|---|---|---|
| | | | | | Per Cent. | Per Cent. |
| 1 | Calcium arsenate | 10,036 | 58 | 182 | 0.57 | 1.81 |
| 2 | Arsenate of lead | 6,733 | 61 | 191 | 0.90 | 2.83 |

No burning resulted from the use of calcium arsenate.

These plots had been used for test-sprays during 1932 and recorded the following infestations at the end of the year:—

Plot No. 1: Percentage of worms, 0.9; percentage of stings, 2.6. Plot No. 2: Percentage of worms, 1.2; percentage of stings, 5.1.

It will be noted that, although only receiving three sprays during 1933, a further reduction of infestation was obtained. During 1934 further tests will be made with calcium-arsenate sprays on a heavily infested orchard.

Respectfully submitted.

MAX H. RUHMANN,
*Entomologist in Charge.*

## REPORT OF APIARY INSPECTOR.

A. W. FINLAY.

Early spring examinations showed winter losses of normal proportions, not more than 10 per cent. to date of April 1st.

Continued wet and cold weather during April and May, however, caused heavy mortality among colonies that were short of stores. This condition was general throughout the Province, except in most of the commercial apiaries, where feeding was resorted to to maintain brood-rearing. Weather conditions during the months of May, June, and part of July were not conducive to nectar-secretion. The honey-flow was slow and intermittent. Swarming was general under these conditions, and though increase in this manner made up for earlier losses from starvation and spring dwindling, the prospects for a honey-crop were not very good. Towards the end of July and for the first two weeks in August exceptionally hot weather caused a great improvement. The honey-flow was rapid and continued for some time after the normal close of the season, so that final reports showed a better than normal crop.

A crop questionnaire was sent out on August 16th to about fifty prominent bee-keepers, representing all districts in the Province, accompanied by a return post-card stating the number of colonies operated, the average surplus per colony, and the estimate of the average for the district. About 60 per cent. of these cards were returned, representing twenty-eight apiaries, operating 2,159 colonies, with an average surplus of over 100 lb. per colony, and estimating an average for their districts of 78 lb. These reports are used as a basis in estimating the total crop report for the Province, supplemented by your Inspector's knowledge of local conditions for districts not so reported.

The total *estimated* honey-crop for the Province amounted to 1,164,350 lb., an increase of 157,150 lb. over that of last season. This compares favourably with reports from other Provinces of from 30 to 35 lb. per colony below normal, due to drought, grasshoppers, etc.

Several Apiary Inspectors for the various districts commenced their work in April, but made little progress that month due to inclement weather. Their efforts were confined to the districts in which they reside, as far as possible, to avoid excessive transportation costs. Systematic inspection was given in areas where disease was prevalent and a check-up made in other areas as far as the limited appropriation for this work allowed. Much good work was accomplished by these men in the control of contagious bee-diseases, which, unfortunately, had to be stopped before completion owing to the funds for this purpose becoming exhausted.

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

| Inspector. | District. | Examined. | | A.F.B. | E.F.B. |
|---|---|---|---|---|---|
| | | Apiaries. | Colonies. | | |
| J. F. Roberts | Okanagan | 121 | 733 | 48 | ..... |
| H. L. Johnson | Chilliwack | 123 | 474 | 22 | 48 |
| E. R. Freeman | Langley-Surrey | 184 | 1,167 | 120 | 22 |
| W. J. Sheppard | Vancouver Island | 58 | 194 | ..... | ..... |
| A. W. Finlay | Matsqui and various | 285 | 2,077 | 120 | 65 |
| Totals | | 771 | 4,645 | 310 | 135 |

All colonies found to be diseased were promptly treated or destroyed, according to the severity of the case, and all diseased material burned. Absentee owners of diseased apiaries were notified of conditions and given a maximum of ten days to clean up. Printed forms were provided for this purpose, embodying a declaration that this work had been done according to instructions and returnable to the Inspector's office, the receipt of which obviated the necessity of a return visit of the Inspector. Bee-keepers' field-days were attended and practical demonstrations and addresses given.

In addition to supervision of work of local Field Inspectors, extension-work was again carried on by your Inspector in visiting various districts of the Interior and working in co-operation with the local District Representatives; apicultural instruction was combined with apiary inspection and encouraging results were noted, the effect of two seasons' previous

work in this respect. Several doubtful samples of diseased combs were afterwards forwarded to the office for micro diagnosis through the efforts of District Representatives, the determination of which undoubtedly prevented further outbreak or extension of disease in that particular apiary or district. Pressure of other work cut short this season's visit to the Interior districts, with several important places unattended. A special report on this work, recommending its extension, was forwarded to the Department on July 3rd, 1933.

### OFFICE-WORK.

The district office at the Court-house, New Westminster, was attended two days per week, Mondays and Fridays, for interviewing bee-keepers, attending to correspondence, reports, registration of apiaries, microscopic examinations of smears and samples of brood-combs sent in for bacterial diagnosis, and other office-work. There were 114 smears and twelve samples of comb received and examined. Reports were sent out with instructions for treatment, a detailed list of which is appended. Of these, eighty-three proved to be affected with American foul-brood, eighteen with European foul-brood, and twenty-five sterile or sac-brood. Three hundred and forty-seven letters were received and 334 sent out.

### EXHIBITIONS.

An increase was noted in the number of entries of competitive exhibits of honey and apiary products at the principal fairs, especially at Victoria, where the number almost doubled, and were all of exceptionally high quality. The honey exhibits at Vancouver Fair secured a much improved placing this season, being staged in the centre of the Horticultural Building, where they formed an attractive centre piece for the flower displays and to their mutual advantage. At these and several of the smaller fairs your Inspector attended in a judicial capacity.

Encouraged by their previous efforts at the Imperial Fruit Show in England, British Columbia bee-keepers again entered the lists in Empire competition with an increased number of entries, and further improved on their previous successes by taking the great majority of the awards. In all classes of the honey section open to the Dominion, British Columbia was awarded sixteen out of the possible nineteen prizes and special awards of merit. As the highest points were given for quality, British Columbia bee-keepers can rightfully boast of producing the finest honey in the British Empire and, to no less extent, its skilful preparation for market.

All of which is respectfully submitted.

A. W. Finlay,
*Inspector of Apiaries.*

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## REPORT OF LIVE STOCK COMMISSIONER.

Wallace R. Gunn, B.S.A., B.V.Sc., V.S.

In the year 1933 there was more than the usual precipitation, especially in the range country, and particularly during the spring season. This encouraged growth of all range plants. A sudden hot spell during midsummer dried up the open ranges and forced stock back into the timber ranges. Lakes and ponds throughout the range area are gradually filling to considerably higher levels. The fall season saw a continuation of rain, with but little snow, after a sudden early fall in the upper ranges in early September.

Live-stock production for the year was particularly good, with cattle and sheep wintering well. The early spring grass brought stock on well; good calf and lamb crops are reported. Considerable grass beef went to market during the early part of the season, during the months of June and July. Market conditions, however, for the year were not at all good, and it is questionable whether many outfits were able to do more than break even on their business, and some no doubt "went in the red."

### HORSES.

The serious condition of the horse-breeding industry of the Province still continues, with a large part of the farming areas depending entirely upon old worn-out horses. In these districts there are but very few brood mares that could raise foals, and no stallions of any kind available for use.

During the year quite a number of draught horses and also some good light stock were marketed from the upper range country around Kamloops, Ashcroft, and Nicola. Prices were rather low for the draught stock at the point of shipment, but fair prices were realized at point of sale in the farming districts.

It is unfortunate that we were unable to prevent the entry to our Province of a nondescript lot of horses driven in from Alberta. Many of these animals were no better than the wild horses running on our ranges which we pay yearly to have destroyed.

Kamloops again came forward with a very fine horse display at their annual exhibition. Much of this Upper Country is proving to be an ideal place for developing and wintering over horses, especially racing-stuff. The climate and general conditions seem to make it possible to winter over, so that but a very few weeks are required to put them in first-class racing condition.

## BEEF CATTLE.

Prices were very disappointing again this year. In many cases the cost of production was not realized by the rancher. A number of ranchers held over 2-year-olds from 1932, expecting to realize a better price for 1933, but they were disappointed. This extra marketing of heavy beef also had a tendency to disrupt the market. Charges against beef production continue to be well on to as high as in previous years.

The experimental work that has been carried on for two years in the feeding of Upper Country beef at the Coast seems to point to the necessity of further work being done before the policy can be finally O.K.'d. It is possible that much of the feeding of range cattle in the Province of British Columbia will have to be done in areas adjacent to the range, where climatic conditions are similar to those where the cattle are produced. Again, British Columbia will always continue to turn off early grass cattle to reach the market in June and early July. This is one of the best markets of the year and cannot very well be invaded by animals from any other part of the Dominion.

## RANGE PROBLEMS.

Some policy should be evolved which would get away from the enormous losses in cattle due to poisoning by the timber milk-vetch (*Astragalus campestris*). As stated previously, the early spring weather was conducive to a heavy growth of range plants, including timber milk-vetch. This plant does very well in the timbered areas, and of course, with the drying-up of the grass as a result of the sudden hot spell in July, cattle were forced into the timber range to secure green succulent feed, and almost immediately reports came from all over the territory of cattle and horses, particularly milking animals, being affected with *Astragalus campestris*. As far as treatment is concerned, in most cases, little can be done, and as a result many cattle and some horses, mostly brood mares, died. Many other cattle became permanent "knockers," and these knocker cattle will go to market at best very poor beef and at a loss to the producer. The general suggestions offered, as means of control, include moving the animals gradually off these infested ranges, especially all milking animals.

As a general policy I have suggested that, in so far as possible, ranchers should attempt to develop breeding pastures on non-infested ranges, where they can keep their breeding cows within reach of bulls and at the same time keep the most susceptible animals off the badly infested ranges. The breeding season and the season when *Astragalus campestris* is most common come at about the same time. This facilitates matters and makes this suggested plan generally practical.

During the winter the usual outbreaks of hæmorrhagic septicæmia and certain other conditions, such as coccidiosis and necrotic stomatitis, were prevalent, and it is at this season of the year that assistance is mostly required in this part of the Province. Your Commissioner went carefully into this matter with individual ranchers and cattle associations, offering suggested treatment and preventive measures. Circulars have been prepared and distributed to stockmen in these districts, giving full information as to how to prevent and control these diseases. The situation as it exists at the present time in the Province of British Columbia requires that fundamentals be dealt with, such as, first and foremost, the health of the live stock. When some definite programme of disease-control and general health has been fully worked out, more attention can then be given to the improvement in breeding stock.

The year 1933 seemed to be about the peak of the rabbit cycle, and as a result the wood-tick (*Dermacentor andersoni*) was prevalent throughout the range country. While no large out-

breaks of tick paralysis were reported, many individual cases are known. Control of this parasite is something that requires attention before some serious outbreak of diseases fatal to humans, such as Rocky Mountain spotted fever and tuleremia, make their appearance extensively within the Province. Many different methods of control have been suggested, but to date none appear to be entirely satisfactory. Some of the practical men throughout the country seem to feel that a system of burning off areas of undesirable scrub timber land where cattle are compelled to range will not only kill large numbers of the tick, but will destroy many of these rodents which act as intermediate hosts in the spread of the tick.

## BRANDS.

Until the complete reports for the calendar year are received, comparison can only be made on the basis of shipments up to October 31st. In the Cariboo, while Williams Lake will show about the same as last year, the Clinton area is down, and the total for the Cariboo will probably be below 1932. Kamloops-Nicola will probably be down about 10 per cent. The smaller districts also show reductions, and it is not likely that total shipments will exceed 18,000 head, as compared with 22,000 head in 1932.

The sudden activity in hides in the spring in order to replenish a bare market was a feature of the year for stockmen. Increased prices and the need of ready cash resulted in the collection and shipment of hides of all conditions and ages, whereas last year the difficulty was even to give them away. Nearly 20,000 hides have been shipped, which is four times the 1932 total and double the total of any of the previous three years.

Some useful amendments to strengthen the "Stock-brands Act" were passed at the last session of the Legislature.

Thanks to the co-operation of the police and the paid Inspectors, this work is being carried on efficiently. In Kamloops District Inspector Cahilty is devoting a good deal of his time to the patrolling of the ranges.

The following convictions were secured: For dealing in hides without a licence, three—at Fernie, Williams Lake, and Lytton; for using an unregistered brand, three—at Kamloops, Kelowna, and Burns Lake; for illegal slaughtering, one, at Ootsa Lake. In addition, many other reports of cattle-stealing were investigated.

Two new Brand Commissioners, C. Moon, Williams Lake, and L. P. Guichon, Quilchena, were appointed to replace E. Clark, deceased, and R. H. Helmer, resigned.

Following many complaints from the stockmen, alternative schemes were submitted for the more systematic registration of brands for Indians, but it is to be regretted that the stockmen, while anxious to have this work done, were not prepared to endorse it at present.

New brands were issued in about the same number as last year, and through careful checking of shipping records many brands which were being used illegally were put on the records.

Renewals are coming in very slowly, less than 20 per cent. having been received to date, which is indicative of the hard times the stockmen are going through.

The quadrennial issue of the complete Brand Book—till December 31st, 1932—was made last spring, and the regular monthly lists of brands issued were sent out.

(*See* Appendix 11 for additional statistics.)

## DAIRY CATTLE.

The dairy industry has been seriously affected throughout the entire country, and of course this reflects on the breeding of dairy cattle. Sales of pure-bred sires have not been particularly good during the year. The Holstein Breeders' Association contributed some very fine calves to stockmen along the main line of the Canadian National west of Prince George to serve as foundation stock. They also supported the industry in the way of prize-money to Holstein Calf Clubs, which was of great assistance. The Jersey, Guernsey, and Ayrshire Breed Associations also assisted with junior clubs.

Breeding-diseases and their sequelæ continue to be the most important factor affecting the general production of dairy cattle, and should receive first attention, because production pro-

grammes are of little value when seriously modified by breeding-diseases. This is work requiring the attention of qualified veterinarians, and unless they are given the direction of this work the trouble is going to continue and no doubt increase. If the dairy-cattle men could be persuaded to recognize the importance of vigour and constitution in their cattle and be encouraged to pay more attention to general sanitation and hygiene about their herds and premises, and try to as far as possible follow out balanced-production programmes, there would be perhaps a margin of profit in the production of milk even with the present low prices. This same thought applies in the production of poultry; where vigour is overlooked no amount of biological treatments and laboratory tests can make the business successful or profitable. In other words, *nature will take a hand and eliminate the undesirable.*

## WARBLE-FLY CONTROL PROJECT.

The Deep Creek District warble-fly control project was organized under the Live Stock Branch by H. E. Waby, District Agriculturist at Salmon Arm. The Deep Creek District was chosen on account of it having the required features of being almost completely confined. With mountains and wooded areas almost completely surrounding the area, the possibility of reinfestation from outside districts is very small. Within this area there were some twenty-nine herds with a total live-stock population of somewhat over 400, including bulls, mature cows, heifers, yearlings, and calves. The material used was a Derris powder mixture. The first application, which commenced on February 10th, was completed on February 14th. At that time a total of 979 warbles were found on the backs of the animals and, as is usual, a greater percentage of warbles was found on the backs of the younger animals. The Federal Assistant Entomologist gave every assistance.

The second application was given from March 13th to 16th. At this date a total of 1,847 additional warbles were found on the backs of the animals. The third treatment was commenced on April 10th and completed on April 14th, and at that time 590 more warble grubs were found on the backs of the animals. A later examination proved that a fourth application was not necessary, which evidently indicates that the late warble-fly is not so prevalent in that district. The material for this work was supplied by the Provincial Department of Agriculture and cost only an average of 3 cents per animal.

The farmers of the Deep Creek District have repeatedly expressed their very great appreciation of this work and have asked that the programme be continued. It is expected that their request will be complied with, and we are looking forward with interest to the check-up on the results obtained from last winter's treatments. Needless to say, there will be some warbles, but, judging from the reports of individual farmers throughout the area, cattle were not bothered nearly so much by the heel-fly during the past season. It is expected at the present time the territory will be slightly extended to take in another clearly defined and protected area adjacent to the Deep Creek District. There has been organized also another area in the Upper Thompson Valley adjacent to the range country.

As far as warble-fly control work is concerned, without a doubt this policy will eventually spread to every part of this Dominion. Warbles cost untold thousands to the cattlemen of this country in loss of hides, loss in beef, irritation to the animal, resulting in lower milk and meat production. Beef-cattle ranchers in many sections cannot move their beef cattle during the daytime without the heel-fly stampeding the cattle, and, again, cattle cannot graze in the open in many sections of the country as a result of the heel-fly, and what is a very costly feature to the rancher is the fact that he gets a decidedly reduced calf-crop because bulls cannot contact breeding cows hidden away from the heel-fly in the timber.

## SHEEP.

This year's Sheep Show and Sale, held under the direction of the British Columbia Sheep-breeders' Association, for several reasons did not prove particularly satisfactory to those contributing rams. Prices in general were not good for rams this season. Again, weather conditions seriously interfered, and two conflicting dates for the sale were given out to the public. However, most of the rams were sold either through the ring or by private treaty. At the meeting of the association which followed the entire matter of the ram-sale was gone into very thoroughly, and it is hoped that next year will see a much better sale.

The price of lamb varied from $5.25 to $5.50 in January and February, to pick up in June to $5.65, going down in October to the low for the year at $3.75, and up in December to $4.75. Choice spring lamb found the high price of $7.25 in June and reached its lowest level of $4.75 in October, and went up to $6 in December. Butcher ewes sold best in June at $3.25 and lowest in October at $2.25.

The method of putting British Columbia and Western Canadian lamb on the market will have to be modified if sheepmen are going to make a profit out of their business. It is the opinion of the sheep-breeders and many interested in the industry that orderly marketing of a well-finished product is the only way that this situation can be corrected. In the past, throughout the entire season, particularly during the big marketing months, many lambs came on the market far too light in weight and decidedly unfinished. These unfinished lambs seem to be used by the buyers to set the market price for the entire run. As the season advances, these unfinished lambs are placed in feed-lots by the packers and other large feeders, to come back in competition with the spring crop of lamb which has been produced at considerable expense either by shed-lambing in the Upper Country or on farms on the Lower Mainland and Gulf Islands. This is a condition that tends to very seriously discourage the production of early lamb in our farming districts; consequently sheepmen at the Coast are inclined to favour later lambing, which, of course, will mean their product going on the market at the same time as the range-country lamb, which is the very thing we have been trying to educate against.

We decidedly want a continuity of supply, with the farm-raised lamb reaching the market first and being well out of the way by the time the range lamb is ready. Throughout the range areas of British Columbia and adjacent to the range areas there are a number of small rangemen who in the past have been very careless how their product has been shipped out. Educational work that has been going on under the direction of this Branch for the last few years has very greatly improved this situation, but there is much yet to be done.

Sheepmen throughout Western Canada, the different breed associations and live-stock branches, are working out a plan at the present time to prevent as far as possible this unfinished material going on the market. It is felt that the producer is losing the very best of his market when these lambs are allowed to be accumulated in lots adjacent to the large markets. If the present suggestions materialize, it is intended that all unfinished lambs will be returned to the farmer or rancher producing them and not permitted to be shipped to the central markets. This will definitely keep breakers from competing actively with the spring lamb and will return to the rancher and farmer any profits there may be.

## PESTS AND PARASITES.

Certain areas where parasites and diseases obtained a foothold have been given attention, and as a result of the year's work very marked improvement has been noted. The sheepmen are well pleased with the results obtained. This work is being done, with the assistance of the Provincial Veterinary Inspectors, on the area plan for efficiency and economy. It will be extended as rapidly as possible. In many sections of the Province work of this nature has to be given first consideration before thinking of any extensive programme of improved breeding.

Predatory animals, particularly the cougar and the coyote, continue to cause considerable loss to the sheepmen. Every effort has been made by the Government to co-operate in ridding districts of these animals. In some sections of the Province bear are a great menace to sheep-raisers. These animals, when they get old and lose their activity, prefer to hang about sheep-ranches and pick off animals at their leisure rather than go out in the usual way to secure their food.

Sheep losses from dogs cost the Department this year $842.10 for the first eleven months for 229 animals killed, compared to $978 for 176 head killed in 1932 and $913 for 109 head killed in 1931. This apparent increase in the number of animals killed no doubt is due to the fact that sheepmen are forced to report even the smallest loss under present conditions, while the decreased expenditure is due to careful attention to paying out compensation in keeping with the present price of sheep. As usual, a large part of the killings occurred around towns and, of course, adjacent to Indian reserves. Your Commissioner feels that where towns and municipalities are permitted to collect their own dog tax they should be required to take care of their dog population, for in cases where the tax is not collected carefully a lot of stray dogs

are to be found. These stray animals make raids out of the municipality or town into areas under the jurisdiction of the Government, and where the owner of the dog doing the damage is unknown the Government is compelled to pay within the area under its jurisdiction.

## MARKETING.

Due to the extended stay of your Commissioner in the Cariboo, Lamb Week this year had to be left to the direction of the British Columbia Sheep-breeders' Association. It proved to be of some assistance to the industry at a time of year when the market is usually glutted with the heavy markets from the range country, but to get best results the concerted action of all groups is needed.

Ram-grading, as usual, was carried on by the Federal Department of Agriculture and approximately the same number of rams were graded as in previous years. Many breeders get considerable educational assistance out of this grading policy, while others seem to feel that there is room for improvement in the policy. While this may be true, without a doubt, if all the breeders actually endeavoured to use the policy in the way that it is intended, it would be of considerable value to the industry. Another point that has not been overcome with respect to this policy is that the buying public are not familiar with the policy, and many times purchase two-star and even one-star rams under the impression that they are graded rams and therefore must be of first quality, while had they taken the trouble to examine the policy they would have learned that the top rams are graded three-star. Although this year's work seemed very satisfactory, it is without doubt unfair to expect one man to grade all breeds of rams. It is felt by most sheepmen that if this could be corrected it would mean an improvement.

The suggested lamb-grading policy outlined last year by the Federal Department has not been put into force, and, as mentioned in last year's Annual Report, very few British Columbia sheepmen feel that this policy would be desirable in this Province.

Perhaps one of the most outstanding educational features in support of market-lamb work is the Williams Lake Annual Fair and Sheep Sale. This event received financial support from both the Federal and Provincial Departments of Agriculture and has done a very great deal for the sheep industry in that part of the Province. When this event was first held it was quite evident that many sheepmen knew very little regarding the type of lamb that was required, the weight at which it should be marketed, and the required finish; also, with the poor quality of many of the sires being used in the district at that time, it would be impossible for such breeders to produce suitable market-lambs. To-day, as a result of this education, the class of sire found throughout this range country is a decided improvement in type and breeding, with the result that the quality of lamb produced is vastly improved. In addition, lambs are now being presented for market and sale at the weights favoured by the packers, and finish is receiving sufficient attention that at this year's fair only a very small percentage of the lambs examined were found to lack suitable finish. This programme of work is fitting in definitely with the present policy in hand by both the Provincial Department of Agriculture and the British Columbia Sheep-breeders' Association and other sheep associations throughout Western Canada.

A programme of work on the Gulf Islands and in the Fraser Valley, which will need considerable attention, has been undertaken. As stated previously, the fundamentals consist in building up clean, healthy stock; this to be followed or accompanied by a programme of type and production improvement. Surveys were made and field-days held throughout these districts, and from the information secured it is quite evident that the situation needs immediate attention. Many sheepmen attending these field-days went away fully convinced that they could not possibly continue in the business profitably unless something was done.

## GOATS.

The milk goat is proving its place under the present emergency. Many people who would find it very difficult to purchase milk are able to supply their families by keeping one or two goats tethered on vacant lots and waste land adjacent to their homes. As far as the pure-bred end of the business is concerned, this is not receiving more attention than usual, and consequently it can scarcely be said that the general quality of the stock is improving. There are of course a few good breeders throughout the Province who are keeping up the standard, and when good material is really required it can be secured.

Inquiries have come regarding goats and goat-breeding from all parts of the Dominion as far east as the Maritimes, where some goats were shipped last year and where they seem to be doing well.

R.O.P. record-work has continued up to the present. Whether it will be carried on for the coming year or not is questionable at the present time.

## SWINE.

British Columbia still continues to be an importer of pork and pork products. Prices for swine during the last year have improved somewhat, no doubt due in part to the quota granted Canadian pork and bacon on the British market. Over 150,000 hogs are imported into the Province each year, and no doubt this condition will continue so long as the Prairie breeders insist upon producing surplus hogs fit only for the fresh-pork trade. If they could be encouraged to produce hogs suited for an export trade, this would relieve our market considerably and make it more profitable for British Columbia breeders to produce for their own market.

In many sections of the Province good feeder hogs can be produced even where very little grain is grown, and this will take care of our feeder-hog market adjacent to the large centres of Vancouver, New Westminster, and Victoria. This has been the suggestion made to swinemen. Throughout the dairying sections of the Province both feeder hogs and finished hogs could easily be produced in reasonable numbers. There is invariably to-day a surplus of milk in most of these sections which would take care of the production of feeder hogs, and where some grain is raised finished pork could be produced and placed on the large central as well as the local markets at a fair profit.

One of the strongest reasons in favour of following out this programme is again with the idea of protecting the health of our live stock. In many parts outside the Province certain diseases have gained a strong foothold and are seriously affecting swine production. It is of course impossible for British Columbia to prevent the entrance of these hogs to the Province, and the result will sooner or later be a spread of such diseases as swine erysipelas as well as hæmorrhagic septicæmia (swine-plague). Where feeder hogs are shipped in from points outside the Province and again passed on to the farms for finishing, there is little doubt but what these places will become infected sooner or later, and from these centres these diseases will gradually spread to a large percentage of the farms throughout the Province where swine are kept.

Another policy supported by the Live Stock Branch was the Junior Swine Improvement Associations, intended to encourage swine production amongst the older junior farmers in the Province. These associations were grouped together within a district, with each member owning one choice gilt, either high-class grade or pure-bred, and a pure-bred boar was placed with each association. The idea was to bring in sufficient new blood to support our present herds, and gradually adding to the number of these associations until car-load shipments could be secured for shipment to the central markets. As a result of our one year's activity, we have learned that boars from outside the Province have to be selected very carefully if they are to prove successful in our Province. In some cases they do not appear to acclimatize properly, which perhaps is again a case of not enough attention being given to the matter of vigour, and there is the possibility of chronic infections. In every case where vigorous, healthy boars were used excellent results were obtained.

Unless Canada on the whole makes some attempt to fill the quota allowance provided on the British market, this large quota privilege will no doubt be reduced materially and will without doubt be given to some other part of the Empire or to a foreign country. At the present time Canadian production is not taking care of the export market, but in too many cases Canadian producers in the different Provinces are competing against each other instead of working to develop the export market.

## JUNIOR LIVE STOCK CLUBS.

There were in the Province this year the following junior clubs:—

*Swine Clubs.*—Number of clubs, 12; total membership, 94; number of pigs exhibited, 188.

*Calf Clubs.*—Number of clubs, 25; total membership, 208; number of calves shown, 208.

(NOTE.—There were five additional Calf Clubs sponsored by the Holstein-Friesian Cattle-breeders' Association with fifty-six additional members.)

*Poultry Clubs.*—No. of clubs, 29; total membership, 239.

Prize-money for the Swine Clubs amounted to $297, with the Provincial and Dominion Departments of Agriculture and the local organization contributing equally.

Prize-money for the Calf Clubs amounted to $600, with the Provincial Department of Agriculture contributing one-half of the prize-money and the local organization contributing the other half.

Poultry Club work comes primarily under the direction of the Poultry Commissioner, but I might add that prize-money for the Poultry Clubs amounted to $174, contributed entirely by the Provincial Department of Agriculture.

In addition, there are a number of Sheep Clubs, mostly adjacent to the City of New Westminster, sponsored by the Kiwanis Club, which are doing very good work. While the Department keeps in touch with the club and does a certain amount of organization-work, the financing of these clubs is taken care of by this service club.

In general, our club programme has been somewhat reduced from last year, due in part to a reduction in moneys available for the work and in part to a general weeding-out of clubs where interest was not keen and where the work was not accomplishing what really was intended. Generally, interest in club-work throughout the Province is very keen, and it is felt that only a class of clubs suited to the district, and only clubs where interest warrants the expenditure, should be given consideration.

Until this year our junior competitors that met teams from other Provinces at the Toronto Royal went into these contests with but a very few years' experience in club-work and in actual club-contest work. This year, with our dairy-cattle team, we had in Joseph O. Bulman, of Westwold, and Thomas P. Wilson, of Vinsulla, two boys of much greater experience than many of our previous teams. These boys had not only the advantages of many other competitions and good training, but had in addition the advantage of years of show-ring experience on the show circuit as herdsmen. The training secured by working with experienced stockmen very materially supplemented the excellent training that they had received from their coaches. In addition, the long years of training, competition, and experience that these boys had received sent them into the Toronto competition in a position to do their best and not become unduly excited or affected by the competition. As a result these two boys placed fourth in the competition conducted by the Canadian Council on Boys' and Girls' Club Work at the Toronto Royal. They were defeated by but a small margin by the Quebec, Ontario, and New Brunswick teams.

We were represented in the poultry competition at the Toronto Royal by Georgina F. Game and Dorothy J. Chamberlaine, who placed third in keen competition, despite the fact that Miss Game was seriously incapacitated with an attack of influenza.

Our swine team from the Fraser Valley, made up of Clifford Freeman, Langley Prairie, and Stuart McLaren, Milner, went into the Toronto competition perhaps at a greater disadvantage than either of our other teams. The numbers of swine available for training boys and girls in judging is limited to but a very few large herds, and since the contest at Toronto largely centres around the standards as set down by the Federal Department of Agriculture Hog Grading Service, which is not in force in the Province of British Columbia, our boys could scarcely be expected to place high in the competition.

British Columbia, as a member of the Canadian Council on Boys' and Girls' Club Work, while working under some disadvantages of distance from the competition centre, and being required to compete against the larger Provinces such as Ontario and Quebec, nevertheless has very many advantages over perhaps any other Province in the Dominion. Our competing teams get, without a doubt, the finest trip—a trip that would cost many times our annual fee to the Council. We are in addition building up in our young people an appreciation for the Dominion of Canada by putting them in contact with people of the other Provinces. Placed as we are on the west coast of the Dominion, there could be a tendency to become provincialized, and possibly, with conditions as they were in past years, a tendency to contact and observe more often our neighbours on the Pacific Coast of the United States.

ESTIMATED NUMBERS OF FARM LIVE STOCK IN BRITISH COLUMBIA, YEARS 1932–33.

| Description. | 1932. | 1933. |
|---|---|---|
| Horses | 57,700 | 58,700 |
| Cattle— | | |
| Milch cows | 83,000 | 90,772 |
| Other cattle | 174,000 | 189,425 |
| Total cattle | 257,000 | 280,197 |
| Sheep | 151,900 | 148,638 |
| Swine | 51,700 | 47,327 |
| Hens and chickens | 3,340,800 | 3,001,900 |
| Turkeys | 41,800 | 40,940 |
| Geese | 9,600 | 9,940 |
| Ducks | 45,000 | 43,000 |

This Branch wishes to recognize the action of Captain Dunwater, of Fintry, B.C., in so kindly giving a purse to the winning dairy-cattle team again this year.

Respectfully submitted.

WALLACE RAYMOND GUNN,
*Live Stock Commissioner.*

## REPORT OF CHIEF VETERINARY INSPECTOR.

A. KNIGHT, V.S.

It was necessary to notify the Inspectors in their respective districts to turn in their reports by December 9th, so that these could be compiled in the Annual Report; therefore it is possible to include only eleven months of this year.

The general health of live stock throughout British Columbia is in good condition. Epidemics of a contagious nature which have broken out occasionally have not assumed large proportions. Your Inspectors, on being notified, have promptly responded to the calls of the stockmen and have lent advice in the curtailing of contagious troubles amongst live stock.

Such diseases as hæmorrhagic septicæmia and blackleg in cattle have been diagnosed and remedies have been prescribed for their treatment in the way of serum injections. A number of the stockmen are making a practice of inoculating their cattle with serum once a year as a preventive measure against blackleg and hæmorrhagic septicæmia, and therefore where these diseases were more or less prevalent they have been reduced to a minimum by following this practice.

Your Inspectors, co-operating with the Live Stock Commissioner, have also dealt with parasites in sheep and hogs, lending advice as to the proper handling of sheep and swine on infested areas, and also medical treatment. This phase of our work, although not compulsory under the "Contagious Diseases (Animals) Act," has been greatly appreciated by the stockmen, as parasites among the class of animals mentioned have been causing the farmer considerable trouble of late years.

A general test in the Fraser Valley Restricted Area was commenced on October 26th, 1932, and continued into this year for three months. This entailed considerable expense to the Provincial Department of Agriculture as well as the assistance of your Veterinary staff. During this work, 6,663 premises were visited, 66,561 cattle were T.B. tested, and a total of 412 reactors were found. The number of premises on which reactors were found was 256.

Your Inspectors have also covered other areas throughout the Province, paying attention to the testing of the dairy herds supplying the towns and cities with milk as well as grading the dairy premises. The sanitary conditions of the dairies have greatly improved within this last few years, and probably it is more noticeable during this last year. The figures submitted show that there is a considerable increase in the number of Grade A and Grade B dairies throughout the Province, and the public are being supplied with milk from a much better class of dairy premises than formerly. This will tend to increase consumption of milk as well as safeguard the health of the people.

Dealing more especially with the various diseases handled through the past year, particular attention is drawn to the following:—

*Actinomycosis.*—This disease has been investigated by your Inspectors. It is more or less prevalent in our dairy and beef herds. The usual advice, where the disease is found in the

early stages, is to attempt treatment by using the potassium-iodide remedy. If in the advanced stages and the tumour is discharging, the owner is advised to destroy the carcass. Multiple abscesses and carcinoma tumours are also found. Milk is prohibited for sale from such animals.

*Udder-troubles.*—Amongst dairy stock, at least in those herds frequently inspected for milk-supply, mastitis or other infections of the udder are commonly found. Treatment is advised, but at the same time the milk is not sold from cows affected with udder-trouble. Proper milking methods and clean surroundings are factors also in the elimination of these disorders to a great extent.

*Intestinal Parasites.*—These are found chiefly in sheep and swine and, as in former years, are the cause of trouble and loss to farm animals. Advice has been given to the farmer in the medical treatment of infested animals and also in the method of handling and sanitary precautions to prevent such troubles. Owners are more interested and a greater amount of precautions are being taken.

*Hæmorrhagic Septicæmia.*—A number of outbreaks were found in the Chilcotin area, especially amongst some of our larger cattle-ranchers. Dr. McKay investigated the trouble and advised preventive treatment by inoculation with a hæmorrhagic septicæmia serum. This prevented further loss. Small outbreaks have also occurred on Vancouver Island. These have assumed very small proportions, only a few young cattle being affected. By change of pasturage and using sanitary precautions the disease was curtailed.

*Coccidiosis.*—This disease has been causing trouble from year to year, although outbreaks have occurred chiefly amongst yearlings and 2-year-olds, and the losses amongst this age of stock have been the greatest. Occasionally we have an outbreak involving older cattle. Medical treatment has been advised and also the cleaning-up of infected corrals. Owing to the stock covering such a wide area it is very difficult to thoroughly clean up infected ground.

*Foot-rot.*—Some 11,000 head of sheep were inspected for foot-rot. The sheepmen have been very willing to co-operate with your staff in stamping out this disease, and it has not been so prevalent this year. Some 500 head were found to be infected near Pavilion, and Dr. McKay reports prohibiting 1,500 sheep pasturing on the Hunter Range. As the low, wet parts of the range country are more liable to carry the infection, the sheepmen are advised to pasture their sheep on the high land. This disease is now listed under the "Contagious Diseases (Animals) Act," and I believe this will prove of benefit to the sheepmen.

*Abortion* amongst dairy cattle continues to be a source of trouble, especially to the dairymen. Your staff has at all times given advice to the dairymen as to the sanitary precautions to be taken in an outbreak of this nature. No preventive measure has been discovered for the control of this disease. The Dominion Government is lending assistance towards the diagnosing of the disease by making blood tests. This is done under certain restrictions. Also a number of private practitioners have established laboratories and are doing something towards the blood-testing of animals for contagious abortion. Sanitary precautions in handling diseased animals are a great factor in its control.

| | |
|---|---|
| Total number of premises visited by Provincial Inspectors on tuberculin test | 1,090 |
| Total number of cattle tuberculin-tested by Provincial Inspectors | 10,431 |
| Total number of reactors | 96 |
| Tested by Dominion Inspectors with assistance of Provincial Department, Fraser Valley Restricted Area:— | |
| Total number of premises visited | 6,663 |
| Total number of cattle tested | 66,561 |
| Total number of reactors | 412 |
| Premises inspected for grade and cattle kept on same:— | |
| Total number of premises visited | 3,140 |
| Total number of cattle inspected | 39,652 |
| Total number of grades inspected— | |
| Grade A | 1,359 |
| Grade B | 1,552 |
| Grade C | 623 |
| Ungraded | 602 |

A. KNIGHT,
*Chief Veterinary Inspector.*

# REPORT OF THE POULTRY COMMISSIONER.

J. R. Terry.

The late winter and spring weather was mild and more favourable than usual. Breeding stock came through in better shape, but one of the disadvantages of a mild winter is that the production of eggs reaches high totals earlier than expected, with the result that prices are depressed accordingly.

As to prices of feedstuffs, it is to be recorded that until early summer most of the quotations were consistently low, but a flurry in wheat prices took almost all grain prices up in sympathy, with the result that many breeders, already somewhat shaky financially, were forced to close down.

A decline in flock population has again to be noted this year. A conservative estimate of the decrease would be about 15 per cent. Very few large shipments of eggs were sent out of the Province during the year. Again this year eggs in fairly large quantities were imported into the Province. Rather an unusual sight was to be seen in many store windows this year, "Alberta Storage Eggs."

Again this year we publish a table of egg prices for the past twenty-eight years. The prices are payable to the producer and are the average for the whole Province throughout the year.

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

## BREEDING OPERATIONS.

During all slack periods it is interesting to note the easily apparent improvement in breeding flocks generally. Heavy culling always follows as soon as a slump makes itself felt. This year an added incentive was given by the fact that mortality amongst adult fowls is progressing to a point where it is very imperative that rigid culling must be followed, or else extinction of the fowls is predicted.

The hatching operations were a little above the average as far as quality was concerned, but the number incubated again showed a decrease. Conditions obtaining last year were repeated. Fewer fowls were hatched, and in the fall there was again a rush to buy well-developed pullets of the most popular breeds.

The preference for brown eggs again continued, and many of the Leghorn-breeders are again hatching a proportion of heavy-weight varieties for the purpose of supplying the demand, and also to get a better return for the sale of poultry-meats, mainly surplus males.

Each year shows a decided demand for smaller-sized dressed fowls at all seasons, with the exception of Christmas and New Year festivities. Wholesalers and butchers explain that the average family consists of less than four persons, and the family purse cannot be made to cover the cost of a fowl above 4 or 5 lb. In an attempt to supply this class of trade, breeders are experimenting with fowls by cross-breeding. Both here and in Great Britain new breeds are originating. What appears to be a cross between a Game fowl and a Mediterranean class of bird has been given the name of the York fowl in Great Britain. It is a medium-sized fowl, with a weight of about 5½ lb. for the male and 4 lb. for the female. The cockerels of this breed make first-class 3½-lb. roasters, with the gamy breast and plumpness.

Cross-breeding for the purpose of sex determination at birth has been taking hold during the past two or three years. Several breeders specialized in the selling of day-old pullets, crossing Rhode Island males and White Wyandottes, whilst others utilized a cross of Barred Rocks and Black Leghorns. The latter cross is the most accurate.

An Oriental company has been formed for the purpose of teaching a supposedly new method of examination at birth of chicks to determine sex. It is reported that several beginners have taken the course. It is understood that an unlimited market exists in the United States for experts at this work on hatcheries and large breeding establishments. At present the fees are such as might deter many who otherwise would try the experiment.

## BOYS' AND GIRLS' POULTRY CLUBS.

A drop of about 45 per cent. took place in the number of clubs operating this year as compared to last season. Northern parts of the Province again had the major part of the clubs organized. A few of the clubs again selected day-old chicks as against the majority who desired eggs. The number of settings supplied was 228, the eggs totalling 2,964.

Better hatching averages were obtained, and in many cases good prices were obtained for surplus cockerels, especially in the northern parts of the Province. Many children report the selling of hatching-eggs in their districts from past hatches. This means that fairly large sums of money which formerly went to the Eastern Provinces for eggs and stock are being kept in the Province. The stock which has been imported in the past has very seldom been up to the quality expected for the money paid.

The breeds mainly chosen by the clubs have been Barred Rocks, Rhode Island Reds, White Wyandottes, Orpingtons, Light Sussex, and a few settings of White Leghorns. The last-mentioned breed is not much favoured in the colder settlements of the Province.

During the past few years many of the juvenile clubs have entered judging competitions conducted by local Poultry Associations and Fall Fair Boards. Such work has been done during the past year by the Cloverdale, Vernon, Grand Forks, Boundary District, Langley Prairie, Armstrong, and Kamloops Clubs.

In addition, the writer has officiated as judge at the Vancouver Fair in August for the juvenile classes, and also for the Provincial Elimination Trials at Armstrong Regional Fair. At this fair competitors from various parts of the Province contest for the right to try for Dominion championships at the Royal Fair, Toronto, each winter. This year Armstrong Club proved the champion at the trials, defeating the Boundary Club team, from which district came the Dominion champions last year.

The Armstrong team was trained by an enthusiastic commercial poultry-breeder there, and the two girls—Miss Georgina Game and Miss Jessie Chamberlaine—were sent to Toronto, and succeeded in winning second place. The contest was more difficult this year, and the team, its coach, G. Game, and the District Agriculturist, H. Evans, of Vernon, all deserve much credit.

At the Vancouver Fair the children were all under 16, and it is predicted that as soon as they reach Dominion trial age—16 and over—the Interior contestants will get a few teams from the Coast worthy of their steel. The Vancouver Poultry Association deserves much praise for the way in which the children have been encouraged in the district. Many of its members gave many hours of judging instruction during the year.

## TURKEYS.

Owing to low prices received last year many breeders reduced their hatching operations during this year, but despite this the prices received have again been disappointingly low, averaging about 14 cents per pound, even for really high-class, well-fattened stock. It must not be forgotten by Provincial breeders that turkeys raised on the Prairies will always set the prices here for the favourite fowl at the holiday season. During times such as these, especially when wheat is at such a low price on Prairie farms, a few turkeys and common fowls constitute the principal live stock raised. With plenty of insect-life and a fair amount of milk plus the wheat fed, turkeys can be raised at about a quarter the price of local turkeys.

Owing to improved breeding methods, coupled with better breeding stock, the rate of mortality amongst Provincial birds has been very materially lowered during the past decade. The elimination of all breeders that show any weakness or sickness will still further improve matters in breeding operations.

As mentioned last year, many breeders are trying to produce a smaller and more compact bird to cater for the markets here. This year again the demand is for the medium-weight birds. A very limited demand is evidenced for the really heavy bird. These are in the main too expensive for most people, especially these slack times. At Winnipeg Agricultural College the experts have had fair success so far in producing a new breed of turkey which would fill the requirements before mentioned.

The Cowichan Turkey Association again held its annual show of Island birds, with an increased entry. A full exhibit of all the principal and popular breeds—Mammoth Bronze, Narragansetts, White Holland, Bourbon Reds, and Blacks—was made.

A fair demand in the spring for hatching-eggs and day-old poults was experienced. The average price was 20 cents for eggs and 75 cents for poults.

The British Columbia Turkey Club again marked time, but hopes in the coming spring to again become active.

## WATER-FOWL.

In the spring an unusual demand for geese-eggs and breeding stock developed, especially for the white breeds—Embden and Chinese. The hardy Toulouse still held its own and constitutes about 85 per cent. of the geese population. Farmers with sufficient pasture and an inclination for the breed should find geese a profitable side-line even at present prices. A plentiful supply of greenstuffs is necessary, however, and a small stream or swamp is also of benefit. Most large cities have sufficient Jewish population to make a good demand for live geese at the appropriate festivals. Only specimens of live birds without blemish are desired by the Kosher butcher. Average prices during the year were about 20 cents per pound.

The duck flocks of the Province almost held their own during the year, with the Pekins as general-purpose variety holding premier place, and Khaki Campbells and Indian Runners the most popular in the light-weight or egg-laying varieties. Crosses of Muscovy and Pekin were again made for table purposes.

Eggs from the light-weight varieties are slowly making a market for themselves, although in some sections of the Interior the only market available is that of the confectioners and bakers. Average prices were a few cents ahead of the common fowl prices—about eighteen cents per dozen.

There are several up-to-date commercial duck-farms in the Province and most of these report fairly good times, with a moderate demand for breeding stock. This work is a real specialist proposition, and only those with prospect of a steady market, coupled with plenty of experience in the business, should start out.

## DISEASE PROBLEMS.

During the spring the writer was visited by a breeder from the State of Washington, one of the largest breeders in the United States; in 1929 the ranch he managed did business in excess of $100,000 and raised over 12,000 head of stock. He stated that he came for the purpose of buying White Leghorn breeding stock that would prove "livable." Down the Pacific Coast it was now the common practice for persons buying laying stock to pay as high as 45 cents each more for yearling hens than for matured pullets. This, it is alleged, is because of the heavy mortality of the pullets during the first laying year. Estimates as high as 45 per cent. death losses were given from large flocks owned by experienced breeders. The greater proportion of the losses was from ovarian diseases, much of which was admittedly caused by forced feeding. It was also admitted that hatching-eggs were taken from matured pullets, especially where large-scale incubation was practised.

It is not contended that such losses are being experienced here, yet the mortality in the majority of flocks is much too high, and also higher than a few years ago. Pullorum disease, coccidiosis, leg paralysis, and infectious bronchitis are the causes of most of the death losses. During the past year the losses have been so heavy that many breeders have become sufficiently alarmed that blood-testing, heavier culling, and a general overhauling of the plant have been taken up. Much more has yet to be done. During boom times people were encouraged to embark in the business, not only as egg-producers, but as pedigree-breeders, almost before they had made their first payment on the ranch. Many of these unfortunately found out too late that the industry needed years of experience before the highly specialized work of a breeder

could be learned. Five years' apprenticeship is none too long before a poultry-keeper should take up the pedigree-breeding end of the industry.

The writer considers that, besides elimination of diseased birds by blood-testing, more attention will have to be paid to the feeding of all kinds of fowls, so that the health and vitality of the flocks may not be depleted. Pullets coming into lay before 5½ months, by forced feeding, should never be kept over for breeding purposes.

Ninety per cent. of the visits made by the Division, mainly at the Coast, have had to do with disease or worm infestation.

## PROVINCIAL ASSOCIATION.

The annual meeting and convention was held again at Vancouver during the Fat Stock Show. Entries were up to the usual figure, although the prize-money was lower than in the past owing to the lack of a departmental grant this year. This year the excellent showing of breeds of fowls used principally for meat purposes was very encouraging. Many Cornish and Old English Game fowls competed for the awards. For the first time in many years there was a full representation of all standard varieties of turkeys. High-priced imported birds were shown by an Island breeder.

The British Columbia Registered Breeders' Association, with Dominion Registrar H. E. Upton as Secretary, again exhibited. A splendid showing was made. Many predict that in the future the popular breed exhibits at shows will all be registered stock. Some good sales were made.

Several United States exhibitors, one from distant San Diego, Lower California, exhibited, and were successful in carrying off prizes.

The annual meeting was again held without aid of Government grant. Eleven delegates were present from all parts of the Province, and over 100 of the general membership attended all the meetings.

Affiliated association shows were held at Victoria, Ladysmith, and Vernon. No assistance was given by the Department.

## RABBITS.

Extraordinary interest has been taken in the wool-producing end of the industry this year. As mentioned last year, much of this activity was stimulated by broadcasting programmes by enterprising breeders in the State to the south of us. Many articles also were published in weekly columns of local newspapers. Much of the advice given in these talks and articles has been of a flowery, boosting nature. High prices are still being paid by beginners for inferior stock, and only those breeders of high reputation should be patronized. Most of the breeders of repute are members of Rabbit Associations.

The Department has published up-to-date information from British official sources and these bulletins have been appreciated.

Hutch record and young stock record cards have been in big demand and breeders are appreciative of the Department's assistance.

The Vancouver and Victoria Associations held shows during the year, and many visitors attended, mainly to watch the wool clipping, carding, and spinning operations that have been a feature of these events.

Many applications were received for Bulletin 80 on rabbits, and circulars, and many visitors to the office were supplied with breeders' directories and advice.

## OFFICE AND FIELD WORK.

During the year James Allen, Poultry Instructor, has been on part-time work for the Division. During the spring he made a lengthy visit to the northern part of the Province, addressed meetings, and gave killing and culling demonstrations. Visits were made and meetings addressed at Glentanna, Evelyn, Telkwa, Quick, Houston, Topley, Francois Lake, Uncha Lake, Palling, Forestdale, Fraser Lake, Fort Fraser, Vanderhoof, Hazelton, Pineview, Woodpecker, Beaverley, Prince George, and Longworth.

Respectfully submitted.

J. R. Terry,
*Poultry Commissioner.*

# REPORT OF DAIRY COMMISSIONER.

HENRY RIVE, B.S.A.

Production of milk during the year has been only slightly greater than in the previous one. The spring was cold and backward in dairy districts, with little growth of grass. In addition, clovers and grasses suffered severely during the preceding months, much winter-killing occurring. Pastures were therefore later and scanty. Silo mixtures and roots yielded fairly, corn indifferently well. Yields of grain and hay were below the average. Dairy fodders in stock at this time are consequently rather lighter than usual.

Prices for dairy products continue low, trending upwards slightly towards the end of the year. Prices for mill-feeds have steadily, if gradually, risen.

The marketing of milk on the Lower Mainland remains in an unsatisfactory condition. Prices of fluid milk to consumers remain low, though the price-cutting of last year has shown abatement. With an approximate production of 225,000,000 lb. milk in the whole area, and fluid outlets for not more than 100,000,000 lb., there is left inevitably for manufacture into dairy products considerably over 100,000,000 lb. To regard this, in fluid-milk trade terms, as surplus to the fluid supplies of the area is to render exceedingly difficult any just or equitable disposition of returns in view of the exceedingly different services and costs that obtain in the production of milks of various grades for various purposes.

## CREAMERIES.

The same services as heretofore have been regularly rendered the creameries of the Province. General conditions and practice obtaining have been noted in respect particularly to cream-grading, milk and cream testing, and sanitary surroundings. The milk plants, creameries, and dairy-factories of the Lower Mainland were visited by F. Overland; those of the Southern Interior by F. C. Wasson; both of these Provincial Dairy Inspectors on occasion making calls on the plants of the Islands and those of the Central Interior. Calls on patrons requiring assistance have been carried out and cards conveying check-tests and grades mailed to a percentage of patrons of each factory on the occasion of such visits.

The quality of butter manufactured in the creameries of the Province is steadily, if slowly, improving. With the advent of dull times and decreased local consumption, the enforced marketing of butter in the larger centres has brought many of the smaller country creameries to a better realization of to-day's demands—mild flavour and keeping quality which are due to good cream and pasteurization. Action by the Federal Dairy Branch is hopefully awaited in regard to the retail marketing of butter according to grade. The project is looked upon favourably by the authorities at Ottawa, who apparently prefer to be responsible for its enforcement rather than to permit to arise the differences as to grade names, flavour scores, etc., that must inevitably result if action by separate Provinces is undertaken. During the year twenty-nine establishments (seventeen quite small) have manufactured butter. Under near normal conditions of climate and pasturage, an annual increase of about 10 per cent. in creamery butter is to be expected.

## CHEESE.

During the year three cheese-factories have operated steadily. Two of these produced four varieties in small quantities only. The remaining factory, a far larger commercial project, manufactures annually several hundred thousand pounds of Canadian cheddar. Other kinds made are Roman, Kingston, Monterey or Jack, and Camosun. A few of the larger dairy firms turn out between them several thousand pounds of cottage cheese. On the farm a score of dairies produce small amounts of several varieties, including Cheshire, Derby, Swiss Brick, and Camosun, which is a modified cheddar. There is great need of investigation and stimulation of cheese possibilities in British Columbia.

## CONDENSED PRODUCTS.

*Evaporated Milk.*—The condensery at South Sumas (Borden's, Ltd.) ran steadily during the summer season, May to October. The Fraser Valley Milk Producers' Association condensery at Delair ran as continuously as might be throughout. Much of the evaporated milk manufactured is for local consumption. Export trade is being diligently sought after both in Europe and in the Orient.

*Milk-powder, Butter-milk, Casein.*—The manufacture of powdered milk, skim and whole, continues, though with none too favourable markets. The demand for casein is reviving, but for both casein and semi-liquid buttermilk, demand for some years past has suffered greatly.

*Ice-cream.*—Due partly to season as well as to depressed conditions, the total of ice-cream manufactured has dropped considerably.

The number of dairy-factories operating in British Columbia includes twenty-nine creameries, three cheese-factories, two condenseries, ten wholesale ice-cream factories, besides many small ice-cream plants and one plant each for milk-powder, casein, and buttermilk.

## VERIFICATION TESTS.

Application was received, accompanied by the necessary fees, for tests to be conducted of the milk of four patrons of the Fraser Valley Milk Producers' Association shipping to the dairy plant at Sardis. F. C. Wasson was detailed and duly carried out the work. Under instructions, a special two-day test was also performed by G. H. Thornbery of a herd in the neighbourhood of Victoria.

## HERD IMPROVEMENT.

There continue operating in the Province twelve Cow-testing Associations with fifteen routes, employing fifteen supervisors. The total of members with herds on test decreased somewhat during the two previous years, and the recorded yields have reflected quite perceptibly the lowering in standard of rations on account of poor returns for butter-fat. During 1933 numbers of members and of herds on test have increased, though not yet to previous proportions, and the yields recorded cannot be expected to reach high figures for a season or two in view of the enforced slackening of feeding practice. It may be said that, though a difficult period has been encountered by Cow-testing Associations, their work has been maintained, and as times improve a considerable expansion of the system may be expected. Nothing but a complete collapse of all these institutions and the loss of many years' work of incalculable value will follow any withdrawal of subsidies at this time. (For the list of associations, supervisors, secretaries, and subsidies paid *see* Appendix No. 6.)

The Third List of Dairy Sires is now in the press. It contains particulars of the performance of daughters, numbering five or over, of pure-bred dairy bulls of the Province, with daughter-dam comparisons when available, as closely to date as may be. The attention now directed by all Dairy Breed Associations and others to the various bull indices that are being evolved makes this work of supreme interest and importance to those concerned in permanent herd improvement.

In making known the possibilities towards better breeding arising from a knowledge of these things, the Dairy Branch has received from W. R. Foster, M.Sc., Plant Pathologist and Geneticist, the fullest measure of co-operation and assistance. Introducing very clearly, as he has done at several lectures, an outline of first Mendelian principles, the experienced C.T.A. and R.O.P. dairy-farmer is finding answers to many questions that long have both puzzled and dismayed.

## CREAM-GRADERS' LICENCE COURSE.

The course for 1933 was held January 23rd to February 8th at the premises of the Associated Dairies, 1170 Hornby Street, Vancouver. At the same time a course for intending supervisors of Cow-testing Associations was held. Fourteen applicants attended. Eleven passed the testers' licence examination successfully, two of these in the supervisors' course. Two were issued cream-graders' licences. Four were withheld till factory experience is secured. The course for 1934 is to be held again at 1170 Hornby Street, Vancouver, commencing January 22nd.

## TESTERS' LICENCES.

During the year eighteen applicants were examined. Sixty-four licences were issued. (For list of testters holding licences during 1933 *see* Appendix No. 8.)

## CREAM-GRADERS' LICENCES.

Forty-five licences to cream-graders were issued, all combined cream-graders' and milk-testers' licences. (For the list of cream-graders so licensed *see* Appendix No. 9.)

## DAIRY AND CREAMERY LICENCES.

To fifty-five persons, firms, companies, or associations buying milk or cream on the basis of the butter-fat content, licences were issued. (For the list of creameries and dairies so licensed *see* Appendix No. 7.)

## FAIRS.

Assistance with the dairy classes was given as usual at Victoria Exhibition. At Vancouver the usual services were proffered, but on account of the deliberate withholding, on the part of the manager, of help for the uncrating of packages, the frequent handling of boxes in course of classifying, listing, affixing entry-tags, and finally judging, the representatives of this Branch withdrew. The dairy exhibits at this exhibition for years have been subjected to neglect and worse, as though totally unwelcome, and no efforts or representations have availed towards improvement. No credit can come to this Department or Branch by further participation in a section which it is manifestly desired to discourage if not to obliterate.

## MEETINGS.

Meetings were attended and addressed during the year at Vernon, Evelyn, Telkwa, Round Lake, Wistaria, Prince George, Chilliwack, Pitt Meadows, Cloverdale, Ladner, Courtenay, and Saanich.

## BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION.

Again, owing to lack of funds, activities have been few. The annual convention was held at New Westminster on January 17th and 18th with the co-operation of the British Columbia Veterinary Association. The various Cow-testing Association contests alone are being continued. It is planned to hold the annual meeting for 1934 at Chilliwack on January 18th and 19th next.

## LEGISLATION.

The regulations under the "Milk Act, 1927," relating to pasteurized milk and pasteurized cream were amended by Order in Council on January 19th of this year.

## PUBLICATIONS.

Dairy Circulars Nos. 23 and 24, "The Annual List of C.T.A. Certified Records" and "First Studies in Mendelism," by W. R. Foster, M.Sc., respectively constitute the publications of this Branch so far issued for the year. Dairy Circular No. 25, "The Third List of Dairy Sires," will be in the press before the year expires.

## OFFICE.

A large volume of inquiries, applications, reports, etc., in relation to general dairy-work, cream-grading, testing, licences, C.T.A. and Herd Sires, continues to be received. F. C. Wasson, Provincial Dairy Instructor and Inspector, was on May 1st transferred to Kelowna.

The diligent application of the stenographer-clerks to the work of the Branch is worthy of better recognition than has yet been given. The duties of the two Dairy Inspectors and of the Assistant in Charge of Cow-testing have been carried out efficiently.

Respectfully submitted.

HENRY RIVE,
*Dairy Commissioner.*

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# REPORT OF FIELD CROPS COMMISSIONER.

CECIL TICE, B.S.A.

In many districts clover, grasses, and fall-sown crops, including winter wheat, suffered badly as a result of the unfavourable winter conditions of 1932–33. In fact, many clover and grass fields were ploughed up in the spring and sown to oats and other crops to supplement the hay-crops. Many fall-sown wheat-fields were also ploughed up and put into other crops.

The spring of 1933 was cold and backward with much rain. While this favoured growth of range plants, it retarded field-crop production. Spring crops were sown late and did not get off to a good start. The month of August, on the other hand, was very hot and dry.

Grain and hay crops were below average, particularly the hay and pasture crops in the Fraser Valley. The acreage of potatoes was below average and the yield was generally light.

Field-crop seeds yielded well, the timothy-seed crop in Central British Columbia being much heavier than it has been during recent years.

During these times, when prices for farm produce are low and all feeds which the farmer purchases are fairly high, there is a tendency for farmers to produce more of their own concentrates. This would appear to be a very sound procedure.

## FIELD CROP UNION.

The need for a Field Crop Association in the Province has been apparent for some time. For this reason, at a meeting of representative farmers held in Chilliwack in the month of May, it was decided to form a British Columbia Field Crop Union. The objects of this organization have been stated as follows: To test out improved seeds, various crops, and the method of growing crops; to distribute information relative to crop improvement; and to co-operate with all organizations in Canada interested in the improvement of agriculture and of field crops in particular. Special attention will be given those crops which may have a place in the feeding of various classes of live stock, and every effort will be made to encourage farmers to produce many of the concentrates which they are now purchasing. Furthermore, there is a distinct need in many districts of the Province for the production of crops having a high protein content in order to provide a balanced ration.

Attention will also be directed towards an improvement of the pastures, so that the same may be more efficiently managed and the most suitable kinds of grasses used. Forage-crops, grains, etc., will also receive their share of attention both in respect to kinds and varieties.

Provision has been made in the by-laws to extend the operations of the organization so as to cover fertilizers, weeds, and other phases of agriculture in due course if considered desirable.

It is proposed to model this organization along somewhat the same lines as that followed by the Ontario Agricultural and Experimental Union, the Saskatchewan Field Husbandry Association, and similar organizations which apparently are functioning very successfully in Canada, the United States, and in other countries. In a Province such as British Columbia, where the soils and climate vary so much in short distances and where the agricultural areas are so widespread, it would appear that an organization such as the British Columbia Field Crop Union may have a very definite place.

The organization proposes to distribute small lots of seed of specially selected varieties and kinds of crops to members of the union for testing out on their farms. In this way it is hoped farmers will be saved the expense of spending large sums of money on certain varieties and kinds of crops which may prove to be valueless. Every experimenter will be expected to carefully conduct the test selected by him and to keep proper records.

Much information relative to crop production in British Columbia is obtained from investigational work carried on at the various Dominion Experimental Farms, University of British Columbia, and on the Illustration Stations. These institutions, however, cannot cover every local condition. There is need then for some organization which can obtain information regarding the performance of various varieties and crops under the special conditions existing in various localities in this Province. The British Columbia Field Crop Union, it is hoped, will fill this need.

The association's business will be conducted by an executive. There will be also ten directors; one director to represent each of the Farmers' Institute districts in the Province. In addition to this, two representatives from each of the following institutions will be ex-officio directors: University of British Columbia, Federal Department of Agriculture, and Provincial Department of Agriculture. An experimental committee to decide on the type of tests to be conducted in the various areas of the Province has already been appointed for this year—namely, Messrs. Newton, Hicks, Moe, Rive, and Tice.

Your Commissioner has also been appointed secretary-treasurer of the union. Up to the present time fifty members have joined up.

Much of the field demonstration-work in field crops now being carried on by the Provincial Field Crop Branch will be handled through this organization.

## WORLD'S GRAIN AND SEED EXHIBITION.

The World's Grain and Seed Exhibition took place in Regina, Saskatchewan, July 24th to August 5th, and was generally considered a great success. This was very gratifying to all concerned in view of the difficult times through which we have been passing. The competition was open to all countries of the world and classes were provided for all kinds of grain and field-crop seeds as well as vegetable-seed. Australia, Great Britain, Ireland, United States, and India, as well as many other countries, together with the various Provinces of Canada, were well represented with exhibits.

It is interesting to note that this Province forwarded 126 entries. Of this number, eighty-eight captured prizes and thirteen were awarded first prizes. No other Province or country was awarded as many first prizes as British Columbia was, which indicates not only the wide range of seeds which can be produced in this Province, but also proves that British Columbia seeds are of the highest quality. Altogether British Columbia exhibitors won over $11,000 in prize-money. A complete list of the prize-winners is shown in Appendix No. 10.

In the junior grain-judging competition the team from the University of British Columbia captured fourth place, which was very creditable in view of the keen competition.

## WEEDS.

Weed-work during the year was conducted along similar lines to that followed during recent years. The most important area in the Province from the standpoint of weed-control is probably the Peace River District, for in this section grain is grown on a very extensive scale and weeds are not, as yet, as prevalent there as in most other sections of the Province. Nevertheless, it should be pointed out that many bad weeds have already been introduced into the British Columbia section of the Peace River and every effort must be made to control them. The Peace River District probably offers a better opportunity for the adoption of systematic weed-control measures than other sections of the Province.

Two temporary Weed Inspectors—namely, Messrs. Hadland and Moody—were reappointed for weed-inspection work in the Peace River District and they carried on their duties, as in the previous year, under the supervision of the Provincial Police. In this connection sincere appreciation is expressed of the close attention and interest which Sergeant Greenwood gave to the weed-work until sickness necessitated his departure from the district in the fall. The work is at the present time under the supervision of Sergeant Duncan. Mr. Hadland was assigned the territory on the north side of the Peace River, whilst Mr. Moody devoted his attention to the district south of the Peace River.

The Provincial Police also continued to inspect settlers' effects coming into the district to see that no weed-seeds were being introduced.

In the remainder of the Province attention was largely confined to educational work and a check-up on agencies responsible for the enforcement of the "Noxious Weeds Act."

## FIELD-CROP SEED PRODUCTION.

In view of the fact that S. S. Phillips is devoting his attention to seed-promotion work, this office has curtailed its activities in connection with seed-production matters during the year. However, there are certain phases of seed-work which continue to receive attention by this office, and your Commissioner is also a member of the seed-production committee for the Province.

It is interesting to note that as a result of the combined efforts of the Provincial and Federal Departments of Agriculture an enterprising farmer of Chilliwack was successful in producing a crop of Italian rye-grass seed this year. This is, as far as we know, the first time that seed of this kind has been produced in this Province on a commercial scale. Heretofore all our supplies of this and similar grass-seeds have been imported.

The development of the alfalfa-seed crop in the Interior, particularly around Lytton, is being watched, and every effort is, and will be, made to assist in improving the position of this

industry. The following figures show the amount of field-crop seeds produced in British Columbia in 1932:—

| | Lb. |
|---|---|
| Swede turnip | 755 |
| Mangel | 5,690 |
| Timothy | 122,000 |
| Alsike clover | 6,000 |
| Alfalfa | 30,000 |
| Red clover | 80,000 |

Your Commissioner, who is a director of the Canadian Seed-growers' Association, attended the annual meeting of the association held in Regina, Saskatchewan, in July.

## BRITISH COLUMBIA SEED FAIR.

The 1932 Provincial Seed Fair, which was held in the Crystal Garden, Victoria, from January 18th to 21st, 1933, proved very successful from the standpoint of quality and number of exhibits. The fair was conducted by this Branch in co-operation with the Victoria Chamber of Commerce. It served largely as an elimination contest for the World's Grain Exhibition. Some excellent exhibits were received from all parts of the Province.

## DISTRICT SEED FAIRS.

Two district seed fairs were successfully held, the one in conjunction with the Interior Exhibition at Armstrong, whilst the other, which was for Central British Columbia, was held at Smithers.

## CROP COMPETITIONS.

During the year a combined field-crop and cleaned-seed competition was conducted with oats by the Delta Farmers' Institute, and standing field-crop competitions with potatoes were conducted by each of the following institutes: Pemberton, Langley, and Malakwa. A standing field-crop competition with oats was also conducted by the Sheererdale Farmers' Institute in the Peace River District.

## SEED-CLEANING MACHINERY.

The following is a list of the departmental seed-cleaning machines, together with a statement of the amount of seed cleaned by each during the winter of 1932-33:—

| Location. | Wheat. | Oats. | Barley. | Rye. | Peas. | Beans. | Timothy. | Clover. | Alfalfa. |
|---|---|---|---|---|---|---|---|---|---|
| | Lb. | Lb. | Lb. | Lb. | Lb. | Lb. | Lb. | Lb. | Lb. |
| Francois Lake | ..... | ..... | ..... | ..... | ..... | ..... | 12,000 | ..... | ..... |
| Evelyn | 6,000 | 8,000 | 2,000 | ..... | ..... | ..... | ..... | ..... | ..... |
| Telkwa | 18,500 | 53,000 | 2,500 | 3,000 | ..... | ..... | 85,317 | ..... | ..... |
| Quick | 23,400 | 54,050 | 4,800 | ..... | ..... | ..... | ..... | ..... | ..... |
| Barrett Lake | 8,000 | 12,000 | 10,000 | ..... | ..... | ..... | 24,500 | ..... | ..... |
| Hixon | 1,820 | 10,310 | 100 | ..... | 200 | ..... | ..... | ..... | ..... |
| Lytton | 4,000 | 3,000 | 4,000 | ..... | ..... | 10,000 | ..... | ..... | 22,500 |
| Armstrong | 340,625 | 137,860 | 97,119 | ..... | 1,735 | ..... | ..... | 665 | 1,800 |
| North Pine | 18,240 | 12,682 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Rolla | 49,500 | 31,960 | ..... | 1,120 | ..... | ..... | ..... | ..... | ..... |

It is desirable to point out that these cleaning-machines are proving of very great value in the districts in which they are located.

## MISCELLANEOUS CROP INVESTIGATIONS.

*Soy-beans.*—Several tests were conducted in the Fraser Valley and on Vancouver Island with soy-beans. Three varieties were under test—namely, Mandarin, Wisconsin Black, and O.A.C. 211. At the time of writing this report complete results have not been compiled. However, from observations made during the growing season, it would appear that the Wisconsin Black is the earliest maturing variety and that seed can be successfully produced both on the

Lower Mainland and on Vancouver Island. Generally speaking, however, observations would indicate that in the Fraser Valley soy-beans have their chief value as a forage-crop.

*Winter-killing.*—Complaints have been received from time to time respecting winter-killing in alfalfa, clover, and other plants. This condition is being investigated and tests are under way with more hardy strains.

*Field Peas.*—Tests are being conducted in certain districts of the Interior and Central British Columbia with various varieties of field peas, the object being to encourage the production of this crop, particularly in areas where hog production is being advocated by the Live Stock Branch.

*Pastures.*—Your Commissioner was appointed secretary of the Provincial Pasture Committee. A survey of the pasture situation is being undertaken by this committee.

*Pastry-flour Wheat Work.*—The Provincial Committee on pastry-flour wheat, of which your Commissioner is a member, has under way a series of tests in conjunction with the Dominion Cerealist in various parts of the Province. It will take several years to secure information of a definite nature, as the tests will need to be conducted over a period of years.

*Malting Barley.*—Several samples of barley were collected during the year and these have been forwarded to the Dominion Research Laboratory at Winnipeg for examination to ascertain their suitability for malting purposes.

*Soil-analysis.*—Following the practice of the Department for several years, samples of soil have been received by this office and the same have been analysed by the Provincial Analyst.

## PUBLICATIONS.

During the year the Potato Bulletin was revised and a circular on soil-fertility was issued. Also a large number of stencilled circulars on important topics were prepared. In this connection your Commissioner wishes to make special mention of the splendid assistance which has been rendered to the Branch by Paul C. Black, who has written or revised a number of these publications.

## ACKNOWLEDGMENTS.

This report would not be complete without referring to the valuable assistance rendered this Branch during the year by officials of the Federal Department of Agriculture and of the University of British Columbia, and also by the Provincial Analyst. Without such assistance it would be difficult to carry on certain phases of the work satisfactorily. Also the hearty co-operation received from members of this office is greatly appreciated.

Respectfully submitted.

C. Tice,
*Field Crops Commissioner.*

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# REPORT OF SOIL SURVEY BRANCH.

C. C. Kelley, B.S.A.

At the beginning of the fiscal year the Dominion Government, by a 10-per-cent. reduction in the Budget, eliminated a vote provided for the annual assistance of soil surveys in Canada. Through lack of Dominion Government assistance survey-work during the year had to be restricted and kept in line with funds made available by the Province.

R. H. Spilsbury, Draughtsman and General Assistant, was engaged during the winter of 1932–33 in study leading to a postgraduate degree in soils and chemistry. His services were retained from May 17th until October 1st, 1933, when he returned to the University of British Columbia to complete his course.

Other assistance included a part-time chainman, whose services were used as lay-assistant in office and laboratory after the close of the field season.

From January 1st until May 17th, 1933, your Officer in Charge was without assistance. While every effort was extended to complete the annual office-work, it was found to be too much for one man to handle, and some of the work was laid over the field season until the following winter, when the same situation will have to be faced. Consolidation of field-work done during the year is a full-time winter occupation for two men.

Activities during 1933 were divided into three kinds of work: (1) Educational work; (2) miscellaneous soil problems; (3) general soil surveys.

(1.) *Educational Work.*—(*a.*) A glossary of soil terms was prepared. This was released in mimeographed form.

(*b.*) Press articles of educational nature on soils and related subjects were prepared. No difficulty was experienced in getting such materials published.

(*c.*) Bulletin reviews: Owing to the fact that literature on soils is not readily understandable to experts engaged in other fields of endeavour, a number of bulletin reviews were made, interpreting important data for use in areas that have been surveyed and mapped. This material was issued in typewritten form to officials of the Dominion and Provincial Departments of Agriculture.

(*d.*) Farmers' Institutes, the local Rotary Club, and groups arranged by School Boards were addressed on subjects related to soil and soil-management.

(*e.*) Five radio addresses were given during 1933, over CKOV, Kelowna, on soils and soil organic matter. These addresses have been mimeographed for distribution.

(*f.*) A paper was prepared outlining a scientific basis for land settlement.

(2.) *Miscellaneous Soil Problems.*—From time to time, during the summer, farmers in various parts of the valley called upon the Survey staff to visit their farms in connection with soil problems on which they desired explanation and a method of treatment.

The method of visiting farms in connection with individual soil problems is held to be preferable to receiving soil samples for examination. Soil samples taken by the average farmer do not give a representative idea of the quality and texture of the surface soil, and generally do not take the soil profile into account. It is considered important not only to examine the surface soils, but also the subsoil and local climatic conditions. After these three factors have been examined, samples for mechanical analysis are taken from top soils and subsoils by the survey party, and, except where chemical tests are necessary, satisfactory results have been achieved.

Problems involving chemical examination have been left until such time as a service which includes chemical analysis is established.

(3.) *Soil Surveys of Glenmore, Winfield, and Okanagan Centre Areas.*—The Glenmore survey commenced during the last week of May and continued for the succeeding two months. A map-sheet showing soil boundaries and 25-foot contour intervals related to the Okanagan Lake bench-mark was prepared from registered plans. The Glenmore map-sheet covers approximately 8,000 acres on a scale of 400 feet to an inch. Acknowledgment is made to Glenmore municipal authorities for their co-operation in checking plans, roads, flumes, and buried pipe-lines.

The Winfield survey, covering approximately 3,040 acres, and the Okanagan Centre survey of about 5,600 acres followed on completion of the Glenmore survey. The two latter surveys are described on separate map-sheets on a scale of 400 feet to an inch. The area surveyed during 1933 totals approximately 16,640 acres.

An important part of the area making up the total on the three map-sheets is classified as range, which did not require intensive examination. Accurate calculations showing acreage of range and soil types will be given in separate reports, which will deal with the Glenmore, Winfield, and Okanagan Centre areas in detail.

## PROBABLE ORIGIN OF THE OKANAGAN VALLEY AND ITS SOILS.

At different periods in time British Columbia has been subject to mountain-building movements, which have raised and lowered the land in relation to the sea. Each time the land went below the sea a layer of sedimentary rocks was formed, and each time it came up these rocks were partially weathered into soil.

The beginning of a period known as the Tertiary was marked by the rise of the Southern Interior, and other parts of British Columbia, for the last time. There followed a long period of erosion with a more or less humid climate, which created watersheds and valleys and caused the movement of large masses of debris.

The end of the Tertiary period was marked by a series of violent events. Volcanic upheavals and lava-flows spread everywhere. A line of weakness split open to form what is now the Okanagan Valley. Gold-bearing gravels in ancient stream-beds were covered over and cemented into conglomerate masses by the Tertiary lava-flows.

From the standpoint of agriculture the next important era was an ice age, in which a glacier filled the valley. When the glacier finally melted it left unconsolidated deposits of ice and stream origin over large areas.

The consolidated rocks are obscured by water-sorted gravels up to an elevation of nearly 900 feet above the present level of Okanagan Lake. Tributary streams, such as Peachland and Mission Creeks, have built up conspicuous deltas in the form of a series of benches, reaching to the original level of the lake.

The main valley stretches from Shuswap Lake to the International Boundary. It contains lakes of various sizes, formed probably by the collapse of surface deposits following the melting of underlying ice. On the lower slopes of the main valley there are a series of benches or terraces rising to nearly 900 feet above Okanagan Lake. These benches or terraces are interrupted or modified here and there by tributary streams, the more ancient of which have left their deposits at each successive lake-level and have finally built up fan deposits on the lake-shore.

Through the agency of ice, tributary streams, and erosion from the valley-walls great masses of debris have been deposited on the valley-floor. Each different force of formation deposited material of different chemical composition and geological origin. Natural weathering, sorting, and grading within these masses produced in each a family of soil classes similar to one another in so far as the texture of the surface soil is concerned, yet different in chemical nature and physical structure of the soil profile.

In the bottom of the valley we have laminated or plated silts and clays. These are obviously of glacial origin, but they have been subject to secondary sorting and transportation by lake-waters. Higher up on the sides of the valley these silts and clays have been covered by a blanket of soil which has weathered from the valley-walls. This is a sedentary or local type of soil and its characteristics are in relation to the kind of rock from which it weathered. In some cases former shore-lines penetrated these local deposits, resorting this material and forming sandy beaches of different width and extent.

On benches formed by tributary streams a thin blanket of soil has formed and covered the original sands and gravels, which, at a depth of from one to several feet, still exist in their original state. Where the blanket of soil is too thin on stream-benches, and where the depth of sand is too shallow or too coarse on former lake-shore lines, we have the so-called "marginal lands" of the various irrigation districts. These marginal lands require excessive amounts of irrigation-water for ordinary cropping. Failure of the water-supply leads to tree-injury and pathological disease.

## CLIMATE AND THE ORIGIN OF ALKALI.

In British Columbia there are two main soil divisions based on climate. These are the mid-latitude semi-arid soils (Pedocals) and the humid soils in various parts of the Province (Pedalfers). A distinguishing point between the two is alkalinity in the former and acidity in the latter.

The mid-latitude semi-arid type is a salt-accumulating soil, whereas the humid, or coast type, is a salt-losing soil. This essential difference is brought about by the difference in annual precipitation.

The rock-particles which break down into soil are composed of highly complex chemical compounds. The tendency of some of these compounds in the process of disintegration is to break down into simple salts (e.g., sodium chloride or common salt, sodium sulphate or Glauber's salt, magnesium sulphate or Epsom salt, sodium carbonate or washing-soda, lime, etc.).

Where the mean annual precipitation is over 18 inches there is a certain movement of percolating ground-water, which removes salts as they are formed and carries them off into the streams and rivers and finally into the sea. Under these conditions the soil becomes impoverished of bases. It becomes acid, and a weak alkali in the form of lime must be applied to the land to reduce the acid when the acid reaction becomes too strong for healthy plant-growth.

Where the annual precipitation is less than 18 inches the opposite condition exists. The annual run-off is low. Salts form in the soil in the same way as described above, but there is not sufficient annual precipitation to cause an annual movement of percolating ground-water, hence the salts remain in the soil where they form. Where annual run-off is slight the salts form local concentrations in low-lying lands, sloughs, etc., making such places strongly alkaline. Thus, in the mid-latitude soils such as we have in the Okanagan Valley, the salts remain in the land where they form, instead of being leached out.

The formation of salts in Okanagan soils has been going on for a great period of time before the irrigation systems were installed. With the advent of irrigation comes the movement of ground-water for the first time in ages. The salts begin to move from their highly dispersed state, and commence to concentrate at points where topographical relief is favourable. If a grower has an orchard situate on such a point of concentration he will be indeed unfortunate unless proper measures towards the solution of his problem are taken.

This situation gives birth to the alkali problem, for which semi-arid areas under irrigation are noted. As the agriculture of the Okanagan Valley becomes older we will hear more and more about alkali. The only answer to the problem is prevention by means of research and investigation while farm lands subject to salt accumulations are still on a commercial basis.

Thus, in semi-arid districts such as the Okanagan Valley, an artificial climatic change, like the application of irrigation-water, unbalances the scheme of nature and permits the accumulation of salts where topographical features favour their concentration. Under these conditions, unless knowledge and understanding are applied, one generation of fruit-growers will appreciably degrade land values, and influence thereby the fortunes of the succeeding generation.

Other than by observation, no work on the alkali problem has been done to date. To emphasize the need of doing such work it may be said that in dealing with alkali an ounce of prevention is worth a pound of cure.

## SPECIAL WORK.

During July the Survey staff was visited by G. V. Jacks, M.A., B.Sc., Deputy Director, Imperial Bureau of Soil Science, Rothamsted Experimental Station, England, and Dr. D. G. Laird, Ph.D., Associate Professor of Agronomy, University of British Columbia.

These distinguished visitors were conducted to areas that had been surveyed. The soils were examined and the methods used by the Provincial Soil Survey were reviewed. It is satisfactory to report that methods of survey used during the past three years in the Okanagan Valley were approved by both experts.

Following special instructions, a visit was made to the Lillooet District during October for the purpose of examining lands in connection with a contemplated irrigation project to be used as a relief settlement. It was found that soil conditions and acreage available were both inadequate for the particular purpose and the project was dropped.

It may be stated here that in turning in an adverse report sums of money were saved, both to agencies involved and prospective settlers, that would pay the cost of annual soil-survey appropriations for many years.

It is strongly emphasized that all lands to be used for settlement should be examined by the Survey staff. So far as soil productivity is concerned, land settlement can be made fool-proof by the use of the soil survey. In the performance of such work the survey could operate on an enormously profitable basis.

With the exception of Dr. D. G. Laird, Associate Professor of Agronomy, University of British Columbia, and the Provincial Soil Survey staff, there are no official soil experts in British Columbia. This fact should be recognized in all matters pertaining to soil and land settlement. Ignoring the value of soil knowledge has, in the past, cost British Columbia tremendous sums of money.

In the latter part of October work preliminary to a survey in 1934 was done in the Vernon Irrigation District, following application for completion of a soil survey. The area still to be surveyed in the Vernon Irrigation District covers approximately 15,000 acres.

During the past year the field and office work was conducted with two assistants; one technical assistant who acted as surveyor-draughtsman and one lay-assistant. This allowed office and field work to be conducted at the same time. However, such assistance has been seasonal, whereas there is sufficient work for a surveyor-draughtsman the year around. The work cannot be conducted on a satisfactory basis with untrained men. It is therefore suggested that the position of surveyor-draughtsman be made permanent.

There appears to be no call to cover extensive areas in a number of districts each year, or to make large expenditures in order to rush the general survey. Every year certain specific needs arise, and these can be taken care of one at a time. Every argument in connection with soil survey points to a small but permanent staff of two, with one seasonal lay-assistant.

Seasonal staffs cannot gain or store knowledge about difficult problems or plan efficient results. Approximately 86 per cent. of soil-survey appropriation is expended in the form of wages.

It is suggested that the establishment of an office laboratory be considered as one of the ultimate requirements of the Soil Survey. Base exchange, lime content of soils, organic matter, and alkali investigation, and the determination of the characteristics of different parent materials in the establishment of soil series, depend upon chemical analysis.

Respectfully submitted.

C. C. Kelley,
*Officer in Charge, Soil Survey.*

## REPORT OF WOMEN'S INSTITUTE BRANCH.

Mrs. V. S. McLachlan.

In 1931 the total income of only 129 institutes was $56,480.31, but in spite of the heavy drop in revenue over one-quarter of last year's income was spent in direct payments for charity and community betterment, much of it in local relief-work. This sum does not include donations of eggs, fresh and canned fruits and vegetables, and much sewing done by practically every institute either for the local hospital, the Solarium, the Crippled Children's Hospital, or the Salvation Army Hospital.

| | |
|---|---|
| New institutes organized in 1933 | 16 |
| Institutes disbanded in 1933 | 8 |
| Total Women's Institutes | 161 |
| Membership at June 30th, 1933 | 3,752 |
| Receipts of 142 institutes, 1932 | $39,036.00 |
| Cash expenditures on charity and community work in 1932 | 10,783.13 |

The new institutes were organized at Saturna Island and Ganges; Bon Accord, Devereux, Erinlea, Mill Valley, Sunrise Valley, Sunnybrook, Stewart Flats, Tupper and Willow Valley in the Peace River District; Delta and Pinegrove in South Fraser District; Magna Bay and Procter in the Interior.

Since the object of Women's Institutes is "to improve conditions of rural life, so that settlement may be permanent and prosperous," the work is divided into eleven branches. Some of the largest institutes have committees in all eleven branches, but the majority devote themselves to two or three in which they are particularly interested.

### AGRICULTURE.

There were ninety prize books presented by the Department for eighteen institute flower shows. Coquitlam held its first show, but a number of places found they could not finance a show this year.

Potato and Boys' and Girls' Poultry Clubs were organized by a number of institutes, including Beresford, Arras, Sunset Prairie, Vimy, etc.

Kelowna held a seed and plant exchange in the spring and members of the Department have given talks and demonstrations to institutes in many places. Victoria, Langford, Luxton, and Royal Oak Institutes had good exhibits in the Victoria Spring Flower Show.

### COMMUNITY BETTERMENT.

In rural sections the Women's Institute is usually the pivot of efforts for community betterment. They are at the back of the community Christmas-tree, picnics, relief funds, and most social activities, as well as working for the nearest hospital or building the community hall. They have undoubtedly helped considerably to keep up the morale of the people, many of whom are on relief, and inspired continued efforts at self-help. For example, the Arras Institute in the Peace River, finding it is no longer possible to obtain Travelling Libraries, has organized a public library for the general good composed of all available books in the community. Progress, also in the Peace River, last winter held classes under the night-school Act in spinning and knitting, and have now purchased a spinning-wheel, which is loaned out to members at a small charge so that they may spin up their own wool. The Comox Institute has also adopted this plan. All institutes make over and distribute old clothes and never fail to accede to appeals

sent on from this office, of which quite a number are received during the year. Every year news comes in of "showers" organized to help burned-out families.

Although a membership of forty constitutes a large institute, the following is some of the work carried on from year to year: Mount Ida has improved and enlarged the Community Hall. Burton has paid for their hall and deeded it to the community. West Saskatoon, Squamish, and Howe Sound are all building or paying for halls they have already built. Burrard has obtained the lease of the beach at Ioco, cleaned it of logs and rubbish, and keeps it clean and sanitary, so that the beach is becoming a popular resort and near-by shops are profiting. Shawnigan keeps its beach clean and provides a Swimming Instructor during the summer. Nelson runs a Women's Exchange, where members from all over the Kootenay sell their produce and handicrafts at a small commission. Bon Accord in the Peace River sponsored the first Dramatic Festival of the British Columbia Institutes, when four centres competed, and Stewart Flats won what proved to be a most popular event in the community life.

In considering the social activities of institutes, a Secretary's remark throws light on the great need for some such amenities in the long winter: "It is almost pathetic to see the way the women from the country enjoy the monthly meetings." Another Secretary apologized for the fact that they always began with tea and a social hour. She explained that most of the members had walked 4 or 5 miles to the meeting, and, having seen no one but her immediate family since the last meeting, every woman needed "to get her talk out" before settling down to business.

## EDUCATION AND BETTER SCHOOLS.

Large numbers of country institutes provide cocoa or hot soup for school lunches in cold weather, notably at Prince George and Fraser Lake, where members take it in turn to provide soup materials and go to the school to make and serve it each day. Lac la Hache, with only eight or nine members, raised money to purchase lumber for a new school and made their husbands build it. Vernon and Armstrong regularly hold bird-house making and cookery competitions for their children. Grand Forks, West Saskatoon, Balfour, Vernon, Arras, Sunrise Valley, and Edgewood hold sewing and knitting classes for children, and at Armstrong the class proved so popular there had to be an overflow class in the evenings. Finally, an exhibition of work was held, when coats, dresses, suits, smocking, embroidery, etc., were shown. Arras had a manual-training class for boys last winter.

Many institutes take advantage of the provisions of the Night-school Act and have classes with the assistance of the Education Department.

Playground improvement, playground equipment, and first-aid kits are usually the responsibility of the local institute.

## HOME ECONOMICS.

Every opportunity is seized to inspire members to give preference to home and Empire products. Institutes are keen supporters of the British Columbia Products Campaign, and Victoria did outstanding work for the Tudor Rose League.

To improve the standard of women's work at fairs, lectures and demonstrations have been held whenever possible, Mrs. J. D. Gordon, the Provincial President, doing much useful work along these lines. At Vancouver Fair a challenge cup is awarded each year to the institute gaining most points in all classes of needlework, knitting, and lace-making. This year Comox Institute won the cup from Denman Island, last year's winners.

In the interests of economy, institutes are encouraged to make use of particularly proficient members of their own community, and persuade them to give 10- or 15-minute talks or demonstrations in their special line. A list of suggested demonstrations is provided from the office, and frequently we are asked to assist in preparing the talk. They are becoming increasingly popular.

## INDUSTRIES.

The most profitable industry at the present time is the making of wool-filled comforters, using local fleeces. It is a regular source of revenue to many institutes, and wool is also carded up and spun and knitted for warm clothing. One member of Denman Island Institute has purchased a knitting-machine and is making socks for most of the island from local wool. Okanagan Centre and some other institutes make gloves, which sell well in a limited market. Cortes Island is learning to make Indian baskets, taught by an Indian woman.

As there is difficulty in obtaining some handicraft materials in small quantities, two years ago the institutes subscribed for a handicraft fund, with which materials have been purchased and are sold to members at a little over cost price. Mrs. M. E. Watt, Nelson, is in charge of the fund.

## PUBLIC HEALTH AND CHILD-WELFARE.

Institutes interested in this work adopt a policy outlined for them each year by the Provincial Board of Health. Well-baby clinics are held regularly in many centres, notably Nelson, Okanagan Centre, and Rutland, which had six Japanese babies at one clinic. Following the successful dental clinics held two years ago, in co-operation with the Dominion and British Columbia Dental Hygiene Associations, clinics have been held this year at Sicamous, Shuswap Lake, Laidlaw, Cariboo, and Devereux. This last included the adults and afforded immense relief to the patients. Sunrise Valley is now raising funds for a dental clinic for the children who need it urgently.

Whonnock and Ruskin helped to pay the expenses of inoculating the children against diphtheria. Squamish sent a child threatened with blindness down to Vancouver for examination and treatment.

Armstrong organized a much-needed Hospital Auxiliary. The Okanagan institutes contribute in cash and otherwise to the Kelowna Preventorium.

Under the advice of the Board of Health, institutes purchase goitre tablets for the school-children when necessary and distribute much useful health literature.

## IMMIGRATION, LEAGUE OF NATIONS, AND LEGISLATION.

These committees find it hard to get new ideas to interest the members, but the Legislation Committee can always count on a good meeting if the local member of the Legislature is invited to speak on recent enactments for the welfare of the Province. The women are also encouraged to obtain copies of "Votes and Proceedings" through their local member while the House is in session, so that they may have correct information on the work of the Legislature.

## CONFERENCES.

The Department paid the transportation expenses of one delegate from each Peace River institute to the District Conference at Shearerdale, and the Districts of North and South Fraser, South Vancouver Island, and Okanagan each paid the expenses of their own conferences. With the advice and assistance of this office, the programmes were drawn up and stencilled in the office to save the expense of printing. Mrs. McGregor and Mrs. Noble, members of the Board of Directors of the Provincial Women's Institute, attended the Biennial Conference of the Federated Women's Institutes in Winnipeg; the Federated Women's Institutes paying their expenses.

A conference was planned for the Bulkley Valley District (where they have not had one since 1928) and the Superintendent was to attend, but this had to be cancelled on the ground of expense. It was found impossible to hold conferences in the Salmon Arm, Kootenay, and Arrow Lakes Districts.

## OFFICE-WORK.

During the year 1,653 letters and reports have been received and 1,024 sent out, as well as a number of circular letters. Many inquiries have been received regarding wool carding and spinning and information on the making of wool comforters has been sent to England, Scotland, and Sweden, upon request. The Vancouver Social Service recently sent in an urgent appeal for information on the making of fireless cookers. Information on the work of the British Columbia institutes has been supplied for the book of the Rural Women's Liaison Association, and also informataion has been provided for a book entitled "Country Women in Council," a copy of which was sent to the office recently.

Frequent appeals are received from individuals or communities for clothing and other relief. These, subject to the approval of the Relief Committee, are turned over to the nearest institute, and usually amply satisfied.

Respectfully submitted.

MRS. V. S. MCLACHLAN,
*Superintendent, B.C. Women's Institutes.*

# APPENDICES.

## APPENDIX No. 1.

### British Columbia Bulb Surveys, 1929–31–33.

| District. | Narcissi. | | | Tulips (Early). | | | Tulips (Darwin). | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1929. | 1931. | 1933. | 1929. | 1931. | 1933. | 1929. | 1931. | 1933. |
| *Vancouver Island.* | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Victoria | 33½ | 45⅛ | 45¾ | 1⅙ | 1 | 1⅜ | 5½ | 4½ | 8 |
| Cowichan | 4½ | 4⅞ | 7½ | ⅜ | ⅜ | ⅝ | 1½ | 1⅝ | 1¾ |
| Other districts | 1½ | 2½ | 2¼ | 1/250 | 1/40 | 1/32 | ⅓ | 7/16 | ½ |
| Totals | 39½ | 52½ | 55½ | 17/12 | 1⅖ | 2 1/32 | 7⅓ | 6½ | 10¼ |
| *Mainland.* | | | | | | | | | |
| Fraser Valley | 25 7/12 | 30¼ | 26½ | 2⅓ | 5 | ½ | 7 | 8 7/12 | 6¼ |
| Okanagan | ⅛ | 1 | ½ | 1 1/12 | ½ | ½ | 5½ | 5 | 4¼ |
| Kootenay | 11/12 | 1 | 2 | ..... | ¼ | ..... | ⅓ | 2⅓ | 4 |
| Totals | 26⅝ | 32¼ | 29 | 3 5/12 | 5¾ | 1 | 12⅚ | 15 11/12 | 14½ |
| Total B.C. bulb acreage | 66⅛ | 84¾ | 84½ | 5 | 7⅕ | 3 1/32 | 20⅙ | 22½ | 24¾ |

| District. | Hyacinths. | | | Gladioli. | | | Iris (Bearded). | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1929. | 1931. | 1933. | 1929. | 1931. | 1933. | 1929. | 1931. | 1933. |
| *Vancouver Island.* | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Victoria | ⅖ | 1/20 | 3/16 | 4⅔ | 10⅜ | 6⅞ | 1/10 | 1/10 | 1/32 |
| Cowichan | ..... | ..... | ..... | 7¾ | 4½ | 2⅝ | 1 | 1 1/16 | 3/16 |
| Other districts | ..... | ..... | 1/32 | ½ | ⅓ | 1 | ..... | 1/10 | 1/16 |
| Totals | ⅖ | 1/20 | ¼ | 13 | 15¼ | 10½ | 1 1/10 | 1¼ | 9/32 |
| *Mainland.* | | | | | | | | | |
| Fraser Valley | 4¼ | 3½ | 2 | 19½ | 33 1/12 | 25 | 5 7/12 | 3⅜ | 5¼ |
| Okanagan | 1/500 | ..... | ..... | 6½ | 9¾ | 13 | ..... | ..... | ..... |
| Kootenay | ..... | ..... | ..... | ¼ | ⅛ | 1/16 | ..... | ..... | 1⅛ |
| Totals | 4¼ | 3½ | 2 | 26¼ | 43 | 38 1/16 | 5 7/12 | 3⅜ | 6⅜ |
| Total B.C. bulb acreage | 4 13/20 | 3⅗ | 2¼ | 39¼ | 58¼ | 48 9/16 | 6⅔ | 4⅝ | 6⅝ |

| District. | Iris (Other). | | | Dahlias. | | | Other Bulbs. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1929. | 1931. | 1933. | 1929. | 1931. | 1933. | 1929. | 1931. | 1933. | Variety. |
| *Vancouver Island.* | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | |
| Victoria | ⅘ | 1½ | 3¼ | 1¾ | 2¾ | 2 | 1 | 1⅛ | 3½ | Lilies. |
| Cowichan | ¾ | ⅖ | ⅜ | ¾ | 1 | 1½ | ..... | ..... | 2 | Lilies. |
| | | | | | | | | | 1/16 | Peonies. |
| Other districts | 1/125 | ..... | 1/32 | ¼ | ⅙ | ⅛ | ..... | ..... | ..... | ..... |
| Totals | 1½ | 1 9/10 | 3⅝ | 2¾ | 3 11/12 | 3⅝ | 1 | 1⅛ | 5½ | Lilies. |
| | | | | | | | | | 1/16 | Peonies. |
| *Mainland.* | | | | | | | | | | |
| Fraser Valley | 3⅝ | 2⅛ | 4⅝ | 3 7/12 | 4⅔ | 3½ | ⅛ | ¼ | 1¼ | Lilies. |
| | | | | | | | 5 | 6 | 8¾ | Peonies. |
| Okanagan | 1/20 | 1/12 | ¼ | 17/20 | ¼ | 1½ | ..... | ..... | 1⅓ | Lilies. |
| | | | | | | | | | ¼ | Peonies. |
| Kootenay | 1/200 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 3 7/10 | 2¼ | 4⅞ | 4½ | 4 11/12 | 5 | ⅛ | ¼ | 2 7/12 | Lilies. |
| | | | | | | | 5 | 6 | 9 | Peonies. |
| Total B.C. bulb acreage | 5⅕ | 4¼ | 8½ | 7¼ | 9 | 8⅝ | 1⅛ | 1⅜ | 8 1/12 | Lilies. |
| | | | | | | | 5 | 6 | 9 1/16 | Peonies. |

Total bulb acreages: 1929, 159⅓ acres; 1931, 200 acres; 1933, 203½ acres.

## APPENDIX No. 2.

### Greenhouse Surveys, 1923–33.

| District. | No. of Growers. | | | | | | Area in Square Feet. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1923. | 1925. | 1927. | 1929. | 1931. | 1933. | 1923. | 1925. | 1927. | 1929. | 1931. | 1933. |
| Lower Mainland (whites) | 45 | 56 | 70 | 80 | 81 | 91 | 690,480 | 782,154 | 843,720 | 1,081,868 | 1,042,634 | 1,079,359 |
| Lower Mainland (Orientals) | 2 | 6 | 8 | 14 | 32 | 39 | 163,670 | 208,794 | 254,590 | 382,117 | 666,639 | 705,124 |
| Vancouver Island (whites) | 51 | 65 | 88 | 110 | 128 | 143 | 570,930 | 567,357 | 663,653 | 746,324 | 856,685 | 918,762 |
| Vancouver Island (Orientals) | 9 | 15 | 18 | 22 | 34 | 36 | 382,382 | 654,664 | 844,095 | 1,018,024 | 1,222,883 | 1,271,291 |
| Okanagan | 8 | 12 | 21 | 23 | 16 | 20 | 67,770 | 80,650 | 116,277 | 117,177 | 121,345 | 135,605 |
| Kootenay | 5 | 8 | 9 | 11 | 12 | 12 | 29,948 | 33,737 | 42,427 | 40,171 | 38,216 | 42,523 |
| Totals | 120 | 162 | 214 | 260 | 303 | 341 | 1,905,180 | 2,327,356 | 2,764,762 | 3,385,681 | 3,948,402 | 4,152,664 |
| White growers | 109 | 141 | 188 | 224 | 237 | 266 | 1,359,128 | 1,463,898 | 1,666,077 | 1,985,540 | 2,058,880 | 2,176,249 |
| Oriental growers | 11 | 21 | 26 | 36 | 66 | 75 | 546,052 | 863,458 | 1,098,685 | 1,400,141 | 1,889,522 | 1,976,415 |

## APPENDIX No. 3.

### Stone-fruit Plantings, 1931, 1932, and 1933.

| District. | Peaches. | | | | Apricots. | | | | Plums and Prunes. | | | | Cherries. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1930. | 1931. | 1932. | New Planting, 1933. | 1930. | 1931. | 1932. | New Planting, 1933. | 1930. | 1931. | 1932. | New Planting, 1933. | 1930. | 1931. | 1932. | New Planting, 1933. |
| Salmon Arm | 34 | ..... | ..... | ..... | 45 | ..... | 10 | 15 | 3,615 | 100 | 75 | 100 | 1,433 | 100 | 50 | 100 |
| Vernon | 1,193 | 500 | 874 | 957 | 2,071 | 500 | 165 | 435 | 19,702 | 800 | 1,392 | 1,634 | 2,248 | 200 | 646 | 242 |
| Kelowna | 983 | 800 | 500 | 300 | 1,041 | 500 | 1,000 | 250 | 8,580 | 800 | 1,500 | 750 | 6,896 | 300 | 350 | 400 |
| Westbank | 505 | ..... | 126 | 86 | 1,271 | ..... | ..... | ..... | 1,861 | ..... | 202 | 150 | 1,238 | ..... | ..... | ..... |
| Peachland | 4,169 | 1,000 | 1,623 | 1,380 | 358 | 75 | 25 | 54 | 950 | 25 | 215 | 33 | 1,285 | ..... | 50 | 128 |
| Naramata | 2,944 | 665 | 1,612 | 1,217 | 4,191 | 50 | 839 | 436 | 924 | 25 | 62 | 191 | 2,642 | 150 | 25 | 90 |
| Summerland | 7,154 | 825 | 2,365 | 3,179 | 11,197 | 175 | 626 | 1,031 | 5,597 | 35 | 218 | 505 | 5,241 | 499 | 125 | 165 |
| Penticton and South | 30,175 | 11,082 | 8,860 | 13,172 | 23,596 | 2,246 | 1,099 | 4,040 | 6,489 | 504 | 133 | 1,524 | 9,703 | 2,775 | 29 | 960 |
| Totals | 47,157 | 14,872 | 15,960 | 20,291 | 43,770 | 3,546 | 3,764 | 6,261 | 47,718 | 2,289 | 3,797 | 4,887 | 30,686 | 4,024 | 1,275 | 2,085 |
| | 98,280 | | | | 57,341 | | | | 58,691 | | | | 38,070 | | | |

### *Summary.*

| | 1931. | 1932. | 1933. | Total. |
|---|---|---|---|---|
| Total new tree-plantings— | | | | |
| Peaches | 14,872 | 15,960 | 20,291 | 51,123 |
| Apricots | 3,546 | 3,764 | 6,261 | 13,571 |
| Plums and prunes | 2,289 | 3,797 | 4,887 | 10,973 |
| Cherries | 4,024 | 1,275 | 2,085 | 7,384 |
| Totals | 24,731 | 24,796 | 33,524 | 83,051 |

*Percentage Total Plantings made 1931–32–33.*—Peaches, 52 per cent.; apricots, 23.6 per cent.; plums and prunes, 18.6 per cent.; cherries, 19.3 per cent.

Note.—In the orchard survey of 1930, acreage computed on the number of trees per acre as follows: Peaches, apricots, plums, and prunes, 100 trees; cherries, 60 trees.

## APPENDIX No. 4.

### Codling-moth Spray Tests, Kelowna, 1933—Pridham Orchard, Salome Block.

Original infestation, 1931, 42 per cent. worms, 14.5 per cent. stings. This block consists of 160 trees, average age 30 years. Block divided into six plots. Counts were made from three average trees in each plot.

| Plot No. | Sprays. | | | | | No. of Apples examined. | No. of Worms. | No. of Stings. | Percentage, 1933. | | Percentage, 1932. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | May 17–19, Calyx. | June 7–9, 2. | June 22–28, 3. | Aug. 7–9, 4. | Aug. 24–25, 5. | | | | Worms. | Stings. | Worms. | Stings. |
| 1 | x | x | x | x | x | 10,336 | 2 | 170 | 0.02 | 1.65 | 1.40 | 9.5 |
| 2 | x | x | x | x | — | 9,722 | 23 | 120 | 0.24 | 1.24 | 2.25 | 12.2 |
| 3 | x | x | — | x | x | 7,295 | 35 | 162 | 0.48 | 2.20 | 3.10 | 12.3 |
| 4A | — | x | x | x | x | 11,576 | 44 | 256 | 0.38 | 2.20 | 3.60 | 13.2 |
| 4B | — | x | x | x | — | 9,568 | 102 | 550 | 1.00 | 5.75 | ..... | ..... |
| 5 | x | x | — | x | — | 9,864 | 22 | 296 | 0.23 | 3.00 | 2.55 | 15.2 |

All sprays consisted of 3 lb. Arsenate of Lead to 80 gallons (imperial) of water. Spreader was used in all sprays, at the rate of 1 lb. to 240 gallons, excepting the calyx-spray.

Crosses indicate sprays applied. Dashes indicate sprays omitted.

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## APPENDIX No. 5.

### Codling-moth Spray Tests, Kelowna, 1933.

Original infestation in 1930, 30 per cent. worms, 8 per cent. stings. Trees over 25 years old. Counts made from three average trees.

| Plot No. | Kind of Sprays. | May 17–19. | June 7–9. | June 7. | No. of Apples examined. | No. of Worms. | No. of Stings. | Percentage, 1933. | | Percentage, 1932. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Worms. | Stings. | Worms. | Stings. |
| 1 | L.A. | x | x | x | 6,783 | 61 | 191 | 0.90 | 2.80 | 1.27 | 5.2 |
| 2 | C.A. | x | x | x | 10,036 | 58 | 182 | 0.58 | 1.72 | ..... | .... |

Legend—L.A., Lead Arsenate. C.A., Calcium Arsenate.

No spreader was used in the Lead Arsenate sprays, which were applied at the rate of 3 lb. of Arsenate of Lead to 80 gallons of water. Calcium Arsenate first used in this experiment in 1933 was applied at the rate of 10 lb. to 240 gallons of water. No burning resulted from the use of this material on Jonathan, Salome, or McIntosh apples in 1933.

## APPENDIX No. 6.

### Cow-testing Associations in British Columbia, 1933.

| Name. | Instituted. | Secretary. | Supervisor. | Departmental Grant. |
|---|---|---|---|---|
| Bulkley Valley | Oct., 1926 | O. Ekman, Telkwa | J. E. Manning | $900.00 |
| Chilliwack, Route 1 | March, 1913 | W. S. Annis, R.R. 1, Chilliwack | J. J. Andrews | 600.00 |
| Chilliwack, Route 2 | Nov., 1928 | W. S. Annis, R.R. 1, Chilliwack | A. H. R. Howell | 600.00 |
| Chilliwack, Route 3 | April, 1927 | W. S. Annis, R.R. 1, Chilliwack | A. S. Dixon | 600.00 |
| Comox Valley | ,, 1914 | W. E. Mantle, Sandwick | T. G. M. Clarke | 600.00 |
| Dewdney-Deroche | Oct., 1930 | D. W. Strachan, Dewdney | G. Jess | 600.00 |
| Langley | June, 1914 | J. C. Berry, Langley | Wm. Rose | 600.00 |
| North Okanagan | July, 1929 | B. H. Morris, Enderby | Alf. Johnson | 600.00 |
| Okanagan | April, 1920 | G. D. Cameron, Kelowna | Wm. Hooson | 600.00 |
| Pitt Meadows-Maple Ridge | Nov., 1925 | C. S. Pallot, Pitt Meadows | W. E. Hawthorne | 600.00 |
| Richmond-Ladner, Route 1 | March, 1919 | R. J. Smith, R.R. 1, Ladner | G. H. Medd | 600.00 |
| Richmond-Ladner, Route 2 | ,, 1930 | R. J. Smith, R.R. 1, Ladner | D. S. Heelas | 600.00 |
| Sumas-Matsqui | Nov., 1923 | B. Stewart, R.R. 2, Abbotsford | R. A. Wilson | 600.00 |
| Surrey | ,, 1924 | F. McKinnon, Cloverdale | H. C. Clark | 600.00 |
| Vancouver Island (South) | April, 1929 | R. Rendle, 1118 Johnson Street, Victoria | G. G. Grimes | 600.00 |

## APPENDIX No. 7.

### Creamery Licences issued during 1933.

| Name. | Address. |
|---|---|
| Associated Dairies, Ltd. | 405 Eighth Avenue West, Vancouver. |
| Associated Dairies, Ltd. (Valley Dairy, Ltd.) | 1569 Sixth Avenue West, Vancouver. |
| Avalon Dairy | Wales Street and Forty-third Avenue, Vancouver. |
| Bell, Wm. | Central Dairy, Nanaimo. |
| Borden Co., Ltd., The | Sardis. |
| Burns & Co. | Creamery Dept., Woodland Drive, Vancouver. |
| Cariboo Farmers' Co-operative Association | Quesnel. |
| Cloverleaf Dairy | 1508 Hastings Street East, Vancouver. |
| Columbia Valley Co-op. Creamery Association | Golden. |
| Clark's Hygienic Dairy, Ltd. | 1001 Pender Street West, Vancouver. |
| College Dairies (1928), Ltd. | Rear 1156 Pender Street West, Vancouver. |
| Comox Creamery Association | Courtenay. |
| Cowichan Creamery Association | Duncan. |
| Crystal Dairy, Ltd. | Cranbrook. |
| Empress Dairies, Ltd. | 1002 Hastings Street West, Vancouver. |
| East End Dairy | 2469 Oxford Street, Vancouver. |
| Fraser Valley Milk Producers' Association | 425 Eighth Avenue West, Vancouver. |
| Fraser Valley Milk Producers' Association | Sardis. |
| Fraser Valley Milk Producers' Association | Abbotsford. |
| Gibson's Dairy Produce, Ltd. | 7 Hastings Street West, Vancouver. |
| Hazelwood Creamery Co., Ltd. | 351 Keefer Street, Vancouver. |
| Hilton Dairy | 6395 Fraser Avenue, Vancouver. |
| Jersey Farms, Ltd. | 2256 Broadway West, Vancouver. |
| Kelowna Creamery Co., Ltd. | Kelowna. |
| Keremeos Creamery | Keremeos. |
| Lake Windermere Creamery | Invermere. |

## APPENDIX No. 7—*Continued.*

### Creamery Licences issued during 1933—*Continued.*

| Name. | Address. |
|---|---|
| Model Dairy | 3342 Kingsway, Vancouver. |
| Alf. Miller | Prince George. |
| Marlborough Dairy | 3507 Sanders Street, Burnaby. |
| Nanaimo Creamery Association | Nanaimo. |
| Nechaco Farmers' Institute | Vanderhoof. |
| National Dairies, Ltd | 1132 Hastings Street East, Vancouver. |
| Northwestern Creamery, Ltd | 1311 Broad Street, Victoria. |
| Okanagan Dairy | Penticton. |
| Okanagan Valley Co-op. Creamery Association | Vernon. |
| Okanagan Valley Co-op. Creamery Association | Enderby. |
| Palm Dairies, Ltd | Kamloops. |
| Palm Dairies, Ltd | Grand Forks. |
| Palm Dairies, Ltd | Nelson. |
| Palm Dairies, Ltd | Nelson and Cambie Streets, Vancouver. |
| Palm Dairies, Ltd | 930 North Park Street, Victoria. |
| Port O'Van Ice Cream, Ltd | 1170 Hornby Street, Vancouver. |
| Pouce Coupe District Co-op. Creamery Assn | Pouce Coupe. |
| Ridley, Albert A. J | 2153 Marine Drive, West Vancouver. |
| Royal City Creamery | 309 Sixth Street, New Westminster. |
| Royal Dairy, Ltd. | 707 View Street, Victoria. |
| Salmon Arm Co-op. Creamery Association | Salmon Arm. |
| Salt Spring Island Creamery Co | Ganges. |
| Turner's Dairy | 361 Kingsway, Vancouver. |
| Steves, J. M., Dairy | 2024 Twelfth Avenue West, Vancouver. |
| Twigg Island Dairy | 735 Twenty-ninth Avenue East, Vancouver. |
| Valentin Dairy | Prince Rupert. |
| Valley Creamery, Ltd | Penticton. |
| Victoria City Dairy Co., Ltd. | 1111 Fort Street, Victoria. |
| White Lunch, Ltd | 124 Hastings Street West, Vancouver. |

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## APPENDIX No. 8.

### Milk-testers' Licences issued during 1933.

| Name. | Address. |
|---|---|
| Antilla, Lawrence E | Vernon. |
| Andrews, J. J | Chilliwack. |
| Atkinson, L. A | 425 Eighth Avenue West, Vancouver. |
| Bickert, R. H | Vernon. |
| Campbell, T. | Vernon. |
| Chevalley, F | Sardis. |
| Chevalley, P | Abbotsford. |
| Christie, C. E | Ocean Falls. |
| Clark, H. C | Cloverdale. |
| Clarke, T. G. M | Courtenay. |
| Colwell, C | Courtenay. |
| Coxen, W. G | 1111 Fort Street, Victoria. |
| Cranswick, P. | 1002 Hastings Street West, Vancouver. |
| Davis, R. L | 4446 Sixth Avenue West, Vancouver. |
| Dixon, A. S | Atchelitz. |
| Davidson, W | 2837 Second Avenue East, Vancouver. |

APPENDIX No. 8—*Continued.*

MILK-TESTERS' LICENCES ISSUED DURING 1933—*Continued.*

| Name. | Address. |
|---|---|
| Grimes, G. G. | 4405 Sixth Avenue West, Vancouver. |
| Gibbs, J. | 930 North Park Street, Victoria. |
| Gates, H. C. | 2155 Fourteenth Avenue West, Vancouver. |
| Hall, F. D. B. | Chilliwack. |
| Hawthorne, W. E. | Pitt Meadows. |
| Hansen, Knute | Prince George. |
| Heelas, D. S. | 2350 Thirty-seventh Avenue West, Vancouver. |
| Hooson, Wm. E. | Kelowna. |
| Hoffman, W. | 1569 Sixth Avenue West, Vancouver. |
| Holm, C. | 3121 Clinton Street, New Westminster. |
| Holmes, J. | 2685 Victoria Drive, Vancouver. |
| Howell, A. H. R. | Chilliwack. |
| Hoy, N. D. | 4426 Hudson Avenue, Vancouver. |
| Hurley, M. H. | 1111 Fort Street, Victoria. |
| Hyke, Fred. G. | 1520 Sixth Avenue West, Vancouver. |
| Johnson, Wm. G. | Nelson. |
| Jess, Geddes | Dewdney. |
| Kendall, Walter G. | 425 Eighth Avenue West, Vancouver. |
| Kirkby, Wm. | 2814 Sophia Street, Vancouver. |
| Lord, W. C. | Penticton. |
| Livingstone, John B. | 1001 Pender Street West, Vancouver. |
| Main, T. | Agassiz. |
| Martin, Geo. R. | 405 Eighth Avenue West, Vancouver. |
| Metcalfe, J. F. | 3436 Oak Street, Vancouver. |
| Manning, J. E. | Telkwa. |
| Medd, G. H. | Fort Langley. |
| McLeary, Sam | Cranbrook. |
| Miller, Alfred | Prince George. |
| Miller, R. C. | 2675 Maple Street, Vancouver. |
| Monteith, W. J. | 735 Twenty-ninth Avenue East, Vancouver. |
| Moore, J. S. | 709 Fourteenth Street, New Westminster. |
| Norton, F. H. A. | 1311 Broad Street, Victoria. |
| Orr, J. B. | R.R. 1, Sardis. |
| Ridley, Albert A. J. | 2153 Marine Drive, West Vancouver. |
| Robertson, J. H. | Kamloops. |
| Rochon, J. | 1508 Hastings Street East, Vancouver. |
| Rose, Wm. | Langley Prairie. |
| Staheli, H. | Vancouver. |
| Skelley, E. | Enderby. |
| Strachan, Jos. | 325 Railway Street, Vancouver. |
| Taylor, E. W. | 325 Railway Street, Vancouver. |
| Turner, L. H. | 371 Kingsway, Vancouver. |
| Valentin, H. B. M. | Prince Rupert. |
| Washington, F. J. | 405 Eighth Avenue West, Vancouver. |
| Waterman, Rex H. | Abbotsford. |
| Wells, B. | Abbotsford. |
| West, Chas. | Wales Street and Forty-third Ave., Vancouver. |
| Wilson, R. A. | Abbotsford. |

## APPENDIX No. 9.

### Combined Milk-testers' and Cream-graders' Licences issued during 1933.

| Name. | Address. |
|---|---|
| Arndt, Gus | Kelowna. |
| Anderson, J. D. | Quesnel. |
| Anderson, A. H. | Box 1020, Kamloops. |
| Akerman, J. E. | Ganges. |
| Batey, H. S. | c/o Northwestern Creamery, Victoria. |
| Carroll, W. J. | Courtenay. |
| Dunn, J. S. | 553 Fifth Street, Nanaimo. |
| Dungate, W. | Houston. |
| Dunn, J. S., Jr. | Invermere. |
| Drake, A. W. | Ganges. |
| Ellis, Jack | 7582 Prince Edward Street, Vancouver. |
| Higham, C. J. | 2342 Frederick Street, Burnaby. |
| Hargreaves, J. A. D. | 145 Fifty-third Avenue East, Vancouver. |
| Jenne, H. H. | Nelson. |
| James, D. A. | 3508 Eighteenth Avenue West, Vancouver. |
| Johnson, Alfred | Salmon Arm. |
| Kell, Geo. | 309 Sixth Street, New Westminster. |
| Lamb, Ernest | Vanderhoof. |
| Morse, A. O. | 1750 Eighth Avenue West, Vancouver. |
| Moss, J. | Box 324, Kelowna. |
| Muraro, W. | Nelson. |
| Maslen, W. F. | Pouce Coupe. |
| McAllister, C. W. | 707 View Street, Victoria. |
| McKerricher, W. R. | 134 Eleventh Avenue West, Vancouver. |
| McPhail, G. A. | Salmon Arm. |
| Patten, L. W. | Vernon. |
| Patchett, Geo. | Duncan. |
| Pyvis, Roy T. | Box 152, Chilliwack. |
| Quaedvlieg, E. J. | Keremeos. |
| Reid, Sydney, E. | 342 Fourteenth Avenue East, Vancouver. |
| Rive, Chas. | 2256 Broadway West, Vancouver. |
| Rodger, J. M. | Courtenay. |
| Rolph, E. N. | Box 426, Kamloops. |
| Ross, P. B. | 2012 Twelfth Avenue West, Vancouver. |
| Saunders, H. T. | Box 10, Prince Rupert. |
| Sloan, J. G. | Nanaimo. |
| Skelton, R. J. | Salmon Arm. |
| Smith, Robert | 3342 Kingsway, Vancouver. |
| Thomson, F. D. | Quesnel. |
| Valentine, Victor | 124 Hastings Street West, Vancouver. |
| Woods, R. H. | Penticton. |
| Warburton, S. | 2473 Galt Street, Vancouver. |
| White, C. J. | 58 Fifty-ninth Avenue West, Vancouver. |
| Woodworth, L. | 2150 Adanac Street East, Vancouver. |
| Wise, Harold | 1001 Pender Street West, Vancouver. |

## APPENDIX No. 10.

### British Columbia Awards at the World's Grain Exhibition, Regina, 1933.

*Class 1—Hard Red Spring Wheat.*

7. J. W. Abbott, Baldonnel.
15. W. G. Gibson, Ladner.
40. G. H. Hiffernan, Rolla.
42. Geo. Hutchinson, Kamloops.
49. F. R. E. DeHart, Kelowna.
50. W. Rogers, Tappen.

*Class 1A—White Spring Wheat.*

23. M. S. Middleton, Vernon.

*Class 2—Hard Red Winter Wheat.*

5. R. Wood, Armstrong.
39. F. R. E. DeHart, Kelowna.

*Class 3—Soft Red Winter Wheat.*

5. W. D. Michell, Keating.
10. F. R. E. DeHart, Kelowna.
11. T. R. French, Vernon.
12. M. S. Middleton, Vernon.

*Class 4—White Winter Wheat.*

1. A. J. Fisher, Armstrong.
3. F. R. E. DeHart, Kelowna.
5. J. P. Thompson, Canoe.
6. J. Fowler, Armstrong.
15. M. S. Middleton, Vernon.
17. B. Young, Koksilah.
19. Mike Luniw, Armstrong.

*Class 5—Durum Wheat.*

33. M. S. Middleton, Vernon.

*Class 6—White Medium or Late Oats.*

6. A. McMillan, Evelyn.
20. W. Montgomery, R.R. 1, New Westminster.
21. D. Montgomery, R.R. 1, Ladner.
30. Dominion Experimental Farm, Agassiz.

*Class 7—Yellow Medium or Late Oats.*

36. M. S. Middleton, Vernon.

*Class 8—Early Oats.*

3. W. G. Gibson, Ladner.

*Class 9—Six-rowed (Manchurian Type) Barley.*

1. Mattock Bros., Rayleigh Mount.
10. M. S. Middleton, Vernon.

*Class 10—Six-rowed (Trebi Type) Barley.*

11. M. S. Middleton, Vernon.

*Class 11—Two-rowed (Chevalier Type) Barley.*

10. W. Rogers, Tappen.
13. M. S. Middleton, Vernon.

*Class 12—Two-rowed (Duckbill or Thorpe Type) Barley.*

1. W. Rogers, Tappen.
7. W. G. Gibson, Ladner.
11. M. S. Middleton, Vernon.
28. B. Young, Koksilah.

*Class 13—Hull-less Barley.*

6. M. S. Middleton, Vernon.
14. R. B. McKechnie, Armstrong.
16. T. R. French, Vernon.

*Class 16—Flint Corn (Varieties requiring less than 110 days to mature).*

12. M. S. Middleton, Vernon.
16. Mrs. A. Kelsey, Erickson.

*Class 18—Any Named Variety of Rye.*

1. M. S. Middleton, Vernon.
14. N. E. Sjodin, Notch Hill.
17. T. R. French, Vernon.

*Class 20—Silver Hulled Buckwheat.*

12. M. S. Middleton, Vernon.
13. Dominion Experimental Farm, Agassiz.

*Class 23—Foxtail Type Millet.*

1. M. S. Middleton, Vernon.

*Class 24—Any Type other than Foxtail Millet.*

4. Mattock Bros., Rayleigh Mount.
9. M. S. Middleton, Vernon.

*Class 25—Large White or Yellow Field Peas.*

1. W. G. Gibson, Ladner.
2. Ronayne Bros., Pemberton.
3. C. E. Eckert, Yarrow.
5. W. D. Michell, Keating.
8. Mattock Bros., Rayleigh Mount.
9. C. W. Stirling, Sidney.

*Class 26—Small White or Yellow Field Peas.*

19. Ronayne Bros., Pemberton.

*Class 27—Any other Type or Colour Field Peas.*

2. W. D. Michell, Keating.
9. W. R. McIntosh, Vancouver.

*Class 28—Canners' Field Peas.*

1. Dominion Experimental Farm, Windermere.
12. Mattock Bros., Rayleigh Mount.
14. W. G. Gibson, Ladner.
17. Kolling & Pauli, Woodpecker.

*Class 29—White Medium or Large Field Beans.*

9. Mrs. A. Gibson, Ladner.

## APPENDIX No. 10—*Continued.*

BRITISH COLUMBIA AWARDS AT THE WORLD'S GRAIN EXHIBITION, REGINA, 1933—*Continued.*

*Class 30—White Small Field Beans.*

13. Mattock Bros., Rayleigh Mount.

*Class 32—Yellow or Greenish Yellow Soy-beans.*

17. M. S. Middleton, Vernon.

*Class 33—Any other Colour Soy-beans.*

2. M. S. Middleton, Vernon.

*Class 35—Flax-seed for Fibre.*

4. M. S. Middleton, Vernon.

*Class 36—Seed of any Variety of Hemp.*

1. J. Turner, Cadboro Bay.

*Class 37—Alfalfa or Lucerne Seed of any Variety.*

10. J. W. Abbott, Baldonnel.
17. A. M. Ruddock, Lytton.

*Class 38—Red-clover Seed.*

11. F. A. Beharrell, Matsqui.

*Class 39—Alsike-clover Seed.*

10. E. J. Down, Woodpecker.

*Class 40—Sweet-clover Seed.*

14. N. D. Dow, Pouce Coupe.

No entries in Classes 43, 44, 45, and 46.

*Class 47—Meadow-fescue Seed.*

2. W. P. Boden, Streatham.

No entries in Classes 48 and 49.

*Class 50—Sunflower Seed.*

1. Mattock Bros., Rayleigh Mount.
6. M. S. Middleton, Vernon.

*Class 51—Mangel Seed (any Variety).*

1. J. M. Steves, Steveston.
4. James Canadian Seeds, Ltd., Duncan.
6. Mattock Bros., Rayleigh Mount.
7. B. J. A. Campbell, Glen Valley.
8. R. Brett, Chilliwack.
9. J. E. Deloume, R.R. 1, Cobble Hill.

*Class 52—Swede Turnip or Rutabaga Seed (any Variety).*

1. A. Marlow, Beaver Creek P.O., Alberni.
2. J. E. Deloume, R.R. 1, Cobble Hill.

*Class 53—Sugar-beet Seed (any Variety).*

1. Mattock Bros., Rayleigh Mount.

*Class 54—Grower's Collection of Garden Vegetable Seeds.*

1. Mattock Bros., Rayleigh Mount.
6. James Canadian Seeds, Ltd., Duncan.
7. Sunset Seed Co., Keating.

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## APPENDIX No. 11.

BRANDS RECORDED, RENEWED, ETC., DURING 1933.

| | Recorded. | Renewed. | Reissued. | Transferred. | Total. |
|---|---|---|---|---|---|
| Cattle-brands | 175 | 169 | 68 | 21 | 433 |
| Horse-brands | 83 | 96 | 29 | 6 | 214 |

Number of licences issued: Hide-dealers, 41; slaughter-house, 36; beef-peddlers, 3.

CATTLE AND HIDE SHIPMENTS, 1933.

*Cariboo.*

| | Cattle. | Hides. |
|---|---|---|
| Williams Lake | 6,526 | 703 |
| Lac la Hache, Soda Creek, and Quesnel | 739 | 449 |
| Clinton, Lone Butte, 100-Mile, and Lillooet | 3,349 | 774 |
| Totals | 10,614 | 1,926 |

APPENDIX No. 11—*Continued.*

CATTLE AND HIDE SHIPMENTS, 1933—*Continued.*

| | Cattle. | Hides. |
|---|---|---|
| *Kamloops, Nicola, etc.* | | |
| Kamloops and Chase | 2,084 | 2,295 |
| Nicola | 4,452 | 1,157 |
| Ashcroft and Lytton | 922 | 498 |
| Salmon Arm | 2 | 522 |
| Totals | 7,460 | 4,472 |
| *Okanagan.* | | |
| Vernon and Lumby | 128 | 2,651 |
| Armstrong and Enderby | 121 | 650 |
| Kelowna | 43 | 1,799 |
| Penticton | 205 | 1,037 |
| Totals | 497 | 6,137 |
| *Similkameen.* | | |
| Keremeos | 310 | 303 |
| Oliver | 231 | 549 |
| Princeton | 140 | 591 |
| Coalmont | 141 | 261 |
| Totals | 822 | 1,704 |
| *South-east British Columbia.* | | |
| Grand Forks and Greenwood | 114 | 1,636 |
| Nelson, Creston, etc. | 2 | 2,098 |
| Cranbrook, Fernie, etc. | 26 | 2,464 |
| Golden, Revelstoke, etc. | 30 | 1,387 |
| Totals | 172 | 7,585 |
| *Central British Columbia.* | | |
| Prince George, Vanderhoof, etc. | 278 | 632 |
| Smithers, Telkwa, etc. | 203 | 853 |
| Burns Lake | ..... | 426 |
| Totals | 481 | 1,911 |
| *Peace River.* | | |
| Pouce Coupe, Fort St. John, Dawson Creek, and Rolla | 448 | 348 |

*Totals compared.*

| District. | 1931. | | 1932. | | 1933. | |
|---|---|---|---|---|---|---|
| | Cattle. | Hides. | Cattle. | Hides. | Cattle. | Hides. |
| Cariboo | 11,223 | 693 | 10,928 | 377 | 10,614 | 1,926 |
| Kamloops and Nicola | 8,153 | 3,784 | 7,952 | 2,509 | 7,460 | 4,472 |
| Okanagan | 1,047 | 3,848 | 598 | 1,322 | 497 | 6,137 |
| Similkameen | 579 | 452 | 927 | 159 | 822 | 1,704 |
| South-east British Columbia | 189 | 3,238 | 284 | 1,131 | 172 | 7,585 |
| Central British Columbia | 242 | 104 | 801 | 49 | 481 | 1,911 |
| Peace River | 420 | 107 | 852 | 8 | 448 | 348 |
| Totals | 21,853 | 12,226 | 22,342 | 5,555 | 20,494 | 24,083 |

## APPENDIX No. 12.

### Publications issued by the Department of Agriculture during 1933.

| Name. | Description. | No. |
|---|---|---|
| First Studies in Mendelism | Dairy Circ. 24 | 3,000 |
| Second List of Dairy Sires | Dairy Circ. 22 | 1,500 |
| Milk and Butter-fat Records, 1932 | Dairy Circ. 23 | 1,000 |
| Woolly Aphid of the Apple | Hort. Circ. 34 | 1,000 |
| Field Crop and Garden Spray Calendar | | 1,500 |
| Fruit Spray Calendar | | 2,000 |
| The Potato in B.C. | Bulletin 86 | 3,000 |
| Soil Fertility | Field Crop Circ. 11 | 2,000 |
| Blackberry Culture | Hort. Circ. 57 | 1,000 |
| Gardening on a City Lot | Hort. Circ. 43 | 3,000 |
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