THIRTEENTH ANNUAL REPORT

—OF THE—

FARMERS' INSTITUTES OF BRITISH COLUMBIA

—AND—

MINUTES OF THE PROCEEDINGS

—OF THE—

FOURTEENTH CONVENTION OF THE CENTRAL FARMERS' INSTITUTE.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA.

PRINTED BY AUTHORITY OF
THE LEGISLATIVE ASSEMBLY OF BRITISH COLUMBIA.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1912.

DEPARTMENT OF AGRICULTURE,
VICTORIA, B.C., May 1st, 1912.

The Hon. Price Ellison,
Minister of Agriculture.

SIR,—I have the honour to transmit herewith the Thirteenth Report of the Farmers' Institutes of British Columbia, embodying the proceedings of the Fourteenth Annual Convention of the Central Farmers' Institute, held in the Botanical Chambers of the Department of Agriculture, Victoria, B.C., on January 25th, 26th, and 27th, 1912.

I have the honour to be,
Sir,
Your obedient servant,
WM. E. SCOTT,
Deputy Minister of Agriculture,
Superintendent of Farmers' Institutes.

THIRTEENTH ANNUAL REPORT

OF THE

FARMERS' INSTITUTES OF BRITISH COLUMBIA

AND

Minutes of the Proceedings of the Fourteenth Annual Convention of the Central Farmers' Institute.

The appended statement giving record of institute meetings held throughout British Columbia indicates the progress that has been made by the Department of Agriculture along the lines of theoretical instruction in agriculture. The increased membership of the institutes in existence prior to 1911, as also the additional institutes that have since been formed throughout the Province, clearly demonstrate the success of the work of the Department of Agriculture so far as the institutes are concerned. It would appear that the members are quick to realize the advantages of being associated with the institutes, such as the obtaining of stumping-powder at a cheap rate; the reduced transportation of same as granted by the railway companies; the lectures delivered by experts in the different branches of agriculture as sent out at the expense of the Provincial Government, and other concessions granted or secured by the Department of Agriculture.

In regard to the work of the institutes for the year 1912, a further incentive has been created, and the Department has arranged for the donating of prizes to institutes for best-prepared essays by the members delivered at some or other meetings of each respective institute; also prizes are to be given for the manner in which reports are compiled and sent in to the Department of Agriculture.

RECORD OF INSTITUTE MEETINGS.

Institute.	No. of Meetings.			Attendance.			Number of Addresses.	Number of Members.	Cash on Hand.
	A.M.	A.M.	Eveng.	A.M.	P.M.	Eveng.			
Alberni	..	..	2	..	..	40	5	53	
Arrow and Slocan Lakes	..	1	2	..	30	17	11	82	$ 18 20
Arrow Park	..	..	12	..	..	30	9	53	106 65
Aldergrove	..	..	5	..	..	25	8	93	193 95
Bella Coola	..	3	..	..	43	..	3	83	*78 47
Burton City	..	6	7	..	16	32	9	104	81 25
Comox	..	..	4	..	..	22	7	74	77 55
Cowichan	..	2	1	..	16	30	4	271	..
Chilliwack	2	3	1	47	57	35	5	137	211 34
Central Park	..	1	1	..	8	40	3	217	..
Creston	8	..	..	54	..	..	8	184	80 15
Cranbrook - Fernie	..	..	11	..	..	20	8	66	..
Coquitlam	..	..	3	..	..	17	6	32	39 10
Crawford Bay	..	1	10	..	14	28	8	54	22 60
Celista	10	1	1	23	52	56	7	49	..
Delta	..	..	1	..	..	17	2	143	25 85
Fire Valley and Lake Shore	..	..	..	..	..	..	..	38	..
Greenwood	..	..	..	..	..	..	..	75	71 00
Glenside	..	..	4	..	..	22	2	42	28 15
Howe Sound	..	..	1	..	..	36	..	31	†
Islands	..	..	8	..	..	19	10	46	117 80
Kitsumkalum	..	2	2	..	..	..	12	143	25 50
Kent	..	..	6	..	..	15	6	74	165 37
Kelowna	..	..	..	..	..	..	..	119	..
Kamloops	..	1	6	..	33	90	26	134	4 75
Kettle Valley	..	3	9	..	28	59	9	107	87 35
Kootenay Lake	..	1	3	..	57	55	10	46	111 45
Langley	..	1	8	..	31	32	9	109	105 74
Metchosin	..	..	10	..	..	..	23	93	92 32
Mission	..	..	..	..	..	..	..	114	..
Maple Ridge	..	5	4	..	19	26	19	50	81 08
Matsqui	..	2	..	..	35	..	3	126	4 80
Martin's Prairie	..	..	2	..	..	49	4	88	65 00
Myncaster	..	1	8	..	..	20	3	41	164 05
North Vancouver	..	..	..	..	..	..	..	195	23 28
Nanaimo	..	1	5	..	17	21	9	186	..
Nicola	..	..	11	..	..	12	12	134	93 90
New Denver	..	..	8	..	15	55	9	44	..
Northern Okanagan	..	2	11	..	25	33	18	162	85 15
North and South Saanich	..	..	..	..	..	..	..	67	..
Okanagan	2	9	10	26	26	31	33	187	86 89
Okanagan Centre	..	1	5	..	30	22	8	51	36 60
Penticton	2	2	4	21	37	41	8	55	..
Peachland	1	4	7	26	20	42	13	45	54 82
Richmond	..	4	5	..	73	38	12	219	213 35
Rosehill	..	..	3	..	..	55	3	40	18 75
Surrey	..	4	4	..	19	15	8	103	103 00
Spallumcheen	..	3	3	..	21	24	5	287	..
Summerland	..	..	..	..	..	..	..	..	108 55
Sooke	..	..	..	..	..	..	..	..	31 35
Shawnigan	..	..	10	..	..	26	13	121	..
Strawberry Hill	..	..	6	..	..	21	10	33	35 85
South Kootenay	..	1	4	..	46	49	8	137	53 25
Sumas	..	4	..	..	20	..	..	93	..
Salmon Valley	..	..	5	..	..	17	..	53	30 23
Salmon Arm	..	4	7	..	69	94	20	140	146 35
Slocan	..	1	..	..	27	..	..	29	..
Victoria	..	..	8	..	..	22	16	124	108 38
Valdes Island	..	..	..	..	..	..	..	34	..
Windermere	..	3	..	..	..	..	..	61	136 95
Westbank	..	..	5	..	..	25	3	49	34 85
West Kootenay	2	4	5	22	27	25	19	188	86 48
Golden	..	..	1	..	..	..	..	..	†

Total membership—1911, 6,167; 1910, 5,226: increase, 941.

* In arrear.
† Organization meeting.

CENTRAL FARMERS' INSTITUTE.

FOURTEENTH ANNUAL CONVENTION.

The Fourteenth Annual Convention of the Central Farmers' Institute of British Columbia was convened at 10 a.m. on January 25th, 1912, in the Botanical Chambers, Department of Agriculture, Victoria, B.C., Mr. Wm. E. Scott, Deputy Minister of Agriculture and Superintendent of Farmers' Institutes, being moved to the chair to preside over the proceedings. The following delegates from the Farmers' Institutes were present:—

Name of Delegate.	*Name of Institute.*
Jas. Allen	Langley
R. C. J. Atkins	Coquitlam
L. J. Botting	Salmon Valley
W. F. Brett	Spallumcheen
Geo. Copeland	Chilliwack
Jno. T. Collins	Islands
James Erskine	Richmond
J. Gordon Frazer	Martin's Prairie
Jas. Fowler	Robson
L. Fetherstonhaugh	Westbank
William Graham	Bella Coola
A. K. Goldsmith	Aldergrove
C. E. Whitney Griffiths	Metchosin
C. W. Greer	Rosehill
H. J. Hutchinson	Delta
L. A. Cresset Kent	Okanagan
A. E. Keffer	Arrow Park
W. L. Keene	North Vancouver
Philip J. Locke	Crawford Bay
Samuel Macdonald	Cranbrook-Fernie
Major J. F. L. Macfarlane	Shawnigan
W. A. McKenzie	Penticton
J. D. McGuire	Salmon Arm
Henry Nixon	Slocan Valley
Jas. H. H. Nelson	Sumas
Karl Neubrand	Arrow Lakes
Walter Paterson	Cowichan
W. A. Pease	Creston
W. H. Pennycook	Strawberry Hill
W. G. Robb	Kootenay Lake
H. M. Raymer	Kelowna
Herbert Skinner	Nanaimo-Cedar
J. S. Shopland	Comox
J. M. Stuart	Sooke
John W. Taylor	Matsqui
Wm. Thomson	Celista
John L. Vicary	Peachland
E. Stuart Wood	Kamloops

Name of Delegate.	*Name of Institute.*
Robert Whitaker	Nicola
F. K. Wishart	Kitsumkalum
E. T. Wade	Surrey
Chas. F. McHardy	West Kootenay
Chas. W. Little	Northern Okanagan
Albert Letts	Glenside
F. Cowley	Alberni
F. E. Harmer	Central Park
M. T. Williams	Okanagan Centre
L. C. Morrison	Fire Valley and Lake Shore
S. Walker	Burton City
John T. Lawrence	Kettle Valley
H. Whiting	Rock Creek
William Reith	South Kootenay
J. A. Catherwood	Mission
George Nicholls	Kent
F. Duncan Campbell	Maple Ridge
Chas. J. Thompson	Summerland
E. Tunnacliffe	Windermere
W. N. Shaw	Nanaimo-Cedar

SUPERINTENDENT'S REPORT.

GENTLEMEN,—I beg leave to herewith tender you my report as Superintendent of Farmers' Institutes, and to welcome you all to the Fourteenth Annual Convention.

It affords me great pleasure to have to report that the past year has witnessed a splendid development and forward movement in this most important organization of the Department of Agriculture. Agriculturists and fruit-growers are, I am sure, beginning to realize that the work of the Farmers' Institutes is proving a live issue, and a strong educative factor in the development of agriculture in our Province.

The cordial co-operation of the members of the different institutes has made my work as your Superintendent a pleasure, and I sincerely trust that the satisfactory progress may continue and increase each succeeding year, and that the spirit of co-operation may be engendered thereby towards the protection and improvement of mutual interests.

New Institutes.

When last I submitted my Superintendent's report, there were forty-nine institutes incorporated in the Province, with a membership of 5,226. Fourteen new institutes have been formed during the past year, making a total of sixty-three, with a membership of 6,167. This makes an increase of membership for the past year of 941.

These figures show that the average membership of each institute is ninety-eight, which I consider a very satisfactory showing, taking into consideration the fact that the new institutes which have been inaugurated are in comparatively new districts, where as yet the farming population is sparse.

The following is a list of the new institutes incorporated during the past year: Okanagan Centre, Westbank, Martin's Prairie, Sumas, Kitsumkalum, Salmon Valley, Glenside, Golden, Fire Valley and Lake Shore, Greenwood, Celista, Valdes Island, Howe Sound, Rosehill, and Slocan Valley.

(A tabulated statement giving the institutes, with membership, number of regular and supplementary meetings held, attendance, and financial condition, will be found on page 4 of this Report.)

Regular Meetings.

Printed itineraries of the regular spring and fall meetings were again sent out to each member of institutes, giving date of meeting, time, place, name of lecturer, and subject on which demonstration or address was given.

I regret that, owing to unaccountable delay in the transmission of mail through the post-office, some of the earlier meetings of the institutes were not as well attended as they otherwise would have been, many members not receiving itineraries in time. Ample time was allowed and no blame can be attached to the Department in this respect.

It has been suggested that it might be advisable to revert to the old method, by which each Secretary advises the members of meetings by way of post-cards. The present method was adopted in order to save the Secretaries the clerical work involved.

Spring and Fall Meetings.

Attendance at the spring and fall meetings has been eminently satisfactory, and a decided improvement on previous meetings. This is most encouraging to the Department, and I trust that this improvement may continue.

The following gentlemen have been engaged during the past year, and I hope have given general satisfaction:—

Spring Meetings.—M. A. Jull, B.S.A., Live-stock Commissioner, Department of Agriculture; R. M. Winslow, B.S.A., Horticulturist, Department of Agriculture; J. F. Carpenter, B.S.A., Assistant Horticulturist, Department of Agriculture; M. S. Middleton, Assistant Horticulturist, Nelson; J. L. Dumas, Horticulturist, Walla Walla, Wash.; Prof. F. C. Elford, Poultry Department, Macdonald College, Quebec; J. I. Brown, Gunn & Langlois Company, Poultry Department, Montreal, Que.; J. R. Terry, Poultry Instructor, Department of Agriculture, Victoria; Hon. E. T. Judd, Deputy Dairy Commissioner, Salem, Ore.; Wm. Schulmerich, Hillsboro, Ore.; W. Wansbrough Jones, Kelowna; and H. Reid, Victoria.

Fall Meetings.—Wm. E. Scott, Deputy Minister, Department of Agriculture; Henry Rive, Dairy Instructor, Department of Agriculture; J. R. Terry, Poultry Instructor, Department of Agriculture; J. F. Carpenter, Assistant Horticulturist, Department of Agriculture; Dr. H. B. Medd, V.S., Mount Tolmie; Wm. Gibson, 1077 Chamberlain Street, Victoria; Edwin Buss, 1308 Stanley Avenue, Victoria; E. T. Robinson, 417 Young Street, Victoria; H. M. Riddle, Salmon Arm; W. Miller Higgs, Sooke Way; G. A. Paul, Columbia Gardens; G. S. Harris, Moresby Island; Washington Grimer, North Pender Island; Henry Reid, Michigan Street, Victoria; J. S. Shopland, Sandwick; Wm. Neilson, Fruitvale Poultry Yards, Fruitvale; Rev. W. E. Dunham, Cranbrook; C. C. Clark, Kamloops; J. D. Reid, Metchosin; F. Quick, Royal Oak; M. S. Middleton, Assistant Horticulturist, Nelson; F. E. French, B.S.A., Assistant Horticulturist, Salmon Arm; F. W. Lang, B.A., Revelstoke; and J. T. Collins, Salt Spring Island.

Short Courses.

In connection with Farmers' Institutes, short courses were held at many points in the Province, dealing with the different phases of horticulture and relating to the theory and practice of fruit and vegetable growing.

One, two, and in some cases three-day meetings were held during the first three months of the year. The series was commenced in December, 1910, at Mission, Hammond, Aldergrove, Abbotsford, and Chilliwack. During January, February, and March further short courses were held at Mara, Armstrong, Vernon, Okanagan Centre, Okanagan Mission, Rutland, Kelowna, Summerland, Peachland, Penticton, Keremeos, Midway, Grand Forks, Creston, Kaslo, Procter, Waneta, Fruitvale, Nelson, Castlegar, Rossland, Edgewood, New Denver, Arrow Park, Nakusp, and Salmon Arm.

The attendance at these short courses was most satisfactory, averaging from thirty-five to forty people, who showed keen interest in the addresses given by the Horticulturists. This work is being carried out to a great extent this year, and, in so far as possible, every institute which would guarantee a fair attendance has been granted these meetings. There is a limit, however, to what can be done with the present staff, but every endeavour is being made to carry out the work effectively, so as to cover all the principal fruit-producing sections of the Province.

This work has in all cases met with the hearty support of the farmers and fruit-growers, and I think that much good will result therefrom.

Packing-schools.

The work of the Department in conducting packing-schools which was inaugurated two years ago by the establishment of several in the Okanagan has grown to large proportions. During the past year thirty packing-schools were held at the following places: Metchosin, 1; Saanichton, 1; Ganges Harbour, 1; Duncan, 1; Port Haney, 1; Nanaimo, 1; Mission City, 1; Salmon Arm, 2; Armstrong, 1; Hullcar, 1; Willow Point, 1; Keremeos, 1; Enderby, 1; Vernon, 2; Kelowna, 2; South Okanagan, 1; Peachland, 1; Summerland, 3; Penticton, 3; Creston, 1; Nelson, 1; Procter, 1; Grand Forks, 1.

Each school was limited to fifteen pupils at a fee of $3 each. The Department endeavoured to secure the best possible men as packing instructors, and in addition paid for all the fruit and material used in the schools. The attendance at the thirty packing-schools was 390, and the series covered the entire Province, only a very limited number of applications having to be refused.

Diplomas were granted by the Department to pupils attaining a certain degree of efficiency, which was put at a standard of 75 per cent. The good work which has been done by the operation of these packing-schools is plainly evident from the fact that this year about 75 per cent. of all the fruit packed for commercial purposes came from packing-school pupils. Arrangements have been made for the present year to hold a series of fifty packing-schools. This necessarily entails a very large expense on the Department, but I consider that the results accomplished fully justify the expenditure.

Payment of Secretaries.

I would again this year suggest to you the advisability of supplementing the grant given by the Department to Secretaries where, owing to the growth and progress of the institutes, the secretarial work involved in the efficient administration of their duties justifies more remuneration.

Canvassing for Members.

I am pleased to inform you that my recommendation as to canvassing for membership by the Directorate of institutes has in some cases been acted upon with very gratifying results, and I would again urge upon you the necessity for a continuance of this work, so that we may secure every one who is interested in agricultural pursuits as a member of the institute in his district.

Co-operation.

This is the primary object of Farmers' Institutes, and I would again urge upon you the necessity for active co-operation amongst the members of each institute. In union there is strength, and in order for farmers to secure the price which they should for their produce. concerted action is imperative. Supplies, foodstuffs, machinery, implements, seeds, grains, etc., may be secured by co-operation at wholesale rates, thus effecting a material saving to each individual member. The dealers to whom you sell your produce and from whom you secure your supplies are thoroughly organized, and therefore you are at a great disadvantage unless you can meet them on an equal basis. Co-operation in marketing your produce and securing your supplies is the secret of success, and I trust that this phase of Farmers' Institute work may be taken in hand by all institutes in the Province.

Departmental Bulletins and Reports.

The Department has issued during the past year no less than sixteen bulletins and reports, the great majority of which have been sent to members of institutes. The bulletins and reports issued during the year are as follows (46,547):—

No. 28. "Production of Eggs."
No. 29. "The Poultry Industry on the Pacific Coast."
No. 30. "Guide to Bee-keeping."
No. 31. "Foul Brood among Bees."
No. 32. "Control of Bovine Tuberculosis in British Columbia."
No. 33. "Fruit-growing Possibilities of Skeena River and Porcher Island Districts."

No. 34. "Fruit-trees and Black-spot Canker."
No. 35. "The Place and Purpose of Family Life."
No. 36. "The Preparation of Food."
Report of the British Columbia Fruit-growers' Association.
Report of the British Columbia Stock-breeders' Association.
Report of the British Columbia Dairymen's Association.
Report of the British Columbia Farmers' Institutes.
Report of the British Columbia Agricultural Fairs.
Report of the British Columbia Poultry Association.

I regret that the annual report was not available for the members of the institutes at an earlier date, but this delay was unavoidable owing to congestion of work in the Printing Department.

The officials of the Department are at present employed in compiling bulletins dealing with all branches of farming, and I hope that these may be available for the members at an early date. I consider that bulletins compiled by the expert officials of the Department who are thoroughly conversant with conditions in our Province will have a greater practical value than those compiled from outside sources.

A series of circulars has been prepared by the Provincial Horticulturist and his assistants, dealing with all the different phases incidental to fruit and vegetable growing for use in the short-course work. These circulars treat with the following subjects and are concise and practical:—

No. 1. "Short Courses in Horticulture."
No. 2. "Commercial Onion-culture."
No. 3. "Orchard-sites and Orchard Cultivation."
No. 4. "Orchard Pests and their Control."
No. 5. "Plant-growth."
No. 6. "Spray Calendar for 1912."
No. 7. "Fruit-pit or Baldwin Spot."
No. 8. "Apple Packs and Packing."
No. 9. "Sprays and Spraying."
No. 10. "Commercial Potato-culture."
No. 11. "Our Prospects in Fruit and Vegetable Culture."
No. 12. "Orchard Intercrops."
No. 13. "The Fruit-growers' Vegetable-garden."
No. 14. "Practical Irrigation."
No. 15. "Cabbage, Celery, and Tomato Production."
No. 16. "The Culture of Small Fruits."
No. 17. "Planting Plans and Distances."
No. 18. "Annual Report of Markets Commissioner."
No. 19. "Selection of Nursery Stock."
No. 20. "Cultivation of Dry-belt Orchards."
No. 21. "Pruning Fruit-trees."

Transcripts of Addresses.

I am indebted to many of the institutes for very capable addresses, which were given at the supplementary meetings. These papers are of great value to the Department, and I trust that, whenever possible, the Secretary of each institute will endeavour to forward the addresses given.

Agricultural Conditions.

The past year, on the whole, has been a satisfactory one for the farmers of the Province. The fruit-crop unfortunately was light, but this was to some extent compensated for by the enhanced value which growers received for their fruit.

Stock-raising and dairying have not increased as much as circumstances justify, owing to the fact that many of our farms adjacent to the cities are being held at the present time for speculative purposes, and therefore are non-producing.

The poultry industry has been advancing by leaps and bounds, and especially has this been the case on Vancouver Island and the Lower Mainland. Hay and grain crops were on the whole very good.

Exhibition-work.

Exhibition-work was conducted by the Department of Agriculture at various places in the North-west Provinces and Eastern Canada, also at New York, St. Paul, and Chicago.

I would like to refer to the wonderful triumph scored by the Province in securing the $1,000 Stillwell Trophy at New York for the Provincial potato-display. This award was secured in the face of keen competition from practically every State in the Union and Provinces of the Dominion. There were no less than sixty-six entries. The value of this success can hardly be overestimated, and undoubtedly will advertise the productiveness of our soil throughout the world in a very forcible manner.

In conclusion, I would like to express to the Presidents, Directors, and Secretaries of all the institutes my appreciation of their courtesy and co-operation with the Department. The relations prevailing have been always harmonious, and this makes my work as your Superintendent a pleasure. With the active co-operation of the Directorates of each institute, I am convinced that the year 1912 will witness a marked onward movement, and that the result will do a great deal towards building up the foremost industry of the Province, that of agriculture.

Mr. Campbell: I beg to move the adoption of the Superintendent's report.

Mr. Graham seconded.

The report was unanimously adopted.

ADDRESS BY THE HON. THE PREMIER.

Mr. Scott and Members of the Central Institute,—I think that this is the ninth or tenth gathering of the kind that I have been permitted to address in the Capital City, and it is not at all difficult for me, when Mr. Scott refers to certain statistics, to note with what substantial progress your Association has moved along. I am fully advised of the work that you undertake, both here and through the agency of your various branches. I know that you meet here for the purpose of considering ways and means for bettering yourselves, and that, of course, must make for the general benefit of the whole industry. It is true that the Government has lent very considerable assistance in the furtherance of your efforts, and that fact has been well recognized by those who are associated with this Convention. Mr. Scott, with myself, I am sure fully understands with what inconvenience and loss of time many of you have come here. I can well realize that it must be a tremendous sacrifice for several of you to leave your distant homes and arrange to spend so much valuable time here on a mission of this sort. I am quite satisfied, however, that you are quickly repaid when you come to consider that you are taking part in a work that means so much for our Province and for the Dominion. I have followed as well as I could to-day the account of your proceedings of yesterday as reported in the morning's *Colonist*. I was especially interested in the discussion that took place on the question of the public ownership of telephones. This is by no means a new theme to this part of the country, and since the last few years, in Alberta, Manitoba, and Saskatchewan, attempts have been made along this line, and the issue has become a very live one. Now, gentlemen, so far as the Provincial Government is concerned, though we have been pressed by various representative bodies in the interior of the country to undertake the construction and operation of a telephone system, we have never gone so far. I look upon the question in this light: Consider the size and configuration of the Province. Even if we tried to carry out such a scheme, it will be readily admitted that it would offer tremendous difficulties apart altogether from the cost. You must understand that if to-morrow the Province were prepared to go in for a general system of Government-owned telephones, it must also be prepared to reach every remote part of the country where there is a settlement. Then you must know, also, as well as I do that the Dominion Government has already undertaken the installation of a very considerable telephone system in the Kootenays, the Boundary Country, the Okanagan, and Kamloops Districts, and also in the Coast and Islands Districts as well. In regard to that system, I may say that there are a number of complaints, and that I have been asked to represent to the Minister at Ottawa that it is desirable to bring about

a number of improvements at once. This I propose to do in the hope that there will be such an expansion of the system as will give the country a much better service. Now I will pass from this subject, not because I desire to leave the impression behind me that it is the intention of the Provincial Government to turn its back on the proposition, but rather with the intention and with the hope that you will understand that as things are at the present time the Government sees very many difficulties which are prohibitive of their adopting a Government-owned system of telephones. While that discussion was in course of progress there was some mention made of legislation which, if introduced, would implement the installation of a telephone system in the rural districts. I believe that in the Prairie Provinces a law has been enacted which has gone a long way toward giving relief in the rural districts in this connection. I may say that, through Mr. Scott, representations have been made to me with a view to having similar legislation enacted here. Of course, if the Dominion Government continues to enlarge its present service here, and I have no reason to think that they do not intend doing so, you may presently find a Federal-owned telephone system in most of the settled rural districts; but, in addition to that, if it is deemed prudent and the Legislature advises a Statute along the lines just mentioned, then you would have the power in your own hands to put in a telephone system just where conditions warranted. The telephone instead of being a luxury is now an absolute necessity. It would appear the luxuries of one age are the necessities of the next. (Applause.)

Now, gentlemen, I suppose that the delegation which I believe is presently to wait upon me will bring up this same question, and in that connection I would just like to say that, while we may not be able to see eye to eye on that matter, or while it may appear that the Government is not in a position to go as far as you would wish, it must not be concluded that the attitude of the Government is in any way at all a reflection upon the wisdom or usefulness of your deliberations. We look upon you as a very important factor in the development of the Province; and I do not hesitate to say that in the past a great many of the recommendations and suggestions that have emanated from this board have found expression in the Legislature and also on the statute-book. I do not know, gentlemen, that I should keep you any longer, except to say that I would like very much to congratulate you all upon the advance which has been made in the agricultural interests of the Province. But while much has certainly been done, I would remind you that there is still a great deal more to do. I firmly believe that you are honestly trying to measure up to the task before you, because I know that that is the only way in which any of us will achieve success. Unquestionably, in my opinion, you are leaving nothing undone to make your work as complete as possible. As for the Government, we recognize that the Province is yet in its early infancy and that agriculture is just about making a fair start. It is true that a great deal has to be done by the Provincial Government and also by the Federal Government. Let us hope that, with your co-operation, as the months roll by, no effort will be spared, either by the Dominion or Provincial Governments or yourselves, to give to agriculture the great measure of recognition which it so richly deserves. Mr. President and gentlemen, I am very grateful for the manner in which you have listened to me, and I beg to thank you.

Mr. McHardy: I am sure we have listened with a great deal of interest and pleasure to what the Hon. the Premier has said. We know that both he and Mr. Price Ellison are in hearty sympathy with us. They recognize as fully as we do that agriculture is at the basis of the country's prosperity. I feel sure that they will help us in every conceivable way. While this body has undoubtedly expressed itself as in favour of the Government ownership of telephones, I am confident that the Provincial Government will do everything it can in the matter. I take very great pleasure in moving a vote of thanks to the Hon. the Premier.

Mr. Macdonald: I heartily second the motion.

The motion carried unanimously.

Hon. the Premier: Mr. Scott and gentlemen, I very much appreciate the hearty vote of thanks which you have so kindly tendered me, and especially the reference made by the mover in regard to the question of telephones. We are all working together, I am sure, for the advancement of British Columbia, and with that common purpose in view I think we can afford to be a little generous one to the other. I simply want to say again, and to emphasize it more clearly if necessary, that while perhaps the Government may not go the length of

all your suggestions and resolutions, yet at the same time I want you to understand that the Provincial Government is the friend of this institute and especially of the farmers of the Province of British Columbia. (Applause.)

RESOLUTIONS COMMITTEE REPORT.

The Chairman: I think it is now in order to call upon the Secretary to read the report of the Resolutions Committee. At the last Institute Convention it was decided that the resolutions for this year should be sent in to the Department by the 15th of December, so that we could have them printed and sent out to the Secretaries of the various institutes before the delegates came here to attend the Central Convention. I appointed a Resolutions Committee of four and called upon them to attend two days before Convention. They have been here at work consolidating and revising, and you will find that some of your resolutions have been left out, but their text has invariably been incorporated into other resolutions.

C. F. McHardy (West Kootenay): Before having the report read, I would like the Convention to pass a resolution endorsing the action of the Chairman in appointing that committee.

Chas. W. Little (Northern Okanagan): I will move that resolution, because I think it would be unfair to have one portion of that committee answer for the rest.

L. J. Botting (Salmon Valley) seconded.

The motion carried.

F. W. Brett (Spallumcheen): From reading the report of the Resolutions Committee, I find that several have been brought in after the date set. Now, I would like the permission of the Convention to introduce one also.

The Chairman: I would ask you to submit that matter to the Resolutions Committee at lunch-time.

A delegate: I would request that the Resolutions Committee call the attention of the Postmaster-General to the unsatisfactory condition of things in Victoria.

The Chairman: If you bring it up after lunch-time with the Resolutions Committee, the matter will be taken in hand.

Chas. W. Little (Northern Okanagan): If the delegate wishes to have a resolution brought before the Convention he has every right to do so, although, personally, I think he should leave it alone. I do not think it is the business of this Convention to consider such matters.

L. J. Botting (Salmon Valley): I understand that the matter is at present being considered, and therefore I think it unnecessary for us to take any action.

The Chairman: There is no doubt but that there was a great deal of delay through the post-office in connection with the sending out of notices for meetings. At the last Convention, however, I would point out that the question was taken up of giving shorter notice of meetings, the reason adduced being that if members received a printed itinerary a month before the meeting, the chances were that it would be forgotten. The present regulation, I think, should meet the requirements of the case, and I may add that the question of delay in the transmission of notices is being taken up with the authorities at Ottawa, and therefore I think it would be inadvisable for us to do anything in the matter at this time. I do not blame any one in the post-office; it is simply a congestion in buildings which are not large enough to accommodate the work. I have to inform you that the Hon. the Minister of Agriculture has kindly consented to address the Convention to-day. Now, in speaking to these resolutions which are about to come before us, I would ask you to fix a time-limit in order to be as businesslike and expeditious as possible.

On the motion of F. Duncan Campbell (Maple Ridge), seconded by P. J. Locke (Crawford Bay), it was agreed that five minutes be fixed as time-limit for each speaker on resolutions.

TELEPHONE-LINES.

(West Kootenay.) "*Resolved*, That the Provincial Government enact legislation at the present session whereby local companies may be incorporated to own, maintain, and operate telephone-lines, and also that municipalities may be granted similar powers."

C. F. McHardy (West Kootenay): We find that all over the country there is a demand for telephonic communication. It comes from both farmers and settlers in the outlying districts.

There is also the question of rates to be considered, as it is generally believed that the people are very much overcharged at the present time. We know that the Government is loath to take over the Government ownership of the public utilities, and there is no use asking for what we know we won't get. Now we find that there is no Act whereby private companies can incorporate, it is necessary to get a special Act through the House. I am also told that a member is going to bring in such an Act. It might even be a Government measure. I do not think that there should be any adverse criticism of this motion, as I think it will cover the whole ground. I have much pleasure in moving its adoption.

J. C. Harris (New Denver): There is one remark in my friend's statement which I take exception to. He said that the Government would not do it. Now. I take it that we are the Government, and I think we wish to see it done. What we want the Government to do is to make a statement of its position. You all know very well that you cannot get a private telephone company to go into the forest, where we want the telephone to go. That is a work for the Government. The resolution on this subject sent in by our association asked for a complete statement of the Government's position on the matter. They would have the people behind them in such a project, and I do not see why it should not be taken up.

W. A. McKenzie (Penticton) seconded the motion.

P. J. Locke (Crawford Bay): There have been a number of resolutions sent in, all apparently asking for the same thing—namely, Government ownership of telephones. It is very apparent that what the farmers of the Province want is Government ownership of the telephone system not only in the interest of the needed extension, but also in regard to the rates, and therefore I do not think that the resolution on the agenda paper meets the requirements of the case. We are so situated that we will never get a private telephone company to come in to relieve the situation. We want it in the interests of our business and also for the development of our mode of life. It is also very important in the finding of suitable markets for our produce, and altogether it has long since ceased to be a luxury and is now a much-needed necessity. I would support the attitude of Mr. Harris.

C. E. W. Griffiths (Metchosin): I do not think that the Resolutions Committee have truly expressed the sentiments of the different associations in this matter. I think that the telephone is one of the greatest necessities of the Province at the present time. If the telephone was general throughout the Province, you would find the settlers much more contented than they are. At Metchosin three years ago we spent $1,200 constructing a line, but it turned out to be worthless because we had no connection with the city. It was worse than a white elephant. The city company asked us to pay $10 a month for connection with their system. It is no use going on with the resolution. The telephone companies have already the right to build lines, but they will not build them where they are most needed.

K. Neubrand (Arrow and Slocan Lakes): I may say that in our part of the country no private company is likely to come in with a telephone, so that it is up to the Government.

J. A. Catherwood (Mission): Private companies have the power to come in. At Mission City we have a private company; at Chilliwack also we have one. The resolution will not fill the bill at all.

W. Graham (Bella Coola): We have a telephone and it is a great boon to us. We transact our business promptly and our women can gossip every morning, and that means a great deal in a civilized community. It takes thirty days for the mail to come to Bella Coola, and without the telephone we would be lost altogether, but with it we have contentment throughout the entire valley.

J. S. Shopland (Comox): We have a telephone in Comox, but our Government will not extend it beyond the three-mile limit unless we pay $3 a month. I am authorized to fight for a Government ownership of telephones. I see here that the feeling is very strong in favour of that idea.

The Chairman: In view of the feeling of the meeting in this regard, I think the best course to follow will be to refer it back to the Resolutions Committee, so that another resolution could be brought in dealing with Government ownership of telephones. No one realizes greater than myself the great benefit to the farmers generally in having a telephone. This question has come before the Government, and so far they have not seen fit to take any action, but

it is clearly the wish of this meeting that a resolution regarding the Government ownership of telephones be brought up for a vote, and therefore I ask you to refer it back to the Resolutions Committee.

A delegate: Why should we refer back to the Resolutions Committee again? Let us put the other resolution to the meeting here.

The Chairman: There are so many resolutions dealing with the same subject that we have had to consolidate them into one. I think it would be better to let things take their proper course.

Mr. McHardy: At the present time companies can incorporate by special Act of Parliament. This, if it passes, will enable any body of men to incorporate without going to the trouble of having a special Bill. We are not asking any private concern to come in and help us out; we do not want them to help us out; we want them to help themselves out. In regard to Government ownership of telephones, you will have to specify which Government you mean. The Dominion Government owns and operates the long-distance lines. Mr. Roblin told me that he was very sorry he ever touched the telephone question. As a matter of fact, the Government is afraid to touch it. For my part, I think the resolution as submitted is all right. We will get something by it and get it this session.

Mr. Keffer: I move, "That this resolution be referred back to the Resolutions Committee."

Mr. Brett: It has already been proved that Government ownership is a success in Alberta. There they can extend the telephone wherever they get one to a mile. In my constituency they refuse to connect unless they can get three to the mile, or if there is less than that, and they do connect, they want $3 and more.

The motion referring the resolution back was adopted.

EXTINGUISHING FIRES.

(South Kootenay.) "Whereas the present law affecting the putting-out of fires is very unfair to settlers clearing land; and whereas every inducement has been held out to get settlers into the country, yet by this law a great hardship is placed on them, as they cannot clear that land: Therefore be it *Resolved*, That we most strongly urge the Government to give actual settlers greater freedom in this respect by allowing Deputy Fire Wardens to issue permits as in former years."

W. Reith (South Kootenay): I am sorry that this resolution should figure so early on the list, because I am rather inexperienced in these matters, and would like to have benefited by listening to others. I may say, however, that we are deeply interested in this resolution. We are greatly handicapped at the present time by the present regulations and we would like to see them altered. How the land is to be cleared under the present regulations is more than we can understand. In regard to fire-prohibition, I think the railway companies are the people who should be aimed at instead of the farmers.

A. K. Goldsmith (Aldergrove): I am very pleased indeed to second this resolution. Aldergrove put in a resolution along the same lines, and I am pleased to see that it has been incorporated. Last year matters were made worse than before, because not only were the Fire Wardens reduced, but the time was increased during which it was impossible or illegal to burn without breaking the law. If we lived in a district where forest fires could do much harm we would not complain so much; we all realize the importance of protecting the forests; but it is not necessary to lay the whole Province under a hard-and-fast rule. The truth of that is to be found in the fact that no damage was done through the accidental fires that did occur. Let us have suitable men as Fire Wardens who know how and when to issue permits, and I think the difficulty from which we suffer will disappear.

W. Graham (Bella Coola): In supporting that resolution, I would like to say that in Bella Coola we have been greatly handicapped. I believe that the Fire Warden should have a discretionary power to issue permits whenever he thinks the conditions are favourable.

P. J. Locke (Crawford Bay): We also have a resolution along the same lines and therefore I heartily support this one. Our conditions differ radically from the conditions prevailing at Bella Coola, but in the long run the results are the same. We had fires when we should not have had them, and we did not have them when we should have.

G. Nicholls (Kent): I fully endorse what the previous speakers have said; there is a resolution from Kent to the same effect. I see a representative body of men here to-day, and I would like to hear expressions from every one of them.

W. G. Robb (Kootenay Lake): My association has a resolution on the same subject and I will heartily support it. When we wanted to burn we found we could not get a permit. I know one man who had just come from the Prairie Country who made a fire right out in a ploughed field, where there was no danger to any one. He was sent out of the Province, and he was a good desirable citizen. I think that was a great mistake. I think the Government will be only too willing to change the regulations.

F. Cowley (Alberni): My instructions are to speak in favour of this motion. I have been in the bush for twenty years and know what I am talking about. During the last ten years the regulations have been made very strict indeed. You are all aware what the "Bush Fire Act" is for; we are not allowed to start a fire from the 1st of May until the 1st of October without a permit, and if you get a permit you have to watch the fire continually, night and day. If you neglect it, you are liable to be fined from $50 to $200. Any man in the district seeing your fire neglected can go and report it and get $25 of the fine for himself. Suppose you watch your fire and meet all the requirements of the Act as far as you can, and suppose that a little bit of a whirlwind carries a piece of burning wood to another man's land, there is nothing in the world to prevent him from reporting you. It might mean as much as $40 a day to pay men to watch your fire, and, as it is in the interests of these men to keep the fire going as long as possible, the farmer finds he has to fight them and the regulations as well. To my mind, the one reason why we are not permitted to burn is that the speculators are afraid for their land.

C. F. McHardy (West Kootenay): I take exception to the statement in regard to speculators, because it is not borne out by facts. I know of some very serious fires where millions of dollars of good timber has been burned up.

J. S. Shopland (Comox): There are a lot of settlers who have not been allowed to clear land; progress in regard to agricultural clearing has practically been turned down. I think any man who owns 150 acres should be permitted to burn when he likes. (Cries of No, No.) I do not see anything wrong in allowing a man to burn, providing he is taking care of it.

C. W. Little (Northern Okanagan): Unless I am mistaken, I think the feeling of this Convention is to change the resolution and make it read, instead of greater discretion, full discretion to the Fire Wardens and their deputies.

H. Skinner (Nanaimo-Cedar): The last few words covers the ground desired.

The Chairman: I think the matter is a very serious one. I remember about three years ago sailing up past Vancouver Island from the south to the north; it appeared to be one huge blaze, and miles of valuable timber was destroyed. We have to consider that point of view also. I think, if you pass the resolution asking the Government to appoint the best men they can, you will meet the requirements of the situation. What applies to one part of the Province does not apply to another, and therefore the Wardens should certainly have some discretionary power.

The resolution was adopted.

A delegate: When shall the matter be brought before the authorities?

The Chairman: It shall be done straightaway.

"Noxious Weeds Act."

(Fire Valley and Lake Shore.) "*Resolved*, That the 'Noxious Weeds Act' in relation to Canada thistles be amended so as to read that Canada thistles found uncut on July 1st shall be cut by the authority of the Government, and charged against the said land, and a penalty of not less than fifty dollars inflicted."

L. C. Morrison (Fire Valley and Lake Shore): We sent that resolution in from our association and we feel that it should be attended to. Last year in our valleys we were allowed to grow them to seed. The thistle is a great nuisance to the farmer, and I think something should be done to check it.

A. Letts (Glenside): I did not know that there was a "Noxious Weeds Act" in British Columbia. We want that Act enforced if it is in existence.

The Chairman: Any one can enforce the Act.

J. C. Harris (New Denver): It is like this, gentlemen: Year after year we see plainly the effect of passing a general law for the whole of the Province. We see that localities are so different and so peculiar that it is not fair to make a law applicable to all of them. Our association asked for greater powers of local government, so that the different districts can take the matter up. That appears to be the only remedy. The present Act is not satisfactory. We are not getting it enforced, and we never will get it enforced. We must have local discretion, so that the people will say how far the weeds will grow. There are not thistles in all districts, but there are other weeds, and we want the people affected by them to be able to deal with them as they think best.

The Chairman: Last year the question was brought up, and as a result of what took place a consolidation was effected of the "Thistle Act" and the "Noxious Weeds Act." The old "Thistle Act" applied to thistles only, and the "Noxious Weeds Act" applied to the seeds of weeds. The two were amalgamated, and by this means you have got just as stringent an Act as it is possible to have. I have discussed the question with the Attorney-General, and he has instructed the Superintendent of Police to notify every constable throughout the Province to enforce the Act. I think, in these circumstances, it is up to the people themselves to see that it is enforced. It is up to you to notify the constable in your particular district.

H. W. Whiting (Myncaster): I would suggest that in certain districts we should have a Weed Inspector. In our districts we find that ill-feeling is caused through the neighbours reporting upon one another. The difficulty of having a policeman doing this work is that he does not know anything about weeds, and therefore I would suggest that we have a practical man appointed to enforce the Act in a satisfactory manner.

J. T. Lawrence (Kettle Valley): Our position in the Kettle Valley is similar to a great many others, and I think the suggestion just made is a very good one. You can readily understand that the people object to reporting anything like this to the police, because such a course breeds ill-feeling, and it is in the interests of the members of any community to live in harmony with one another. I have been instructed to move a resolution to the following effect: "That whereas the Provincial Government has passed an Act dealing with the noxious weeds; and whereas the law could not be enforced until the Provincial Police were notified: Be it *Resolved*, That the Government be requested to appoint a Weed Inspector or Warden for every district, whose duty it will be to enforce the Act."

P. J. Locke (Crawford Bay): There is a resolution coming later on dealing with the inspection of orchards. Would not the men inspecting orchards be appointed Weed Inspectors also?

The Chairman: You would get more of them if Fire Wardens were appointed.

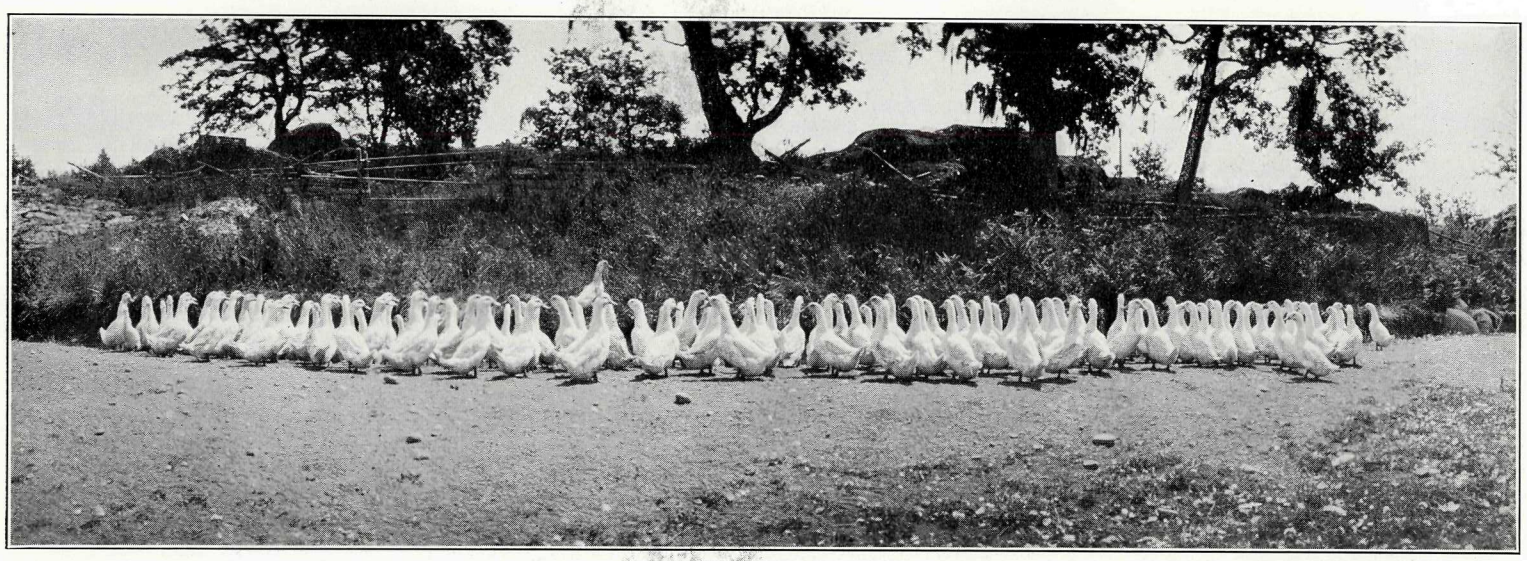
C. F. McHardy (West Kootenay): I would move, "That the whole matter be referred back to the Resolutions Committee." We did not realize that the situation was so complicated. If you will refer it back, we will bring in another resolution more in keeping with the circumstances.

W. A. Pease (Creston): We sent in a resolution along similar lines to the one suggested. I may say that in Alberta they have Weed Inspectors in each district, and as a result of that policy they have kept the weeds well in hand. I see no reason why we could not adopt the same policy here. If we have to report to the constable, we would be in trouble all the time with our neighbours. It should be remembered that the railroads are also infested with Canada thistles, and something ought to be done to bring them within the scope of the Act also.

F. Cowley (Alberni): I will second the amendment to refer it back to the Resolutions Committee. I may say, however, that I was never more surprised in my life than to find the amount of noxious weeds in the Lower Fraser Country. I found not less than fifty kinds of weeds, and the thistles were blowing all over the place. I think it is more important that we should have an Inspector of Weeds who thoroughly understands his business.

C. W. Little (Northern Okanagan): I believe the best weed inspectors are the farmers themselves; and I believe the question can be handled best through the institutes themselves; practically every farmer in my district is a member of the Farmers' Institute, and if we put it up to them in the institute they can have the Act enforced, and cut out any ill-feeling. If the institute as a body takes up the matter, no one would have any grievance, because the action would be representative of the feelings and interests of the district. (Hear, hear.)

Delegates to Convention of Central Farmers' Institute, Victoria, January, 1912.



Money-makers.

H. J. Hutchinson (Delta): I claim, and have always found it so, that the Game Warden, Fire Warden, or any other Warden does not know, nor has he any means of finding out, the conditions prevailing in the different districts unless it be on the advice he gets from the farmers themselves; and therefore the only way for a Provincial constable, a Weed Inspector, or any one else to deal with the matter is to approach the farmers, and get the information on which they will take action. A constable cannot wade over 160 acres of land in order to find out what weeds are there. I think it is up to the farmers themselves to report to these officials.

The amendment to refer the resolution to the Resolutions Committee was adopted.

PURE-BRED BULLS.

(Fire Valley and Lake Shore.) "*Resolved*, That the institute respectfully ask that the Government furnish to the institutes, where it is difficult to obtain pure-bred bulls, one only to each institute; the breed to be determined by vote of institute; the said animal to be kept and cared for by a responsible member of said institute free of cost, and a record of service, number of calves, and quality of same should be kept; and at the end of two years the bull to be exchanged. We consider that the improvement in the stock of the country will more than repay the original outlay."

L. C. Morrison (Fire Valley and Lake Shore): I do not think that we are asking too much in this matter. If the Government supplies these animals, then we will know that they are all right.

The Chairman: I think this is a question for the institutes themselves. It is just here that the co-operation of the institutes should come in. Surely, if you in your institute want to get a pure-bred bull to improve your stock, you can get together and obtain one.

L. C. Morrison: The Governments of other countries are doing this work.

The Chairman: I am sure that the Government is doing a great deal through its various organizations, but when it comes to getting bulls for individuals, I think that is a question for the institutes.

J. T. Lawrence (Kettle Valley): I will second the resolution, not because I am in favour of it, but because I want to speak to it. (Laughter.) I want to ask a question. Does not the Dominion Government take some action in this matter? I see in the *Star* that the Government had organized some kind of a bureau. It seems to me it could be handled better in that way. I think it would be advisable for those who wanted this work done to join the Breeders' Association or the Dairymen's Association, and deal through them.

The Chairman: The Stock-breeders' Association is at present getting four car-loads from the East. If you are members of the Stock-breeders' Association, then you will have the benefit of reduced transportation charges.

The resolution was lost.

STATEMENT BY THE CHAIRMAN.

The Chairman: I wish to inform you that the Minister of Agriculture will attend this Convention between 3 and 4 o'clock this afternoon. I also have to inform you that Mr. Warren, manager of the Silica Brick & Lime Company, wishes to address this Convention on the subject of crushed lime-rock. In that connection the Department has done something. The wish was expressed by a great many of the Farmers' Institutes that some endeavour should be made to secure lime for fertilizing purposes as cheaply as possible. I at once took the question up with Mr. Warren, and as a result of our conversation he has ordered a crushed-rock plant to be installed straightaway. I understand that lime will be supplied at $3.50 to $4.25 per ton. I took the question up with Mr. Bosworth, of the C.P.R., also, and have had a special tariff rate submitted. I went fully into the scientific side of the question with Director Thatcher, of Pullman, Wash., whose information was supplemented by that of Dr. Withycombe, of Corvallis, Ore., to the effect that rock-lime crushed like fine sand is the best way of applying it to the soil. Mr. Warren will be here this afternoon to speak to you on the subject.

Major Macfarlane (Shawnigan): Have your officers any distinct data as to what time the lime takes to assimilate?

The Chairman: We have no precise information on that, but Mr. Warren has made a special study of it, and I have no doubt but that he will inform you.

DISSATISFACTION WITH CONDUCT OF BUSINESS.

C. J. Harris (New Denver): There is some dissatisfaction with the conduct of business. I find that a great many resolutions have been cut out of the printed list, and that a number of those not cut up are slightly mangled. I think it would be to the best interests of the Convention to go back to the resolutions as printed. If we try to act on the resolutions as brought up there will be some dissatisfaction. I do not intend to cast any reflections on the Resolutions Committee, but I think that it is impossible for four men who do not know the local conditions to draw up resolutions to meet the requirements of the Province by a process of consolidation. I move, therefore, "That we return to the printed form, and that any resolution brought up in the meeting shall be dealt with later on."

A delegate: I second that motion. We had two resolutions in the printed list and one of them has been cut out entirely.

The Chairman: At the last meeting it was agreed that a committee be appointed. You gave me instructions to appoint that committee. I choose four gentlemen representative of the different localities and conditions.

A delegate: There is no reflection upon yourself, sir; I do not think any one in the meeting would suggest such a thing; but I do not think the Resolutions Committee has done the best possible in representing the wishes of the delegates here.

H. Skinner (Nanaimo-Cedar): As Chairman of the Resolutions Committee, I would like to say a word. The last speaker seems to be under the impression that Mr. Scott was at these meetings. He was not. We received many resolutions practically suggesting the same thing, and the course we followed was to embody as much of the text of all of them in one and cut out the rest.

C. F. McHardy (West Kootenay): I am another member of the Resolutions Committee, and I may say that our association had three resolutions on the printed list and they have all been cut out. I can only say that if you adopt the idea of Mr. Harris you will be here for ever.

F. D. Campbell (Maple Ridge): If we have the time, it will be perfectly in order to bring up any resolution that any one may think fit.

W. H. Pennycook (Strawberry Hill): In the matter of the Resolutions Committee, I would suggest a different method of selection. The Farmers' Institutes should have a list of men suitable for the work, and the committee should be selected from them. By adopting that method no favouritism could be shown to any locality.

C. E. W. Griffiths (Metchosin): I think that suggestion is a most businesslike one, and would like to give it my support.

A. Keffer (Arrow Park): This is a tempest in a teapot, gentlemen; let us get down to business in a proper manner.

H. W. Raymer (Kelowna): I do not see any mention of the resolutions brought in from Kelowna. If there should not be time our resolutions will not be discussed.

L. J. Botting (Salmon Valley): I do not think any resolution should be cut out. They should all find a place on the agenda paper. No resolution should be withdrawn except with the consent of the district bringing it in. I suggest that there be a standing rule to the effect that the Resolutions Committee does not interfere with the resolutions sent in.

The Chairman: There were, I think, a little over a hundred resolutions sent in. Now, as you see, we have spent this morning and we have only passed on three. It is purely a question of simple mathematics how long it will take you to get through a hundred at this rate. The Resolutions Committee is always a very difficult position. I think I selected four gentlemen capable of acting in your interests, and I think that they have done so. To my mind, these strictures on your Resolutions Committee are a little out of place.

W. Reith (South Kootenay): I will move an amendment to the question, "That we accept the schedule as printed and go ahead with the business."

A. Letts (Glenside): I will second the motion.

The amendment was adopted.

Resolution re Telephones.

Moved by C. E. W. Griffiths (Metchosin), seconded by K. Neubrand (Arrow and Slocan Lakes). "*Resolved*, That this Central Farmers' Institute, in convention, being strongly in favour of the Government ownership and extension of telephones, request the Chairman to appoint a committee to wait upon the Government to ask them to appoint a Commission to inquire into the whole question of telephones."

The Chairman: I think that is the best way to solve this difficulty, and I will appoint a representative committee. To my mind, the only way this question can be settled is by the appointment of a Commission, and if the Government can see its way to do this, I think it will be best.

The resolution was adopted unanimously.

The following gentlemen were appointed: J. C. Harris, A. E. Keffer, and C. E. W. Griffiths.

Exemption from Taxation of Improvements on Farm Property.

(Fire Valley and Lake Shore.) "*Resolved*, That all improvements on farm property be exempt from taxation, as, under the present system, it gives the farmer or rancher no incentive to improve his property, and only tends to keep back progressiveness."

The Chairman: I think that resolution has been covered by the report of the Tax Commissioners, but, of course, if you pass it, it will no doubt strengthen the hands of the Government.

L. C. Morrison (Fire Valley): I beg to move the adoption of the resolution.

J. C. Harris (New Denver) seconded.

The resolution was adopted.

Revised Statutes.

(Maple Ridge.) "*Resolved*, That the Department be requested to supply each Farmers' Institute with the Revised British Columbia Statutes."

F. D. Campbell (Maple Ridge): I think this would be a very good thing for all the institutes, and I have great pleasure in moving its adoption.

J. T. Lawrence (Kettle Valley) seconded.

The Chairman: This is a question on the same lines as the bull issue. You are in a position to secure the Statutes by paying for them, and I don't see why the institutes should not look after that themselves.

C. W. Little (Northern Okanagan): I may say that I was a J.P. for ten years and no one ever wanted to see the Statutes. We all have J.P.'s within reasonable distances, and I don't see any necessity for this resolution. We must not ask the Government for too much. If we ask for less, we stand a better chance of getting it.

W. Graham (Bella Coola): I am a J.P. for my district, and I never refused any one admission to the Statutes.

C. J. McHardy (West Kootenay): No one has ever come to see mine.

W. Graham: But we are a more progressive people up there. (Laughter.)

F. D. Campbell: I will withdraw the resolution with pleasure, if you do not think it is necessary.

Resolution re Taxation.

Mr. King (Richmond): In regard to the resolution on taxation, I want to say that what we wanted was to have the "Municipal Clauses Amendment Act" so altered as to let the agriculturists be exempt from taxation.

C. F. McHardy (West Kootenay): I think we realize that the Government is doing so much for the agriculturist already that he can afford to pay any little taxation in that regard.

Mr. King: It does not come under the Government at all in our case.

The Chairman: I think you are out of order.

Mr. King: Then what is the use of coming here?

The Chairman: If any one has a grievance and wants to bring in a resolution, he can do so through the Resolutions Committee.

C. F. McHardy: I would like the rules suspended to consider the matter.

On the motion of L. J. Botting (Salmon Valley), seconded by J. D. McGuire (Salmon Arm), the rules were suspended.

Mr. McBride (Richmond): This is a question of very great importance to every farmer in British Columbia. The assessment has been raised from $80 per acre to $109 per acre. When you come to pay taxes like that, you cannot do it. We must have a limit to this taxation. As a matter of fact, it is the real-estate men controlling the municipalities that are responsible for the rise. They have got the Council over to interview the Government to take away the only protection we have. Last year they borrowed a million and a half and we have not got a yard of permanent roads. I would ask you to endorse the resolution brought in by the Richmond Institute, which is as follows: "Whereas, owing to excessive speculation in farm lands in British Columbia for subdivision and other purposes, the assessment in some instances has been increased beyond all reason, thereby compelling many farmers to sell their holdings; and whereas many of these subdivisions are left lying idle, growing nothing but weeds; and whereas there is no farm settlement in British Columbia immune from speculation, and especially in the vicinity of cities and railway centres; and whereas this speculation is a serious detriment to permanent agricultural settlement and intensive farming, thereby contributing largely to the high cost of living: Therefore be it *Resolved* by the members of the Central Farmers' Institute, That the Provincial Government be hereby requested to at once amend the 'Municipal Clauses Act,' fixing a limit not to exceed $500 per acre on the assessment of farm or agricultural land, in any part of British Columbia, while held and occupied by *bona-fide* settlers for farm or agricultural purposes; and that copies of this resolution be forwarded to the Premier, the Minister of Agriculture, and the press." If this goes on it will end by taking the farms and all that is on them. I myself have seen three car-loads of settlers leaving Eburne. It simply puts farming out of the question. I may say that we have made arrangements to interview the Government to-morrow on the subject. We have lost control of the Council. Point Grey is in the same position, and Coquitlam and Port Mann will be in the same position. Mr. Oliver, who is here, has found that in 1889 there was a clause protecting the farmers and gardeners, and what we want is to have that clause reinserted.

P. J. Locke (Crawford Bay): I have great pleasure in seconding the motion.

C. F. McHardy: I am not in accord with the motion. It appears to me that one must suffer for the success of the many. If your land is worth so much, why not sell it and get out?

A delegate: Sometimes a farmer does not like to part with his place. I can say, personally, that the assessment in Coquitlam has gone up tremendously. I was taxed to $300 an acre last year, and I got warning from one of my colleagues that next year I would be taxed $2,000. I think the limit set in the resolution is a very fair one.

C. F. McHardy: Well, what could you sell your property in Coquitlam for?

A delegate: I don't want to sell it, and I don't think I should have to sell.

J. C. Harris (New Denver): I am in accord with Mr. McHardy. In moving this resolution, are we really supporting the interests of the farmers? Suppose for a moment that you had a farm on Hastings Street or Government Street with the value increasing every year by thousands of dollars, and suppose you did not want to sell, how would the city ever make progress? By adopting this resolution you will be helping the speculator, whereas if you leave things as they are the land-speculation is bound to collapse before long.

C. F. McHardy: I move, "That we take no action on the question."

W. A. Pease (Creston): I second that.

Mr. McBride (Richmond): It is conditions and not theories that we have to deal with. I do not know of one speculator who holds land for industrial purposes. In my locality there has not been one place sold for half of what we are assessed at. They can tax us whatever they like, and if they run up the assessment they can borrow the money. There has been millions of money taken out of South Vancouver by the real-estate men.

The amendment to the motion was lost, and the motion was adopted.

J. Erskine (Richmond): I now move, "That the Chairman be requested to name a delegation to wait on the Executive Council of the Legislature with a view to obtaining their support to the resolution just passed."

J. D. McQuire (Salmon Arm) seconded the motion.

The motion was adopted.

Address by Mr. Warren on "The Use of Lime."

Mr. Chairman and Gentlemen,—I see you are very busy, and therefore I will not take up more of your time than is necessary. I want to tell you that the firm which I represent manufactures lime here. We have had a good deal of correspondence with farmers in connection with lime for agricultural purposes. The different farmers have different views as to what they require, and I have been unable so far to find out exactly what they wish. Consequently, I took the matter up with Mr. Scott, to whom I am indebted for the pleasure and privilege of meeting you to-day. I have come here with a view to ascertaining what your requirements are in regard to lime for agricultural purposes. The farmer must have some sort of a fertilizer at such a price as will enable him to use it freely. Quite recently we sent several car-loads to one gentleman, and I was particularly interested to know the result. The results, I may say, were most satisfactory, and we have come to the conclusion that the only way to obtain such satisfactory results is to have the raw limestone ground. I have brought over with me a couple of samples of the raw limestone, and I believe that, if we can find that we can meet the ideas of the members here in regard to the grinding, we might be able to do business. In our experience the great difficulty has been to get it fine enough. If you don't require it too fine, I think we can satisfy you. We have our plant in operation, but, of course, the only way in which we could let you have it cheaply would be in car-load lots. We figure that we would be able to put it on the cars at Colwood, eight miles from here, for $4.50 a ton. We understand from the manufacturer that we can have a guarantee to make it finer than the finest of the samples which I have shown you. In order to obtain that degree of fineness, instead of one machine doing it we have to put it through three machines, and, as a matter of fact, four machines are being advocated at the present time. If you are satisfied that we can do it, we will be pleased to try. The price I have quoted you is only an estimate, and I believe that we might be able to do it even cheaper than that. If we find that we can deliver it in the steamer, we may do so for $4 and possibly $3.50 per ton, but you may rest assured that we will do it at the lowest possible price.

J. T. Lawrence (Kettle Valley): How many tons are there in a car-load?

Mr. Warren: From 30 to 40.

Major Macfarlane (Shawnigan): How would you propose to get it to the Saanich Inlet?

Mr. Warren: The only way would be to bring it to Victoria. At present we have no connection with the Island except to Victoria. We are endeavouring to secure a special rate from the railway company.

The Chairman: Dr. Thatcher and Dr. Withycombe said that the ground rock-lime is the best form in which to use lime as a fertilizer. I would ask you all to take it up with your members; by the co-operation of each institute you can secure the lime very cheaply by getting it in car-load lots. I am sure there are sufficient members of each of the institutes to enable each institute to take a car-load.

Mr. Howe: The finer it is ground the quicker it would act, but if it is a little coarser it will act longer.

J. C. Harris (New Denver): Will it act as quickly as burnt lime?

Mr. Warren: Yes, just as quickly.

A delegate: It would be a good idea to have both grades.

Mr. Warren was thanked for his presence and for his address.

Regulation of Highway Traffic.

(Okanagan Centre.) "*Resolved*, That, in view of the great and sudden increase of motor traffic in this Province, some amendment to the "Highway Traffic Regulation Act" has become desirable, in order that horse-drawn vehicles may be relieved from the necessity of taking the left-hand side of the road in dangerous places or on the unprotected hillside roads; also that more stringent rules be made and enforced to control motors from being driven at excessive speed; also that notices and danger-signals be posted near curves and other dangerous parts of the roads to restrain the speed of motorists within the limits demanded by the public safety."

M. P. Williams (Okanagan Centre): With regard to the first part of this resolution, I may say that there is considerable feeling about the way the new Government road at Kootenay is being used as a speedway. It seems to me that some amendment to the rules of the road is necessary in order that a man driving a horse may not have to take the outside of the road on the edge of some precipice. I am sorry the resolution did not appear in the printed list, because I believe it is a most important one, and I have great pleasure, therefore, in moving the resolution.

W. H. Pennycook (Strawberry Hill): I will second the motion. Where I come from motor-cars take the preference all the way through, and many of the roads are through canyons and precipices.

F. E. Harmer (Central Park): I don't think you can alter the regulations. What we want is the enforcement of them.

The Chairman: I would just like to point out that the motion was not received in time to be put on the printed list.

Major Macfarlane (Shawnigan): The rule of the road is the law of the country, and those who meet with damage through a disregardance of that law by others are entitled to compensation. Motor-cars have no more a monopoly of the road than men driving horses.

The resolution was lost.

CONTROL OF WATERWORKS IN THE PROVINCE.

(Okanagan Centre.) "*Resolved*, That, in the opinion of this meeting, the Government should, under the powers conferred on the Lieutenant-Governor in Council by the 'Water Act, 1909,' assume effective control of all waterworks in the Province by appointing Inspectors of Waterworks for each water district; and insisting on the installation and maintenance, wherever necessary, of measuring-devices which will enable the said Inspectors and the licence-holders to easily ascertain whether each licence-holder is receiving and using the amount of water to which he is entitled under his licence."

M. P. Williams (Okanagan Centre): The water question is an extremely difficult one, and the suggestion has been made that the Government should assume the ownership of the system. I think the suggestion embodied in the resolution is a feasible one. Our great difficulty comes from not being organized. The farmers cannot form themselves into a municipality of any kind. I hope some supporters of the Government-ownership idea will speak to-day and give us their views.

C. J. Thompson (Summerland): I find that the Government is taking this question up seriously. I had a communication from the Water Commissioner to call at his office and also at the Minister of Lands' office, and the latter is preparing a by-law to deal entirely with this irrigation question in the Province. Therefore I think it would be best to withdraw this motion.

A delegate: Will it be on the lines of the resolution?

M. P. Williams: I don't know anything about the by-law, but I think there are others who would like to speak to the question before it is disposed of.

C. W. Little (Northern Okanagan): I think it would be a good idea to have the matter laid over until to-morrow, and in the interval find out the Government's intentions in the matter.

C. J. Thompson: Would it meet with your views to pass a resolution asking the Government to appoint a Commission?

M. P. Williams: I prefer Mr. Little's idea.

It was decided to hold the matter over.

INSURANCE.

Mr. Townley, manager of the Mutual Fire Insurance Company, craved the courtesy of the meeting to be allowed to make a few statements in regard to the affairs of his company.

Mr. Townley: I wish to say that we had a most successful year. We had $393,000 of all the very best farmers' work. We have now a sufficient cash balance to meet from four to five years' losses without touching our premiums. We are doing insurance at less than any one else—we are doing for $13 what the others are doing for $30. I may also say that it is due to our company that the rates have not been raised, and I am here this afternoon

to ask you to support us. We feel that we are deserving of your support in extending our company and in keeping the insurance down. Our total capital is nearly $3,300,000, which for ten years' experience I think is very satisfactory. We are now in a position equal and superior to many of the insurance companies in the country. No one has ever lost a policy through us. There are no shareholders to pay and no one gets anything in the shape of interest on shares. Those insured get the sole benefit of the low rates.

In response to a question, Mr. Townley said that the rate was $4 per thousand, with the exception of creameries, and that was $16.

Bounty for the Destruction of Owls.

(Creston.) "*Resolved*, That the Government be asked to repeal the Act granting a bounty for the destruction of owls, as we consider the slight amount of damage done by them to poultry is greatly overbalanced by the benefit done in destroying mice and other vermin in fruit-growing districts."

W. A. Pease: As our resolution says, we find the owl a benefit. Of course, they will take chickens, but I think you can protect yourselves against them, whereas you cannot against vermin, at least to the same extent. With the experience I have had, I have never yet had an owl steal a chicken.

J. Allen (Langley): I second the motion. We find the same thing in our district. The owl is a great destroyer of rats and mice, and it gives us very little trouble with our poultry.

C. W. Little (Northern Okanagan): I cannot see eye to eye with my friends. The bounty is only paid on the horned owl. I do not know of one instance where a horned owl got a mouse or anything else that you might call a nuisance. They get away with any amount of grouse and chickens. The horned owl is the only one we have a grudge against, and I don't see any reason why we should remove the bounty.

Major Macfarlane (Shawnigan): I entirely agree with the last speaker. The horned owl is a most destructive creature. He will take anything at all. The small owl is not destructive, but the horned owl simply loves game. They are very handsome to look at, but I prefer to look at mine stuffed.

C. F. McHardy (West Kootenay): I have never yet seen an owl touch anything. It is no trouble in the Upper Kootenay Country.

The resolution was lost.

Enforcement of the Game Laws.

(Aldergrove.) "*Resolved*, That the need for a better enforcement of the game laws be brought to the attention of the Government."

A. K. Goldsmith (Aldergrove): This resolution is brought in because the game is being steadily depleted. I believe that the laws in existence are sufficient to protect the game, but they are not sufficiently enforced.

G. Copeland (Chilliwack): I would like to second the motion. We find that we have some difficulty through some people who don't know the difference between a pheasant and a cow. Our stock sometimes come home loaded up with shot. We would like some protection in this matter. We understand that the open game season does not include Sundays. We would like that part of the law enforced or amended, so that we might be secure during church services from people shooting almost under the church windows. Some of the shooting heroes appear to think that a chicken is as good eating as a pheasant. We think that perhaps the condition of things might be improved by limiting the number of birds that may be shot during the season. There is another matter we would like to urge; while the pheasant may be a good grain-bird, he is also an excellent friend around the farm. They are generally loaded up with a species of worm, and we think that a bird performing a useful function of this sort should not be unduly slaughtered.

H. J. Hutchinson (Delta): We have been troubled a great deal with our Game Wardens. We find that it is impossible for them to look after 40,000 to 50,000 acres, so we took the matter into our own hands and formed an association. All the farmers became members, and paid their dollar fee; that permitted the farmer and his sons to indulge in shooting. We charged the outsider $5 for ten days' shooting, and we only allowed them ten cock birds. The system

has worked very satisfactorily in some places. We incorporated the association and prohibited all Sunday shooting; and then to overcome the nuisance of the shooting on the roads, the Municipal Council passed a by-law prohibiting all shooting on the roads. Now our association has $800 in the treasury.

C. E. W. Griffiths (Metchosin): You will probably notice that we have a motion on much the same lines, and I would ask the Resolutions Committee if they did not notice it. One method of stopping the shooting at the time and on the places mentioned will be to prohibit the use of firearms on Sundays or on the roads. Another great difficulty we have is that the sportsmen come out in motor-cars and take pot-shots at the birds. I think the meeting might include in the resolution something to the effect that the Government be requested to prohibit the use of firearms near the public highway.

F. D. Campbell (Maple Ridge): I think there is a law in force now to that effect, but I should imagine that the enforcement of the law is a matter for the institutes.

Major Macfarlane (Shawnigan): There is a law and it ought to be enforced, but I also think the law should be amended so as to prohibit shooting on Sunday. This is the only portion of Canada where Sunday shooting is allowed. It is also barred in Great Britain. Why British Columbia should allow it I do not know. I think it is a disgrace. In regard to the shooting from motor-cars, I think it is an intolerable nuisance.

C. F. McHardy (West Kootenay): I think the motion is sufficient in itself. The municipalities can enforce the laws. In certain places it would be a hardship to prohibit shooting on the highways.

H. Skinner (Nanaimo-Cedar): I think the matter is already covered by legislation; there is already a law in force prohibiting the shooting over public highways, and I think you will find that the "Lord's Day Act" covers the Sunday shooting.

C. W. Little (Northern Okanagan): The resolution admits that there is a law, and, that being so, I think the institutes can see that it is enforced. If we pass a resolution of this description it will mean a vote of want of confidence in the Government.

W. Paterson (Cowichan): We all know that the laws are in existence, but the trouble is that they are not enforced, and I think we are entitled to ask the Government for a better enforcement. We are invaded every Sunday by people from the cities. It is these men who act in an unsportsmanlike fashion and slaughter the birds. If the Government would enforce its laws in regard to Sunday shooting, I think things would be much better. We fined a man $40 for the offence, and he appealed and had it reduced to $10.

The Chairman: I really do think that this is a matter for the people of the districts concerned, and that the institutes should take the matter up themselves.

W. Graham (Bella Coola): If a complaint was made, would not the law be enforced?

The Chairman: Certainly.

S. Macdonald (Cranbrook): I am of the opinion that this matter should be placed in the same line as noxious weeds. When any one is discovered breaking the law, it should be our duty to report it to the police in the same way as we should report to the Weed Inspector that So-and-so is not cutting his weeds.

A delegate: This is a very different question; in the case of noxious weeds the proof is there, but here you have to secure the proof. I admit that it is a very difficult matter to handle.

J. S. Shopland (Comox): We have very few pheasants now. The miners came down from Cumberland and made a clean sweep. The difficulty is that you must catch the hunter in order to get his name. I don't see why we should not enforce the "Trespass Act." There must be something to prohibit people from prowling all over the country. I would like to see the Sunday shooting in the settled districts strictly prohibited.

The resolution was lost.

ADDRESS BY THE HON. PRICE ELLISON.

Mr. Chairman and Gentlemen,—The Deputy Minister requested me to address the members of the Farmers' Institute. I thought that I had already addressed all the people connected with agriculture in the Province, but he said: "No. The Farmers' Institute is a more important organization than the others"; and while I look around this room, without casting any reflection whatever upon the other agricultural associations, I must come to the conclusion

that the Deputy Minister was right. I must congratulate you upon your attendance here to-day and upon the intense interest manifested in the work being done by the institutes. I have read the report of the Superintendent, and I am glad to know that he is so well pleased. I think he has every occasion to be so; I myself have had reason during the year to note the progress which has been going on in the agricultural associations, and I can assure you that it is very gratifying indeed to the Superintendent and to myself to remark upon the wonderful development that has taken place. In my opinion, gentlemen, this is due entirely to your efforts, and I just want to say that we are looking forward to a continuation of the good work. It is true that we have not gone ahead as rapidly as we might have in agriculture, but that, I think, is due to the fact the agriculture has been overlooked very largely as the backbone of a country. But it is coming into its own. It is through you that British Columbia is going to be known to the world as an agricultural country. It is now acknowledged that the productiveness of the soil of this Province is perhaps the best in the world. We all vie with one another in the different districts to see which of them is capable of producing the best results. That is quite right, for without that rivalry agriculture or any other industry would not make the great strides it has. British Columbia is being brought to the attention of the whole world, and nothing has done so much to bring it before the notice of world as the winning of the magnificent Stillwell Trophy which you see here. When you consider how many people in the States and how many people in Canada were trying to capture the cup, and in spite of this tremendous opposition this Province was able to secure it, I think you ought all to be proud of the country in which you live. You must also remember that, while in other places special arrangements had been made for the exhibits, here in the Province of British Columbia it was not until the very last minute that we decided to send an exhibit. The Deputy Minister and I discussed the matter, and it was very late in the season before anything was done at all towards collecting the exhibit, and therefore in a great measure the success represented by the winning of the Stillwell Trophy is due to the wonderful fertility of your land. So successful was the exhibit and so much interest did it arouse that the railway corporations demanded that we should show it at Chicago. It was shown there, and afterwards it was taken to St. Paul, Minnesota. Now, if I might speak a word about the agricultural conditions in the Province of British Columbia, I would say that it is not child's play to come here and engage in agriculture. Those of you who have your land clear are to be congratulated; the struggles you have passed through will not be compensated for a long time. I am speaking in this matter from personal experience, because no one knows better than I do the hardships and the privations that have had to be undergone before the industry could attain the position which it occupies at the present time. We hope now that, with the transportation facilities proposed by the Government, and also with the extension of trunk roads, and so forth, most of the difficulties of the past will entirely disappear, and that the agricultural areas will be brought into direct touch with the centres requiring their products, and also that the great north country will be opened up. When that is accomplished it will mean a great deal for agriculture and a great deal for the Province, because the more agriculture goes ahead the more prosperous will the general conditions of the Province be. After the fisheries, the lumber, the mining, and other natural resources have given out you will have to fall back on agriculture, and therefore we are fortunate indeed to have cast our lot in with the agricultural interests of British Columbia, in the industry that is going to help more than all the others to make this the greatest Province in the Dominion.

I scarcely know what would interest you most, but I do know that you are all interested in the clearing of land. The Department has done everything possible in regard to supplying cheap stumping-powder. We would like to have gone further in that matter, but we are assured by the manufacturers that they have got the price down to rock bottom. I may say, however, that I have been very seriously considering the possibility of manufacturing it ourselves. (Applause.) The Department is wideawake to everything that may tend to advance your interests. We looked into the question very closely, and found that the manufacturers are doing as well as any manufacturer could possibly do, and on a very small margin of profit. Of course, I am glad to know that the arrangements made by the Department and the Government have been taken advantage of. If you knew that you could get a box of powder within a few miles you generally went and got it, whereas if you had to have a car-load you could

never get ready to use it; but by the arrangement of the Government your institutes are in a position to order car-loads for the benefit of the members. I have thought very seriously as to what was the best way to clear land, but I have not come to any conclusion, and I have found no one else to come forward and show me how it can be done cheaper than with stumping-powder. If you get expensive machinery, then you must get expensive labour to operate it. I can assure you that if we discover anything that will help you to clear land at a cheaper rate than we have, the Department will be only too glad to assist you.

I am very glad indeed to know that your membership has increased by some nine hundred during the past year. That fact must be entirely due to the interest taken in the movement by yourselves. The membership fee is 50 cents, and at a moderate estimate members secure $1.50 worth of departmental literature. The bulletins which we issue are prepared by men who know their business. You receive advice right from headquarters. You will never make any mistake by reading the bulletins. I had a communication recently from a very eminent horticulturist who said he was delighted with the idea. You are all interested in one branch or another of agriculture, and it is the object of the Department as much as possible to issue bulletins at stated intervals upon the various phases of the industry, so that every one who is a member of the institute will receive some benefit. Had you been here yesterday and seen the prizes presented to the dairymen, you would have been pleased indeed to know what has been accomplished. Some of the results were very great, and all of them were exceedingly gratifying to the Department. There is another matter I would like to refer to, as some of you come from long distances and may not be acquainted with the fact. The Department sent Dr. Knight East some time ago to select four car-loads of pure-bred stock for the different ranchers and dairymen in the different districts of the Province. There is no reason in the world why you should not all take advantage of that. The Department, I am sure, would be delighted to see you get twenty car-loads during the coming year. When you get a car-load you know that transportation is reduced accordingly, and it does not cost any more for labour to bring a car-load than it does to bring two or three animals. I need not tell you that we do not make anything out of it; we want to impress upon you that the more you help yourselves the more the Government is ready to help you. Now, I do hope and trust that the intelligent discussions you will have will be of benefit to every one, and that you will be able, as a result of the pleasure derived from this Convention, to look forward to the next annual meeting. From time to time we hope to accept as many of your suggestions as may appear reasonable to the Government, and compatible with its responsibility to the rest of the Province. I must congratulate all the associations that have met here upon their intelligence in discussion and their moderation in demands. I can well remember the time when I attended agricultural association meetings, when there were a hundred-and-one resolutions and not one of them to the point. Confine yourselves to subjects that are of interest to every one in the business, and make your requests to the Government such as will command their serious consideration. There are no pigeon-holes in my Department. The Government expects that you will ask for things. To him that asks shall be given, but you must see that you ask for the right thing, something in the interests of the whole Province. You must understand that I represent the whole Province in regard to agriculture. There are some gentlemen in this room who had an interview with me on a certain subject, and I had to tell them that they had no case at all. We do not give just because you happen to ask; we give to those who are most deserving. Of course, we know that you all have some claims to make, but it is impossible for the Government to meet all of them, and our aim is to relieve the most pressing cases. I don't want you to think that I can do it any more than any other gentleman who has occupied my position. I can, however, say that I can sympathize very readily with your claims, because I have been in the business and know what it means. It is the desire of the Department to encourage you in every way that will develop and foster agriculture in the Province. I must say that I think we have done a great deal. We have appointed experts in agriculture and horticulture to look after your interests, and it is our intention this year to get a man who will give lectures on gardening. We need that almost as much as anything else. I want to encourage you by giving you every assistance in my power, because I know what the life is. In most cases we are willing to let the other people do the work; that is human nature; but if you are ranching and doing it right, you are not going to get out of the hard work. I may also tell you that

there is no place in the world to-day where the products of agriculture bring a better price than they do here; and when the transportation facilities that are now pending are in closer touch with the markets of Vancouver and Victoria, and also the markets of the outside world, your conditions are bound to improve tremendously. There are a great many interests to be looked after, and I can assure you that it is no easy task. There are men here who are praying to have the water removed from their land, and on the other hand there are others calling to the Government to take over the irrigation systems. I can only say that the Government is in hearty sympathy with all of you, and that when the time ripens things will be done to make your conditions better than they are to-day. I hope you will not think that I am talking too much about it. It is a very important matter. There is no part of the Province can prosper without every other part of the Province advancing.

Now, in conclusion, let me say that I am delighted to see so many of you here, and to have the opportunity to congratulate you on the work done during the past year. We have had a very satisfactory crop, and many of you must have considerably augmented your bank accounts. By the statistical system adopted by the Department we will now be able to show you how you have progressed, and we will also be in a position to know in which direction our efforts are most needed in order to stimulate the industry. I thank you, gentlemen, for the courteous manner in which you have listened to my address. (Applause.)

C. W. Little (Northern Okanagan): I know there are sixty-five of you other fellows wishing to beat me out in proposing this vote of thanks for the Minister's most sincere and interesting address. In Mr. Ellison we have a most sympathetic friend. I have known him for nearly twenty years; he has graduated from the plough to the Chair of Agriculture; where he will quit I do not know. I can assure you, gentlemen, that in the matter of powder alone he has done a noble work for the farmers of the Province, and I have the very greatest pleasure in proposing this vote of thanks.

W. A. McKenzie (Penticton): I have very great pleasure in seconding the motion.

The motion carried unanimously, with musical honours.

Weeds and Orchard Pests on Indian Reserves.

(Chilliwack.) "That whereas there are in this municipality a number of Indian reserves which are not being used by the Indians, and that these lands, as well as many of the reserves where Indians are living, in their present condition are a menace to agriculture on account of the foul weeds and orchard pests: Be it *Resolved*, That the Central Farmers' Institute be requested to draw the attention of the Indian Department to these conditions, with a view to having them attended to."

G. Copeland (Chilliwack): In moving this resolution, I would just point out that these reserves are infested with weeds and pests that are a great source of danger to all the orchards in the community. I do not suppose that the Provincial Government is in a position to deal with the trouble, but the resolution is brought up here so that it can be referred to the Dominion Government.

The Chairman: This is a very pertinent question, and I may say that action was taken by the Provincial Board of Horticulture to get the Dominion Government to take some measure to have them cleaned up. About two years ago the Board got the Dominion Government to give an appropriation for this purpose. Since then we have approached the Government again, and I have heard from Dr. G. Hewitt, Dominion Entomologist, that the Dominion Government had given another $1,500 for cleansing Indian orchards. They have now appointed a permanent man to visit the orchards, prune and spray the trees, and gather up and destroy all rubbish.

A. K. Goldsmith (Aldergrove): I would like to second the motion. We have a reserve in Sumas as well as in Chilliwack, and we find the same condition of things existing there. I am glad to hear that steps have been taken to remedy matters, and I do not think it is very necessary to press the resolution further.

The Chairman: The resolution has my hearty sympathy and support. We have in the Minister of Agriculture at Ottawa a man who is deeply interested in the welfare of the industry out here, and I think that the resolution might do some good. While they have given material assistance, I do not think that it is sufficient for the purpose.

The resolution was adopted.

EXPERIMENTAL FARMS.

(Summerland.) "*Resolved*, That the Central Farmers' Institute request the Government to urge upon the Dominion Government the necessity of establishing additional experimental farms at as early a date as possible."

W. Thomson (Celista): I am the mover of that resolution. I just want to say that the one in existence at the present time is of no use to the farmers in the interior. It might be feasible to establish more than one, but we would leave that to the Government to decide. At any rate, there ought to be one in the Dry Belt.

J. G. Frazer (Martin's Prairie): I second the resolution because my institute instructed me to support a motion of the kind. What we want is a farm in the Dry Belt for the purpose of experimenting in dry farming. Those who come from the Dry Belt will readily understand the importance of that. We find in the district I come from, where we have not got the water, that we must cultivate good and deep and very carefully. We have the theory of dry farming all right, but we would like to see a practical illustration of it on an experimental farm.

Mr. McKay: I do not believe that there has been a question before us yet of the importance of this one. It may not appear so to all the delegates present, but it is so nevertheless. There are thousands of acres in British Columbia that can be made productive if we only knew how. The people are not educated in this regard, and as a consequence they hold the opinion that you cannot farm on the Dry Belt. I went on to it, and with the first 30 acres I broke I threshed 27 tons of good fall wheat. If that is not worth while, I do not know what is. We have proved that the land is productive, and therefore I see no reason why the Government should not assist us to retain the moisture in the land. We have land that can be purchased for $20 an acre, and I believe that it can be made to produce almost as well as other land under proper treatment. It is true that we have sent lecturers who declare that the land is capable of cultivation, but most of us are from Missouri, and we want to see a farm established there. Kamloops is rapidly becoming a centre, and there is good ground there. We ourselves sent in a resolution that the farm be established at Martin's Prairie.

L. J. Botting (Salmon Valley): I would like to support this resolution. We would very much like to see an experimental farm established on the Dry Belt.

A. Keffer (Arrow Park): There is a Dominion Government farm established and in operation in Alberta, and I do not think it is likely that the Dominion Government would start another one here.

The Chairman: When it comes to a question of locating an experimental farm, the question would have to be very carefully considered, but the fact of there being one in the Province of Alberta does not debar us from having one also.

The resolution was carried.

HORTICULTURIST FOR THE BOUNDARY DISTRICT.

(Kettle Valley.) "*Resolved*, That we recommend to the Department of Agriculture the appointment of an Assistant Horticulturist for the district west of the Columbia and extending as far as Keremeos, known as the Boundary District."

J. T. Lawrence (Kettle Valley): I move this resolution; we see so very little of the Horticulturist that I think there is need of another one.

H. W. Whiting (Myncaster): I second the motion.

The Chairman: We now have five Assistant Horticulturists. At the beginning of the year there were four. Mr. Middleton's territory was subdivided, and Mr. French has been appointed to cover the ground. We have therefore had one added this year, and I hardly think that you will get the Minister to sanction the appointment of another one, for this year at any rate. The fruit-growers have had a very great deal of consideration from the Department, and it must be remembered that there are other branches to be considered.

J. T. Lawrence: In view of these circumstances, I will withdraw the motion.

EROSION OF BANKS OF RIVERS AND LAKES.

(Arrow Park.) "*Resolved*, That the attention of the Provincial Government be directed towards the erosion of the banks of the rivers and lakes caused by the wash from the C.P.R. boats, and that the Provincial Government bring the matter before the Dominion Government, with a view to taking steps to having the matter remedied as far as possible."

A. Keffer (Arrow Park): This is a very simple matter, concerning the erosion of the banks of a waterway by the action of steamers. If these banks were protected, it would stop some of the troubles to navigation. I may say that I have already written the Federal Minister of Public Works on the question. A little money spent on the banks would save them.

C. Walker (Burton City): I think that the mover of the motion has explained the matter fully, and that it is not necessary for me to go further into the matter. Every one should see the necessity for endorsing a movement such as this.

K. Neubrand (Arrow and Slocan Lakes): I am very much in favour of it. If anything can be done, I would certainly ask this meeting to help it along.

C. F. McHardy (West Kootenay): I would suggest that the words "C.P.R." be struck out of the resolution; it might occur elsewhere.

The motion with the amendment as suggested was adopted.

COST OF POWDER.

(Windermere.) "*Resolved*, That it is the opinion of the Central Farmers' Institute that the progress of agriculture is being retarded by the present cost of powder, and that the price can yet be reduced without injury to the manufacturer; therefore that the Legislature be asked to further any measure that will reduce the cost of powder to the farmer and public roads built in the Province."

The Chairman: In view of what the Minister of Agriculture has said upon this matter, do you think it is advisable to go on with it? I may say that after the last session of this Convention the Minister and myself took the question up with the powder companies. We saw first one and then the other. The Minister asked me to make an estimate of the amount of powder that would be used during the year, so that he could buy it from the company and pay cash if they would reduce the price. The companies pointed out that it was only owing to the fact that they got in a big extra supply of nitro-glycerine before its advance in price that they were able to sell at the price. They could not reduce the cost of powder by one cent, and they showed us the very small margin of profit on which they were working.

E. Tunnacliffe (Windermere): I think the resolution had better be withdrawn.

C. W. Little (Northern Okanagan): My proposition to the Minister meant a saving of $800; previous to this arrangement, it was up to the President, Secretary, and Treasurer to buy a car-load of powder. My proposition was that the Government should make arrangements with the companies to provide car-loads and prepay the freight, and that at the end of each month we would settle up. I do not think the Government is going to lose anything out of it.

The Chairman: The offer is open to all the institutes, on the understanding that the Secretary and President are to a certain extent responsible for the powder. If a farmer wants five boxes of powder, he can go to the institute Secretary and get it on payment of the institute price.

A. Keffer (Arrow Park): Our institute must have missed the benefit of this, because we have been worse served than ever before. We estimated the amount of powder we would want in the year, and we supposed that we would pay for it as we took it up. We had a car-load, and we were billed for the entire amount. We were also charged demurrage, and that ran very high. We did not propose to stand for it all, so we appealed to the Railway Commission, and the switching-charges were not allowed.

The Chairman: Some misunderstanding must have occurred. I would like to take the matter up with the Canadian Explosives Company.

The resolution was withdrawn.

P. J. Locke (Crawford Bay): I would like to move a resolution that the Government be requested to supply powder to the farmers from their magazines at a price of $5. As far as I am concerned, I think it is impossible for us to begin to think of a car-load, and it is almost impossible to decide how much we shall want throughout the year. The present system does not help us at all.

The Chairman: Why don't you get your powder from the local magazines? Can't you get it at the Government rate?

P. J. Locke: We have asked, and can't get it.

The Secretary: It is supposed to apply to the local magazines as well as others.

W. Reith (South Kootenay): The members of our institute have ordered powder from the local magazine at $5 a case and $1.12 freight.

The Chairman: I will get the manager of the company to attend the Convention to-morrow.

A delegate: Mr. Holmes, of the company, is here now; perhaps it would be as well to hear him speak.

Mr. Holmes: You seem to be under some misapprehension. It is not our system to deliver powder round the country, and be out of money for twelve months. I do not know what arrangements the Government may have with the farmers, but if the Government will take the responsibility we are willing to deliver at any time.

The Chairman: You get the money from the Government.

Mr. Holmes: It is the Government that is storing powder and not the company. All Government shipments are made from Nanaimo.

The Chairman: But why should it not be shipped from the magazines?

C. F. McHardy: (West Kootenay): I think it could be arranged to have the farmers supplied from the local magazines.

C. E. W. Griffiths: We receive our powder from the local magazines.

Mr. Holmes: Then that is the only instance in the Province.

F. K. Wishart (Kitsumkalum): We get it from the magazine in Rupert.

W. F. Brett (Spallumcheen): We bought it by the box and it cost just as cheaply.

J. C. Harris (New Denver): I move that we adjourn.

The motion was adopted.

Friday's Session.

PRICE OF CLOVER-SEED.

(Arrow Lakes.) "*Resolved*, That the Government be asked to cheapen the price of clover-seed on the same lines as they do with stumping-powder; i.e., that the Government make arrangements with some seed-house in Vancouver to procure a car-load of Mammoth red-clover seed, and to resell to the institute members at cost, plus, say, 10 per cent. as interest on the money invested."

The resolution was withdrawn.

CANCELLATION OF RESERVES.

(Burton City.) "*Resolved*, That, in the matter of the cancellation of reserves as shown by section 81 of the 'Land Act,' the public notices of the cancellation of reserves shall be described not only by the lot number, but also as in the vicinity of some well-known place, so that the land may be identified by all actual settlers, who will have an equal chance to apply for the same."

S. Walker (Burton City): I think this resolution will speak for itself. We think that the lot number is not sufficiently definite, and therefore we ask you to give this resolution your endorsation.

F. D. Campbell (Maple Ridge): I have much pleasure in seconding the motion. I think that the present system does not give us as much information as we desire. If we had more, it would give us a chance to get in on some of them.

Mr. Pridham: It should be clearly made so that it will be for the benefit of the settlers alone, and that the speculators will not figure in it.

The Chairman: I think the whole matter can be settled properly by having it submitted in the right quarter.

The resolution was adopted.

EXEMPTION FROM TAXATION.

(Special.) "*Resolved*, That the Government be asked to have the 'Municipal Clauses Amendment Act' so altered as to permit of agricultural and horticultural associations being granted exemption from taxation."

Mr. King: It appears that North Vancouver is the only institute that this clause affects. We have worked the Municipal Council for exemption from taxation, which they have willingly granted, but they wish to have power under the Act to do so. In 1910 the Council voted to exempt the associations as recreation-grounds. If they can exclude such grounds as this, I think that they might extend it to cover the resolution. The whole matter seems to rest on the word "aid." In the "Municipal Clauses Act," section 50, subsection (24), the municipality has power to aid agricultural and horticultural associations. The next clause comes under 65, by which they can aid by resolution. But they do not like to rebate taxes under that clause. Our society is desirous of getting clause 170 amended; that is the clause in which exemption is given. The property is vested entirely in the society, and if by any chance, which I hope will not be the case, we should have to close, that property would revert to the Crown. There are no shareholders in it, and I do not think that it is asking too much to request exemption from taxation. Central Park, who have their own buildings and their own land in Government property, have no taxes whatever. I would suggest, however, in connection with the resolution, that the words "institutes where there are no shareholders" be mentioned.

W. H. Pennycook (Strawberry Hill): I have great pleasure in seconding the motion. I do not think that there is anything more to be said on the subject.

C. F. McHardy (West Kootenay): Just a word of explanation. The question of taxation has been dealt with by the Government. There is a difference in asking the Government for exemption and in asking the Government to empower the municipalities to grant exemption.

H. Skinner (Nanaimo-Cedar): I went through the "Municipal Clauses Act" and they have not that power.

The Chairman: Could not the municipalities grant a sum of money to the associations, and get over the difficulties in that way?

H. Skinner: That would mean that the associations would have to go to the Council every year, and there is always a chance of it being thrown out.

W. H. Pennycook: We are situated between two municipalities, and neither of them will give us any assistance.

The resolution was adopted with the suggested amendment.

The Chairman: Mr. Hayward has very kindly consented at my request to attend and give you an address on the most important matter of co-operation. Mr. Hayward has been closely identified for a number of years with that most successful co-operative organization, the Cowichan Creamery, and a great deal of the success is undoubtedly due to his indefatigable efforts. I have much pleasure, gentlemen, in asking Mr. Hayward to address this Convention.

Address on "Co-operation" by Mr. Hayward, M.L.A. for Duncan.

I feel rather diffident in addressing an audience such as this, but at the same time I have always taken a great deal of interest in the Farmers' Institute, having been Chairman of the first Farmers' Institute ever held in British Columbia, and I think, therefore, that what I may have to say may be of some value to you who are but now considering the movement. At the time of the first convention the number of delegates present in this room was thirteen, so you will be able to understand how much progress has since been made. With regard to co-operation, Mr. Scott, the Deputy Minister of Agriculture, has rather overstepped the mark in his eulogic references to my connection with the movement, but it is perfectly true that for the last seventeen years I have been trying to help it along. The creamery at Cowichan has been in operation for many years, and it is to the dairymen of that district that much of its success is to be credited.

I would not like to suggest that agriculture is flourishing any too well in the Province of British Columbia. My honest belief is that agriculture is doing as well as might be expected under the circumstances; the circumstances are rather hard, I may say, and in that connection there are five or six matters over and above the question of co-operation that I would like, if time permitted, to discuss with you. Co-operation is not the only thing that will make for success in farming, but at least it is one of the chief things that will bring agriculture into a better state in the Province of British Columbia than it enjoys at the present time. I say better, because I believe that one of the greatest difficulties we have is that we are sending out of the Province annually $14,000,000 to bring in that which might very well be produced

within our own confines. You will understand, therefore, what a very serious work the agriculturist has before him. Speaking as a supporter of the Government, I say that the Government intends to do everything possible to assist you.

In regard to co-operation, I would just call attention to the fact that, so far as I have been able to see, it has operated very successfully in our district and in many other districts. It has done much to put dollars and cents into the farmer's pocket; it has created a frendlier spirit among the farmers, due to the closer association which the effective operation of the idea entails. In the past, it cannot be denied that the petty bickerings and little jealousies between the farmers, due largely to their isolated condition and individual effort, resulted in pecuniary loss, a loss that has since been transformed into a gain by the adoption of the co-operative idea. It is true, in my opinion, that if the farmers joined together they would rule the world. It is absolutely true; but it is likewise true that it is a very hard thing indeed to get the farmers to join together. I regard that—the breeding of a spirit of confidence among the farmers—as one of the chief works of co-operation. Wherever you have a co-operative creamery, or wherever you co-operate in any shape or form, you not only increase the quantity of the product, but you also raise the standard of quality, both of which performances being coincidental with an all-round reduction in the cost. There are hundreds and thousands of farmers who would make butter—and that would be a good thing for the butter and the consumer of butter—if it could be produced on a co-operative principle. The fact that at the present time they have not only to make the butter, but find a market for it, is one of the reasons why so little of that commodity is made. If butter was made on the co-operative principle, that is, if all the farmers centralized the production of butter, or the elements of butter, it could be done at a greatly reduced cost to that which at present prohibits them from making that very necessary commodity. It is in the details of the work that the farmer loses, and it is in these same details that the co-operative creamery would make those losses gains. If you increase the quantity and raise the quality of dairy produce, you at the same time increase their monetary value. The monetary values of butter and eggs have altered wherever you have a co-operative society controlling the industry. It is not very many years ago when I, who have been farming here for the last seventeen years, used to peddle butter and eggs around this town, and be glad to take from the grocer just whatever he would give me—and I am sorry to say, take it out in trade. To-day, I send my products to the creamery, and the grocer has to pay what we ask, and not what he chooses to give.

I am going to give you a few figures regarding our Cowichan Creamery. Now, the Cowichan Creamery is a purely co-operative concern. It started out to make butter. As far as my connection with it went, I started in with the hope that the creamery would start an egg-station. We have now gone beyond that into a poultry-station. We have got a pig-feeding station; we buy our feed in car-loads lots; we have a siding from the railway. Everything is mixed up by the association, and the farmer brings in his produce and takes out his feed. The one offsets the other, and at the end of the month he has paid for his feed and is due to receive the balance on his product. During the year the creamery produced 158,000 lb. of butter. It shipped 82,000 dozen eggs, and it placed on the market no less than 20,000 lb. of dressed poultry. With regard to the feed, it is an enormous amount, somewhere in the neighbourhood of $40,000 to $50,000 per annum. Everything is increasing by leaps and bounds. Last year the egg product was doubled; the feed product was also doubled. All these things are paying. In 1906, before we started an egg-station, I used to have the greatest difficulty in getting rid of eggs; and when I did, I was selling, during the spring of the year, at 18 cents per dozen in the case. In 1907 we started the egg-station, and from that day to this the lowest price I have ever received in the spring of the year for such eggs was 27½ cents.

I would call your attention to the fact that a co-operative creamery can do things that an individual cannot do. A creamery can have a cold-storage and take care of its own eggs. It can sell eggs in the market in September and October against what are called fresh eggs from Manitoba and the Prairie Provinces, and these will sell at 35 cents and bring to the producer his 27½ cents. There are many other things in which the farmer might co-operate. Our creamery is considering the installation of a fruit-packing station, and acting practically as commissioner or agent to sell anything—vegetables, potatoes, or anything else. I venture to say that there are not many here who, having had dealings with a commission house, have not felt that the commission men got more than they were entitled to get.

Haying Scene.

Successful Strawberry-growing.

About two years ago it was suggested that this co-operative principle was the solution to all the farmers' difficulties. There are those who believe that the solution is to get all the farmers into one great co-operative concern, but I think that the only way to properly conduct the co-operative system is for each district to have its own co-operative creamery, and then for the managers and secretaries for each of these to meet together in annual convention. If that is done, and there is no mortal reason why it should not be done, a great step will have been taken towards the solution of many, at any rate, of the farmers' difficulties at the present time. As chairman of the Cowichan Creamery, I can assure you that what I am telling you are facts. I feel that the chances of the farmers under co-operation will increase 100 per cent.

If at any time in any district I can be of any use to the Farmers' Institute, I shall be glad to go there and explain the system under which we have worked at Cowichan. There are gentlemen in this Agricultural Department who have helped us and aided us enormously, and it is up to us to help you also. There are gentlemen in the Department who have seen our books, and know that what I say is a fact, and who could go to the other districts and aid them similarly, and perhaps better, because they have the advantage of the knowledge of the Cowichan Creamery behind them.

I thank you, gentlemen, and hope I have not intruded upon your time. As Chairman of the first Farmers' Institute in the Province, I shall always be glad to assist you in any way possible.

F. D. Campbell (Maple Ridge): I am sure we have all gleaned some very valuable information from the address of Mr. Hayward, and I have therefore much pleasure in moving that a vote of thanks be accorded him.

Walter Paterson (Cowichan): I would like to second that motion. We farmers realize that in Mr. Hayward we have the best asset we could possibly have. He is a very modest man, and it is as well that I should tell you. The creamery has not been without its difficulties. A year ago we were in difficulties through excessive expenditure. We called upon Mr. Hayward to act as director and chairman, and during that single year he has not only cleared off all the difficulties, but he has carried us further on.

The motion was adopted unanimously.

Mr. Hayward: Please be good enough to take very seriously what I said at the close of my remarks. If I can assist you at any time I shall be only too pleased to do so. I would be delighted to have the opportunity of addressing the farmers in a heart-to-heart fashion. Anything I can do for the farmers is something done for the Province, and consequently I will take the very greatest pleasure in doing it. (Applause.)

British Columbia Literary Association.

(Crawford Bay.) "*Resolved*, That the Provincial Government be asked to assist in forwarding the aims and objects of the British Columbia Literary Association by means of an annual grant, and that the Legislature be asked to encourage the organization and development of public libraries throughout the Province."

Rev. Mr. White: I am sure I am extremely obliged to the Association for the permission so generously accorded me to be here this afternoon. I have been very much interested in coming here and in listening to your discussions, and I would like at this juncture to draw your attention for a moment to the scheme of establishing libraries in this Province. I would just like to say that the most important product of the farm is not the onions we heard about yesterday, or the fine cattle, nor is it the beautiful fruit. The main product of the farm is the men who are grown on it. I am sure that nobody with any sense will attempt to deny that statement. You can go into an ordinary city or town and you will see a great many men who look as if they were misfits. Then I come and look into your faces, and I must confess that you are a pretty fine set-up lot of fellows. I want to draw your attention to-day to something which, in my opinion, will tend toward the making of better men in our community. I am here representing the British Columbia Literary Association; a number of us feel that there is work to be done here. When we began to think seriously about the matter, the first thing that occurred to us was that an Act should be passed; that is, an Act rendering the establishment of libraries throughout the Province easier of accomplishment than it is at the present time. I do not see why British Columbia should be behind anywhere else in this matter. In this Province we have

a very up-to-date "Library Act." I know that you are interested in this, because I have had correspondence from a great many of the organizations represented here, and I have yet to hear from a Farmers' Institute that is not directly interested in the institution of libraries in your various communities. I have here a whole bunch of letters on the subject, but I will not weary you with reading them. I am perfectly sure that a small library in a small country community means a great deal more per head than the large city library means per head. In fact, I am strongly of the opinion that it is much more important from an educational point of view that there should be a large number of small libraries scattered throughout the Province than that there should be the great and sometimes cumbersome libraries in the larger cities. We have distributed a number of the copies of an Act proposed by this Association, and perhaps some of you would like to look at it. In the first place, I may say that it is divided into three parts. The first part provides for the organization of libraries in municipalities, cities, towns, and rural municipalities. This is brought into effect by a petition from the people and a by-law passed by the Council and then voted on by the people. It provides for the organization of a board, consisting of the Mayor of the city and others appointed by the Council and by the School Board. The next important item is on the fourth page. It is section 11, which provides for the levying of a library rate, fixed at not more than one mill on the dollar, unless the increase be voted by a two-thirds majority of the Council. The second part of the Act provides for the incorporation of library associations in unorganized districts. A number of people may gather together and form themselves into an association for the establishment of a library; and the Act provides that when there are fifty of them they may draw a grant. The third part of the Act deals with the grant. I do not know whether the Government will bring forward this Act during this session or not, but I believe that if a little influence was brought to bear upon them it would turn the scale in the right direction. The Government is not opposed to the Act, but they do not want to overload themselves with legislation. I would like to see a strong application from this organization go to Dr. Young and the Premier, and impress upon them that this Act, which is already in order, has to be put on the statute-books at this session. I would also like to suggest that, instead of passing the resolution as it has been submitted, you adopt the form of the one which I myself have drafted, and which is as follows: "*Resolved*, That it is the opinion of this Convention that it is of the first importance that an Act should be placed on the statute-books of the Province providing for the organization, development, and assistance of public libraries in organized and unorganized districts, and that a delegation be appointed to go before the Minister of Education to advocate the purport of this resolution."

P. J. Locke: I am sure we are all in sympathy with the idea. I shall withdraw the original resolution and bring forward the other one myself.

Another delegate seconded, and the resolution was adopted.

Messrs. Locke, Tunnacliffe, and Allen were appointed by the Chairman as a delegation to wait upon the Minister of Education on the subject-matter of the resolution.

FENCE LAW.

(Kootenay Lake.) "*Resolved*, That the present fence law is unsatisfactory and should be amended, and that this resolution be forwarded to the Government as a resolution from the Kootenay Lake Farmers' Institute."

W. G. Robb (Kootenay Lake): I am the mover of this resolution. I hope that the Department will be able to devise a fence that will be satisfactory and at the same time in compliance with the fence laws. The present law requires a fence to be 4 feet 9 inches high. I imagine that the framer of the present law had nothing in mind but a lumber fence, which is more expensive and not so satisfactory as some of the more modern fences. In some places it is impossible to deliver lumber at less cost than $25 for 1,000 feet, and you will find that a good substantial wire fence can be built for about a third of the money. Only a few of the more expensive fences will comply with the present requirements. Resolutions have been passed asking for a hard-and-fast law in the matter. We do not want to go as far as that, but we think we should have some protection against cattle running at large.

C. E. W. Griffiths (Metchosin): I take great pleasure in seconding the resolution. In our district we have found the same sort of trouble. We are able to get wire so very much cheaper if we could use it. I do not think you will find any cattle that will do much to a fence 4 feet

9 inches high. I certainly think some change should be made in the fence law. I do not think that it is reasonable to suggest that a fence of wire should be 57 inches high. Things have changed since the law was enacted, and I think, therefore, that we should now change the law.

A. Keffer (Arrow Park): I am entirely in sympathy with the idea. This is one of the old laws, and I think we should bring in a modern one dealing with changed conditions. I have seen a good fence that would turn any sort of cattle and yet it was not recognized by the law.

C. F. McHardy (West Kootenay): I was under the impression that the wire fence was legal.

F. Cowley (Alberni): A legal wire fence has to be staked.

W. F. Brett (Spallumcheen): The present law works a hardship on the farmers. At the very lowest calculation it would cost a man $90 to fence 10 acres.

The resolution carried.

Bounty on Hawks, etc.

(Crawford Bay.) "*Resolved*, That there should be a bounty of $2 on all hawks injurious to farmers; a bounty of $2.50 on skunks; the bounty on coyotes be raised to $5; and that a bounty be put on gophers."

P. J. Locke (Crawford Bay): I am moving this resolution. This year we have suffered considerable loss from the chicken-hawk. With regard to skunks, it is not so bad. We think that if the benefit is to be allowed on the owl, it should be allowed also on the hawk.

J. G. Frazer (Martin's Prairie): I will second that resolution. We particularly want the bounty on coyotes, because they are the principal menace to poultry in our district; together with my neighbours, I have suffered considerably from them.

A. Letts (Glenside): We brought in a motion in this respect dealing with gophers. They are in great abundance in the Dry Belt. They have come in from Washington State and they are now spreading northwards. Within the last ten or twelve years they have travelled very far, and they grow at the rate of one or two million a year. In Washington efforts are being made to exterminate them.

H. W. Whiting (Myncaster): I think the original resolution was for the Government to provide the poison, but we think this is the best method.

The Chairman: What is the best form of poison?

H. W. Whiting: We find that strychnine is the best.

C. F. McHardy (West Kootenay): Up in our district the gophers do the most harm. We had a particular remedy recommended to us, but upon using it we discovered that they fattened on it.

A delegate: I have been on the Prairies for ten years. The municipalities there supplied us with strychnine. It was put into the wheat and boiled. We used to strew it along the ground. We found that that kept them down. In British Columbia I think that if the Government passed a law giving a bounty it would work more effectively than the system on the Prairies.

The resolution was adopted.

Inspection of Orchards.

(Crawford Bay.) "*Resolved*, That the present system of inspecting orchards is absolutely inadequate, and that the number of Inspectors be at once considerably increased."

P. J. Locke (Crawford Bay): I beg to move this resolution. The matter was discussed last year when it was under Mr. Cunningham's department. I have been on my place for four years and have never seen an Inspector yet.

The Chairman: We have no less than eight Inspectors. They are supposed to be competent men selected by Mr. Cunningham, and I know that they have instituted a comprehensive system of orchard inspection. They are also supposed to give advice to the people and to serve them with spraying notices when infection is found. As regards the Horticultural Branch of the Department, you have your representative in your district. He is supposed to be in touch with you all, and to advise you as to what diseases you have in your orchards and what remedies you should employ. You must remember, however, that the Province is a very large one, and to give every individual the attention that he would like to have would be a very difficult job.

P. J. Locke: I am willing to withdraw the resolution after hearing the explanation from the Deputy Minister.

The Chairman: The Inspectors are not supposed to go around and spray every orchard, but they are going around enforcing people to spray infected orchards. You cannot compel people to spray unless there is disease. You must prove the infection. We are doing all we can, and you must do your part.

The resolution was withdrawn.

DUTY ON FRUIT.

(Summerland.) "*Resolved*, That the Dominion Government be urged to take immediate steps to place the duty on fruit on a parity with that of the United States, which in several instances is considerably higher on various kinds of fruit than ours."

The resolution was adopted.

MATTERS OF INTEREST TO THE AGRICULTURAL COMMUNITY.

(West Kootenay.) "That whereas there are many matters of vital interest to the agricultural community which have from time to time been the subject of resolutions passed by the Farmers' Central Institute and by various local institutes, and presented to the Government expressing their wants and requirements; and whereas exceptional conditions exist in this Province, which, by reason of its general physical conformation and heavy growth of timber, the widely scattered areas of arable and cultivated lands, and other well-known peculiarities, render the development of agriculture in British Columbia unusually slow and unduly expensive as compared with the rate of development in other Provinces; and whereas by reason of modern and improved methods of agriculture and of business generally, and of the high price of all materials and appliances required by the farmer, greatly increased facilities and much larger capital are necessary to successful farming operations than formerly: Be it therefore *Resolved*, That, in the opinion of the members of the Farmers' Central Institute, representing as they do the view of the farming community throughout British Columbia, the present economic conditions, including all such matters and questions as have been referred to, should have the immediate and serious consideration of both the Provincial and Federal Governments, so that some comprehensive financial policy of betterment, commensurate with the great possibilities of the agricultural industry in this Province, be evolved, placing agriculture on a basis of equality with that of other businesses in respect to opportunity, and that it have a degree of consideration attached to it that has been given to the subject of forestry, in regard to which the Government's policy is eminently wise and progressive; and be it further *Resolved*, That a committee from the members of this institute be appointed by the Chairman to present this resolution to the House, the Premier, and the Minister of Finance and Agriculture, and to urge upon them the importance of its recommendations."

C. F. McHardy (West Kootenay): This is the most vital question of all, because it comprises most of the other questions we have to deal with. Money is at the bottom of a great deal of good as well as of evil. The trouble is that we as farmers cannot get it cheap for the development of our farms. Some companies will loan on improved farm lands. In the town it is different. You can get money on anything. Why should there not be some scheme whereby when a man gets so much land clear he can get an advance on it, so that he will be able to go on and clear the rest of it? The Government loans securities to the railways. They have forestry insurance and taxation. I see no reason why the farmers should not get assistance also. All we ask is that a committee be appointed to look into the whole matter.

Major Macfarlane: This is a notable improvement upon the resolution brought forward last year, which did not at that time receive the favour of this assembly because it was not understood. The motion brought forward last year was with a view to having advances made to farmers on similar lines to the system in vogue in Ireland. I have in my pocket some of the rules and regulations about the lending of money to farmers in Ireland. It is a financial success there, and I do not see why it should not be a financial success here. It is putting the Government to no expense, because the money all comes back. In the *Montreal Star* some weeks ago there was an editorial referring to the hard lines of farmers who were up against it on account

of the high rate of interest. They invited correspondence from those who were suffering from this condition, and ever since then each weekly number has been flooded with communications. There can be no doubt that such a system as is proposed in this resolution would result beneficially to the whole Province, and therefore I have very great pleasure in supporting it.

C. W. Little (Northern Okanagan): I feel that I should say a word or two on this subject, although I am sure the Convention will pass the resolution. Here is a business proposition; the farmers have a feeling under the present system that they will do no more until the rate of wages and the rate of interest makes it permissible. Uncultivated land is assessed at $25, and the moment you bring it under cultivation it is assessed at $150, and therefore anything that can increase the assessment of the land should meet with the support of the Government.

The resolution was unanimously adopted.

Major Macfarlane, Mr. Hardy, and Mr. Little were appointed by the Chairman as a committee to bring the matter to the attention of the Government, after which the Convention adjourned for the day.

Saturday's Session.

Institute Stumping-powder.

The Chairman: Gentlemen, with regard to the question of institute stumping-powder, I have something to tell you. About two months ago I had a communication from Winnipeg to the effect that the C.P.R. was going to cut out the single first-class rate granted to the Government on stumping-powder supplied to institute members, on account of this concession having been abused. I wish you all to understand that this rate, which is a most valuable concession, is given on the understanding that the powder is used by your institute members for land-clearing purposes, and that if you transgress that rule in any of the institutes you are liable to have the rate cancelled at any time. This is very important, and I wish you to understand it. It required an assurance that it would not occur again to induce the C.P.R. to reinstate the rate. I have been cautioned by the company that if any other abuses occur the rate will be cancelled at once.

Mr. Holmes: In regard to the discussion we had yesterday about the powder, I thought that that had reference to Government road-work. I am led to understand that a good many of the Secretaries were in the habit of selling the powder to the road foremen, which is, of course, against the rules. As regards the magazines, we have only one or two or them in use, the others being situated in the mining districts. In that connection I would point out to you that you are saving 60 to 75 cents a case by getting it from the mill, the magazines being some distance from the railways. Our prices at Victoria are the same as at Nanaimo.

J. H. Nelson (Sumas): Does this restriction apply to municipal road-work?

The Chairman: It applies to every other purpose except land-clearing for institute members.

C. E. W. Griffiths (Metchosin): I heard it said that you could buy a box of powder in the States for $3. I would like to know if that is so.

A. Keffer (Arrow Park): Are we to understand that the obtaining of powder will be the same as last year?

The Chairman: A car-load will be supplied on the understanding that the Secretaries of the institutes will be responsible for the collections. The Secretaries will pay the company as sales are effected, and the company will refund the Government.

J. H. Nelson (Sumas): Would the Secretary of the institute be personally responsible?

The Chairman: Well, somebody has to accept the responsibility.

F. D. Campbell (Maple Ridge): At Maple Ridge we are able to run the magazine. Any member wanting powder goes there and gets out just as much as he wants.

W. H. Pennycook (Strawberry Hill): Can we draw on the magazine at New Westminster without going to the wholesalers?

Mr. Holmes: No. It costs 30 to 40 cents extra a case there.

The Chairman: If you get it from the magazine, it appears that you will have to pay more for it.

W. A. Pease (Creston): Suppose that a contractor wanted to clear land, would he get the powder on these terms?

The Chairman: Yes, if the man who owned the land supplied it and was an institute member.

ADDRESS BY MR. CUNNINGHAM ON "THE ENFORCEMENT OF SPRAYING REGULATIONS AND THE INSPECTION OF ORCHARDS."

Mr. Chairman and Gentlemen,—I am sorry that I was not able to be present yesterday, but I may say at the start that my sympathies are with you. I have charge, it is true, of all the infected trees and plants on the Indian reserve. This is, however, the first time that the Provincial Government has had the right of intervention. I may say that I took the matter up with the Minister and succeeded in getting an order from him that will enable me to deal with the question. What I have to do is to cut out every infected tree and bush, and I am telling no lie when I say that they are all infected. Of course, the Indians are clamouring for the right to take away their trees, and I had to issue an order to the effect that not a single tree was to be touched or taken away. They must all go up in smoke. And in that connection I make bold to state, gentlemen, that so long as the Provincial Government is denied the right to inspect or destroy infection on the Indian reserves, we shall never get the country clean. I have a sample here of what is to be found on the reserve, and I think you will agree with me when I say that it explains why the District of Victoria has suffered so much from orchard pests. That reserve has been an incubating department for the whole of the city. During the present week I may say that I have been engaged dealing with three car-loads of apples that have been delivered contrary to law. That question may involve quite a conflict between myself and the carrying company. It is my duty to see that the regulations are enforced, and I will do it. The firm who are dealing in these apples brought in three car-loads and had them delivered to another firm in the city without inspection. Now I must prosecute both of them. That is my work. It is very unpleasant, but it is very important. Now, I see that you have been considering items connected with my work in regard to the better inspection of local orchards. In that connection I would like to say that we are doing the best we can. During the last two years I have secured two power-sprayers and had them distributed throughout the Province. I want to get a dozen of them, a baker's dozen if possible. I am bringing all the influence and pressure I can to bear upon the Minister in this regard. I showed him a few specimens under the microscope, and he says that something must be done to clear the orchards of British Columbia regardless of who suffers in the doing of it. I personally have been giving the best of my life to the advancement of the fruit industry. It means the protection of the fruit-grower against the invasion of infected nursery stock and fruit. I was the first man to be called upon when the Board of Horticulture was inaugurated in 1889; it asked my advice on the question, and I was the first vice-president of the association. We failed at the first organization, and the business was deferred until a later time. When the Board was organized finally, we were empowered to bring in regulations. One of these regulations was for the inspection of fruit. We realized even then that if the British Columbia orchards were to be protected we must take advantage of the inspection of fruit.

Now, a long and careful experience has taught us that one of the worst insect pests in existence is the codling-moth. We passed a regulation regarding it, whereby fruit of every description has to be carefully inspected before it is distributed. I was asked to lend a hand in the enforcement of these regulations. I left my place, and took the train to Vancouver and at once commenced my work of inspecting fruit. We took the precaution, where it was necessary, to call upon the Provincial police to assist us in enforcing the law. In that case I called in the police, inspected the fruit, and condemned it. There were nine car-loads. Since then the farmers have been on top. From that time till now I do not know of a box of fruit that has been delivered anywhere in the Province until after it has been inspected. If such a thing is known to you, I would like you to report it to me.

I said that the codling-moth was the worst pest in existence, but I would like to qualify that by making the fruit-fly the exception. It is worse than the codling-moth, and up to the

present they have found no remedy for it. That is why we have added citrus fruits to the list to be inspected. Not only are we protected from the introduction of this pest, but it gives us a great advantage in the markets of Australia and New Zealand. The authorities in New Zealand have imported twelve different shipments of fruit. It was my privilege to inspect that fruit, and to give a certificate to the effect that there was not within a radius of fifty miles any of those pests referred to. The Australian authorities respect my certificate. That is my advantage. One enterprising fruit firm in the Okanagan has made twelve shipments of fruit to Australia and reaped a very handsome return. Not a pound was rejected. They have a copy of our regulations over there, and therefore accept my certificate. I am pleased to say that in our dealings with the codling-moth we have constituted a record. At Kamloops several years ago some Christmas presents of barrels of apples that were never inspected were shipped in to residents. The result was that the barrels containing this fruit were thrown out in the yard by the parties receiving it, and the first thing we knew was that the codling-moth found an adaptable place to propagate, and naturally every orchard in Kamloops was infected. Six or seven years ago I inspected the infection. We found one orchard a mile west of the town infected with the disease, and later all the others in the town. Then we started a system of spraying, and succeeded in confining the area of infection to within certain limits. We concluded, however, after careful investigation and a great deal of correspondence with experts, that there was only one thing left to do; the codling-moth is a night flyer, and it is carried by air-currents from one orchard to another, depending upon the drift of the current for the direction the infection will follow. We realized that it was only a question of time until the whole Province would be infected, and we decided that we must exterminate them all. We tried one other experiment, and then we cremated the whole year's crop of fruit, and for the first time in the history of civilization in dealing with the codling-moth British Columbia succeeded in exterminating it. That is a record of which I am proud. If I had never done anything else, I would be glad to have done that. The Kamloops infection, if continued and extended, would have inoculated every other part of the Province. I defy any other country in the world to produce a record like that.

Now, in regard to the inspection of nursery stock, I must say that that is a very important duty. When I tell you that during the last five years ten million trees and plants have been individually inspected in Vancouver under my supervision, you will probably be able to estimate the magnitude of the work. It involves a tremendous amount of labour. The season extends from the 1st of November to the middle of May, so that from the time when I ought to be doing orchard-work I am engaged in nursery-stock inspection. Now, as you must be aware, in the Province here we are free from San Jose scale infection; and if you were to ask me why it is we are free, I would say it is because our nursery stock is inspected. I challenge any man to show me where an infected tree or plant has been delivered to him. There is one exception; a lot was delivered at Nelson, and it was infected with a disease of a very peculiar character. It was so small that we could hardly detect it. We destroyed three thousand of them and delivered a few that we considered safe. I sent up a man when they showed infection later to dig up the trees and burn them. The fault was not ours exactly, because the authorities in Montreal to whom the trees had been submitted passed them as all right. That, however, is the only instance.

I think the cancellation of Indian reserves is expedient. In Westminster District there are sixty-four reserves, and neither myself nor my officers can go into them. I had not any right to go on this Songhees Reserve here until the Government took it over. I had not the right to enforce the spraying or any other of the preventive measures. It is up to this Board to deal with that question. I think it is most important that there should be a readjustment of the Indian reserves in the Province.

The Chairman: That lies with the Federal authorities.

Mr. Cunningham: The Federal authorities have one man inspecting the whole of the reserves in British Columbia. Something is being done, it is true, but something more must be done. The Provincial Government must have the right to enter the Indian reserves. I may say that we are doing something with the orchards. I have a staff of eight men at work; I hope very soon, however, to have twice eight; but, gentlemen, you must not expect that they will be able to inspect every orchard in the Province. It would take more than a hundred

men to do that; you must learn to inspect your orchards for yourselves. All the men in charge of the sprayers are experts; they come from California and are well up in the work. So far I have bought half a dozen power-sprayers; they have been imported since we started this work. I shall look to the several Farmers' Institutes for assistance in this matter.

There is another disease with which I have come in contact, but which so far has baffled me; it is the Baldwin spot, and it is a serious infection. Some contend that it is pathological; but others do not. Personally, I believe that it is a fungous disease, and that our remedy will ultimately be found in spraying. I hope to be able to demonstrate within the year that my contention is right. In regard to the preparing of land for an orchard, I would like to say that the stumps first of all should be cleared off, and then we can begin at the root of things. We have a whole lot of expert advice to give you. In fact, I know of no other country that looks after its farmers in the same way. There is no excuse for us not producing the very best fruit on the Continent of America. In my work I am going to make an appeal to the rural municipalities to help me in cleaning the trees. The Government has been good enough to do so much for us that I think it is up to us to do the rest. I thank you, gentlemen, for this opportunity of addressing you.

Major Macfarlane (Shawnigan): I think the address we have just listened to should be productive of benefit to all of us, and I think a hearty vote of thanks is due to Mr. Cunningham.

E. S. Wood (Kamloops): I would like to say that last year I found one specimen only of infected fruit in Kamloops, which shows that it has been very well exterminated. I think the Government made a little mistake in not prosecuting the disease further, for where there is one single family left the codling-moth will continue to develop, and in a few years will be as bad as ever before.

The Chairman: You may be sure that it will be very carefully watched.

E. S. Wood: I would like to suggest that whenever any of us come across the specimen in our orchards we should at once send it to Mr. Cunningham.

The Chairman: I am quite sure that we all appreciate the work of Mr. Cunningham as Inspector of Fruit; he is absolutely fearless and no respecter of persons, and it is due to him that the Province to-day is as free from fruit pests as it is. I may say that, while we may have had little differences of opinion on some subjects, when it comes to the main issue we have always been of one mind. Mr. Cunningham's work deals with inspection of nursery stock and fruit, and the enforcement of the regulations of the Provincial Board of Horticulturists. He also has charge of the demonstration spraying work. The work of the Horticultural Branch under Mr. Winslow is primarily educative; he and his men are assigned to different places in the Province to give demonstrations and expert advice in orchard practice. I would not like you to get the two branches mixed up in your minds. The work conducted by Mr. Winslow and the Assistant Horticulturists has resulted in an enormous amount of good to the fruit industry of this Province.

The motion was carried unanimously.

EXPRESS RATE ON HIGH-CLASS POULTRY.

(South Kootenay.) "That whereas the express rate on market poultry is the regular merchandise rate, but on pure-bred poultry is a rate and a half on the Great Northern Express; and whereas the Government is spending large sums of money yearly to encourage the raising of high-class poultry: Be it therefore *Resolved*, That the Government take some action to remove this obstacle and injustice to the more extensive breeding of high-class poultry."

W. Reith (South Kootenay): I move this resolution.

J. Allen (Langley): I second the motion, because I think that it is a very important matter to all poultrymen. It seems to me that this obstacle should be removed. I brought three consignments from the interior; they were shipped in a light airy coop. The reason the express charged a rate and a half was that the birds required special handling. When the coops arrived here there was a hole in one side, and then I found that the birds had not been fed for two or three days at least. Now, I think that if we have to pay a rate and a half our goods should be properly looked after.

The Chairman: Have you ever brought this matter before the attention of the Railway Commission? I think it should be brought on from your institute.

W. Reith: These grievances came up at our annual meeting.

J. D. McGuire (Salmon Arm): I think if they become members of the Poultry Association they will get a 50-per-cent. reduction.

J. Allen: I am a member of the Poultry Association and I never received any reduction.

The Chairman: I believe that the Poultry Association has taken the matter in hand, but the concession is only granted in so far as Canada is concerned. If it is going to be brought up at the Poultry Convention, I think the motion should be withdrawn.

The motion was withdrawn.

Baldwin Spot.

(West Kootenay.) "*Resolved*, That the Central Farmers' Institute memorialize the Government to use every means to find a cure for the Baldwin or brown spot, and check the spread of the same."

The Chairman: The Minister is making provision in the Estimates for the appointment of a Plant Pathologist, in view of which I think you might withdraw your resolution.

The resolution was withdrawn.

Exemption from Revenue Tax.

(Martin's Prairie.) "*Resolved*, That we consider that all persons paying taxes on real estate or personal property should be exempt from the revenue tax and poll-tax."

J. G. Frazer (Martin's Prairie): The Taxation Committee's report recommends the entire abolition of these taxes. We do not go so far as that, because we know that there are men who come in and use our roads and exercise other privileges and yet pay no taxes; what we think is that the tax should be levied against these people only.

The Chairman: The Tax Commission brought in a recommendation that the whole tax be abolished.

A. Keffer (Arrow Park): Yes, but we want the alien still to pay the poll-tax; he enjoys the protection of the laws.

C. W. Little (Northern Okanagan): My institute considered it an excellent idea for getting hold of the Chinese, Japanese, and Hindoos. We think the tax should be increased to $5, but that all persons paying real or personal property tax should be exempt. We do not think it should be abolished.

W. Graham (Bella Coola): This resolution came up in our institute and it was voted down. I think the present Act should be abolished or enforced properly.

C. F. McHardy (West Kootenay): I would suggest that the word "all" be taken out and the word "only" inserted.

J. C. Harris (New Denver): We have just had a Taxation Commission; they have gone all over the Province, and I am glad to see that they have decided from all the evidence that the tax was indefensible. Just suppose that the City of Victoria was to charge a poll-tax, we would all be aliens. It has not been found a good way to collect taxes. If you read the report of the Commission you will find very lengthy and deliberate reasons for abolishing the tax, and I do not think it would be wise in these circumstances to pass a resolution like this.

The resolution was adopted.

Careless Fire Patrol.

(New Denver.) "*Resolved*, That the attention of the Government be drawn to the careless fire patrol maintained by the railway companies during the summer."

J. C. Harris (New Denver): Our institute wants this matter brought up; perhaps we should go direct to the railway company. We thought, however, that we would be able to do more good if we could pass a resolution here, drawing the attention of the Government to the slackness with which some of the officials follow the trains.

C. E. W. Griffiths (Metchosin): I take great pleasure in seconding the motion. We have had several fires in our district, and I don't think we can be too careful in protecting ourselves.

The resolution was adopted.

DATE OF PUBLICATION OF ANNUAL REPORT.

(Northern Okanagan.) "*Resolved*, That the Annual Report of the Central Farmers' Institute be got out not later than the 1st September."

The Chairman: I would like to explain that the difficulty occurred through our having a stenographer taking down the proceedings who had other work to do, with the result that we had to wait his convenience; also there was congestion of work in the Printing Department. This year we have engaged some one specially who will start on the work right away, and we hope to have it out without unnecessary delay.

The motion was withdrawn.

AMENDMENT TO "INHERITANCE ACT."

(Salmon Arm.) "*Resolved*, That the institute ask the Central Institute to use its influence in aid of widows whose husbands have died without making a will in getting her equal share of her late husband's estate even if she has no children, being only reasonable that the widow who has worked and struggled to aid her husband should have her equal share of the estate at his death."

J. D. McGuire (Salmon Arm): I have learned this morning that the Attorney-General has reconsidered the legislation of last year, and I beg to withdraw the motion and submit another in its place: "That whereas we are informed that the Attorney-General has made the necessary and just amendment to the 'Inheritance Act,' providing that widows whose husbands have died intestate shall be entitled to a third interest in the estate as was formerly provided by Provincial Statutes: Be it *Resolved*, That we, the delegates of the Central Farmers' Institute, hereby endorse this action on the part of the Hon. the Attorney-General."

F. D. Campbell (Maple Ridge): I take great pleasure in seconding the motion.

The resolution was carried.

ADDITIONAL VETERINARY INSPECTORS.

(Shawnigan.) "*Resolved*, That, in view of the numerous cases of tuberculosis, additional Veterinary Inspectors be provided."

Major Macfarlane (Shawnigan): I am the mover of this resolution. When this matter came before our institute, it was pointed out that the Provincial Government had already taken a great deal of trouble with the subject, and since then the gentleman who brought it forward has been in a position to have it withdrawn; but instead of that I thought it would be a better course to bring the resolution forward. British Columbia stands alone as the only Province on the Continent of America that is using the Legislature to deal with the disease. In no other State or Province that I know of have such steps been taken as here. I bring the resolution forward in an apologetic way. We only want to know what information we can get as to what Inspectors are available in the different districts.

The Chairman: I consider that the Department has been doing a very great deal towards the eradication of bovine tuberculosis in the Province. When any one has a herd of cattle to be tested, the only thing to do is to have the Department send an official. Dr. Knight is the Chief Veterinary Inspector, and he has four men under him. On receipt of a notice, he immediately instructs the Veterinary Inspector to proceed as soon as possible to the place assigned. Up till now testing has been voluntary, but after what the Minister said at the Dairymen's Convention, I think it is his intention to make testing compulsory, as the question of infected milk is a very serious one indeed. Dr. Rutherford, who is one of the best authorities on the Continent on bovine tuberculosis, congratulated the work done by the Department in this respect. I would like to tell you a story of what happened in the East. There were two families of people living close together with a few acres each. One of them kept a cow. Suddenly a child of one family died, and shortly afterwards a child of the other family died. They did not know anything about tuberculosis. On hearing of these cases a friend advised them to have the cow tested. They called in a veterinarian, and on his instructions had the animal slaughtered, when it was found to be rotten with tuberculosis. Shortly afterwards a third child died. I think it is right to do everything in our power to stamp out this terrible

disease in the Province. The Government is giving a very generous compensation to those whose animals are slaughtered, but it is up to all of you to do what you can to help along the good work. I think the resolution should be withdrawn.

Major Macfarlane (Shawnigan): I think it is only right, in view of the splendid explanation given, that the resolution should be withdrawn.

C. F. McHardy (West Kootenay): The resolution asks for more Inspectors. If the Government could possibly see its way to appoint more Inspectors, it would perhaps be a good thing to let the motion go through.

The Chairman: I may say, if this legislation is effected and testing is made compulsory, it will probably be necessary to have more men. The districts would be systematically covered and the Inspectors would test the dairy herds whether the owners wanted it or not. We have, however, been increasing the number of men. We started with two and now we have five, and the effect of this increase is reflected in the increased number of herds tested.

The motion was withdrawn.

Employment of Experienced Road Engineers.

(Northern Okanagan.) "*Resolved*, That this Institute endorse the resolution passed by the Highways Association in convention at New Westminster, relating to the employment of experienced road engineers in laying out all district work."

C. W. Little (Northern Okanagan): In moving this resolution, I do not think it is necessary for me to say anything.

F. D. Campbell (Maple Ridge): I second the motion.

The motion carried.

Tobacco Expert.

(Northern Okanagan.) "*Resolved*, That we endorse the Government action in providing a travelling expert in tobacco, and we request it be continued, the experiment being so satisfactory."

C. W. Little (Northern Okanagan): The experiment conducted in our district has been most satisfactory, and I believe that it will yet prove a source of great benefit to the Province.

The Chairman: It is the intention of the Department to further carry out the work. We were extremely pleased with the report. Mr. Holman personally told me that there were many parts of the Province suited for the growing of Virginia and Turkish tobacco. I have here a sample of the very finest tobacco grown in the Province, and it is reputed to be very good. There is a great deal of money in the industry, and I can assure you that it is the intention of the Government to carry on the work.

The resolution was adopted.

Stumpage on Forest Products.

(Burton City.) "*Resolved*, That the Government be asked at the coming session to repeal the stumpage on forest products cut by actual settlers on their own land which is being cleared for agricultural purposes."

S. Walker (Burton City): I think it is a very important resolution, and I hope it will pass.

A. Keffer (Arrow Park): I second the resolution. I am aware, however, that it is against the principle of the Government, and it is one of the great sources of revenue.

C. F. McHardy (West Kootenay): I am not in sympathy with this. We are asking for too much. I think we can afford to pay the 50 cents.

A. Keffer: In the Arrow Lakes we only got $5 for logs; I believe now that we are getting a little more.

F. Cowley (Alberni): I am in favour of the resolution.

S. Macdonald (Cranbrook-Fernie): In our district we have a man who takes up land and cuts the timber, and immediately he has cut all the timber he wants he drops it and takes up another piece of land.

L. C. Morrison (Fire Valley): The resolution asks that this shall apply for lands being cleared for agricultural purposes. The most I ever got was $5 per thousand. I think it is only just to the men clearing land to have the stumpage taken off.

The resolution carried by 27 votes to 18.

WEATHER-STATIONS.

(Spallumcheen.) "Whereas certain sections of the Province are liable to occasional frosts during the blossoming season; and whereas it has been found that on the other side of the line weather-stations have proved to be of every great assistance in giving timely warning to the orchardists of the district: Be it therefore *Resolved*, That the Provincial Government be requested to furnish the necessary instruments to any district not being served by the Dominion Government."

The Chairman: I think if you take that question up with the Dominion Meteorologist he will supply you with them.

W. F. Brett (Spallumcheen): I notice that this matter was brought up at the last Convention, and that the same statement was made then. We are very much interested in this question, and it was thought advisable to make some effort to start a weather-station. I wrote to Mr. Martin Burrell on the subject, and received a reply stating that such matters are under the Department of Marine and Fisheries. I had another letter later on in which he told me that he had had a reply from the Minister of Marine and Fisheries, to the effect that it was impossible to support another station. I do not wish to pass any reflection on our Chairman; our district in particular is delighted with the assistance and service rendered through his Department. But we thought that, in view of the fact that we intend this next summer to go in for orchard-heating experimentally, if the Government would assist us in the matter of furnishing instruments, we would be willing to make the readings and report to them. We called a meeting on the subject, and the idea had an enthusiastic send-off, and I may say that a large number of men intend this year to install orchard-heaters. Two men in the district got orchard-heaters and experimented with them, and we are satisfied with the results. Each man had a full crop of plums. Next door to this orchard the plum-crop was a very poor one. We have already gone into the matter of purchasing sprayers. I am glad to tell Mr. Cunningham that in our district we have a man who has purchased a sprayer as a result of the experiment. For next year I have inquiries from one or two who intend to purchase them. We have also arranged for telephonic communication in case of frosts.

The Chairman: I think it is a small question, and I shall be pleased to take it up and recommend to the Minister that these instruments be granted in districts not served by the Dominion Government. Of course, it is vitally important to have notice of frosts.

W. F. Brett: The cost will be between $50 and $100.

The Chairman: I do not think it will be as much as that, but I shall be pleased to take it up with the Minister.

A. Keffer (Arrow Park): I hope you will also make some preparation for the supply of data gathered, so that we can all have the benefit of it.

The Chairman: We would compile the information received and send it out in bulletin form.

The resolution was adopted.

PROVINCIAL EXHIBIT TO DRY-FARMING CONGRESS.

(Kettle Valley.) "*Resolved*, That this Convention request the Government of British Columbia to send a Provincial exhibit to the Dry-farming Congress to be held at Lethbridge this year."

The Chairman: I have discussed the idea with the Minister, and I may say that he is in favour of sending a very large Provincial display.

J. T. Lawrence (Kettle Valley): I will move the resolution, on the ground that it will strengthen the Government's hand.

W. Graham (Bella Coola): I second the motion.

The resolution was adopted.

SKYLARKS AND WAGTAILS.

(Nanaimo-Cedar.) "*Resolved*, That the Department import skylarks and wagtails as farmers' friends into the Nanaimo and Cedar Districts, in order to combat the wireworm and other pests."

W. N. Shaw (Nanaimo-Cedar): We are very troubled with the wireworms, and I think that this resolution will be a means of helping us to get rid of them. The skylark is a beautiful songster, as well as a great destroyer of worms. The wagtail is another bird of the same sort.

J. S. Shopland (Comox): I take great pleasure in seconding the motion. I do not know the last bird as a wagtail, but I think I know it as the dishwasher. The skylark is one of the prettiest singing-birds in the world.

H. Skinner (Nanaimo-Cedar): I understand that the Victoria Natural History Society is importing skylarks, woodfinches, and English robins.

Major Macfarlane (Shawnigan): I think every farmer should do all he can to introduce the skylark. In this country there is nothing so sad as the utter silence. True we have a lark, but it is merely an imitation.

J. L. Vicary (Peachland): I think there is a lot of sentimentality in the talk for English birds. We have a certain number of native birds, and I think they are doing good work. I have known other things imported elsewhere on sentimental grounds, and in the end we had a great struggle to get rid of them. I think, before doing anything in the matter, that we get a report as to the advisability of introducing these birds.

The Chairman: I may state that some time ago there was a report to the effect that the Provincial Game Warden intended to import certain birds, and there was a loud protest raised from all parts of the Province. It is a very serious question and one that should be very carefully thought out. Just consider what the rabbit did in Australia. If you bring these birds out here they might take a liking for your small fruit. I may say, however, that there is a clause in the "Game Act" prohibiting unsanctioned importation of them. Personally, I do not think the lark would do any harm, but you never can tell.

W. N. Shaw (Nanaimo-Cedar): I think it is a very good idea, and there is no sentiment about it. In all my experience I never knew of a lark lighting upon a tree. The same may be said of the wagtail.

The resolution was adopted.

CATTLE-GUARDS.

(Aldergrove.) "*Resolved*, That the railroads be compelled to maintain efficient fences and proper cattle-guards along their lines."

A. K. Goldsmith (Aldergrove): I move the resolution, and in doing so I would like to say that I think you will agree with me that many of the fences are in a disgraceful condition.

J. C. Harris (New Denver): I second the motion. The same state of affairs prevails all over the Province, and in order to deal with it effectively I think we ought to take this action. It is a shame that the railway company should be in a position to ignore the claims of the farmer.

R. Whitaker (Nicola): I would like to support the motion. With us it is a burning question. In sixteen miles of railway we had twenty-nine head of cattle killed in this way, and in only two cases was there any compensation received. At one particular place the fence was down for two and a half years.

J. T. Lawrence (Kettle Valley): I would also like to support the motion. If the farmer has money enough to fight the case, there is no kick raised about paying the claim; but if he has not money enough, as it very often happens, his claims are ignored.

The resolution was adopted.

USE OF RIVERS AND STREAMS FOR LOG-DRIVING PURPOSES.

(West Kootenay.) "Whereas Part I. of the 'Water Act,' relating to the use of rivers and streams for log-driving purposes, provides no summary or satisfactory mode of compelling parties and companies holding log-driving licences on such rivers and streams to maintain or operate their works in conformity with the plans filed or the conditions of their licences; and whereas the failure or neglect of such licence-holders to maintain or operate their works has resulted, or may result, in the inconvenience and damage to the rapidly increasing riparian owners and settlers along the banks of such rivers and streams, in respect of which they have no effective remedy unless by individual action in the Courts: Be it therefore *Resolved*, That the Central Farmers' Institute direct the attention of the Provincial Government to the conditions above mentioned, and respectfully urge upon it the necessity of making such amendments to the said

'Water Act' as will enable the Commissioner, or some other official, in each district to inquire into and deal summarily with any such failure or neglect, on the complaint of any riparian owner or settler affected by such works, and to make and enforce by penalties, forfeiture of licence, or otherwise, as may be provided, such orders in the premises as the circumstances of each case may warrant."

C. F. McHardy (West Kootenay): I am the mover of the resolution. I feel that the "Rivers and Streams Act" is being stretched a bit too far in favour of the lumbering industry. All we ask here, however, is an amendment to the present Act. On the Slocan River the people asked for certain privileges. The Government engineer took in the situation, and then got the Council together and passed an Order in Council; but even then the company went right ahead with the work contrary to the arrangement. I applied to the police and to Mr. Price Ellison, but I learned that nothing could be done as the Act was weak.

L. C. Morrison (Fire Valley): I would second the motion with pleasure.

The resolution was adopted.

TIME FOR SUBMITTING RESOLUTIONS.

(Arrow and Slocan Lakes.) "*Resolved*, that all resolutions to be submitted to the Annual Convention be in the hands of the Secretary a sufficient time before the date of the Convention, to enable the Department to have them printed for use."

K. Neubrand (Arrow and Slocan Lakes): This resolution is for the purpose of facilitating the bringing-in of resolutions.

C. W. Greer (Rosehill): I second the motion.

C. F. McHardy (West Kootenay): I think it would be better to fix the time, and I would also like to limit the number. I will move an amendment to the effect that resolutions must be in the hands of the Secretary by the 15th November.

S. Macdonald (Cranbrook-Fernie): I second the amendment.

J. L. Vicary (Peachland): I only hope that you will stick to it and see that there is no alteration in the rule.

J. T. Lawrence: Ours did not get in on time on this occasion, and I think that if you make this a rule it will work a hardship on us.

The Chairman: Such a time must be fixed; and let it be distinctly understood that none will be considered if they come in later. Going on in the way we have from year to year makes the successful working of the Annual Convention very hard. I also want to know your wishes in regard to the Resolutions Committee—as to who shall appoint it, etc. I shall be very pleased if you will take the responsibility off my shoulders. (Cries of No, No.) Do you want a Resolutions Committee? (Yes.) And do you leave the matter in my hands? (Yes.)

The resolution was adopted.

TERMINAL ELEVATORS.

(Sooke.) "*Resolved*, That in order to stimulate the movement of wheat westward, so that the Pacific Coast of Canada may take its share in the great wheat trade, we, the delegates to the Central Farmers' Institute of British Columbia, in convention assembled, do deem it highly advisable that, coincident with the arrival of the Canadian Northern Railway on the coast and the opening-up of the Panama Canal, terminal elevators, under the Dominion Government ownership and management, should be established at such points on the Mainland and Vancouver Island as hereafter may be considered expedient."

J. M. Stuart (Sooke): I move the adoption of the resolution. I have come to the conclusion that the first thing we must have, if we want the trade to come this way, is an elevator. A terminal elevator would mean that we would have a continual stream of trade all the year round.

C. E. W. Griffiths (Metchosin): I have great pleasure in seconding the motion. Our idea is to get cleaner and cheaper feeds. On the Pacific Coast we are peculiarly adapted for poultry-raising, and we require cheap, wholesome feed.

C. W. Greer (Rosehill): I am glad that this resolution came up, because we have had some trouble about shipping our grain. If there was some system of grading adopted, it would be a great advantage to the country.

The Chairman: Just so soon as the trade conditions justify the action we will have elevators on the Pacific Coast. Of course, we are all aware of the great activity at Coquitlam and Port Mann, and it is certain that a great deal of wheat will be shipped that way.

J. M. Stuart: Our present Government is in favour of the Government ownership of terminal elevators. The grain-growers of Saskatchewan and Manitoba have passed resolutions asking that these elevators be located at Fort William and Montreal. I think it is up to us to make a fight for them also.

The resolution was adopted.

Government Road-work.

(Cranbrook-Fernie.) "*Resolved*, That the Central Institute be asked to take up the matter of Government road-work, to see that farmers living in the district where roads are being constructed be given the preference to work their teams on the same."

S. Macdonald (Cranbrook-Fernie): I have much pleasure in moving this resolution. The reason we are taking this matter up is because we think that a man who is struggling to clear land should not be refused a chance to put his team on the road-work. At the present time teams from the city are employed and the farmer is discriminated against.

The Chairman: The Government road-work is generally given to the farmers' teams, and if you know of a case to the contrary you should take it up with your member.

C. W. Greer (Rosehill): I have great pleasure in seconding the motion. If the farmers' teams were employed it would save them a great deal of money.

C. F. McHardy (West Kootenay): I hope the resolution will not go through. The object of the Government is to give the farmers the first chance.

J. T. Collins (Islands): I would be sorry to see this go through. I know that several farmers have a grievance, but there is a reason for it. I am sure that if the proper Minister was seen on the subject there would be an end of the matter.

L. C. Morrison (Fire Valley): The Government has always assisted us in this matter. But for the assistance I got from the Government on the road I would not be here to-day. I think if this resolution goes through it will be all right.

F. D. Campbell (Maple Ridge): I hope it won't go through. I do not think we have any kick against the Government. If we put this resolution on record it will be a sort of reflection on all they have done for us.

S. Macdonald (Cranbrook-Fernie): We have no criticism to offer the Government. There is no censure in the resolution.

W. Paterson (Cowichan): I think this is purely a local matter, and I would advise you to communicate with the Minister of Public Works.

S. Macdonald: I think it is perhaps better to withdraw the resolution, then.

The resolution was withdrawn.

Vote of Thanks to the Department of Agriculture.

(Salmon Arm.) "*Resolved*, That the Central Farmers' Institute pass a vote of thanks to the Department of Agriculture for the able manner in which it has handled the affairs of the Province."

J. D. McGuire (Salmon Arm): In moving this resolution, I do not propose to make any speech. We all appreciate the work of the Department, and nothing I could say would make that appreciation any more vivid than it is.

A. Keffer (Arrow Park): I have very great pleasure in seconding the motion. I am sure that we are all under a deep debt of gratitude to the Department of Agriculture. We know that it is a live organization, and we feel that so long as it is our guide we will move along the right lines.

The resolution was adopted unanimously.

Votes of Thanks.

L. J. Botting (Salmon Valley): I take great pleasure in moving a hearty vote of thanks to the Resolutions Committee. I think the members of that committee have done excellent work.

It is true that in some instances matters have not been just as we would have liked them to be, but, on the whole, I think it will be conceded that they have done wonders in generally meeting our requirements. Personally, I do not think that any resolution should be thrown out without the consent of the Convention.

F. E. Harmer (Central Park): The Resolutions Committee has had a hard row to hoe, and therefore I take all the more pleasure in seconding this vote of thanks. It is rather hard to get a resolution that will meet the requirements of the whole Province on the same question.

The Chairman: I can concur in that. The work of the committee is by no means a sinecure. I know that they have acted to the best of their capacity, and I think that they have done excellent work on your behalf.

The resolution was adopted unanimously.

J. S. Shopland (Comox): I think, gentlemen, it is up to us to move a very hearty vote of thanks to the Chairman for the excellent manner in which he has conducted the business of this Convention.

J. T. Collins (Islands): I have very great pleasure in seconding. I have attended a great many of these meetings, and I can well remember when it was a difficult matter to get the meagre number of thirteen to be present. I think Mr. Scott has managed this meeting with courtesy and consideration for all the divergent views represented in this Convention. I have known him for the last sixteen years. He is a practical farmer and knows our wants exactly. Not only has he been a fruit-grower and a dairyman, but he has been a stock-raiser also. As such we always respected him, and now as Deputy Minister of Agriculture we respect him still more.

The vote was carried with musical honours, the Convention rising and singing, "For He's a Jolly Good Fellow."

The Chairman: Gentlemen, words fail me to convey to you my appreciation of the kind way in which you have passed this vote of thanks. I must thank the mover and seconder for the nice things they said about me. I hope, gentlemen, that we will be able to go on improving year by year in this Department, so as to bring it to the highest possible state of efficiency. That can only be accomplished by a spirit of harmony existing between the Department and the farmers. I think we have had a most successful Convention, the most successful we have ever had. When I see this representative body of men with the interest of agriculture at heart, it encourages me to renewed efforts on your behalf. I hope that you may all have a most successful year. (Applause.)

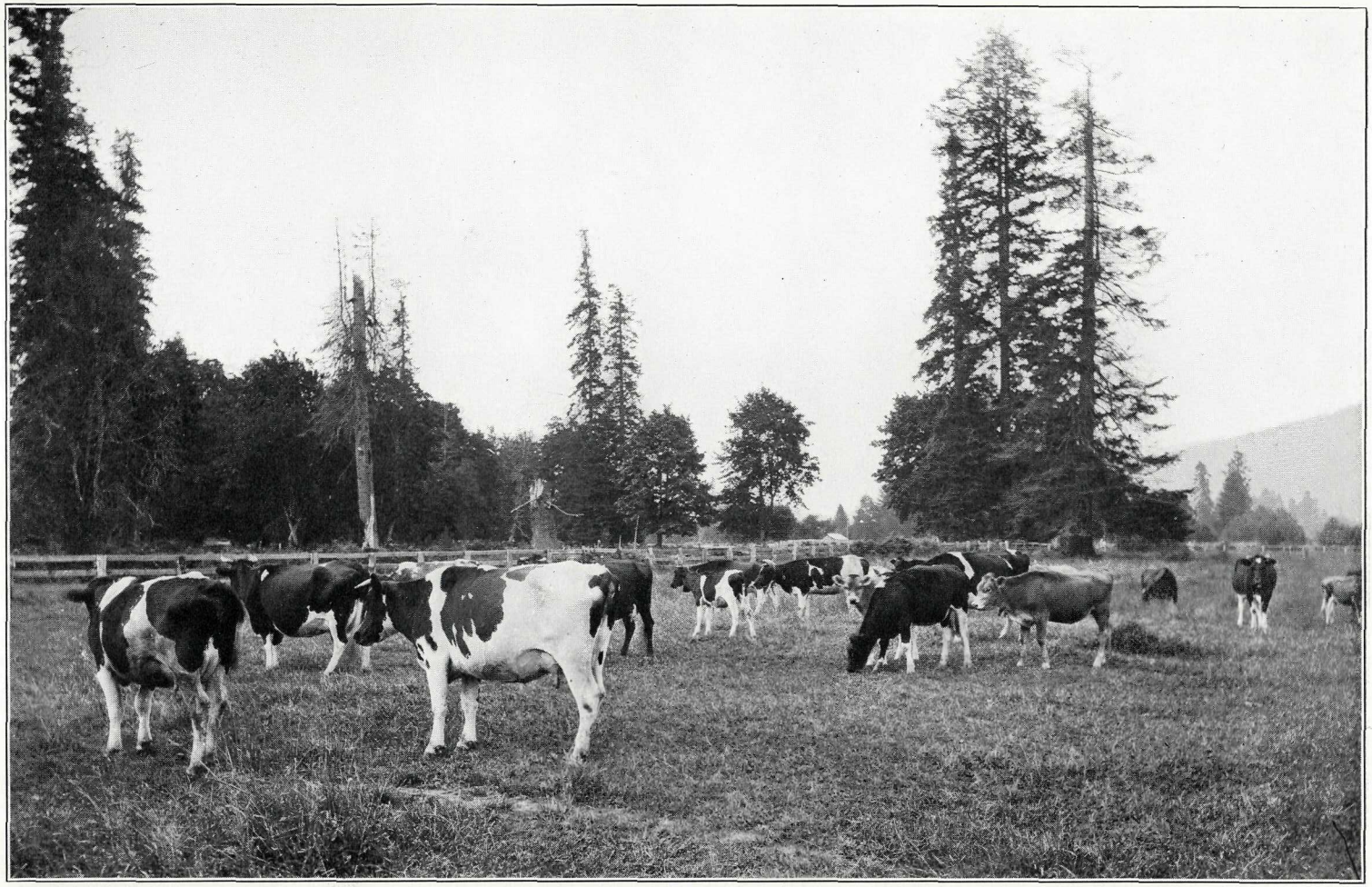
Major Macfarlane (Shawnigan): We must not forget our Secretary. I am not much good at paying compliments, which I regret, because I do not think we could say anything too complimentary of our Secretary and his great work. I have the honour to come from the same country as Mr. Craddock, and I think that has a kind of reflected glory in it for me. I have great pleasure in moving a vote of thanks to Mr. Craddock.

W. Graham (Bella Coola): I would like to second that. I like Mr. Craddock because he is an Irishman. I come from one of the most historical parts of British Columbia, because it was the first point in the Province from which a white man saw the Pacific Ocean. In 1793 Alexander Mackenzie travelled over the Bella Coola Pass, and to this day no better pass has ever been found. Now, I just want to say that much of the success of these Conventions is due to the efforts of Mr. Craddock. (Applause.)

The Secretary: Mr. Chairman and Gentlemen,—I wish that it was possible for me to live up to all the pleasant things that have been said about me. However, I do appreciate very much what has been said in regard to my work in connection with the Convention. I hope that you will all have a prosperous year, as indeed I am sure you will. With you on the outside and Mr. Scott as Deputy Minister on the inside, I am certain agriculture in the Province will make rapid progress.

The Convention then adjourned.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1912.



A Fine Dairy Herd.

Vegetables for the Local Market.

APPENDIX.

Some of the Circulars issued during the Year.

THINNING TREE-FRUITS.

(Circular No. 22.)

By R. M. Winslow, B.S.A., Provincial Horticulturist.

The very favourable weather which has occurred throughout the blooming season in all the fruit districts of the Province has favoured the setting of a very large percentage of the blossoms. There are very few trees which will not have all the fruit they can carry, and probably the majority of them will have more than they can carry with profit. This brings up the question of the thinning of fruit, a practice well recognized in the States to the south of us, but not yet generally understood throughout British Columbia. A discussion of the methods and results of thinning is at the present time very much in order, because the work must be undertaken in the very near future.

How much Fruit should a Tree bear?

In discussing the question of thinning, we admit that a tree may set more fruit than it can possibly bring to perfection, as the fruit-grower understands perfection. Nature cares nothing for the fruit except as an aid to produce seed; the orchardist cares nothing for seeds except as they are necessary to the production of fruit. We wish each tree to carry all the fruit it can bring to commercial perfection, and no more.

At the same time, the tree must make new vegetative growth consistent with its age and the variety.

The third requisite is that it should also form enough fruit-spurs for a similar crop in the following year. This idea is the foundation of our orchard practice.

When a tree is fulfilling these three requirements it is performing its maximum duty to the owner. If it falls short in any one of them, he is not getting his maximum of profit, either immediate or prospective, from it.

How does Thinning help?

The removal of some of the fruit at an early stage in its growth helps materially towards securing the maximum duty of the tree in certain definite ways:—

(1.) The average size of the fruit left on the trees is increased; this is the most obvious result of thinning. Trees overburdened with fruit produce a greater percentage of No. 2 apples. The increase in size of the remainder, after the first or second pickings of Bartlett pears is made, is a striking instance of the increase in size when the number of fruits is reduced.

(2.) The fruit borne is more uniform in size and shape. On the overloaded tree there is much variation in size, and, especially where two or more fruits remain on a spur, they are variable in shape as well. The fruits from the side blossoms of the cluster are in many varieties much different from those from the centre blossom, usually being flatter in shape and having a considerably longer stem. Uniformity in size and shape is an important essential of commercial perfection.

(3.) The colour is materially bettered, more uniform, and comes earlier. The remarkable increase in colour which occurs when the first picking is made from heavily bearing trees of even the winter varieties, such as Jonathan and Wagener, furnishes striking confirmation of this point. While colour seems largely related to sunshine, it is a well-known fact that on a heavily loaded tree the fruit has less colour, which is less evenly distributed and more slowly acquired.

(4.) Thinning improves the quality. This is especially the case where the soil is deficient in moisture or plant-food.

(5.) The fruit is freer of diseases and insect pests, because wormy apples, limb-bruised or diseased fruit of any kind, can be removed at thinning-time. On plums and peaches in moist regions, fruits thinned so that no two touch when fully grown are much freer of brown-rot.

(6.) The removal af misshapen fruit lowers the percentage of low-grade fruit.

(7.) Thinning prevents premature dropping. A familiar instance is that of the McIntosh Red, which is especially liable to drop where two fruits are left on one spur. Premature dropping is quite largely due to the inability of the tree to supply moisture to an excessive crop.

(8.) The load of fruit is more evenly distributed, and this is a very important feature in preventing the breaking-down of trees.

(9.) The cost of picking is reduced considerably, and the labour of picking is divided more evenly over the season. This is an important advantage where the supply of labour is deficient in picking-time. Costs of grading and packing are also much lessened.

(10.) Less fertility is removed from the soil. A ton of apples takes out approximately 1.2 lb. of nitrogen, 1.6 lb. of potash, and 0.6 lb. of phosphoric acid. A ton of pears removes the same amount of nitrogen and about twice as much of the other elements. The seeds take the great bulk of these amounts, the pulp of the fruit taking but a small portion. As the number of seeds is roughly in proportion to the number of apples, and not to their size, the removal of fruits leaves a much greater supply of plant-food for the balance of the crop, for the growth of the trees, and in the soil.

(11.) The tree is less liable to winter injury. The ripening of the heavy crop drains the vitality of the tree, so leaving it in poor shape to withstand the winter. Trees bearing moderate crops for which there is an adequate supply of plant-food and an adequate supply of moisture have sufficient vitality to ripen the crop, and to ripen the fruit-buds and new shoots as well.

(12.) One of the most important results of thinning is that the trees will bear a larger and more uniform crop the following year. The tendency towards biennial bearing is materially reduced, much depending in this, however, on the variety.

For various reasons, then, thinning helps materially to secure the maximum duty from the tree.

WHEN TO THIN.

As soon as the crop can be determined and the supply of labour permits, thinning should be commenced. Start with those varieties which are most advanced. Generally, apples, pears, and peaches are thinned when about the size of a hickory-nut, and the thinning should be completed before they are more than double that size. On the various plums the work should be commenced as soon as possible after the dropping, familiarly known as "the June drop" is over.

Apricots, cherries, and crab-apples are not usually thinned by hand, because the crop which they are to bear is a reasonably certain quantity, and can be controlled to a greater extent than in the larger fruits by proper pruning. The Italian prune and the peach plum are not usually thinned, because normally the set of fruit of these varieties is not great enough to warrant the expenditure.

HOW TO THIN.

To set rules for thinning is even more difficult than to set rules for pruning. The fruit-grower must determine for himself just how much crop the tree will be able to carry. Much depends on the variety, the age of the tree, its vitality, the soil, cultivation, climate, and district. Under equal conditions the Winesap may be thinned to, say, 5 inches, where the Jonathan would be thinned to 6 or 7, and the Northern Spy to 8. In climates such as that of Vancouver Island, where no irrigation is available, and the rainfall averages about half an inch per month during the summer season, or one-fifth that of the average Ontario district, all varieties are thinned to a greater distance than in districts of greater rainfall or where irrigation is available. In this district it is advisable to thin many crops, the whole of which could be carried to advantage under other conditions. Unhealthy or diseased trees should not be expected to grow as great a load as those in perfect health, while trees making extensive growth may very well be allowed to carry much more than average trees under the same conditions.

By one rule which is practised to some extent the grower sizes up all the conditions and determines how many boxes of fruit the tree should carry. It is a small matter then to determine how many fruits there should be left on the tree.

Another rule which might be taken in connection with the previous one is to thin plums to about 2, 2½, or 3 inches; peaches, 4 to 8, depending on the earliness of the variety; pears and apples, 5 to 7 inches apart. In thinning pears and apples, it is only with early varieties that more than one should be left on any fruit-spur, and with these early varieties part of the crop may be removed in one picking and the balance later. With winter varieties of apples it is a good rule to leave fruit only on each alternate spur, to encourage annual bearing. On slender twigs and on wood of the past season's growth (where many varieties bear heavily in British Columbia) it is well to thin to a greater distance than on strong fruit-spurs in the body of the tree. On the outside twigs and shoots the fruit will average smaller than on the stouter branches; they are unable to grow a close crop of fruit to perfection.

A very important point, well illustrated by the Yellow Newtown apple, is that the centre apple of the cluster, and not one of the side apples, should remain. The centre blossom of the cluster comes out first; its stem is usually shorter and stockier than those of the outside blossoms, and at the time of thinning the apple is usually much larger than the others and on a shorter stem. The centre apple usually hangs better to the tree, is the typical apple of the variety, is less liable to variation in shape, and having a shorter stem is better for packing and for appearance sake.

Fruit-spurs vary greatly in size and vitality; the best spurs bear the best fruit; the weaker spurs should be given a chance to develop into strong ones before next year's crop.

In the production of fancy fruit, thinning pays, and pays well. It means much in the assurance of crops of only high-class fruit. It is not likely to be of value unless the orchard is right in the matters of variety, fertility, cultivation, pruning, and spraying; it is not likely to give good returns unless the high-class article produced is properly packed and marketed by business-like methods. Thinning is an essential feature of the new orchard-culture.

Present indications are that this year will see the largest crop of tree-fruits British Columbia has yet had. Throughout the Province from Vancouver Island to the Kootenays the apple, prune, peach, pear, and plum trees have been full of blossom, and there has been no loss from frost or unfavourable weather. Most of the trees are certain to have a heavy load of fruit, of which very much will be undersized unless thinning is practised. It is hoped that fruit-growers will grasp the situation rightly. The prices for undersized fruit are never very remunerative. It is always the good, large, perfect fruits that bring paying returns. This year the difference in price between fancy and low-grade fruit will be emphasized. Large yields of fruit are promised in Ontario, in the Middle States, Colorado, California, Montana, Idaho, Oregon, and Washington, as well as in British Columbia. The North-western States, in fact, have the bumper crop of their history; and they look to the Canadian prairies to buy a great deal of it, as times are good in Canada, while money is scarce in the United States. This means that there will be plenty of poor fruit for sale in our markets without any from British Columbia, and the returns for this class of fruit are bound to be low. Neither do the canneries want small fruit; there is no money in pie-peaches for any one. Every grower should resolve that he will not grow any peaches smaller than "90's." Any shipper knows that there will be no market for the small stuff, and that even in the earliest varieties we can grow, returns will be unsatisfactory for the small grades. Fortunately there is no good reason why any grower should have any percentage of the small sizes to market.

It is unlikely that any fruit-grower will thin too much; it is quite certain that most growers will not thin enough. While the average man may know about thinning, he is short the nerve necessary to carry it out. Most of the growers in British Columbia have not yet had enough experience to realize the difference in profits on large and small sizes. Those men who see the situation clearly and who recognize the fundamental necessity for adequate thinning should use their influence by getting their neighbours to take it up.

BACTERIAL BLIGHT OF THE APPLE, PEAR, AND QUINCE.

(Circular No. 23.)

BY W. H. BRITTAIN, B.S.A., PATHOLOGIST AND ENTOMOLOGIST.

The bacterial blight of pears, apples and quinces, also called "fire-blight," from the appearance of trees affected with the disease, is a source of heavy loss annually to the fruit-growers of Ontario and many parts of the United States. If the growers in districts where the disease occurs wish to avoid such a continuous tax upon their profits, they must adopt stringent measures to stamp out the disease.

CAUSE OF THE DISEASE.

The disease owes its origin to a minute bacterial organism about 1-16,000 of an inch long, and about 1-45,000 broad. This germ entering the plant by way of the blossom, and through the cuticle, by the aid of some sucking insect or other injury, passes down the twig, feeding upon and destroying the cells of the inner bark and cambium. The bacillus winters in a few affected branches that are sufficiently protected against drying out to enable the organism to remain alive, though not very active until another year.

PLANTS AFFECTED.

Besides apples, pears, and quinces, certain other plants may be attacked by the disease. These are the hawthorn, the June berry, and the mountainash.

SYMPTOMS.

The disease will usually be first noticed shortly after blossoming-time. The tips, blossoms, and leaves will be seen to wilt, becoming dark brown or black, and finally shrivel up, presenting a scorched appearance. The bark at first has a moist, water-soaked look, but later it too will become hard and dry. The blighted leaves and blossoms will frequently remain clinging to the affected twigs throughout the winter. Water-sprouts and other growing shoots are affected in a similar manner. Where the disease is active, blisters will appear on the bark, through which will ooze a thick gummy material, at first light yellow in colour, but, hardening in the air, it later turns dark red or brown. As a rule, the disease in the apple is confined to the twigs and smaller branches, and in this form is known as the twig or fire-blight. Sometimes, however, the disease may enter the main limbs or trunk, by passing down the twigs or water-sprouts. It will spread around the base of such shoots, causing the bark to take on the characteristic water-soaked appearance, and the gummy exudate will often ooze from the affected part in large drops. When conditions become unfavourable for further growth the organism dies out. Following this, the bark becomes hard and tough, and shrinking away from the healthy portion, a crack will often form around the affected part. In the seemingly healthy tissue around this area a few germs may lurk to carry the disease over until the next season. This form of the disease affecting the main limbs and trunk, is known as the body-blight.

Body-blight is the rule rather than the exception in pear-trees. Here it spreads much more extensively than in the apple, the final result in most cases being the death of the tree. The spread of the disease down the larger limbs is frequently followed by the development of extensive cankered areas, and from these the yellowish gum will drip abundantly. The coming of the winter will arrest the progress of the disease, but with spring the germs will again begin to multiply and spread in the limbs. Though it usually takes three or four years for a pear-tree affected by body-blight to succumb, in bad cases the result may be accomplished in a single season. Few cases of true body-blight have appeared this season in the Okanagan.

The disease also causes a rot of the immature fruit, entering by way of the stem, or through an insect puncture. Fruit so affected is brown or black, as if bruised, and frequently a light-coloured slimy substance oozes from the affected part. The disease spreads at first very rapidly in the fruit, but when the spur which bears it dies, it shrivels up, becomes dry and hard, and frequently remains clinging to the tree throughout the winter.

SPREAD OF THE DISEASE.

Among the foremost agents in the spread of the disease are bees, wasps, and other insects that carry it around from flower to flower at the blossoming period. It is probably to these insects that all blossom-infection is due. More important than the bees, for it seems

impossible to exercise any control over their work, are the green and woolly apple-aphis. Aside from the direct injury these insects do to the tree by sucking the juices of the plant, it has abundantly been proven that they are most fruitful sources for the spread of the blight. A large precentage of twig-infection may be traced directly to their agency. The leaf-hopper doubtless also plays a part. These insects, walking over the gummy exudate as it oozes from the bark of diseased twigs, which is swarming with the germs of the blight, carry it to other trees, which in turn become infected. The disease may also be spread by the use of infected pruning-tools. To avoid this the knife used in cutting diseased wood must not be used again until properly disinfected.

Control of the Disease.

The work of various investigators has shown that this disease may be controlled if not entirely eradicated. No great alarm need be occasioned by its presence if directions for control are faithfully followed. The disease should be cut out immediately it appears. Where it is rapidly progressing the limb should be cut a foot below the affected part. Where it has passed down a shoot into a limb, the bark around the cankered area should be cut away for four or five inches. After each cut the tool used should be disinfected by dipping or swabbing with some good disinfectant. Formalin is good for this purpose, and will not rust the tools. Corrisive sublimate, in the strength of 1 to 1,000 is also satisfactory. The cut surfaces of the wound should also be swabbed with the disinfectant, and large wounds painted over to prevent the entrance of wound parasites. All twigs which are removed must be collected at the time of cutting and burned. As new infections may be constantly taking place, it is not possible to control the disease entirely in this way. It is, therefore, necessary to further go over the trees after the leaves have fallen, for at least three times, and carefully prune away and destroy all blighted parts. To detect all cases of the disease when it is no longer active is not always easy. Usually, however, quite a clear line of demarcation exists between the diseased and the healthy wood, the former being dark brown and withered, the latter a pale-green colour. Where the disease has formed a "hold-over" canker at the base of a water-sprout or twig, this can be usually detected by the crack which forms around the diseased area.

As a measure of precaution, it is well to remove all suckers from the trees in infected districts, as these long sappy shoots are particularly liable to attack. Last, but by no means least in importance, the grower must practise systematic and continuous spraying for aphides and leaf-hoppers. The presence of such numbers of these pests in infected orchards is a menace to others which are still free from the disease. Spraying should be resorted to with Black Leaf, or Black Leaf 40, as often as necessary to hold them in check.

Summary of Control Measures.

(1.) Cut out disease as it appears.
(2.) Cut out again after leaves have fallen.
(3.) Spray for aphides and other insects.
(4.) Destroy wild plants when found to be affected with disease.
(5.) Carefully disinfect tools and the cut surfaces of wood.
(6.) Destroy by burning all prunings from diseased trees.

PRUNING FRUIT-TREES.

(Circular No. 21.)

By M. S. Middleton, Assistant Horticulturist.

The nature of plants is to grow and reproduce their kind by seed. The seed of fruit-bearing trees has a covering which is edible. The edible portion of fruits in the wild state is comparatively small, and of little account for domestic use. Through years of improvement by selection, propagation, and cultivation, there has been a great change from the natural product to the much-sought-after commercial fruit of the present day. Among the practices which have brought about this improvement, and which are upholding the present high standard of size and quality, pruning is not the least important.

By adopting a proper system of pruning in the orchard, together with good cultivation, soil-fertilization, and spraying, it is possible to produce the maximum yields of first-quality fruit. Pruning alone will not insure success, for if cultivation, spraying, etc., are neglected, pruning will be of little value.

Pruning is divided into two main branches—summer and winter.

Summer pruning is generally practised on young trees, up to about the sixth year, which are making excessive wood-growth, usually at the expense of fruit-spur formation. On the other hand, winter pruning has the opposite effect by encouraging wood-growth and developing strength in the tree.

WINTER PRUNING.

Winter pruning is practised for five main reasons, as follows :—

To shape the tree :
To strengthen the framework :
To allow admission of light and air :
To thin the fruit :
To encourage the formation of fruit-spurs.

FORMS OF HEAD.

In the orchard three forms or shapes of trees are found—vase shape, the pyramid, and the semi-pyramid. The vase or open-centre tree is quite extensively used in growing peaches. Peach-trees grow very fast, and require heavy winter pruning; in order to allow room for the growth of new wood and the penetration of light and air, it is necessary to keep the trees very open. The peach bears its fruit on the wood of the previous year's growth, so that in order to keep the bearing-wood low down in the centre, as well as the outside of the tree, it is necessary to prune hard and to open heads.

In the case of other classes of trees, such as apples, pears, plums, and cherries, which bear their fruit on spurs, the semi-pyramid is now in general favour among the most successful orchardists in the Province. Some of the advantages of this form of a tree over the vase or pyramid are that the tree will carry its load of fruit easier, and fruit of a more uniform size and colour is produced. The semi-pyramid has all the advantages of the vase-shape and the pyramid tree, in that the central leader is allowed to grow, and is continued up to a height of 8 or 9 feet, when the tree has attained this height it is allowed to follow more or less its own course. The leader in the semi-pyramid is checked from year to year, if necessary, by cutting it back to a weak-branch, in order to encourage the growth of the side leader branches. In this way a wide-spreading, open tree is produced, which is by far the best commercial tree. The pyramid tree is not to be recommended, because the strong leader naturally grows to the detriment of the side branches and a tall upright tree is produced. Such a tree is very difficult to handle in spraying, picking, etc., and the fruit produced will not be of such high quality due to the weak side branches drooping umbrella-like over those below, and consequently shading the fruit on the lower branches.

PRUNING YOUNG TREES FOR STRENGTH OF STRUCTURE.

Proper pruning of the young tree is most essential, because at this time the permanent structure of the tree is being formed. The success of the orchard depends largely upon the early training of the tree. To shape a young tree, the height of head, the spacing of the side branches on the main stem, and the selection and formation of wide-angle crotches are of paramount importance. The one-year-old tree when planted should be cut back to 2 feet in height, and the first side branch encouraged to form at about 12 to 15 inches from the surface of the ground. The low-headed tree is by far the best and most handy style of tree to grow. It is found that trees headed at about 12 to 18 inches from the ground will make a heavier growth, produce and carry larger crops of fruit at less expense to the tree, and can more easily withstand the effect of wind and storms, and is much more easily cultivated, sprayed, pruned, and picked than the higher-headed tree. In some sections where a great depth of snow falls and where injury is sometimes caused by the tree breaking down, it is necessary to protect the trees with stakes for a year or so, until the branches are strong enough to stand the strain. This allows about 1 foot of space upon which to form side branches. It is advisable in starting the young tree to leave a central leader, and three or four side branches evenly distributed on the trunk, on about a foot of space. Where it is possible to procure branched,

one-year-old trees it is advisable to do so. Some of these laterals are selected for side branches. As a general rule, these laterals grow at right angles to the trunk, and by cutting these back to a bud *on the upper side* of the branch at about 8 inches from the trunk, strong wide-angle crotches will be the result.

Straight switch trees at setting should be cut back to 2 feet in height. If the tree is of good strength, well planted, and given good cultivation during the first year, it will make a good growth of side branches, from which may be formed the desired structure. (To encourage the starting of the lower buds on the trunk, it is well to make an incision with the knife just above the buds. This is not infallible, but, as a general rule, the checking of the upward flow of sap above any bud will tend to force it into growth.) In pruning this tree the following year, advantage is taken of the characteristic growth of all trees, which is to produce the strongest, longest, and most upright branches from the highest buds. Usually the third, fourth, or more branches from the top will have grown at good, wide angles from the trunk. These are selected to form the side branches, cutting them back to an upper bud about 8 inches from the trunk as in the branched one-year-old tree. One or two of the strong, upright growing upper branches are generally removed. By so doing, the weakest crotches are eliminated from the tree. The leader is pruned to a bud, which tends to throw the growth towards the centre of the tree. It is not necessary that the central leader be straight. By this system it will be more or less crooked, due to the checking it receives from year to year in order to keep it about the same height as the side branches. The leader should not be more than a foot higher than the side branches.

In future pruning, the amount of heading-back must be determined by the pruner, as no orthodox rule can be followed. Trees vary much in their character of growth. Some are strong; others are weak growers. Some are upright; others are sprawly growers, etc. These factors must be considered when pruning the different varieties.

PROPER BALANCE ESSENTIAL.

It must be remembered that the development of the root, top, and the fruit must assume a balance. The roots might be called the boiler of the tree, the top the engine, and the fruit the load. If the boiler is very large and the load light, the engine will be forced, and a heavy growth of wood will be the result. If the boiler is weak and the engine strong, the engine cannot be worked to its full capacity; therefore the growth of wood and the load of fruit will be correspondingly small. If the load is heavier than the boiler or the engine can maintain or carry, a load of small, poor-quality fruits or breakage of the engine or tree will be the result. It might be illustrated in another way—that the load of fruit should act as the governor between the boiler and the engine, or the roots and the tops. It may be seen by the above comparisons that a good balance between the various parts of the tree is absolutely essential if the best results are to be expected. In winter pruning, the balance between the roots and the top of the tree is destroyed. When a portion of the top is cut off, the roots exert their whole force upon the smaller top, and heavy growth is the result. On the other hand, if the pruning of the top is done during the summer, the growth is checked, because a portion of the leaves or the manufacturing part of the plant has been removed, and, as a consequence, there is a tendency to force the tree into fruiting. Thus by pruning at the proper time and in various degrees the balance of trees can be regulated. The quantity of fruit allowed to set and remain on the trees is, possibly, the best pruning that can be practised. It is then necessary to encourage the formation of fruit-spurs in young trees by cutting back all ingrowing branches, or those not required as main branches, to stubs of 6 or 7 inches in length, during the summer (about the middle of August to the middle of September). On these stubs, fruit-spurs will generally form, and eventually fruit. It is found, also, when the terminal shoots or leaders are not pruned back for a year, that the terminal bud, being the strongest, will grow into a branch, and a large proportion of the remaining buds will usually form fruit-spurs. The main branches can be headed back the following year fairly hard, for strength. By following the practice, the young trees may be forced into fruiting quite early. When the trees come into bearing, the system is to make the fruit do the majority of the pruning. In other words, judicious thinning of the fruit will more or less regulate the growth of the trees. After about the sixth year the pruning required on all trees except peaches should be very little. The pruning of bearing trees is principally to open up the head to allow for the penetration of light and air, and to encourage or discourage the formation of fruit-spurs, according to the vigour of the tree.

LIGHT.

The proper distribution of light and air in our fruit-trees is essential. Fruit-spurs will not form well in the shade. If they do form, they will be long, weak, spindly ones, upon which small, colourless inferior fruit will be produced. The amount of light regulates the colour of the fruit, which is of the greatest importance when the product is placed upon the market. Light is also one of the greatest factors in the production of uniformity in the size as well as the colour of fruit. Uniformity is of the greatest importance if the fruit is to be packed and marketed most successfully. The important role which light plays must be borne in mind when pruning trees. Where the least sun and light strikes the trees is where trees should be kept the most open. The portion of the trees receiving the least amount of light is shown by the poorly coloured, small sized fruit, and where long, weak, spindly fruit-spurs are found. This condition is generally found on the lower outside portion of the tree. Therefore, if the highest quality of fruit is to be produced, the outside of our trees *must be kept well pruned out* to allow plenty of light to penetrate right into the centre of the tree. This is one of the reasons for favouring the semi-pyramid tree. It is generally conceded that on young trees the main branches should not be allowed to grow one directly above the other, or should not be closer at the tips than 16 to 24 inches apart after pruning. This distance has to be regulated according to the amount of sunshine in the particular section; for example, trees can be kept a little closer in the Dry Belt sections than in the Lower Mainland or West Kootenay Districts.

THINNING FRUIT BY PRUNING.

If the characteristic growth of different varieties of fruits is known, a great deal of the work of thinning the fruit can be most economically done at the time of pruning. It is characteristic of many varieties to form too many fruit-spurs, as, for instance, such varieties as the Jonathan and Jeffries. These spurs can be thinned out, or the fruit-spur branches cut back to lessen the number of fruit-spurs and to throw new life or vigour into those remaining. By so doing, not only is the fruit thinned, but the excessive drain on the tree's vitality is prevented, and the production of higher-quality fruit is encouraged. This latter practice of cutting back fruit-spur branches is done *principally* on old bearing trees, where they will often attain 2 feet or more in length, and have twenty to sixty fruit-spurs on each branch, when the branch is only capable of carrying and bringing to successful maturity about three or six fruits.

With young trees up to about the sixth year, pruning is practised to encourage the formation of fruit-spurs and fruit. When trees commence to bear well, the pruning is principally to thin the fruits, to strengthen the tree, and to keep the trees open enough to admit plenty of air and light. In other words, endeavour to make the fruit regulate the growth as soon as possible.

In old bearing trees winter pruning is practised principally to allow plenty of light and air to penetrate to all parts of the tree, to keep the tree balanced and shapely, and to cut back the fruit-spur branches and limbs to invigorate them, and to foster the production of the highest quality of fruit.

SUMMARY: FOR SUCCESSFUL PRUNING OF ALL FRUIT-TREES EXCEPT PEACHES.

At Time of Setting One-Year-Olds.—Cut back to about 24 inches from ground. If side branches are present, select most suitable, and cut back to an upper bud at about 6 to 8 inches from trunk.

First Year after Setting.—Winter-prune, leaving three or four main side branches evenly distributed around the main stem on about 1 foot of space. Allow a leader to grow.

Second Year.—Summer-prune all branches not required as main leaders to stubs about 6 inches in length. If making over 3½ feet growth, pinch off *the tips* of the leaders. Winter-prune all leaders for strength, and check centre leader if required.

Third Year.—Summer-prune all growths not required as main branches to stubs, and tip back leaders if making over 3½ feet growth. Winter-prune for strength and form.

Fourth Year.—Thin fruits, if necessary, according to the growth the tree is making. Summer-prune unrequired branches to stubs. Winter-prune for strength, and check leader if necessary.

Fifth Year.—Thin fruit according to growth. Summer-prune all the weaker unrequired branches to stubs. Winter-prune for strength, light, and shape.

Sixth Year.—Thin fruit according to growth. Summer-prune, if necessary, the weakest unrequired branches to stubs. Winter-prune for strength, light, and shape.

Trees in Bearing.—Thin fruit according to growth the tree is making. Winter-prune for strength, and to keep the trees open enough to allow the penetration of light and air, and to shape the tree.

Old Bearing Trees.—Winter-prune to thin the fruit by removing a number of the fruit-spurs, or by cutting back long fruit-spur branches to invigorate those fruit-spurs left. Prune to invigorate the growth of the tree, to open out the tree to allow plenty of light and air to enter, and to shape and balance the trees.

THE CULTURE OF SMALL FRUITS.

(Circular No. 16.)

By J. F. Carpenter, B.S.A., Assistant Horticulturist.

There are a few sections in British Columbia in which the growing of small fruits is not practised to some extent. Climatic and soil conditions in most sections are especially favourable to their production. The crop of 1911 was far short of the market requirements, and indications are that the market demands will not be met for some years. With the increased quantities being used in the canning and jam factories, the increasing demand in the Prairie Provinces and in our local markets, a good incentive is afforded for an increased production.

To the man who goes into fruit-raising with the purpose of obtaining sufficient remuneration to provide for himself and family, and who has very little capital, other than what is required for the purchase of his ranch, the production of small fruits offers him a means of livelihood until such times as his tree-fruits come into profitable bearing. It also affords him an opportunity to remain on his ranch during the early years of its development, and thus ensures better treatment for his trees and other crops. The first few years in the life of an orchard is a critical one, so this is an important consideration.

Some of the main points to be considered before setting out a small-fruit plantation are:—

(1.) Proximity to transportation lines, markets, and canning and jam factories.

(2.) Sufficient labour available at harvesting-time and for the proper care of the plantation. Do not plant any more than can be properly cared for, as the profitable small-fruit plantations are those which receive the best of care.

(3.) Is your soil of a type and in a condition in which it will produce a good crop of small fruits? (This has special reference to non-irrigated districts.)

(4.) Are you in a district where small fruits are grown to any extent? The larger the production in a district the better are the facilities for marketing as a general rule.

Strawberries.

The best soils for a strawberry plantation are a sandy loam, loam, or clay loam, well supplied with organic matter. Strawberries require a large amount of moisture and a good supply of plant-food for profitable culture. Soil that does not drain well should be underdrained. Where the soil is light it would be advisable to grow and plough under a green crop, preferably of a leguminous nature, before planting. Fall ploughing to a good depth, and in heavy soils the use of a subsoiler, is advisable, especially in districts which have a heavy precipitation in the fall and winter and a fairly dry summer.

As soon as the ground is dry enough in the spring to work, cultivate it well in the same manner as you would to obtain a good seed-bed. A good soil-mulch should be kept on the ground until the plants are set.

Propagation.—Plants are obtained from the bearing patch by taking the new plants which have set on the runners. It is advisable to use only the first two plants on a runner coming from the bearing plant, so as to ensure good strong ones. Those farther distant are as a rule poorly developed.

It is a good plan to set apart a section of the patch for the production of new plants. By noting carefully in the bearing patch the bearing habits, yield, growth, strength of vine,

etc., of the different plants, you can pick out those which come nearest your ideal and use their runner plants for your propagating section. Where this system is practised a better class of larger-yielding plants are generally obtained.

Planting.—This can be done either in the fall or spring, depending largely on the condition of the soil and the time of the grower. Spring planting is generally recommended. There are several systems of planting, some of which are: The matted row, the double row, and the Hill systems. With the matted-row system the plants are set about 18 inches apart in the row, with the rows 40 inches to 4 feet apart. The runners are kept off until about the 1st of June, after which they are allowed to set and make a matted row. With this system it is advisable not to allow the runners to set less than 6 inches apart or the rows to be over 2 feet wide. With the double-row system the plants are set about 18 inches apart in the row, with the rows 36 to 40 inches. Four runners from each plant are allowed to start, each producing one plant, two of which are placed on either side of the main plant, thus making a double row. With the Hill system the plants are usually placed 18 inches apart in the row, with the rows 3 feet apart. No runners are allowed to form. The distance for planting varies with the condition of the soil, with the district, and the variety planted. In comparing the results obtained from the three systems, the Hill system seems to be giving the best satisfaction in the non-irrigated districts where the summers are dry and where the early market berry is not desired. A better size of berry can be produced, the patch is more easily kept clean, less moisture is required, and the crop is often as large as is produced under the other systems. In the Dry Belt and in districts and on sites where the early varieties, such as Senator Dunlop, are grown, the matted-row system is mainly used. It matures the fruit a few days earlier than the Hill system. Some growers claim that the matted row is less subject to injury by frost, but in districts where frost injury is probable the plantation should be protected by a mulch.

Planting should be done only after the ground has been thoroughly prepared. Some of the main points to be observed in planting are:—

(1.) Plant only in straight rows. For this purpose a marker, wire, or line should be used.

(2.) Keep the plants fresh between the time they are removed from the ground until they are planted in the new patch.

(3.) Use only good, strong plants.

(4.) If there are any large leaves on the plants it is advisable to remove them, leaving only two or three of the smaller ones. Trim off any black or diseased roots, and if the root system is very large it is better to shorten it.

(5.) Pack the soil firmly around the roots and make sure that the crown of the plant is level with the surface of the ground. Do not cover the crown or leave any of the roots exposed.

Cultivation.—Cultivation should begin immediately after planting and be kept up until the early fall. Two to three inches deep is sufficient in most soils. Deep cultivation, especially in the young patch, is to be discouraged. All blossoms should be kept off the first year. On soils, and in districts where the plants are in danger of being injured during the winter, it is advisable to protect them with a covering of straw, prairie hay, or some cheap material containing no weed-seeds. Most damage is done in early spring through the alternate freezing and thawing of the ground, so the covering should no be removed too early. This can be left between the rows to act as a mulch until the crop is harvested.

The harvesting and marketing of small fruits is discussed in another circular.

Successful growers seldom take more than two crops from a plantation, after which it is ploughed under. The cost of production is usually higher as the plantations become older. Some varieties have imperfect flowers and require another variety in the patch to ensure pollination. Make sure of this point before setting out.

RASPBERRIES.

To obtain the best results, a deep soil, well drained and with a large moisture-holding capacity, is desirable. In the Coast districts, where the humidity is high, it is advisable to obtain a site with a sufficient slope to give good air-drainage.

The same method of preparation of the soil as given *re* strawberries is applicable here. Deep cultivation and ploughing is advisable before setting out a patch, especially on the heavier soils.

Propagation.—The roots of a raspberry are perennial, so the general method of obtaining plants is to dig up the one-year-old plants from the bearing patch. It is also possible, sometimes, to use the suckers and replant them the same spring in which they start, especially if weather and soil conditions are favourable.

Planting.—This is done either in the fall or spring, depending on the district, the condition of the land, and the grower. The planting distance depends on the variety, type, and condition of soil and the district, so that no distances which would be satisfactory for all sites can be given. As a general rule, the rows are 6 to 8 feet apart, and the plants set at 18 inches to 2 feet in a row. They require pruning before setting, in the same way as a one-year-old apple tree—i.e., roots trimmed and top cut back. Plant about 3 to 5 inches deep, depending on the soil, spread the roots, and pack the earth well round them.

Training.—It is found advantageous to support the vines with a trellis. This is generally done the second or third year. To accomplish this posts are set 30 feet or so apart, with a cross-piece at the top which should be about 3½ feet from the ground, on which two wires are strung, one at either end of the cross-piece. Within this space the vines are kept upright, bringing the plantation into better condition for cultivation and other cultural operations.

Pruning.—Fruit is borne on the one-year-old wood, so that in pruning, all canes that have borne fruit are removed, and the remainder thinned out if necessary. The best time to prune is immediately after the fruit is picked, as by leaving the old canes they form an unnecessary drain on the plant-food and soil-moisture. The taller of the new canes should also be pinched or cut back at that time, so as to strengthen the bearing shoots for the following season. They are again gone over and cut back before growth starts in the spring. Blackberries are pruned in the same manner.

Good cultivation should be kept up in the same manner as in a strawberry-patch until midsummer or a little later, depending on the soil and location.

A good plantation when properly handled will bear profitably for twelve to fifteen years, and sometimes longer.

Loganberries.

The culture of loganberries has not been extensive in British Columbia up to the present, but where they have been tried in favourable districts they are being successfully grown. They are produced in the States to the south of us, both for the fresh and dried products.

They have been found to do well on almost all types of soil, and are being grown successfully on the heavier types. The same general remarks *re* preparation of land as given above on strawberries are applicable here.

Propagation.—They can be propagated by tipping, layering, or by the use of cuttings. Tipping is generally practised as described below.

Planting.—This is done either in the fall or spring, but Spring planting is generally practised. Planting distances vary. One of the largest and most successful growers of this fruit in Oregon has his rows 8 feet apart and the plant set the same distance apart in the rows. A trellis is constructed for the support of the vines by placing posts in the rows every 32 feet, on which are strung three No. 12 galvanized wires in a similar manner as on a grape-trellis.

Pruning.—The fruit is produced on one-year-old wood, so in pruning all the canes that have borne fruit are removed; this should be done as soon after fruiting as possible. The canes should be cut off at least 6 inches from the crown of the plant. Ten to twelve new canes can be left, and these are wound round the trellis-wire so as to have them well distributed.

Cultivation.—Good cultivation is given until midsummer. The patch is ploughed in September, throwing the furrows towards the vines. At that time a number of the shoots where the patch has received good care will have reached the ground, and the tips of these are ploughed under. They take root and afford a supply of new plants for selling, or use in the new plantation the following spring.

A loganberry-patch when well handled will yield good crops for many years.

Currants and Gooseberries.

They do best on a good deep soil, well drained, retentive of moisture, and on sites that will afford good air-drainage.

Propagation.—By cuttings principally. Sometimes by tipping and mound-layering. They are generally planted in hills about 4 to 5 feet on the square.

Pruning.—Gooseberries bear on one-year-old wood and on spurs which bear profitably for two to three years. It is advisable to cut out all wood over three years old and keep a supply of new shoots and two-year shoots under way. The red and white currants bear principally on two-year-old wood and are pruned accordingly.

The information given in this circular on each species of small fruit is necessarily brief. Some of the more important essentials to success have been mentioned, which should prove of value to the grower who purposes planting small fruits. It should be borne in mind that the profit which is made on small fruits is due largely to careful attention to cultural operations. The grower who intends planting should have sufficient labour in view and should be in a position to look well after his plantation.

CABBAGE, CELERY, AND TOMATO PRODUCTION.

(Circular No. 15.)

By P. E. French, B.S.A., Assistant Horticulturist.

Cabbage.

There are three groups of cabbage commonly grown: the red, white and Savoy types. The red cabbage is commonly used for pickling. The white cabbage is commonly used as a vegetable, while the Savoy cabbage, which is of the best quality, is little cultivated because production is not so abundant as with the common kinds. The three types of cabbage as to shape are the pointed, round, and flat. The pointed are early, the round medium, while the flat are late varieties.

Soil and Manure.—The best soil for cabbage is a rich loam, moist, yet well drained, and in fine condition. Early cabbage usually need richer soil than late cabbage. It is a good plan to occasionally change the land. Cabbage are gross feeders and need lots of rich manure. A small quantity of hen-manure placed around each plant and mixed with the soil will give very good results, especially with early cabbage.

Early Cabbage.—Seed should be sown in the greenhouse or hotbed about the middle or end of February. If only a few plants are required they can be grown in shallow boxes in the house. When the plants are about 2 inches high, transplant them into flats, placing the plants 1½ to 3 inches apart, depending whether they are to be transplanted once or twice before setting in the field. The ground should be ploughed in the fall and well prepared in the spring, and the plants should be hardened off before setting them in the open ground.

It is important that early cabbage should be planted out as early as possible in the spring and set deep enough to bring the base of the leaves below the ground. Cabbage plants will grow at a low temperature. They may not show much increase in the leaf surface at first, but they form roots rapidly. The distance apart for planting depends somewhat on the variety grown, but the usual distance for early cabbage is 18 inches apart in rows 30 inches apart. If there is very hard frost after planting, the plants may be covered with earth for two or three days, but should be immediately uncovered if the weather turns fine. Cultivation should begin as soon as possible and be continued every week or ten days, and after every rain until the heads are well formed.

The crop should be ready for market from July 1st on. If the land is at once ploughed when the early cabbage is harvested, it can be used for some late crop, as beans, spinach, or celery in some districts. If the market is oversupplied, the heads may be retarded by pulling the plant to one side and so breaking off some of the roots.

Late Cabbage.—The seed for late cabbage is sown in a seed-bed in the open ground. Sow the seed four to six weeks before you want to transplant to the field, in a well prepared seed-bed. Sow in rows about 12 inches apart. The ground should be well prepared before planting. If necessary late-cabbage land may be used for some early crops, such as peas, in the spring. If horse cultivation is to be employed, set the plants not less than 2 feet apart in rows 3 feet apart. During the forepart of the season the cabbage may be cultivated both ways. If this is done very little hand labour is required.

Harvesting and Storing Late Cabbage.—Late cabbage may be harvested and sold at once, or stored for marketing during the winter. They are usually marketed with the outside leaves trimmed off and are shipped in crates.

Cabbage will stand 10 degrees or more of frost, but severe freezing or repeated freezing and thawing is injurious. They are seldom injured very much unless the stump is frozen solid.

Cabbages are generally stored in cellars or specially constructed pits in the field. If stored in the cellar they are placed on shelves, and the cellar should be cool and moist, but not wet. The pits are made by constructing an A-shaped wooden structure, which is covered over with earth. This is made about 8 or 9 feet wide at the bottom and the point about 6 feet high. A false floor is put in to keep the cabbage off the earth and to allow the air to circulate through the cabbage. While in storage cabbage should be well ventilated and kept as cool as possible without freezing.

Soft cabbage may be stored for the winter by setting them in a trench, roots upward, and covering the heads with about 6 or 8 inches of soil and mulch to prevent hard freezing. The roots will show above the ground. Soft cabbages stored in this way will harden up by spring.

Raising Seed.—For raising seed, cabbage are placed together, in a trench about 18 inches deep, head upwards, and covering with soil and mulch to prevent severe freezing. Hard heads give a good quality of seed, but a small quantity. Medium hard heads give a fair quality and a medium quantity, while soft heads give a poor quality and large quantity.

Celery.

Soil.—Celery can be grown on any fertile, well drained soil, but best results can be obtained from a loose, rich sandy loam or a black-muck soil. Well-drained swamp land is often excellent soil for the commercial growing of celery. Special attention should be given to the maintenance of humus in the soil, as celery growing not only exhausts the chemical fertility of the soil, but also injures its physical condition. This is not so important in the case of swamp lands, where there is generally an extra large supply of humus. The maintenance of humus in the soil can be accomplished by the application of large quantities of barnyard manure, or by planting the land every third or fourth year to some leguminous crop, such as clover.

Fertilizers.—Where fresh manure is used, it should be ploughed under in the fall at the rate of about 20 tons to the acre. Well-rotted manure may be applied as a top dressing a short time before planting, and harrowed into the soil. If the manure is ploughed under, the land should be reploughed a short time before planting, in order to bring the manure near the surface.

Many growers are getting excellent results from the use of commercial fertilizers at the rate of 600 or 700 lb. per acre. The best results seem to be obtained by making a furrow where the plants are to be set. Then scatter the fertilizer in the bottom of this furrow and mix it well with the soil and then set the plants on top. Nitrate of soda might be applied in light applications during the growing season just before cultivating. When celery is grown on a large scale, it is advisable for the grower to experiment with different mixtures of commercial fertilizers and find out what gives the best results with his own particular soil.

Raising the Young Plants.—Celery-seed loses its vitality very quickly and is practically worthless when kept over until the second year. Order your seed early, before the supply of the best is exhausted, and there will be very little difficulty in getting good seed. One ounce of seed will give about 5,000 plants. Celery-seeds are slow in germinating, and the temperature of the seed-bed should be kept low. The seeds for the production of early celery are sown about the end of February or beginning of March in hotbeds or flats. Where grown in flats there is less danger of damping off if the seeds are covered with sand.

For late celery the seed is sown in an old hotbed, cold frame, or in a well-prepared seed-bed. The seeds should not be covered to a greater depth than $\frac{1}{8}$ inch. Watering should be attended to very carefully and the bed should not dry out. After the plants are up care should be taken that the bed does not become too wet and the plants damp off. A better root system and a stronger plant can be obtained when transplanting into flats is practised, but this is seldom done when celery is grown on a large scale. The cost of labour is too great to recommend two handlings for commercial celery-production. The plants should be thinned out in the seed-bed to prevent overcrowding.

Transplanting to the Field.—The ground should be well ploughed, harrowed, and smoothed before the plants are set out. The seed-bed should be thoroughly soaked with water before the plants are dug. A portion of the top is generally trimmed off the plant

when transplanted. When raised on a large scale, celery is grown in single or double rows, 4, 5, or 6 feet apart, with plants 5 or 6 inches apart in the rows. Most of the growers in this Province prefer the double-row system. Early celery is generally planted closer together than late celery. If the weather is warm after setting the plants in the field, they should be shaded for a few days.

Cultivation.—The young plants should be frequently cultivated, but at no time should deep cultivation be practised, as the roots are to be found very near the surface of the soil. As soon as the plants attain considerable size the leaves should be drawn up and a little soil compacted about the base of the plant to hold it upright.

Blanching.—Early celery is usually blanched by means of boards, as there is less danger of disease during the warm weather. Late celery may be blanched by the use of boards, or by banking up with earth. There is much less labour required when boards are used for blanching, but if the celery is to be left in the ground late in the fall, there is more danger from frost than when it is well banked with earth.

Digging and Preparing for Market.—In the field the celery should be loosened only as required for removal to the storehouse or washing-house, as a short exposure to the sun after the roots have been disturbed is very injurious and detracts from its keeping qualities. When ready for market the celery is washed free of adhering soil, the outside leaves are removed and the roots trimmed, and it is packed in boxes or crates. A lining of paper is usually placed in the box before packing the celery.

Storage.—When only a small quantity of celery is kept for winter it may be well banked in the field and covered with straw, or put in a trench and covered. This method is, however, too laborious for application on a large commercial scale.

Celery may be safely stored in cellars or storage houses, provided the temperature is kept low and plenty of ventilation maintained. Make bins 3 or 4 feet wide, 2 feet high, and any desired length, and put in about 5 inches of strong soil. Plant the celery, leaving the roots on, close together in rows about 3 inches apart. After the plants are set in, water heavily without putting any more than necessary on the tops. Leave the bin open until the plants are dry and then cover.

Varieties in Order of Maturity.—Golden, Self-blanching, White Plume or Chicago Giant, Paris Golden, Giant Pascal, Evan's Triumph, and Winter Green.

TOMATOES AS A FIELD CROP.

Growing the Plants.—Tomato-seed should be sown in hotbeds or flats about the middle of March. It requires about 1 oz. of seed to produce enough plants for 1 acre. When the second leaf shows, the plants should be transplanted about 2 inches apart each way, into flats, and allowed to develop in these quarters until they have attained a heigth of 4 to 6 inches. They are then transplanted to about 4 inches apart each way in flats or in berry-boxes, pots, etc., and from these quarters to the field. In growing the young plants it is very important to keep the temperature fairly even, and not allow draughts to strike the plants. The less water used as long as the plants are growing well, the better. It is very important that the plants should be well hardened off before set in the open ground.

Soil and its Preparation.—Tomatoes if given proper treatment can be grown on almost any well-drained soil which is in good condition, but probably a rich, sandy loam will give the best results. The treatment of the soil previous to planting is very important. Tomatoes do well after clover-sod. The ground should be ploughed in the fall or early spring, and deeply cultivated in the spring.

Fertilizers.—Barnyard manure may be applied in the fall and ploughed under, or if well-rotted it might be applied as a top dressing in the spring and worked into the soil. Since the tomato belongs to the potash-consuming class of plants, the fertilizers used should be especially rich in potash.

Setting and Cultivating the Plants.—The plants should be set in the field as soon as all danger of frost is over. If the plants are transplanted from flats to the field, cut the soil in the flat into cubes two or three days before removing the plants. Soak with water two or three hours before transplanting. If the plants are to be allowed to run over the ground, they should be set about 4 feet apart each way. If trimmed and tied to stakes, they may be planted in rows 3 feet apart, and 18 inches apart in the rows.

Tomatoes need thorough cultivation. Cultivate fairly deep the first time, but all later cultivations should be shallow, as the tomato is a surface feeder.

Pruning and Training.—Tomato-plants under field cultivation are generally allowed to run over the ground in any direction. For early market it will pay not to leave more than three sets of fruit. Even for the main crop it will pay to take off all the small fruit and cut back the young shoots about the middle of August, especially if the plant is growing rapidly.

Selection.—Tomato-seed should be saved from the best tomatoes, from vines producing a large amount of fruit. The crown setting is always the best for seed purposes.

Varieties.—A good variety is one which bears medium sized, smooth, spherical fruits, which ripen evenly and have small seed-cavities and thick walls. Some of the common varieties grown in Canada are: Red—Earliana, Bonny Best, Wealthy, Chalk's Jewel, Success, Livingstone, Baltimore, and I.X.L.; Pink—June Pink and Globe.

Harvesting and Marketing.—The fruit should be gathered two or three times a week if the tomato is grown as a truck crop. If used for canning purposes the harvesting periods need not be quite so close. For home markets the fruit should be allowed to ripen upon the plant. If the fruit is to be shipped long distances it should be harvested just as the ripening process begins. Only sound fruit should be marketed. In packing tomatoes for the market the fruit should be graded, and those that are symmetrical in form and uniform in size and of a like degree of ripeness packed in any one receptacle.

COMMERCIAL POTATO-CULTURE.

(Circular No 10.)

By P. E. French, B.S.A., Assistant Horticulturist.

The potato-crop as a commercial asset is steadily increasing in value in British Columbia. Up to a few years ago the production did not equal the home demand, imports coming from Ontario and the United States. The general quality and character of our product have long been recognized, and the recent victory which the British Columbia car-load attained in the New York National Irrigation Exposition over sixty-six other competitors from all parts of the United States and Canada has furnished striking confirmation of its superiority.

The Delta and bottom lands of the Lower Mainland produce very large yields of main-crop potatoes, which are consumed principally in the local Coast markets. The Ashcroft potato has long been justly famed for its peculiarly high quality, and other Thompson River Valley points, with Ashcroft, are steadily increasing their output. Around Armstrong the production of early potatoes on the uplands has been made an especial study, while the river lands produce very large late crops. The early varieties produce 2 to 4 tons per acre, marketed at from $28 to $40 per ton; late ones running 8 to 11 tons per acre, at $15 to $22 per ton. Around Vernon, and especially in the Coldstream Valley, the potato-crop will average about 8 tons under irrigation, of high quality. In the Kelowna District both early and late potatoes are grown, the latter producing about 8 tons at selling prices quoted above. In the Grand Forks District a large car-load business is also developing, potatoes yielding 7 to 9 tons under irrigation, and 4 to 5 under dry-farming methods.

The potato market is one subject to peculiar and unforeseen fluctuations. Predictions as to crops and prices are more difficult to make in potatoes than with any other of the main or staple food crops. Generally speaking, the price received per acre leaves a good margin over the cost of production, but this is true more as an average of years than as a certainty every year.

Certain factors are peculiarly essential to success with potatoes as a main crop. The grower must stay with the game, year in and year out, as to make good on the average. It is essential to secure varieties suitable to the district and to the market, and to have a good strain of seed of that variety. The grower must keep down the cost of production by the use of machinery and by intelligent management. The district must get into the car-load-shipping class, and be a factor in the market every year.

As a side-issue, the potato is one of the most profitable intercrops in the orchard, and for production in small areas by men engaged in fruit-growing, poultry-raising, and in general farming. Under these conditions, financial success is dependent on well-selected seed of the most desirable variety, combined with careful and thorough preparation of the soil.

SOIL.

Potatoes can be grown in a great variety of soils, if given proper treatment, but good drainage is essential to a good crop. The ideal soil for potatoes appears to be a rich, deep, friable, warm sandy loam, well supplied with decayed or decaying vegetable matter. The kind of soil to some extent affects the quality of the tubers. Those grown on sandy soil are generally of better table quality than those grown on clay soils. New soil is most desirable, and in it the tubers are generally healthy. Potatoes require a large amount of moisture; thus a soil which has the power of holding a large amount of moisture will give the best results. Such a soil usually contains plenty of humus. For early potatoes a light, rich, sandy loam with a south or south-east slope will give the best results. A warm soil is essential for early production.

SEED.

For the production of early potatoes, it is a common practice to plant tubers of early varieties which have been grown for several seasons farther north. This northern-grown seed seems to give better results for early potatoes. It is a good plan to select your seed-potatoes from plants with good tubers and a large quantity of them. Medium-sized whole potatoes often give best results for early production. For general planting, the most economical sets are those cut from medium-sized potatoes, and each set should have a large amount of flesh and two or three eyes. The sets should not be cut long before planting, and it is generally advisable to have a change of seed every three or four years. To obtain the best returns, it is very important to select good seed and to know where that seed has been raised.

For extra-early production, sprouting potatoes is sometimes practised. For this purpose medium-sized potatoes are taken, greened, and placed in flats in a cellar with temperature of 40° to 45° Fahr. Tubers not quite matured are best. In the spring set the potatoes, eye end up, in flats. Place them in a light, warm place, and allow only one sprout to form on each tuber. This can be allowed to grow as long as 2 inches. Cut off the lower end of the potato when planting, and be careful not to break the sprout.

PREPARATION OF THE SOIL.

Fall ploughing is advisable for early potatoes, because you can get on the ground earlier in the spring. For main-crop potatoes, spring ploughing is probably just as good as fall ploughing, except in case of heavy soils. Potato-ground should be well prepared before planting. The ploughing-under of barnyard manure or clover will loosen the soil, furnish plant-food, and increase the water-holding capacity of the soil. If manure is put on in the spring, it should be well rotted and thoroughly mixed with the soil. Manure should not be put in the drills with the sets, because manure in contact with the tubers induces scab. The soil should be ploughed deep and thoroughly harrowed until well pulverized and loosened. Unlike some crops which succeed best when the soil is moderately firm when ready for seeding, the potato succeeds best in soil which is loose.

PLANTING.

The time of planting, of course, varies with different districts. For very early production the potatoes should be planted as soon as the ground can be throughly worked in the spring. If there is danger of frost when the sprouts are just above the ground, they can be protected by ploughing a little earth on top of them.

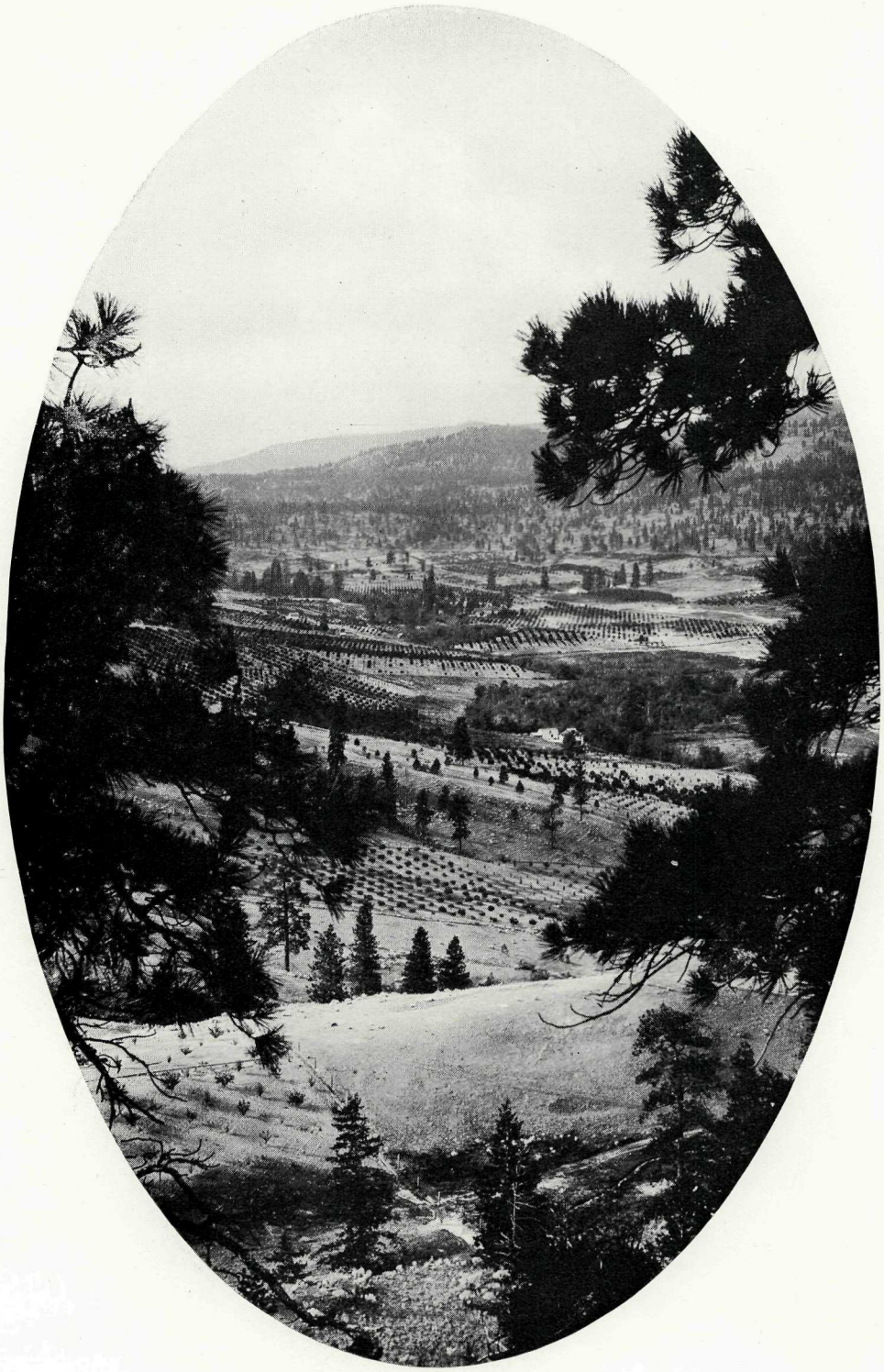
Main-crop potatoes are usually planted during the month of May.

In ordinary practice, it is customary to plant potatoes so as to admit of cultivation in one direction only, the rows being spaced from 30 to 36 inches. The sets are dropped about 12 inches apart in the rows. Ordinarily, potatoes are planted practically on the level, without throwing up ridges. For early production, the sets should be planted about 2 inches deep, and for the main crop about 3 or 4 inches deep. If early potatoes are planted deep, many of them will not sprout, because the ground is cold. Planting potatoes by hand on the large scale is rather expensive, and it will pay the large potato-grower to buy a potato-planter.

FERTILIZERS.

Barnyard manure and clover are the cheapest fertilizers for potatoes. It is not advisable to manure heavily the year the potatoes are grown, but rather to put a heavy dressing on the year before. Potatoes take from the soil about twice as much potash as wheat, but a light

An Ideal Home. Young Orchard, Kootenay Lake, near Nelson.



Orchard Lands, Summerland, B.C.

[By courtesy of G. H. E. Hudson, Kelowna, B.C.]

dressing of manure will supply this. The cheapest way to supply the nitrogen is to grow clover and plough it under. If barnyard manure is not available, commercial fertilizers are often used. If potash is required, it should be put on in the form of the sulphate of potash. The muriate of potash tends to form a waxy potato.

If nitrate of soda is used, it should be put on in small dressings throughout the growing season. Commercial fertilizers, if applied, should be distributed along the row and mixed with the soil. It should not be placed in contact with the tubers.

Variety to grow.

The market requires a smooth, shallow-eyed potato of fair size. For the main crop, a white potato usually sells better than a red. Before choosing a variety to grow, go around and visit your neighbours, and find out which variety is doing the best in your particular locality. Very few growers in British Columbia have gone in for extra-early production, and in the interior of the Province no good test has been made with early or late varieties to determine which are doing the best. Thus it is impossible for us to recommend varieties for different districts.

Some of the principal varieties grown at present are:—

In the Interior—Vick's Extra Early, Early Fortune, Early Rose, Early Ohio, Gold Coin, Money Maker, Mortgage Lifter, Million Dollar, Burbank, Empire State, Carman No. 1, White Wonder.

On the Coast—Sutton's Reliance, Empire State, American Wonder, Rural New Yorker, for main crop. Extra Early Moonlight, Early Puritan, Early King, for early.

On Vancouver Island, Raleigh is principally grown.

Irrigation.

Where irrigation is practised, the water should only be applied when the condition of the plants indicates that they are in need of water, as by the darkening of the foliage. Care should be taken not to wait until the ground is too dry, because one can seldom cover the whole field in one day.

Potatoes planted the 1st of May seldom need water supplied before the end of June or the beginning of July. Do not water after the middle of August, so as to give plenty of time for ripening in dry earth. Cultivate as soon as possible after each irrigation. Great care in supplying irrigation water is necessary for best results, both for market potatoes and for seed stock.

Cultivation and Weeding.

The success of the potato-crop depends largely upon the kind of cultivation given. No matter how well the land has been prepared and how carefully the sets have been planted, the crop will be much reduced if the soil is allowed to become hard, the weeds to grow, and the moisture lost which could be saved. Cultivation should begin soon after planting. The common drag-harrow, or a weeder, can be run over the ground three or four times, or until the potato-plants are 3 or 4 inches high. From then on, most of the cultivation is done with the single-horse cultivator. The first time the cultivator is used the ground should be cultivated fairly deep and as near the plants as possible without injuring them, to loosen the soil for the tubers. Later cultivations should be shallow to prevent injury to the roots and tubers. The soil should be cultivated every week or ten days, depending on the weather. If the soil becomes baked, evaporation takes place rapidly. It should be stirred after each rain. If the land is weedy, the more frequent the cultivation the less work with the hoe to keep the area clean. From five to six cultivations, or even more, are none too many, and it is usually found that the crop increases in proportion to the number of cultivations. The last two or three cultivations the earth should be thrown towards the plants if the potatoes are near the surface. The weeds that are not killed by the horse cultivator should be hoed out or pulled by hand. Hilling potatoes in dry sections is a mistake of much too common occurrence.

Harvesting.

Potatoes may be dug with the four-tined potato-fork, ploughed out, or dug with the potato-digger. The former method is used when the area is small or the ground stony, and also in case of digging potatoes early, when care should be taken in handling, not to bruise

the tubers more than necessary. Where there are large areas to be dug, the potato-digger is essential, as digging with the fork is too expensive, now that good men are difficult to get and wages are high. There are a number of good potato-diggers now on the market.

Potatoes, unless affected with late blight, or rot, are ready to dig as soon as the tops have died, if the weather is favourable. They should be dug in dry weather, so that when taken to the cellar or store-room they will be perfectly dry. If the potatoes are affected with late blight, it is advisable to leave them in the ground as long as possible, because the diseased tubers will usually show signs of rot before they have to be taken up on account of frost. Potatoes in wet land should be dug before those in dry or well-drained soil, because there is a greater tendency to rot.

MARKETING.

Potatoes which have been dug in an immature state should be marketed immediately and placed upon the market in such quantities only as will admit of immediate consumption. The mature potatoes may be shipped in the fall or held over until spring. Growers should be very particular about grading their potatoes before marketing them. All the small potatoes should be picked out and fed to the stock.

STORING.

Potatoes are best stored in a cool, well-ventilated cellar or root-house which is perfectly dark. Too much stress cannot be put on good ventilation. If there is not a good system of ventilation in the cellar, slats can be nailed a little apart about 5 or 6 inches from the wall. A temporary floor with cracks between the boards can be put about 6 inches before the permanent floor. This allows the air to circulate around and through the pile. If the pile is very large, slatted ventilators can be placed here and there from top to bottom.

Potatoes should be kept at as low a temperature as possible without freezing, and at the same time keep the surrounding air as dry as possible. They should be mature when harvested, as skin-slip potatoes do not keep well.

In some sections of British Columbia potatoes are often pitted. This is more often done in the drier parts of the Province. The pit should be made from 6 to 8 feet wide, about 8 inches deep, and as long as needed. The potatoes are then placed in the pit about 4 feet deep and covered with enough straw to keep the earth from coming through, and then about 1 foot of earth is placed on top of this. Do not cover the top immediately. Leave a strip along the top for a week or two for ventilation. If there is danger of rain, this can be covered with sacking. When this strip is covered, leave a small hole for ventilation every 8 or 10 feet. In the winter-time, if there is danger of very cold weather, the pit can be covered with some strawy manure.

The value of potatoes for seed or for eating is greatly lessened if they are allowed to sprout.

DISEASES.

The principal diseases of the potato are the early and late blight, rot, and potato-scab. The two former may be controlled by spraying with Bordeaux mixture throughout the growing season. Generally three or four sprayings are sufficient. The spores of potato-scab may be destroyed on the potato before planting by soaking the tubers in: Formalin, 1 lb. in 30 gallons of water; or in corrosive sublimate, 1 oz. in 7 gallons of water, for two hours.

SPRAYS AND SPRAYING.

(Circular No. 9.)

BY J. F. CARPENTER, B.S.A., ASSISTANT HORTICULTURIST.

The spraying of fruit-trees for the control of fungous and insect pests is of comparatively recent origin. Bordeaux mixture, which is one of the oldest fungicidal sprays on the market, was introduced into the United States in 1887. It is evident, therefore, that our present knowledge of the above topic is subject to change, and that we can hope to see in the near future better sprays, spray outfits, and systems of spraying than we have at present. The information given here is the consensus of the opinion of growers and instructors as to what is considered the best in these lines at the present time.

Some fruit-growers believe that in order to make their orchards productive it is necessary to spray. Nothing could be more fallacious, as the causes of unproductiveness are many. When such causes are due to insect and fungous pests, spraying is, in most cases, a specific. When the cause of unproductiveness is poor soil, lack of tillage, poor varieties, etc., spraying can only have a secondary effect in correcting the barrenness of the plantation. In orchards which have been neglected in districts where orchard pests do serious damage, the owner shall not expect to obtain perfect results the first year. Spraying being a preventive, in a large number of cases it is advisable to spray every year, especially in such districts as are mentioned above.

Economical and successful spraying does not depend altogether on methods of application, but depends to a marked extent on the condition of the orchard. Varieties differ in their blossoming and fruiting periods, etc., and as a consequence require sprays applied at varying periods, especially where some pests, such as apple-scab, brown-rot, and codling-moth, are to be controlled. In an orchard containing a large variety list per acre, successful spraying is made difficult and expensive.

Trees with high heads are hard to spray, and more spray is wasted in covering them than with a low-headed tree. Spraying accomplished from the ground is generally more thoroughly done than from an elevated position. These facts point strongly to the value of low-headed trees for economy and good results in spraying.

Spraying, especially in the case of some of our fungous diseases, has to be most thoroughly done, and all parts of the tree must be covered before satisfactory results can be obtained. A tree which contains superfluous wood will not produce the highest quality of fruits and is difficult to spray. This condition is also conducive to the spread of fungous diseases. Fruit-trees, especially in the non-irrigated districts, should be kept well thinned out in order to produce high-quality fruits and make the spraying operations economical and successful. The relation of successful spraying to conditions in the orchard as mentioned above, i.e., low-heading varieties and pruning, are most important. They are conditions that are desired in a commercial orchard, so that the fruit-grower who keeps his orchard in good condition is in a position to obtain the best results in spraying.

A careful perusal of the circular on orchard pests will no doubt impress the reader with the value of knowing the pests he has to control, the use of correct mixtures, and the value of spraying at the right time. When the time comes for spraying, have everything ready, and do not delay the operation for something which might appear at a casual glance to be more important. A difference of a few days in application sometimes gives a difference of fifty per cent. or more in results.

The value of thoroughness in application cannot be overestimated. In controlling pests it is sometimes necessary to prevent the germination of "seeds" or spores, which are so small that they can be seen only by the use of a powerful microscope. From this, the value of thorough work is appreciated.

Sprays can be considered from the standpoint of effectiveness, cost, manufacture, effect on spray-machines, etc. In comparing the values of the sprays that are on the market at the present time, a large number can be discarded, which do not come up to the best ones when considered from the above factors. New sprays are being frequently advertised, and the growers are warned against their extensive use until they have been tried and proved safe, economical, and successful by the experiment stations. A great deal of damage has been done in the past through the use of new sprays before they had been thoroughly tested by the experiment stations.

Insecticidal Sprays.

For the Control of Biting-insects.

Arsenate of Lead (Paste Form).—Two pounds to 40 gallons of water. Keep the arsenate of lead moist by covering it with water. Stir well the required amount of poison with a few gallons of water before adding to the spraying barrel or tank, so as to ensure a good mixture. For pear and cherry slug, 1 lb. of arsenate of lead to 40 gallons of water will be found sufficient.

Poisoned Bran-mash—For use in the control of cutworms, etc. Mix well 1 lb. of paris green with 50 lb. of bran, and moisten to the consistency of fresh sawdust. Sweeten with a little sugar or molasses.

For Sucking-insects.

(1.) *Black Leaf 40, or Black Leaf.*—For summer spray the latter is diluted 1-60 with water. The former is twelve times stronger than the latter, so will require dilution accordingly.

(2.) *Whale-oil Soap and Quassia-chips*—

Whale-oil soap	1 lb.
Quassia-chips	1 lb.
Water	12½ gallons.

Boil the quassia-chips in 1 gallon of water for an hour. Dissolve the soap in hot water. Strain and mix both solutions together and dilute with water to make 12½ gallons of mixture.

Of these two sprays, the Black Leaf is the most popular among fruit-growers. Lime-sulphur is also used in the control of insects, especially scale-insects.

FUNGICIDAL SPRAYS.

(1.) *Lime-sulphur.*—This spray, both for summer and winter spraying, is becoming very popular. It is an efficient fungicide, and also is useful in the control of many insect pests. It can be manufactured by the grower without infringement on any patent, but it is found at present prices of manufacture to be more economical to buy the commercial mixture. Most brands on the market have been giving good satisfaction, among which are some manufactured in our own Province. It is a good plan to have on hand a hydrometer (specific gravity and Beaume scale attached) to test the commercial mixture before using. The reading as given by the hydrometer is not always a sure indication of the strength of the commercial mixture, as something might be added which would raise the hydrometer test without increasing the fungicidal strength of the spray. With most commercial mixtures it can be used to advantage.

Dilutions—The following is a table showing dilutions of different strengths of commercial lime-sulphur. This shows the dilutions which are giving the best results, and although they might seem a little strong, they are not too much so for aphides. There can be no injury from this strength for the dormant sprays, even when the buds are swelling. For summer-spraying for apples and pears this is diluted with three and a half to four times as much water. For the tender foliage of plums and prunes use five to six times as much water.

Table for diluting Concentrated Lime-sulphur Solutions.

Reading on Degrees Beaume.	Hydrometer Specific Gravity.	AMOUNT OF DILUTION. Number of gallons of water to one gallon of lime-sulphur solution. For dormant spray.	
36	1,310	1 gallon lime-sulphur	9.3 gallons water.
35	1,299	1 gallon lime-sulphur	9.0 gallons water.
34	1,288	1 gallon lime-sulphur	8.6 gallons water.
33	1,277	1 gallon lime-sulphur	8.2 gallons water.
32	1,267	1 gallon lime-sulphur	7.9 gallons water.
31	1,256	1 gallon lime-sulphur	7.5 gallons water.
30	1,246	1 gallon lime-sulphur	7.2 gallons water.
29	1,236	1 gallon lime-sulphur	6.9 gallons water.
28	1,226	1 gallon lime-sulphur	6.5 gallons water.
27	1,216	1 gallon lime-sulphur	6.2 gallons water.
26	1,206	1 gallon lime-sulphur	5.9 gallons water.
6	1,041	1 gallon lime-sulphur	0.4 gallon water.
5	1,034	1 gallon lime-sulphur	0.1 gallon water.

Some growers think it is better to add some lime. This is not necessary, as it does not strengthen the spray, but in some cases it is supposed to have the opposite effect. When it is added, it is advisable to use the spray within a few hours after mixing or it will deteriorate.

In storing commercial lime-sulphur, it should be kept in a tight container, as it deteriorates when exposed to the air for some time.

For summer spraying of peaches, the self-boiled lime-sulphur is recommended. Information *re* its manufacture can be obtained from the Department of Agriculture, Victoria.

(2.) *Bordeaux Mixture.*—This fungicide is not recommended for summer spraying. For fall spraying to control black-spot canker it is superior to lime-sulphur, as it sticks better, longer, and is more insoluble.

For method of manufacture of double-strength Bordeaux mixture, see Bulletin No. 34, Department of Agriculture, Victoria. The 4-4-40 strength is manufactured in the same way, using half the quantity of ingredients.

Dry Sulphur is sometimes used as a fungicide to check the spread of mildews and brown-rot on plums, cherries, etc. For this purpose it is dusted on the tree, or vine, when the disease is first noticed. It is doubtful whether this is practicable on a large scale.

Potassium Sulphide (liver of sulphur) is sometimes recommended for the control of mildews. Use 3 to 5 oz. of the above to 10 gallons of water. It does not spot the foliage or fruit.

Ammoniacal Copper-carbonate.—Sometimes used where spraying is necessary when fruit is nearing maturity Use 5 oz. of copper-carbonate, with just enough ammonia to dissolve it. Dilute with 40 gallons of water. If the ammonia is very strong, it is advisable to dilute it with water before adding to the copper-carbonate.

Spraying Machinery.

The value of a spray outfit does not depend so much upon the work it is capable of doing as on the competency of the man using it. Just as good work has been accomplished and results obtained with a barrel hand-pump as with a power-sprayer. Both good and poor work is being accomplished every year with all types, depending largely on the efficiency of the man in charge. With this in view it would be useless to go fully into the question of spray outfit and make any recommendations, as it is difficult to know whom the reader will be. However, there are a few general principles with regard to their purchase which are worthy of mention.

In selecting an outfit the fruit-grower should not select his type from the standpoint of his present necessities, but should consider his requirements for the near future, during at least part of the lifetime of the outfit. It should be simple in construction (so it will not require the services of an expert mechanic to adjust it), strong, easily worked, easily cleaned, and one in which high pressure can be maintained. This latter point, though possibly not of any great importance as far as the majority of our orchard pests are concerned, is important, as it influences greatly the labour cost of spraying. Double pressure decreases considerably the time required for spraying, and it will be noticed in the cost of spraying as given below that labour is an important item.

Always wash out thoroughly the spray outfit after using. This will save a lot of trouble and time.

Some essentials in a good spray outfit are—

(1.) The pump, etc., should be simple, strong, and easy to adjust.

(2.) The pump should be lined with brass, or some material which will not be corroded or rusted by the spray mixture.

(3.) The air-chamber should be of sufficient size to maintain a uniform pressure, and strong enough for high pressure.

(4.) A good agitator is required, as the fungicidal and insecticidal value of most of our sprays is contained in the fine particles held in suspension in the water.

(5.) A good strainer is necessary, especially where lime is used. The cone-shaped strainers have been found to be the most satisfactory.

(6.) Good strong hose only should be used. The best is none too good.

(7.) Use only the best types of nozzles, and for most purposes it is advantageous to have them adjusted to the pole at an angle of about 45 degrees.

Tables showing comparative values of spray outfits are given below. These will vary greatly according to the machine used, grower using it, age of trees, facilities for mixing, topography of land, etc. They are given as a basis for figuring values, and to show that the labour cost is the main item in spraying. The value of the larger outfits, other than shown here, are that less time is taken in the application of the spray, which is an important consideration, especially when fighting some of the pests, less labour is required per acre sprayed, higher pressure is obtained, and as a general rule, more thorough spraying is accomplished.

COMPARATIVE VALUES OF SPRAY OUTFITS.

Basis: 50 Barrels of Spray.

(1.) *Barrel Hand-pump—*		
Initial cost		$ 25 00
Number of barrels per day, 8.		
Interest on investment, 8 per cent	$2 00	
Depreciation in value, 10 per cent	2 50	
Six and one-quarter days, two men, @ $2.50	31 25	
Six and one-quarter days, horse, @ $2	12 50	
		$ 48 25
(2.) *Duplex Sprayer* (larger type of hand-pump)—		
Initial cost		$ 68 00
Number of barrels per day, 20.		
Interest on investment, 8 per cent	$5 44	
Depreciation in value, 10 per cent	6 80	
Two and one-half days, three men, @ $2.50	18 75	
Two and one-half days, team, @ $3.50	13 75	
		$ 44 74
(3.) *Gasolene Power Outfit—*		
Initial cost		$400 00
Number of barrels per day, 40.		
Interest on investment, 8 per cent	$32 60	
Depreciation in value, 10 per cent	40 00	
One and one-quarter days, three men, @ $2.50	9 37	
One and one-quarter days, team, @ $3.50	4 38	
One and three-quarters gallons gasolene, @ 30c	53	
		$ 86 25

Basis: 200 Barrels of Spray.

(1.) Barrel hand-pump (one outfit. Would require two)	$179 50
(2.) Duplex sprayer	$142 24
(3.) Gasolene power outfit	$129 10

FRUIT-PIT OR BALDWIN SPOT.

(Circular No. 7.)

BY R. M. WINSLOW, PROVINCIAL HORTICULTURIST.

This disease of apples has been reported to the Department from practically every apple-growing section of the Province this year. Not only is the Interior affected, but the Coast as well, while probably the greatest losses are reported from the most prominent fruit sections. During the last six weeks inquiries on the subject have increased greatly, indicating a rapid development of the disease just previous to and following shipment.

During the season of 1909 a similar outbreak occurred, though not to as great an extent as this year. In some cases there have been losses up to 25 per cent. of the fruit picked, and we are advised of other cases where large shipments have had to be sacrificed on arrival at destination because of development in transit.

This trouble goes under a confusing variety of names. The principal ones commonly given by fruit-growers are: Baldwin spot, fruit-spot, dry-rot, bitter-rot, brown-rot, physiological dry-rot, and fruit-pit. In German the common name is Stippen or Stippich-werden, and bitter-pit in South Africa. No scientific name has been given, because no specific cause has yet been discovered.

DESCRIPTION.

When usually noticed, the appearance is that of roundish brown spots just below the surface of the skin of the apple, or perhaps up to $\frac{1}{4}$-inch deep. When near the surface there is a smaller circular depression just above the spot. On the coloured portion of the apple this

depression is surrounded by slightly deeper colour, and on the green parts of the apple the depression is deeper green, changing later to brown. The brown spot is pithy in character, dry, and comparatively tough. The spots are generally from $\frac{1}{5}$ to $\frac{3}{16}$ inches in diameter, and of not quite the same depth.

As the trouble develops, more spots occur, and finally the brown may extend in a more or less complete network through the outer tissues of the apple. The affected flesh is dry and flavourless, but not bitter. The appearance and saleability are very much impaired, and even for cooking purposes badly affected fruit is not of much use.

In the third stage the apple becomes practically entirely brown, soft, and quite worthless.

In its first stages the fruit-pit is hard to distinguish from the effects of hail. Another type affects early apples particularly, causing a more or less complete browning of the tissues surrounding the core. In this case the apple becomes valueless commercially before its outward appearance is much affected.

Variations of the above forms, and very similar forms, are found in the apple, pear, and prune.

This disease has been known and been under investigation for thirty years, principally in Germany, and, during the past ten years especially, in the United States and Canada. We have consulted all the available authorities in Canada and the United States on the subject. They are agreed that it is not caused by any fungus, bacterium, or insect. The organism causing it is absolutely unknown. Spraying has proven absolutely valueless. Scientists are now thoroughly agreed in designating it as a physiological trouble in the same class as water-core.

The true Baldwin spot of New York State, the true bitter-rot of the Middle West, the true apple-scab or black-spot, are all fungous diseases, and the life-history of the organism, like that of typhoid and tuberculosis, is well known to investigators. The disease above described is none of these.

While the absolute cause is unknown, there have been discovered certain inducing causes. These are :—

(1.) Light yields of sappy, usually large, fruit :
(2.) Heavy wood-growth, from 2 to 4 or 5 feet in length.

The light yields and heavy growth are due to the following causes :—

(1.) A heavy crop the previous year :
(2.) Young trees :
(3.) Heavy winter pruning :
(4.) Excess of water by rainfall, seepage, and irrigation :
(5.) Clean cultivation :
(6.) Nitrogen in the soil in excess over potash and phosphoric acid :
(7.) Unhealthy or winter-injured trees.

Any one or any combination of the above conditions may be sufficient to bring on fruit-pit. The remedies are :—

(1.) A good heavy crop of fruit :
(2.) A reasonable growth consistent with the age, size, and health of the tree.

To secure heavy crops and a mature growth, the following are of importance :—

(1.) Rational winter pruning, replaced by summer pruning if absolutely necessary :
(2.) The maintenance of the proper moisture-supply, less irrigation, proper drainage :
(3.) Less clean cultivation ; put the orchard in sod if necessary :
(4.) Decrease the amount of soil-nitrogen by lessening cultivation, by putting the orchard in sod, or planting intercrops, and where necessary balance the nitrogen-supply by adding potash and phosphoric acid. Unhealthy trees should be given proper conditions as above to regain vigour. Properly cared for, they will produce a much higher class of fruit. Badly diseased trees had better be removed.

It is the application of the above remedies under his own conditions which calls forth the skill of the grower.

More rational methods of orchard cultivation are absolutely essential to permanent control of this disease. Its prevalence this year has aroused much needless apprehension in the minds of fruit-growers. The disease can be avoided almost entirely by the proper methods. It is significant that, to a very large degree, good intentions, rather than wanton neglect, have

brought it on. The methods above recommended, skilfully applied, will result in much greater yields of fruit per tree and per acre. The cost of production per box will be actually lessened considerably, and the general quality and colour of the fruit raised in equal degree.

In view of the possible injury which may be caused our Province by needless alarm, it is to be hoped that fruit-growers will investigate the subject rationally, and, having formed their conclusions, will work out the remedy best adapted to their own orchards. It is encouraging to note that the prevalence of fruit-pit in one orchard has no effect whatever on the orchards of the same district. Contagion and infection are impossible; on this account, no Governmental or municipal efforts at control are possible or need be undertaken. This does not absolve any progressive fruit-grower from endeavouring to bring his neighbour into line with proper methods, so as to eliminate this trouble, and with it, water-core, winter injury, to some extent aphis, from the district.

I have been instructed by the Deputy Minister of Agriculture to prepare for general publication a bulletin dealing fully with this subject, which will be issued in time to be of service for the coming season.

In the meantime, fruit-growers who have seen special phases of the subject not previously brought to our notice are asked to correspond with us accordingly. Co-operation in the matter will do much to secure a reasonable attitude in the matter and the adoption of feasible methods of control.

WATER-CORE.

The season of 1911 has been marked not only by the unusual prevalence of fruit-pit, but by a certain amount of water-core as well. The latter disease is found principally in the Interior, and usually under conditions, such as in the irrigated districts, where an excess of water may have been applied. Water-core is known to most fruit-growers under that name, and there has been sufficient of it from year to year, especially in the more susceptible varieties of apples, to bring it to the attention of nearly every one concerned in the handling of fruit. Water-core is fairly well known throughout the United States and Canada wherever apples are grown. It has not been the subject of very extensive study, except, possibly, in Germany, though it is mentioned in many American publications. No specific organism causing it has ever been discovered, in which respect experience has been the same as with fruit-pit.

The varieties principally affected are Ribston Pippin, King of Tompkins County, and the Hyslop Crab, though a large number of other varieties show it to a lesser extent.

DESCRIPTION.

The affected apples show hard, watery areas in the flesh, usually in the core and extending outward from it. Sometimes small spots are scattered through the flesh, and there may be extensive areas of water-core just below the surface. Where these latter areas extend under the skin, they may be detected by a duller colour of the skin. Apples considerably affected are very much heavier than normal fruits of the same size. This is due to the filling of the intercellular spaces, usually occupied by air, with a watery fluid. The diseased fruit has a peculiar, sweetish flavour.

The fruit becomes affected when nearly mature, and water-core continues to develop after picking, the affected areas changing slowly to a brown color, after which the fruit breaks down rapidly.

The causes are almost identical with those favouring fruit-pit—namely, light yields of sappy fruit, combined with heavy wood-growth. In following out the remedies recommended for fruit-pit, water-core will also be practically eliminated. With affected varieties, under conditions where water core is likely to develop, it is advisable to pick the fruit as soon as possible, and have it disposed of as soon as it is ready for consumption. Fruit with a tendency to water-core or fruit-pit should be put into consumption as soon as possible.

As with fruit-pit, the Horticultural Branch of this Department is carrying on further studies, both as to cultural methods and the harvesting and marketing of the fruit. Further information from the experience of fruit-growers who have observed the conditions favouring it will be of general assistance to the industry as a whole.

As with fruit-pit, there has been some needless apprehension regarding water-core. We have no hesitation in assuring fruit-growers that with normal growth and heavy crops the injury from this cause will be very largely reduced, and with early picking of susceptible varieties we may expect to see it disappear altogether as a factor in our fruit-production.

PLANT-GROWTH.

(Circular No. 5.)

By J. F. Carpenter, Assistant Horticulturist.

This subject deals principally with the physiology of plants. A simple definition of plant-physiology is given by Coulter as "A study of plants at work."

These short courses, besides being of a practical nature, are planned to afford an insight into the underlying principles of orchard and vegetable-gardening work. In order that the horticulturist may carry on his work in an intelligent and systematic manner, it is to his advantage to acquire a "working" knowledge of the structure and growth of plants in their relation to soil-culture, budding, grafting, pruning, etc. In dealing with plant-life we are dealing with living organisms. When the grower has a knowledge of the functions of the different parts of the plant and their conduct under different conditions, he is in a better position to intelligently and economically progress in his work.

In the world there are two main divisions of life—viz., animals and plants. In the animal kingdom classification is made according to differentiation in structure, and there is a variation from animals of very simple structure to those of a high degree of complexity. Such is the case in plant-life. There are classes of plants to be found of very simple structure, such as the Algæ, some of which are single-celled, and classes showing gradually increasing complexity, such as the fungi, mosses, and ferns, until the seed-plants are reached, in which we are most interested, and which show a great differentiation of structure as compared with lower plant-life.

The fruit-grower and vegetable-gardener is interested in nearly all classes of life from an economic stand-point. For example, he is interested in bacteria in their relation to plant-diseases, such as pear-blight; in their relation to the cultivation of the soil, etc., fungi as parasites, such as apple-scab, and in other relations; mosses and ferns in several relations; and seed-plants, such as our orchard trees, in many ways. The seed-plants will receive most attention in this circular.

Our fruit-trees and cultivated plants are descendant from wild plants through generations of cross-breeding, selection, improvement, etc., until we have the large variety list of different species of cultivated plants of to-day. Under natural conditions the whole purpose of our fruit-trees is to live and reproduce their kind. The seed is surrounded by a covering of pulp to ensure its sufficient protection and to attract birds, animals, etc., which aid in its distribution. The amount of pulp necessary for this purpose is small as compared with that which is desired in a commercial fruit. Therefore, in producing a commercial fruit, we require the tree to form an unnatural product—that is, more pulp in proportion to seed than is formed under natural conditions; and as a result we have to surround our fruit-trees with unnatural conditions. Thus follows one of the first principles of fruit-culture, that in order to attain success it is necessary to follow practices which are radically different from those followed in our so-called "neglected" orchards of to-day.

Taking an apple-tree as an example of a seed-plant, it is divided into three main parts—viz., roots, stem, and leaves. A root is situated under the ground and functions in three main ways: (1) Anchoring of plant; (2) storage of plant-food; (3) absorption of liquid plant-food from the soil. The parts of the root that are instrumental in the absorption of plant-food and their conduct under different soil-treatments are of main interest.

It is the small white root-hairs near the terminals of the roots and rootlets that function for this purpose. They cannot take in the solid food as an animal does, but require food in solution. Soil-treatment which is conducive to the solubility of plant-food is discussed in the circular on soil-cultivation. The absorption of liquid plant-food by the root-hair is brought about by osmotic action, by which the presence of the weak solution of plant-food on the outside of the root-hair (the outside of which is a permeable membrane) and a strong solution of cell-sap on the inside, the weaker solution will be drawn in by the strong. There are conditions under which this action is reversed—i.e., where the solution on the outside is more concentrated than the cell-sap inside the root-hair—with the result that plasmylosis and death of the cells take place. A good example of this is found in the action of alkali soils on plants.

These root-hairs will not form under very dry soil conditions, neither will they live in water-logged soils or soils devoid of air. Their development is impeded in very compact soils. The relation of this to soil-culture and irrigation is of great importance. Over-irrigated soils are

instrumental in causing a diseased condition of the root and its poor development, besides being detrimental to the physical and mechanical conditions of the soil and the proper liberation of plant-food. A proper system of irrigation results in the development of a large root system capable of obtaining plant-food from a large area of soil. Poor cultivation results in weak solutions of plant-food, and thus a waste of water in supplying the plant with the required amount. It also results in a waste of water through evaporation, and a root system will not develop well in a very dry soil. The intimate relation of underdrainage, soil-cultivation, supply of humus and plant-food, proper irrigation methods, etc., to the development of the root system and economical growth of plants cannot be overestimated.

Root-pruning, both of the young and old tree, root-grafting, etc., can also be discussed in their physiological relation to the plant. The stem and branches of the tree, besides forming the structure on which the fruit and leaves are produced, contain organs for the conduction of food, the growth of the tree, and the storage of plant-food. One of the most important organs from a practical standpoint is the cambium layer, which is the only part of the stem and branches of the tree in which new cells are formed and growth takes place. (When a tree is barked during the rapid growing season it usually separates at the cambium layer.) The relation of this to the practices of budding, grafting, etc., is most important. The approximate location of the organs for the conduction of plant-food and sap is important in its relation to the ringing of the tree, peeling of the bark, cutting above and below buds, etc.

The leaf is one of the most interesting and most essential parts of the tree. It is here that the raw plant-food as it comes from the soil is transformed into carbohydrates, etc., which are used for the growth of the tree and the development of its fruit. Without leaves during the growing season a plant could not live any length of time, as the plant-food, as it is absorbed from the soil, is of little use for the growth of the plant. The outside accessories to the elaboration of plant-food in the leaf are mainly heat, light, and air. Situated on the leaf are numerous breathing pores, which, besides functioning for the taking in of air, give off by transpiration the excess moisture from the plant-food in the leaf.

The buds for the following season's crop of fruit and leaves are formed in the axil where the petiole of the leaf joins the twigs, branches, etc. The amount of plant-food elaborated in the leaf seems to influence to a large extent the character of the buds; and as light accelerates the building up of plant-food in the leaf, it is necessary to the formation of good strong buds. The relation of this to the formation of fruit-spurs is evident, for in order to favour their formation low down in the branches, it is necessary, especially in humid climates, to keep the tree well thinned by pruning, to allow plenty of light to reach the parts where fruit is desired. A knowledge of the functions of the leaf is important to the fruit-grower in its relation to pruning, fruit-bud formation, maturity of wood, etc.

The structure of the blossom, formation of fruit and seeds, changes in fruit and vegetables in storage, can be discussed under the heading of "plant-physiology," but owing to the limited space are only mentioned here.

A study of plant-growth is of great interest and value to the fruit-grower as it is related, either directly or indirectly, to all operations in the orchard. The subject might appear at a casual glance to be too scientific for the practical horticulturalist to listen to, but with the man who is interested in his orchard we have not found this to be the case. On the other hand, the subject offers, when discussed from the fruit grower's standpoint (there are readable books to be had on the subject), interesting and useful information, which will place him in a better position to carry on his operations with pleasure and profit. We trust that the information as given here will be the means of interesting some fruit-growers to the extent that they will secure some available books on the subject, and make use of them as opportunity offers.

ORCHARD PESTS AND THEIR CONTROL.

(Circular No. 4.)

BY B. HOY, B.S.A., ASSISTANT HORTICULTURIST.

For purposes of study and of treatment, orchard pests may be divided into four great classes :—

(1.) Insect pests, such as the aphis, caterpillars, the oyster-shell bark-louse, and the tent-caterpillar.
(2.) Fungous pests, such as apple-scab and peach leaf-curl.
(3.) Bacterial diseases, such as pear-blight.
(4.) Physiological diseases, such as cherry-tree gumosis, fruit-pit, and water-core.

INSECT PESTS.

Before destroying any insect affecting the orchard, three points should be carefully observed :—

(1.) Whether it is actually injurious or beneficial. Many insects such as the lady beetles and the syrphus flies, are of great benefit. Watch closely, and determine the form of injury.
(2.) With injurious insects, note the manner in which the food is absorbed, particularly whether from the surface, or whether by suction from below it.
(3.) Decide on the most vulnerable point in the insect's life history.

For general purposes of control by spraying, insects may be divided into two classes :—

First : *Biting-insects*, provided with biting-jaws adapted to chewing food. These are usually controlled by covering the plant with a stomach-poison, such as arsenic in a suitable form.

Second : *Sucking-insects.*—Are more difficult to control. They are provided with sharp beaks, with which they pierce the surface and draw their food in the form of the plant-juices from below it. There is no way of reaching them with a stomach-poison, just as a mosquito, which is one of this class, cannot be poisoned by paris green. The aphis and the various scale insects are our principal foes in this class. For sucking-insects we therefore use a contact insecticide, that is, one which will kill the insect by touching it, either by filling up the breathing-pores, which are situated along the sides of the body, as with kerosene emulsion, or by the general caustic action of the spray, as with lime-sulphur. To get results with contact insecticides, every insect must be covered. With stomach insecticides, we spray to cover the entire surface liable to injury. With contact insecticides, we spray to cover every insect.

Most insects have four stages in their life-history :—

First : The egg.
Second : The larval, or worm form, which is the period of growth, and during which most insects do their injury.
Third : The pupal form, usually a resting form, and usually invulnerable in practice.
Fourth : The adult or perfect form.

In the case of the tent-caterpillar, for instance, the eggs are deposited in the fall, in a mass, surrounding a young twig, and coated with a waterproof covering. The winter spray usually does them little harm. The eggs hatch in the spring, the larva or caterpillar growing rapidly on the young leaves. This is evidently the time to destroy it with a stomach-poison, as it is a biting-insect. The codling-moth is another example. The egg is laid on the surface of the leaf or fruit, and is not vulnerable to any practicable spray. As the young larva hatches out, it may feed for a few days on the surface of the leaf, but usually makes its first meal on the surface of the fruit, generally in the calyx end. As we have no means of attacking it unless it has penetrated the fruit, it is evident that some stomach-poison must be administered with its first meal. This we secure by an arsenical spray, thoroughly applied just after the blossoms fall. We have no means of attacking the pupal form or the adult form, despite many trials. With a knowledge of the principal facts concerning the life-history of any pest, we are able to determine possible and practicable methods of control.

SOME PRINCIPAL ORCHARD INSECTS.

(1.) *The Bud-moth.*—A small, brown caterpillar found eating the buds early in the spring. If plentiful, spray with arsenate of lead, 2 lb. to 40 gallons of water, just as the buds begin to open.

The Lesser Apple-worm.—A small, pinkish larva, similar in general aspects to that of the codling-moth. It eats into the apple in much the same way. Found principally in the Victoria and Armstrong Districts. If serious, spray with arsenate of lead, 2 lb. to 40 gallons of water, just after the blossoms fall.

The Codling-moth.—Not found in British Columbia. The most serious pest of the apple-grower anywhere. The spray mentioned for lesser apple-worm is the most effectual for codling-moth, and should be followed by another spraying in about ten days.

Tent-caterpillars, Fall Web-worm, Red and Yellow Humped Apple-tree Caterpillars, and other Leaf-eating Insects may be destroyed with arsenate of lead applied when the insects are first noticed.

Pear and Cherry Slug.—A black, slimy larva resembling a tadpole in appearance, but only about half an inch long, found eating the upper surfaces of the leaves of the pear and cherry. The first brood is prevalent in June and early July, the second in August. One of the easiest insects to destroy, either with arsenate of lead, 1 lb. to 40 gallons, or even with ordinary road-dust or slaked lime sprinkled on them.

Scale Insects, the Oyster-shell Bark-louse, the San Jose Scale, and a number of others of the same type are all easily controlled by the winter application of lime-sulphur solution. The commercial lime-sulphur testing 32½ degrees Beaume, should be diluted with nine parts of water. This spraying controls all scale-insects, and is beneficial in other ways. If applied in the spring, just as the buds are swelling, it not only aids in destroying the eggs of aphis and red-spider, but is important in the control of many plant-diseases, such as peach leaf-curl, apple-scab, and some types of canker.

Aphis.—There are numerous kinds of aphis: On the apple, the green aphis, the rosy aphis, and the woolly aphis; on the pear, the green aphis; on the plum and prune, the hop-louse and the mealy aphis; on the peach, the black and green aphides; and on the cherry, the black aphis; but the remedies for all this class are similar.

The spring application of lime-sulphur destroys many of the eggs and the winter forms. During the summer, attacks of aphis are controlled with a solution of Black Leaf, Black Leaf 40, whale-oil and quassia-chips, kerosene emulsion, and other contact insecticides. Use at the strengths indicated on the "Spray Calendar."

With the root forms of the woolly apple-aphis and the black peach-aphis, it is necessary to clear the earth from around the base of the tree, and sprinkle with tobacco-stems. This treatment gives reasonably good results.

Borers.—These affect the apple and peach principally. The borers should be dug out with a sharp knife in the spring. Lime-sulphur, especially if considerable extra lime is added, acts as a deterrent.

Fungous Diseases.—While insects belong to the animal kingdom, the various fungi and bacteria are plants. A fungus is a true plant, though usually quite simple in structure. Unlike ferns and flowering plants, fungi have no green colouring-matter, and derive all their sustenance in organic form by living as parasites on living organisms, or as saprophytes on dead ones. The mushroom and bread-mould are two common types. The whitish threads to be found running through the soil beneath a mushroom or toadstool is the true plant body, which is equivalent to the roots and stems of higher plants, while the mushroom itself is the fruiting body containing the spores, which are the equivalent of seeds.

From the standpoint of the fruit-grower, fungi may be divided into two classes:—

(1.) Those whose mycelium, or vegetative portion, lives on the surface of the host plant, as, for example, the various mildews.

(2.) The larger class embraces those whose mycelium penetrates into the tissues of the host plant, such as the apple-scab and black-spot canker.

The fungi belonging to the first group can generally be destroyed by spraying with suitable fungicides when they appear, but those of group 2 are not affected by such spraying. Their entrance into the tissues is to be prevented by spraying before innoculation takes place. This requires that all the susceptible area be thoroughly coated with the spray, and if growth is taking place, as in the spring and early summer, spraying must be repeated to cover the new growth as long as there is danger of serious innoculation.

The fungous diseases causing most serious loss in this Province are:—

(1.) Black-spot canker.

(2.) The brown-rot of the plum, prune, and cherry.

(3.) Apple-scab.

Black-spot Canker.—This disease causes the death of large areas of the bark and outer wood, principally of the apple. It is of consequence only where fall rains are plentiful, in combination with mild weather. It is easily prevented by one thorough spraying in the fall with double-strength Bordeaux mixture. It is treated fully in Bulletin 34 of the Department of Agriculture.

Brown-rot of the Plum and Cherry.—This disease was first introduced into the Province about ten or twelve years ago, and is now a cause of serious loss, especially in the Coast districts. It is dependent on wet weather, and in dry seasons almost disappears.

Its control is difficult, because of its very rapid growth and prolific spore-production. While absolute prevention under favourable conditions is impossible with the knowledge we now have, the following measures give a reasonable immunity :—

(1.) Prune out the trees to admit air and sunlight.
(2.) Collect and destroy all old fruits on the tree or the ground before spring ploughing.
(3.) Spray with lime-sulphur thoroughly, just before buds open.
(4.) Spray just after blossoming, and again when the fruit is half-grown, with lime-sulphur diluted 1 to 50.
(5.) Thin out fruits so that no two touch.
(6.) Handle carefully, to prevent loss of stems and bruising.
(7.) Allow fruit to stand overnight in a cool place before packing. Pack up only perfect fruit, and keep fruit cool as possible to destination.

Apple-scab.—Apple-scab or black-spot is prevalent in most parts of the Province subject to any considerable rainfall in spring and early summer. The varieties of the Fameuse family are most subject. The spores of this disease are carried over the winter on the twigs and old leaves. They germinate and spread in the spring, about the time the blossoms begin to open.

Remedies.

(1.) Destroy old leaves by burning or ploughing under.
(2.) Prune trees to admit sunlight and air.
(3.) Spray with lime-sulphur, 1 to 9, before the buds open.
(4.) Spray just before blossoming with lime-sulphur, 1 to 25.
(5.) Spray again, just after the blossoms fall, with lime-sulphur, 1 to 30.

The second spraying is by far the most important, and must be very thorough if results are to be satisfactory.

Bacterial Diseases.

Pear-blight.—Pear-blight is at present almost unknown in the Province, the repressive measures taken by the Government to control it having given most excellent results. Growers should, however, be continually on the watch for this disease affecting both pear and apple trees, and must be prepared to take the strictest measures to prevent its gaining a foothold.

Description.—The young shoots and thin leaves wither and turn black, looking very much as though they had been scorched by fire. The infection works down the stem, destroying the life entirely, as far as it goes. Particularly where infection on old bark takes place there will be found small drops of a sweetish liquid oozing from the bark. This liquid contains myriads of the bacteria causing the disease, and, as it is attractive to bees and other insects, these carry the germs all through the orchard, especially to the blossoms. The nectar in the blossom is a particularly favourable medium for innoculation, and from this follows the form called "twig-blight," which involves the destruction of the fruit-spurs.

Spraying is impossible, because the points of infection cannot be reached by it. The only remedy which has proven effectual is the cutting-out of the diseased areas, followed by careful disinfection of the wound and the knife or saw. Cuts should be made from 2 inches to 1 foot below the diseased area, depending on the rapidity of progress being made by the blight.

In connection with the treatment of insects and diseases, fruit-growers should secure copies of the "Spray Calendar for 1912," and of Circular No. 9, on "Sprays and Spraying," issued by the Horticultural Branch of the Department.

ORCHARD-SITES AND ORCHARD CULTIVATION.

(Circular No. 3.)

BY B. HOY, ASSISTANT HORTICULTURIST.

THE SELECTION OF THE ORCHARD-SITE.

Fruit-trees grow and do reasonably well on a great variety of soils and in a great range of locations. This does not warrant, however, the conclusion that they will grow anywhere, or that all types of soil are equally suited. It is a matter of common observation that many orchards are "going back," and even dying, as a result of defective soil conditions, even before the strain of heavy bearing has commenced. In common with other plants, a fruit-tree requires a soil containing all the necessary elements of plant-food, one that will retain a sufficient moisture and that will allow of easy tillage. As a rule, where potatoes and other garden crops grow well, the soil is suitable for fruit-trees, providing that there is also good water and air drainage, the latter to ensure freedom from spring and fall frosts. Depth of soil is also a very important factor. A first-class orchard soil should be deep, mellow, well drained, and free from alkali, to allow of a maximum root-development at the minimum expenditure for improvements in these lines by artificial means. Orchard trees will thrive for a period more or less short on some of the shallow soils, but as a rule, they will begin to "go back" as they begin to bear heavy crops of fruit. Practical experience has shown that these soils must be avoided, if economical production of fruit is to be attained. The limitation of bearing-capacity is the most certain and expensive result of planting on soils deficient in depth. These shallow soils not only hinder root-development and fruit-production, but require larger quantities of water to produce growth, which also involves the leaching and loss of soluble plant-food.

AIR-DRAINAGE.

This important point is one which many intending fruit-growers fail to fully understand. Cold air has a greater weight per cubic foot than warm air, in exactly the same way as cold water is heavier than warm water. On a still night the cooler air flows down to the lower levels, and this drainage of cold air is called air-drainage. The lower levels, as well as pockets enclosed by timber, are, therefore, much more liable to frosts. To avoid frosts in blossoming-time is one of the greatest essentials to continuous and heavy bearing. For this reason fruit-trees should be planted where the air-drainage is naturally good. This applies particularly to peaches and apricots, which bloom very early.

It is a good rule to avoid land where the water-level is but a few feet below the surface. A high water-level restricts root-development, as the roots of orchard trees do not penetrate into water-logged soil. Alkali, hard-pan, open gravel, and bed-rock, in the first few feet, also render a site defective for orchard purposes.

From the standpoint of easy cultivation, stony land and steep hillsides are unsuitable for orchards. On such location it is difficult and costly to cultivate, and also to irrigate.

In investigating any orchard-site, an elemental necessity is to determine the character of the subsoil by means of a shovel or a soil-auger.

In the irrigated sections, or in any section where irrigation may eventually be desirable, it is important to get absolute assurance that the water rights of the land are adequately protected legally, and that a sufficient quantity of water can in practice be delivered at the time required.

The new-comer, looking to commercial returns from his orchard, will do well to assure himself, in reasonable limits, that in general characteristics the district is suitable for this purpose. The best test of the fruit-growing possibilities of any district is, of course, the success which has already been attained there. It is largely on this account that land in proven fruit districts sells at a much higher price than in districts not so long established.

Not the least consideration in starting an orchard is to pay attention to the distance from the nearest shipping point, the size of the district in its relation to car-load shipments, the character of the roads, and the possible extension of transportation facilities with the increase in product.

Preparation of Land before Planting.

Thorough preparation is essential to the success of an orchard. The roots of fruit-trees require a much more favourable condition of the soil than do the roots of the forest trees, especially the coniferous forests which cover large parts of this Province. It is not advisable to plant on land immediately after clearing or breaking. After clearing, plough to a depth of 5 to 7 inches in the fall, and let stand in the rough during the winter. This exposes more soil surface to the weather, which tends to ameliorate the condition of the heavier soils. There is also less run-off of the winter precipitation, the land being in a better condition to absorb it. In the spring, work the land into a good seed-bed with a disk or spring-tooth, followed by some sort of smoothing-harrow. Then sow clover or vetch, or plant to some hoed crop which will permit intercultivation during the season. If vetch or clover is sown, do not remove the hay, but plough down the entire growth produced in the fall. In the spring following, get on the land as soon as it is fit, and work the soil deeply into a fine tilth, so that it will be ready for the trees. Care in preparing the land will well repay the grower in the faster and heavier growth made by the trees.

In the dry belt it is not usually possible to get a catch of clover or newly broken land, in which case rye or wheat should be sown and ploughed down green. Where land is to be irrigated, any inequalities should be smoothed down, to facilitate irrigation, immediately after clearing, before any crops are planted. When an immediate return from new land is desired, the potato is one of the most suitable crops.

On some of the lighter soils, particularly where the clearing has been light, reasonably good results are often obtained simply by fall ploughing previous to spring planting. As a general rule, however, and always on heavier soils, the ground should be worked at least one year before planting.

Cultivation of the Soil.

Soil is tilled and cultivated for three reasons:—

(1.) To kill weed growth;
(2.) To conserve moisture;
(3.) To liberate plant food.

Weeds, if not held in check, are a menace to the orchard or garden, and should never be allowed to have headway. The best time to kill weeds is just as they appear above ground. Weeds are not only undesirable things to have, but they rob the crops of both plant-food and moisture to a very important degree, and, if allowed to grow up and go to seed, may be a cause of great economic loss to the community. Co-operation to destroy weeds should be practised in every district. This Province was originally remarkably free from noxious weeds, but the importation of feed-grain and carelessness on the part of our people are encouraging their growth beyond all economic justification.

The conservation of soil-moisture is the most important feature of tillage. Moisture in the soil may be in two forms—free water, which is injurious, and can be removed by under-drainage, and capillary moisture. It is in the latter form that moisture is available to plants, and this is the form which our cultivation is intended to conserve. This capillary moisture is essential to the proper chemical action in the soil. Without it plant-food cannot be brought into the necessary soluble form. In dry seasons commercial fertilizers usually give very small returns, simply on this account. All plants contain a high percentage of water, most of them over 60 per cent. of their total weight. While this amount seems large, it is really but a small proportion of that evaporated from the leaves during the progress of growth. Measurements at various experiment stations show that the evaporated water is usually several hundred times the weight of the dry vegetable substance produced, varying from 225 to 912 times the weight of the mature dry plant and its crop. From this the importance of an adequate supply of moisture in the soil is apparent. Not only is water necessary as a part of the composition of the plant and for evaporation, but moisture in the soil is necessary if plants are to grow at all. Plant-food is not available, except in a very dilute solution. Practically all the moisture used up is absorbed through the root-hairs, which are not able to take plant-food except in this diluted form.

Two types of soil-water were mentioned above—free water, which is subject to gravity, and capillary water, which is not. Part of the water which falls as rain enters the soil, the portion that runs off varying with the character of the rainfall and the absorptive power

of the soil. On entering the soil, the water which is visible as water, and which flows down by the force of gravity, is known as free or gravitational water. That which is retained by the soil-particles, and which is apparent only by the darker colour of the soil, is capillary water. On it plants are dependent for both food and water. This water is held in a thin surface film around each soil-particle, and can be attracted from one particle to another when the particles touch each other. When the surface soil becomes dry by evaporation, this water flows naturally to the dry-surface particles from those below, so that there is a slow, continuous movement upwards. This upward movement of water is illustrated in a small way by placing a large, dry clod of earth in a saucer of water, the upward flow becoming at once apparent. This process of upward movement and evaporation is continuously in operation in the soil, and the capillary water not absorbed by the roots of plants eventually evaporates in this way.

The free or gravitational water gradually sinks to its own level. A part of it escapes as seepage or drainage, and, as evaporation takes place from the surface, the free water becomes capillary water, and is so absorbed. The proportions of precipitation which become free or capillary vary with the soil. The greatest loss occurs in sand and gravel; the loams, humus, and clays are capable of absorbing and retaining the largest amount of water.

The two essential points in conserving moisture are, therefore :—

(1.) to have the soil in that condition in which it will take in and absorb, as capillary water, the maximum amount of rainfall or irrigation.

(2.) When the water is in the soil, to practise those methods which will retain the greatest amount in available form.

Much moisture is lost in late fall, winter and early spring by water running off the surface. In order that the soil may take in the greatest amount of snow and rain, the land should be ploughed in the fall, or, if in an orchard, a cover crop should be sown. Both methods help to hold the snow and put the land in the best condition for absorbing the maximum amount of moisture. In the spring, moisture should be conserved by cultivation as soon as land can be worked. In arid districts, where the land is dry during the winter, cultivation is continued, even if temperatures are below freezing, to maintain the dry dust-mulch. Where a cover crop has been sown in the fall, it should be ploughed in the spring, just as soon as the land is fit to work, and a proper mulch should be obtained by cultivation as soon as possible.

Cultivation in the orchard should be kept up, and a good soil-mulch kept on the ground until the latter part of July, when it should be discontinued and a cover crop sown. This cover crop, as explained in another circular, serves many good purposes in the orchard, one of which is to reduce the amount of moisture in the soil at the time, so enabling the trees to ripen their wood properly.

SOIL-MULCH: ITS VALUE AND DEPTH.

As stated above, there is an upward movement of water in the soil. This movement is greatest and the evaporation loss is most serious when the soil is compact. By separating the soil-particles, so breaking up the capillary tubes, the movement is stopped. For this reason a loose earth-mulch of the surface should be maintained. The moisture will continue to rise up to the bottom of the mulch, where, because of the loose character of the soil, its flow is stopped. After the mulch is once dried out, the amount of evaporation is reduced to a minimum. One of the best implements for forming this mulch is the Kimball Cultivator. This does not invert the soil to any extent, its action lifting the top layers from the compacted layers below, leaving the top smooth and not in ridges. The soil should not be ridged any more than is necessary, as this exposes more surface for examination.

Experience and many careful experiments show that a mulch 3 inches in depth is as efficient in conserving moisture as one 5 or 6 inches deep.

NUMBER OF CULTIVATIONS IN A SEASON.

No hard-and-fast rule can be laid down. Cultivate often enough to keep a good 3-inch mulch on the soil. This may mean cultivation every five days or every two weeks. It certainly means cultivation after every rain and every irrigation, and usually every ten days, whether rain falls or no.

Land so cultivated will be in good tilth and in good condition for the liberation of a large amount of plant-food. To make plant-food available, moisture, warmth, air, and organic matter

An Attractive Farming Scene.

Planting young Tobacco Plants, Kelowna, B.C.

[By courtesy of G. H. E. Hudson, Kelowna, B.C.

in the soil are all necessary. Cultivating well for the conservation of moisture allows of air-circulation, and tends to make the soil warmer and of a more even temperature. The supply of organic matter which is so necessary for chemical and bacterial action can be kept up best by the use of barnyard manure, the rotation of crops, and, in the orchard, principally by the sowing of suitable cover crops.

Summary.

(1.) The orchard-site should be on deep soil, provided with good water and air drainage. It should have reasonably good transportation facilities.

(2.) The ground must be thoroughly prepared before planting. A year's cultivation after clearing or breaking is not too much.

(3.) Fall-plough farm and garden land.

(4.) Practise the sowing of cover crops in the orchard.

(5.) Work the land as early in spring as possible.

(6.) Maintain a dust-mulch of about 3 inches to conserve moisture. Cease cultivation about July 15th.

(7.) Aim to have a sufficient supply of organic matter in the soil.

COMMERCIAL ONION-CULTURE.

(Circular No. 2.)

By P. E. French, Assistant Horticulturist.

The onion is one of the most important vegetable crops. In the districts of Delta and Chilliwack, Armstrong, Vernon, and Kelowna, growers making this crop a specialty now ship numbers of straight car-loads every year. Crops from the first two mentioned points go largely to the local markets, the Coast onion not being a particularly good shipper for prairie trade. The Interior-grown product goes to local markets also, but principally to the prairies. Only the main crop mature bulbs so far are being grown, though there is an opportunity for development of the trade in pickling-onions, onion-sets, and the large Spanish types, such as Prizetaker and Gibraltar.

The large profits resulting from skilful culture on reasonably suitable land have made onion-growing popular with those holding limited tracts, especially among young orchard trees, while truck-growers in localities particularly adapted, both as to soil and climate, to onion-culture have found the business profitable in larger areas.

The market is generally good. Even against the duty into Canada of 30 per cent. *ad valorem*, we import about 75,000 bushels annually. The f.o.b. price at Okanagan points for a number of years past has averaged about $20 per ton for Yellow Danvers in 100-lb. bags. As a general rule, the price increases during the winter months, but lack of storage facilities and the danger of frost in transit have prevented any great development of storage business. Prices, nevertheless, have been highly remunerative, and the market is steadily increasing.

The New Method of Onion-culture.

There has recently arisen a method of culture in which the seed is sown in March in hotbeds and the plants set out in the field in May, when about the size of a lead-pencil. The advantages of this method are:—

(1.) Less seed is required;

(2.) There is a larger and more uniform crop, in which the expenses of weeding and thinning are almost entirely obviated; and

(3.) The crop is harvested earlier.

The disadvantages are the cost of labour entailed by transplanting, and the cost of the preparation of suitable hotbeds. Where soil is not well prepared, or moisture becomes deficient in August, or where labour is reasonable inexpensive, this method is worthy of consideration, but is not used at present in this Province.

THE OLD METHOD OF ONION-GROWING.

Used almost altogether in the Province for commercial purposes, this does sufficiently well, especially in the districts above mentioned, where a long growing season, suitable soil, and a knowledge of the requirements of the business combine to make it a success.

SELECTION OF SOIL.

The selection of soil is of the greatest importance, as it will not pay to grow onions on poor soil. The mechanical condition of the soil is of the first consideration. Heavy clay soils should be avoided because they are difficult to work, usually deficient in organic matter, and often improperly drained. They cannot be worked as early in the spring as is desired, and the surface bakes and cracks after a rain unless stirred at the proper time.

Soils rich in decomposed vegetable matter are the most valuable for the cultivation of onions. A rich sandy loam is a very good soil, especially where irrigation is practised. A black-muck soil that has been well-drained is one of the best soils for onion-culture. It has the power of retaining moisture which is so essential to the growth of onions. Fields which have been overrun with weeds should be used for other crops before planting with onions.

THE SEED.

The seed should be of the very best quality to obtain the best results. Do not buy seed because it is cheap. The cost of the seed is very small compared with the other expenditures in growing a crop of onions. It is always best to test the vitality of the seed before planting each year, a very good method being to place a few seeds in a damp woollen cloth or moist cotton, and note the number germinating. Order the seed early, because you are then sure of getting the firm's best quality.

VARIETY TO GROW.

This depends almost entirely on the market to which you are catering. The onion to grow is the one which will command the highest price on the market. As a rule, this is an onion hard and compact in structure, mild and sweet in flavour, with a thin skin, small neck, and as nearly globular in form as possible. It should also be bright and handsome in appearance, productive, and of superior keeping quality. As a reliable market variety, to be grown in the old way, and for general purposes, the Yellow Danvers has probably not yet found its equal.

FERTILIZING.

Barnyard manure is indispensable unless the soil naturally contains a large amount of humus. It should be ploughed under in the fall unless very well rotted, when it might be applied on the surface and harrowed in. If applied on the surface when not well rotted, it has a tendency to hinder the working of the seed-drill and wheel-hoe. A good heavy dressing (15 to 20 tons per acre) every three or four years gives very good results. Hen manure (1 ton per acre) is very highly recommended for onions. It will produce the best results when applied as a top dressing before planting. Care should be taken that all manures used are free from weed-seeds.

Of the nitrogenous commercial fertilizers, nitrate of soda is largely used. From 200 lb. to 400 lb. per acre are applied in four equal dressings. The first application should be made broadcast just before seeding, and mixed with the surface soil by harrowing. The other dressings are made by a drill at intervals throughout the growing season.

To supply potash, wood-ashes are frequently used. Ashes are applied in the fall, winter, or early spring, and should be harrowed in, at a rate of about 1½ tons per acre. Bone-meal or other phosphates are beneficial if phosphoric acid is required.

Each grower should study the requirements of his soil. A few experiments should be made before applying commercial fertilizers to any large extent.

PREPARATION OF SOIL.

Fall ploughing is preferable in most places, as it gives the vegetable matter a better chance to decay, and the alternate freezing and thawing pulverizes the soil. The ground can also usually be worked earlier in the spring, which is sometimes of great advantage. No labour should be spared in putting the soil in a fine condition. It should be harrowed four or

five times and rolled two or three times, depending of course on the natural firmness of the soil. A plank drag is a very good implement to level the surface and make it smooth for planting. It is very important to have the ground firm and smooth on top and free from stones, sticks, etc.

SOWING THE SEED.

As soon as the land can be prepared in the spring the seed should be sown. The distance between the rows will depend somewhat on the variety grown, but for ordinary purposes the seed should be sown in rows 14 or 15 inches apart and covered about ½ inch deep. Where the horse cultivator is to be used or where irrigation is practised, it is advisable to plant two rows close together, about 10 inches apart, and the next two rows far enough apart for the horse cultivator to work, about 24 to 26 inches. If the soil is rich and in good condition, about 3½ lb. of seed per acre is sufficient; but if the soil is not extra rich, or if there is danger of much loss from depredations of the cutworm or onion-maggot, more than this amount should be used. More seed than is necessary should not be used, as the work of thinning onions on a large scale is rather an expensive operation. It is important to have the seed sown in straight rows. Crooked rows are not only harder to cultivate, but are always an eyesore.

CULTIVATION AND WEEDING.

Cultivation should begin as soon as the location of the rows can be determined. If it is necessary to run the wheel-hoe before the onions are up, you can generally see the mark left by the roller of the seed drill. The ground should be stirred frequently by means of the wheel-hoe, which straddles the row of onions, leaving only about 1½ inches wide to weed by hand. It is always desirable to stir the surface of the ground as soon as possible after a rain, to prevent the formation of a crust on the surface. The weeds in between the plant in the rows can be pulled when necessary. If the wheel-hoe is carefully used the expense of hand weeding is lessened considerably.

In cultivating onions the earth should be hoed away from, rather than toward, the plants.

THINNING.

About the time of the second weeding by hand the onions should be thinned to about 1 inch apart in the rows. Where the climate and soil are favourable for the growing of onions, there is no need of thinning more than this. Onions have the quality of crowding out to the sides, so they may grow close together and still be of good size.

IRRIGATION.

Where irrigation is practiced, care should be taken not to apply too much water. When the plants are in need of water apply in alternate rows, giving the ground a fair soaking, and then shut off the water, so that the sun can do its part. Cultivation should follow each irrigation as soon as the soil is dry enough.

HARVESTING.

If the onion-tops do not all fall down flat on the ground at the proper time, about the middle of August to middle of September, it is good practice to go over the patch and pound the upright ones down.

Harvesting should commence as soon as most of the necks have turned yellow and are considerably wilted. Do not delay harvesting simply because there may be some green tops when the main crop is ready. If left too long the bulbs are liable to make new roots, especially if the weather is damp, and the quality of the onion is injured. Pull the onions by hand and deposit them in windrows containing the onions from three or four rows. If they are taken out with rakes they are apt to be bruised, and thus will not keep so well. The crop is left in the windrows until fully cured, which takes about ten days in good weather. During this time they should be topped with knives, cutting the tops off about ½ inch from the bulb. On bright days the curing will be hastened by stirring with a wooden rake, being careful not to bruise the bulbs. If there is danger of a rainy season, the onions may be cured in open sheds or on the barn-floor. After the crop is cured the bulbs should be sorted and properly stored.

All weeds and refuse should be removed from the field, and, if possible, a fall crop grown.

MARKETING.

Onions should be sold as soon as a fair price can be obtained, and not stored for the winter unless there is a very good chance of a rise. If you have an extra favourable season, they may be shipped right from the field, but it is generally advisable to empty them out in open sheds and pick them over again. All the small onions should be picked out and sold separately for pickling purposes.

WINTER STORING.

It is not advisable for the inexperienced grower to try winter storing. Unless thoroughly cured, many bulbs will sprout, while others with only a slight bruise will decay. There will be more or less shrinkage, and a large percentage of the onions will be lost if proper care is not given to ventilating and maintaining the desired temperature. However, it is desirable that growers should understand the conditions necessary to keep onions though the winter months, so that they might store part of their crop. I would not advise storing very many unless one has extra good facilities for doing so. It is essential that the bulbs should be well matured, thoroughly cured, not bruised, and in a perfectly dormant state for successful winter storing.

Onions may be wintered by two different processes—namely, by freezing the bulbs and keeping them in this condition all winter, or by storing them in a dry apartment where the temperature can be maintained just above the freezing-point.

The former method is very satisfactory where the weather is cold during the entire winter. The onions are placed in a barn or outbuilding and allowed to freeze. They are then covered with hay, straw, or bags, and are allowed to remain in this frozen state all winter. The covering should not be removed in the spring until the bulbs are entirely thawed out. The temperature should not run above 32° or below 15° Fahr. Successive freezing and thawing or severe freezing will injure the bulbs.

The second method of storing onions is perhaps the safest where one has a good, dry, easily ventilated building. The bulbs are laid out on shelves, and thus can be picked over occasionally. The temperature should be kept above the freezing-point.

As onions cannot be fed to stock, it is not well to have too many on hand in the spring.

ENEMIES OF THE ONION.

The most important enemies of the onion are the onion-maggot, onion-smut and cutworms.

The onion-maggot is a very distructive insect. The eggs are deposited on the plants near the ground and require about two weeks to hatch. After the egg hatches, the larvæ burrow into the bulb, where they remain for about two weeks, then emerge, pupate in the ground, and the adult insects deposit their eggs for another generation. The larvæ cause the plants to turn yellow in colour, wither, and finally die before the bulbs have matured. The only satisfactory preventive measure known yet is the planting on a new location each year.

The onion-smut attacks the young plants, causing the formation of dark spots or lines on the leaves. As the union seedling develops, these spots crack open, exposing a black powdery mass which contains the spores of the fungus. The disease when very severe causes the tops to wither and die, and then often spreads to the bulbs. As a preventive, all the refuse on the field should be burned immediately after the crop has been harvested. Adherence to a strict system of crop-rotation is the most practical preventive against this disease. A mixture of equal parts of sulphur and lime, sown in the drills with the seed, is very good.

The best remedy for cutworms is poisoned bran. Take 50 lb. bran and 1 lb. paris green. Mix dry and dampen with some sweetened water. Apply this in the evening alongside the row.

Papers, Reports, etc., as delivered during the Year in different Institute Districts.

THE DAIRY HERD: ITS FORMATION AND MANAGEMENT.

BY GUST. A. WARNER.

(Paper read at meeting of Aldergrove Farmers' Institute, November 3rd, 1911.)

The pursuit of dairy farming depends for its success upon certain conditions. First, the owner of the business himself, or otherwise the agent or manager who has the immediate control and personal direction of the work, must have a natural fondness for animals, prompting to generous and kind treatment, as well as good judgment in selection, breeding, and care. It is not sufficient that he should be a horseman, or fond of cattle in general; for best results he should have a special liking for the dairy cow, over and above all other animals. The cattle must be good of their kind and of a variety suited to the work; they must be truly dairy cattle. The farm should be specially adapted to the branch of husbandry in view; a good dairy farm is pretty certain to be good for general farming. Like almost all other occupations at the present day, dairying has become divided into several distinct and special lines; these differ mainly as to the form of product and the manner of disposing of it. Milk or cream may be produced for delivery to consumers, and this delivery may be direct or indirect; the same products may be delivered to a factory for manufacture into butter or cheese, or the milk product of the herd may be worked up at home and there converted into butter or cheese. The prudent dairyman should first consider which line of business he will pursue. In so doing he must have regard for all his circumstances—the location, markets, farm buildings, water, and ice supply, the labour at his command, and his own preference, and prospects for profit. Upon his decision as to the particular kind of dairying to be followed should depend the character and composition of his herd of cattle.

Dairymen are divided in opinion as to the kind of cow which is the most profitable. Some prefer a general-purpose cow, being a member of a specially developed milk-producing family; from one of the beef breeds or grades of such stock an animal is thus secured which has a large frame, is easily kept in good flesh, and fattens soon when not milking heavily; such an one also has large calves, profitable for veal or for growing as steers. Even if such animals are not so productive while in the dairy, their meat-making proclivities may make up for it. On the other hand, many dairymen, including the writer, prefer cattle of the distinct class or type especially adapted to dairy purposes alone. This class includes various families and breeds, all having the marked characteristics which distinguish the milk-producer. Owners of such cows expect them to be so profitable as milkers that their beef-producing quality and the final disposition of their carcasses may be entirely ignored; and the calves, except so far as wanted to raise for the dairy, are given little consideration. Which of these lines of policy should be pursued every dairyman must determine for himself. To succeed in business he should select his herd or its foundation, with a view to profit; whether he should buy, breed, and feed his cows, having in view only their dairy products and capacity for reproduction, or whether he will find it more profitable to include the items of beef and veal. Within the general class of dairy cattle one can find great variety, and can therefore select breeds or families well adapted to the special needs in view. Some dairy cattle are noted for the quantity of milk they produce; others for the high quality or richness of their milk, which means butter-producers. Some combine quantity and quality in a specially economical way, under some circumstances. There are cows of active habits, which forage well on wide range of scanty pasture, and will profitably work up the coarser kinds of food in winter. There are others which have proved their capacity for making good returns when more closely confined and subjected to high feeding. Some cows give a great flow of milk for a comparatively short season, and others are noted for an even, steady yield of milk the year through. The dairyman can easily find cattle, therefore, adapted to his particular wants. As a rule, the different dairy characteristics named pertain to different breeds, so that every dairyman is likely to find some one breed of dairy cattle better suited to his wants than the other.

The formation of the dairy herd is to begin with a few well-selected animals as a foundation, and gradually build up the herd to the size desired by judicious breeding and natural increase. This method takes time, and time which may be money, but it is by far the safer and more satisfactory in its results, and it must be recognized as a higher grade of dairy-farming. A desirable combination, in starting, is to buy the number of cows desired, and good animals of the sort determined in advance, if one's means will permit, include a few superior cows, and a first-class bull at any rate. Let the cows selected be such as have had two calves and perhaps three, so that they may be judged by their own development and yet be young enough to improve and be in full profit for some years. With a herd thus formed, begin at once the work of improvement by breeding and selection. Sell promptly any cow which proves unsatisfactory, and replace her by the best increase of the herd.

THE BULL AND HIS TREATMENT.

With any dairyman who depends upon breeding and rearing calves for the maintenance of his herd and its improvement, the choice of a bull is a matter of prime importance. The bull is constantly referred to as the head of the herd, and that trite saying, "the bull is half the herd," should never be forgotten. Every calf added to the herd takes half its blood from the bull; often this is the more important half. The bull is always the main dependence for raising the average quality of the herd, and should be chosen with this object in view. This is especially true if the cows are grades, and the grading-up is in progress. The grade dam may be selected and largely relied upon to give size, form, constitution, and capacity of production to her heifer calf; its dairy quality, the inbred power to increase the richness of milk, is derived from the pure-bred sire. One cow may prove a poor dam, or fail to breed, and still give a profit in milk. Such a loss is comparatively trivial and the fault easily corrected. But if the bull fails, or proves a poor sire, the entire increase of a year may be lost. In getting a bull, get the best; at least approach that standard as nearly as possible. Make a study of the animal's pedigree and the dairy history of his ancestors, and especially of the females of his nearest of kin. A common error among dairymen is to use immature bulls and to dispose of good ones before their merit as sires has been fairly proven. Bull calves are cheap, and young bulls are considered much easier to handle. But it is good advice to the buyer to purchase a bull of some age, whose progeny prove his value as a breeder, rather than a calf of exceptional pedigree; and to the owner having a sire of proved excellence, to keep him and use him for years, or as long as he shows himself potent. As soon as the herd is established and in working order, the study of every individual animal should begin. To guide rational treatment and ensure greatest profit, the owner must become familar with the characteristics of every cow. Peculiarities of temperament, susceptibility to surroundings, and varied conditions, and especially the dairy capacity of the animal, should be matters of observation.

The record of the herd is a matter of utmost importance. It is desirable to reduce the labour of book-keeping to a minimum, and yet accuracy and sufficiency of record must be secured. Forms can now be found for sale which are based upon long experience, and in variety to suit different wants. The record should include a history and description of every member of the herd, with a summary of the dairy performance. The latter requires a daily record of the milk-yield of every cow, with notes explaining irregularities or occurrences of interest. If the quality of the milk is a matter of any importance, as it is in most cases, and ought to be, however the milk is disposed of, a fat-test should be made of the milk of every cow, for several milkings, as often as practicable. It is well to make this test and record of the quality of every cow's milk at least once a month. Set a standard that the cow is to give so many hundred pounds of milk or so many hundred pounds of butter in one year. Bear in mind that you must feed them accordingly, and if they don't come up to the standard, dispose of them, don't sell them to another dairyman, sell them to the butcher.

CO-OPERATION.

By George G. Barber.

(Paper read at meeting of Salmon Arm Farmers' Institute.)

Co-operation is probably the greatest industrial subject in the world in this twentieth century of progress, and every class of people in the world are becoming more and more convinced that without thorough co-operation there can be no adqeuate progress or advancement, and to the casual observer it is quite apparent that there is no class more in need of efficient co-operation to-day than the farming class; and perhaps I cannot better impress you with this need for co-operation than by explaining why this need exists and the causes that have given rise to these conditions.

Those of you who have come from Eastern Canada will remember your fathers telling of the early period in those Provinces when the farmer existed largely to himself, or to his own community; when he required flour, a sack of wheat was taken on his own back or on horseback to a near-by grist-mill operated by water-power and ground into flour, the miller taking his toll from the grain; no money was handled in the transaction.

When he wanted meat, an animal was killed and divided among the community, similar to the method of the beef ring of to-day, with this difference: that the hide or skin of the animal was carefully preserved, and either tanned by a simple process and made into home-made moccasins for the family, or the hide was taken to the village tannery and converted into leather, and afterwards taken to the village shoemaker and made into shoes for the household, both of which transactions were usually accomplished by system of barter, and no real money required.

When clothing was required, a sheep was brought in out of the field and thrown on its back on the barn-floor, and the father of the house proceeded to clip off its coat of wool with a large pair of scissors, while the eldest boy held the sheep's legs to prevent it from kicking; the sheep's wool was afterwards thoroughly washed and carded by the industrious housewife and woven into home-spun garments for the family, or else was taken to the woollen-mills near by and converted into a more finished cloth for a Sunday-go-to-meeting suit. Sugar was obtained from the maple-trees, and instead of rolled oats they had the more wholesome oatmeal. Milk was always obtained from the real cow, and never from the tin cow; thus a farmer lived almost entirely unto himself, and was practically independent of industrial, banking, and transportation combines.

This happy, contented condition of affairs continued until about the time of the great Civil War in the United States. As soon as the war broke out immense armies were mobilized, and for this great mass of men it was necessary to provide footwear, clothing, and rations as expeditiously as possible. Uniforms and shoes could not be contracted for and manufactured by the housewives all over that great country with scant communication; therefore the New England shoe-factories, clothing-factories, condensed-milk plants, great flour-mills, and canning-factories were forced into existence to supply the armies of the north with the necessaries of life, and the manufacturing was done at central points convenient to transportation. This war condition lasting for three years firmly established these industries, so that when the war was over they were able to go to the farmer and buy his produce, and after putting it through a process of manufacture, sell it back to the farmer at no loss to themselves, but at a very considerable gain. This margin between what a farmer receives for his produce and what it costs him to buy back the manufactured product has been gradually increasing, until he is finally given the bone instead of the substance his labour produced.

The example of buying factory-made goods instead of home-made goods was gradually copied from the American people by their Canadian cousins. Considerable quantities of American-manufactured goods came into Canada under reciprocity, and our Canadian Government, thinking, no doubt, to revive the village flour-mills and woollen-mills, placed a heavy duty on American-manufactured goods; but unfortunately the people had grown away from the age of homespun garments, and the immediate effect of the duty was to increase the cost of all manufactured goods, and has ultimately had the effect of building up a considerable number of factories in Canada. These factories are built very largely out of the profits made out of the farmer, as he is the only man who creates real wealth; and if the farmer has created the wealth which has erected these factories, he is certainly entitled to a larger proportion of

that wealth than he is getting from the soil at the present time, and the only reason why he is not getting the proportion to which his industry entitles him is that he is the only man who lacks co-operation.

The matter of building great factories in certain parts of the country to manufacture the producer's goods for him has made it necessary to build many railway-lines to carry his goods to the factories and back again to him in the manufactured condition. These railway-lines have been built by the capitalist with the wealth made out of the factory by forcing to pay double what it cost to manufacture his goods for him, so we see that the farmer has already paid for the building of the railway-lines; and in spite of his having paid for it, he has now to pay double what he should to carry his produce over these lines through lack of co-operation in not owning these things, and in order to exist at all he has to conduct his farm as a food-factory without the benefit of factory hours of labour. No eight-hour day for him; the rising and setting of the sun scarce marks the end of his day's toil, which he must endure in order to make his food-factory produce a profit.

The owners of the woollen-factories, the cotton-factories, the canning-factories, the implement, the cement-factories, and practically every other line of factories have combined to raise the price of their manufactured products, all except the owners of the food-factories; on farms alone they have been content to plod along and take any pittance left for them, when by reason of their occupation they should be people to have the rest of the world at their mercy if they were to combine on production and distribution.

There is no reason why they should not combine or co-operate to sell their produce; the labouring class combine to sell their labour for a higher price. Even the wheat-farmers on the plains are beginning to combine so as to regulate the price of wheat; the Grain-growers' Grain Company organized a few years ago by a dozen farmers at Sintaluta, Sask., with the idea of pooling their interests in selling their grain, has grown from that small beginning until at present they are handling about 25,000,000 dollars' worth of grain annually, and are proving a very great factor in steadying prices paid during the season by regulating the deliveries and advising their members to hold back their grain when there is a glut in the market. The orange and lemon growers of California are strongly organized, and the box-apple districts in Oregon and Washington are working unceasingly to make their organizations more perfect.

This co-operative organizing is absolutely necessary among the farmers and fruit-growers, as every single article he buys is protected by powerful organizations or combines—the beef trust, the milling combine, the shoe-factory trust, the drug trust, the medical doctors' trust, the cement merger, the steel trust, etc.—and it requires so large an amount of ready money to purchase the actual necessaries of life that if the rancher is to continue to eke out a comfortable existence, to say nothing of the luxuries of life, he must, positively must, co-operate to obtain more for what he has to sell and to pay less for what he has to buy. For instance, if all the ranchers of Salmon Arm District were to co-operate in purchasing their flour, they could buy seven sacks for the money they now pay for six. This applies to other necessaries of life in the same proportion, and the family who are now spending $700 a year to live could, with a proper system of co-operation, purchase the same amount for $600, and every year put away $100 for the purpose of sending a son or a daughter through college, or, as the saying is, for the proverbial rainy day.

And, in the matter of fruit, it is not alone the matter of price you get for this year or next year's crop, but from the fact that by co-operating together it will be possible in a few years to provide a canning-factory, an apple-evaporating plant, and a jam-factory to take care of your by-products, all of which plants you will own and each will bring you in a profit.

One of the vexed problems of co-operation is the question as to whether it should be entirely voluntary, or should it be compulsory for members to be loyal to their organization. Many years' experience of the older societies seems to show that it is necessary that it be made compulsory for a member to adhere to the by-laws and rules. The great combines, which are simply co-operative organizations of capitalists, inflict a very heavy penalty on any of their members who fail to comply with the regulations of their combine. In labour unions, which are really but co-operative associations for marketing their labour, a man is termed "a scab" or "a traitor" if he violates the rules of the union. Yet it seems strange that men who would hold up their hands in holy horror at the thought of scabbing on a labour union will not hesitate about that very thing when connected with a fruit union. It is a lamentable fact that there is a considerable element among fruit-growers, as among other classes, who will not, without

compulsion, perform a contract when it is temporarily their interest to break it. Such men are not without encouragement from outside influences, whenever an opportunity is seen to embarrass co-operation.

To guard against occurrences of this kind, the contract made by the local association with its growers should contain a clause imposing a penalty for selling outside the association; without such a clause the association will have no solid foundation; it would be in continual uncertainty as to how much fruit it could control. This penalty should be sufficiently large to act as a deterrent to outside selling. In California the sum specified varies from 25 to 50 cents a package.

The following is suggested as a guide to formulating a provision to cover this point: "In consideration of the benefits conferred on me by my acceptance of this contract for packing and marketing my fruit in the Salmon Arm Farmers' Exchange, Limited, I agree that, if at any time during the life of this contract I shall fail to deliver to the said association all my fruit, as hereinbefore agreed upon, or if I shall dispose of all or any of it elsewhere, otherwise than as herein agreed upon, I shall forfeit and pay to the said association, as liquidated damages, an amount equal to 50 cents for each and every box or package of fruit sold or shipped otherwise than as stipulated in this contract; it being especially agreed that it is impracticable and extremely difficult to fix the actual damages which would be thereby suffered by the said association."

While we have not yet made use of such a contract, it is becoming increasingly apparent that some such form of contract will be not only advisable, but imperatively necessary, if the exchange is to continue to perform the functions for which it is designed. And it is very necessary that it should continue to extend and develop if the rancher is to make his food-factory yield him as large a percentage of profit as it should.

GROWING OF POTATOES.

By John Levett.

(Paper read at meeting of Cranbrook-Fernie Farmers' Institute, March 20th, 1912.)

Mr. Chairman and Gentlemen,—In reply to your request regarding a paper on the growing of potatoes and garden-work in general, would say, as I am not a professional gardener, all I can do is to give you the methods that I have employed and found to work fairly satisfactory. Now, then, one of the most important things to be considered is the ploughing of the land in the fall; the earlier the better, as it permits of cultivation of the soil, so as to encourage all weeds to grow that they may be killed before winter, which otherwise would lay in the ground to make trouble the following season. Of course, land that is ploughed late in the fall should lay in its rough state, so as to permit the weathering and the action of the frost to penetrate as deeply as possible; it also turns up lots of insects to be killed, and it leaves the land in such a condition that it is able to conserve all the snow and rain that falls which otherwise would run off into the creeks and be lost. There are too many of us that do not attach sufficient importance to this matter of fall ploughing and cultivating, as there is no other way in which we can conserve the moisture and get the land in that state of tilth which is necessary for all growing plants. An odd time one runs across land that is inclined to run together or puddle, as farmers call it; of course, that is better left till spring before ploughing, but that kind of land is not very common. Now, the next thing, and of no less importance, is the selection of the seed, as this may mean all the difference between success and failure. There is only one place to do this, and that is in the field when digging the potatoes in the fall; always select those hills that yield the most of the smooth and uniform in type which is so desirable in the potato. If this method was put into practice in selecting the seed we would not hear so much about potatoes running out, but the way it is with most people they seem to think that any old thing is good enough for seed, which is a big mistake and ends in disappointment; but, on the other hand, if one plants the best that can be obtained, he certainly will stand a better chance than the man that sows in a haphazard way, and be well paid for the extra trouble in keeping the seed separate. This is like every other branch of farming; the selection of seed is of the greatest importance and goes hand-in-hand with successful farming. Another thing I always do is to bring the seed out

of the cellar about three weeks before planting-time, and spread them out on a barn-floor or some other suitable place, so as to expose them to the light; this induces them to send out a good, tough, healthy sprout, which is not easily broken off; this also shows you which will sprout and which won't, as I do not believe in planting anything that does not show signs of a good sprout, which is nearly always the cause of so many miss-plants. Of course, where one is planting a big acreage, this might not be practicable, but where one has the floor-space it pays for the extra trouble. Now, next comes planting-time. I like to lay off the land with a plough, with rows 3 feet apart, and as soon as ready commence by cutting the seed and getting them in as quickly as possible, as I believe the sooner they are covered up after being cut the better. I like good seed, medium size, cut in halves, or if large it may make four good sets; planted about 18 inches apart in the row is a good distance, as I don't think there is anything gained by planting too close, and 4 or 5 inches deep, and don't forget to harrow the ground two or three times at intervals before the potatoes come up, as this keeps all weeds in check, and also loosens the surface, which is so necessary for the young plants. As soon as the rows can be seen the cultivator should be started, and kept up about every week all through growing season, or as long as convenient or necessary; a farmer's profit is gauged according to the amount of work he puts on his land—that is, if applied with intelligence—as there is no plant that seems to respond to good cultivation more than the potato. Now, then, a few words about proper tools may not come amiss, as this all tends to make garden or field work a pleasure; take the Planet Junior or ironage seeders and cultivators combined, where one man can do more and better work in one day than can be done in five or six days without such a machine. It is surprising to see how many people there are who still use nothing but the old common hoe, which was all right when we could get nothing better; but now we have no excuse, as good improved hoes and cultivators are easily obtained through our hardware merchants, which will more than pay the cost the first season. The main thing is to have the land in good shape for the seeder, as this is necessary in order to make a good job, and to have the rows so that they can be cultivated; for onions and carrots about 16 inches is a good distance to have them; this allows pretty good room to use the machine. The old habit of letting the weeds take possession, as many do, is poor business, as it takes as much moisture and fertility to grow weeds as it does useful plants, so it is easily seen, if we want to get full returns from our soil, we must use the cultivator frequently, which is the secret in successful farming.

WINTER-FEEDING A DAIRY COW.

By J. J. MEAD.

(Paper read at meeting of Langley Farmers' Institute.)

MR. PRESIDENT AND GENTLEMEN,—I seem somewhat out of place to-night, as I know that there are others here who are more capable of handling this subject, which is a very important one to all who keep a cow. I thought when I was asked to read a paper on this subject I knew all about feeding a dairy cow, but now I find I know but very little.

Well, before we start to feed a dairy cow, let us be sure we have a dairy and not a beef cow to feed. You might say, "How shall we know that?" We must look to the points of excellence to make her such. The highest point of excellence in a milking-cow lies in the udder; this must not only be full in form—that is, in line with the belly—but it must not be cut square in the front like a goat; it should be rounded, full, and of good width behind and carried well up between the thighs. The milk-veins should be full and carried well forward toward the forelegs; if knotted and with curves, so much the better. The tail is another essential point; it should be fine, reaching to or below the hocks, with good switch of hair. The chest should be broad and deep; this shows good respiration, essential to feeding and health when viewed from before. Should show no signs of massiveness; on the contrary, she should give the appearance of delicate fineness, and will look large behind, swelling gradually from behind the shoulders; nor should she be closely ribbed. Generally the best milkers will be found to be rather loosely put together between the last rib and the hips, and good milkers must be roomy in the flank. The hind-quarters must be long from a point of the rump to the hock, and well filled up; this does not mean massive; on the contrary, the best milkers will be rather lean and perhaps high-boned; nevertheless, the same animal, when out of milk (or

dry), may fill up and perhaps present a fully rounder contour (or outline). There are other minor points, such as small lean head, rather long and slightly dished, broad between the eyes, narrow between horns; full eye and placid, curved horns; back level to setting-on of tail and broad across loins, and quite a few other points.

Now we will take up the feed question. Much has been said and a great difference of opinion has been expressed on this subject. The first thing we have to look at is, what feed have we got available—i.e., what feed can we grow the most of and at the least expense? Here we can grow timothy and clover, oats, peas, barley, etc., all of which make good feed for roughage. But in feeding a cow giving milk it should be remembered that the casein and albumen of milk are made from protein; while the butter-fat and milk-sugar are made of carbohydrates and fat. It is plain, therefore, that a milk-cow needs, in addition to her maintenance ration, a quantity of protein, carbohydrates, and fat proportionate to the amount of casein, albumen, and milk-sugar she is producing. The production of milk takes these materials from the blood, and if the supply furnished in the food is not enough to supply the demands of the body and furnish materials for making milk, the tissues of the body are robbed of their regular maintenance supply, and the cow gradually sinks flesh.

To sum up the whole thing in a practical way, we should feed all the protein, carbohydrates, and fat that the cow can make profitable use of. With ordinary hay and grain it has been found desirable to allow about one-third of the dry matter to be grain and the other two-thirds hay; this often is sufficient nutriment, along with sufficient bulk, to ensure proper response from the digestive organs. We must also have due regard to the palatability of the food; if a cow is fed only one or two things, and the same ration is fed for a long time, she is liable to grow tired of it and will not eat enough; we can often increase the palatability of dry feed with the addition of roots or silage if we had it. I believe that ensilage should be one of our chief feeds in winter, providing we had the proper machinery to handle it, as I believe we could raise it cheaper than we can roots. I believe timothy and clover cut in full bloom makes a first-class hay for dairy cows, also mangolds, turnips, and carrots (carrots are believed to make butter a better colour); wheat-bran and crushed oats, three to two and one of oil-meal, make a good feed ration.

Now about the quantity to feed. I have often heard it said that it takes 2 per cent. of the animal's weight per day to sustain her body, so that a cow weighing 1,000 lb. would require 20 lb. of hay, or its equivalent, per day. In order to keep the tissues of the body healthy or in repair, a cow weighing 1,000 lb. requires 7 lb. of protein daily; the amount she must have in addition depends upon the amount of milk she gives. Milk, on an average, contains 3.6 per cent. of nitrogenous constituents of milk; then it would require 3.6 lb. of digestible protein in her feed for each 100 lb. of milk; for instance, a cow giving 30 lb. of milk per day would require 1.08 of protein for casein and albumen in the milk, 70 lb. protein required by the body-tissues, and as a result of experiments at different stations, that a good deal of protein is burned before it can be appropriated by the milk-glands, so more protein should be fed to allow for burning, say 88 lb., so the total amount of protein for a cow giving 30 lb. of milk should be 2.66 lb.; this is the smallest amount of protein that should be fed to a cow giving that quantity of milk. There is no objection to feeding more than this; if we feed less, one of two things happen—if the body takes the protein it needs she will fall off in milk, but if she keeps up the flow of milk, then she will lose flesh. Dr. Emil Wolff, the German investigator, after years of study and experience, has concluded that a cow weighing 1,000 lb. and giving a full flow of milk will do her best when her daily ration furnishes digestible nutrients as follows: Protein, 2.5 lb.; carbohydrates, 12.5; fat, 6.5 lb.

By compounding a ration of available feed, say:—

12 lb. timothy and clover hay cut in full bloom..	pro. 0.66;	car. and fat,	5.29
45 lb. mangolds.....	pro. 0.45;	"	3.55
10 lb. crushed oats	pro. 0.93;	"	5.17
	2.04	"	14.67; fairly good.

Another ration:—

Oat and pea hay, 13 lb.	pro. 1.26;	car. and fat,	5.17
Carrots, 25 lb.	pro. 0.27;	"	2.20
Bran and shorts	pro. 1.15;	"	5.92
	2.68	"	13.29

This ration is a little high in protein, but could be reduced a little by substituting turnips for carrots. My experience in so-called balanced rations has not been so satisfactory in practice as in theory. The most satisfactory way has been to find out the capacity of the cow I am feeding. I feed all the roughage she will eat up clean, and a few pounds of grain at first, and keep increasing so long as she responds; as soon as she stops increasing in milk, then I stop raising her grain ration, as I know I have found her capacity. You will find one cow will require more than the next one to keep her up to her milk; to this she should be fed to make her most economical. No one can make a cast-iron ration; any intelligent feeder by the use of scales can soon find the capacity of his cows and an occasional test. I believe a great many make a mistake in not feeding earlier in the fall. I have occasionally asked my neighbours if they fed anything yet, "No" being the answer in most cases, and yet their cows are falling in milk. I believe in feeding any time you can get them to eat. Just as soon as I have some green feed ready to cut I start feeding; until then I feed a little grain; by feeding early you not only keep up your cows in flesh, but in milk. Feed all you can in the early fall is my watchword; the successful dairyman is he who tries to feed all he can, not the man who tries to see how little he can feed. Another thing as much important is to see that your cow has every comfort, especially in the stable. Also kindness is another important factor; if you want your cow to do the best for you, you must be kind to her; make her as fond of you as she is of her calf. A cow is naturally a nervous being, and any abuse, or make her afraid she is going to get the stool or a kick if she happens to move when you are milking, greatly affects the flow of milk, so it pays to be kind. I find I have still a lot to learn on this important subject. What is there in dairying that requires a man to be ignorant? Must a man getting on in the world move backward like a crab? Or as the late Mark Twain once said of the inhabitants of the Azores Islands, among whom all efforts to introduce new and improved methods have failed: "The peasants crossed themselves, and prayed to God to shield them from all blasphemous desire to know more than their fathers before them."

CO-OPERATION.

By L. H. Foster.

(Paper read at meeting of Burton City Farmers' Institute.)

Mr. President and Gentlemen,—I have chosen this subject not because I know a great deal about it, but because it is one that is of great importance to this community at the present time. As you are aware, co-operation is derived from the Latin "co-operatio," meaning the act of joining together for one common end, or, if you wish, concurrent effort of labour; also this word "co-operation" is built largely on two words, "energy" and "harmony," and it is on these two words I have based this brief paper. Used in conjunction with co-operation they ultimately spell "success," which is the goal of all true systems. Energy is internal or inherent power, or capacity of operating or producing an effect. To all men was given energy, more or less, in varying degrees, and you are aware some men are blessed with a superabundance of it, and to offset this co-operation is essential to supply the deficiencies of the less fortunate ones. It is at this stage of the game that harmony comes in, which is, in other words, the just adaptation of parts to each other in any system or combination of things or the sameness in opinions, effects, or interests. So practically, to be successful, co-operation is merely the name given to a combination of energy and harmony.

In all the known co-operative systems which have been and are still successful, these two words have been their motto; in those that have failed, their motto, consciously as well as unconsciously, the words "laxity and discord," which mean nothing more or less than "destruction," an unenviable end to almost any system. Co-operation never started from fully matured plans of operation; in fact, some of the greatest systems in the world have started from one man, and as needs arose gradually expanded.

Take the "Vooruit," for instance, a system which started some few decades ago in Holland, in an obscure bakery. Conditions at the inception of the "Vooruit" were such, amongst the very poor, that bread, then as now the staple food of the Dutch, was a prohibitive value, and far beyond the means of the very poor; consequently the baker's trade suffered greatly. One of the bakers pondered over the possible solution of this great problem, and

thinking he had found it broached it to a fellow-baker, with the result that in a short while they had to hire bakers to fill their orders. By the registration of a name and the payment of a small fee weekly, they agreed to supply a given amount of bread. If it could be afforded, this sum could be trebled or quadrupled at will, thereby entailing that amount of bread. Fellow-bakers who laughed at the idea now gaze in awe at the magnificent Vooruit Buildings, practically the largest co-operative system in Europe, and one of its show-places for foreign visitors. Not content to solve the bread question, they, as time and funds allowed, branched out into other parts of the human needs. To-day one can buy almost anything, from a needle to a steam-engine, all of which is due to energy and harmony, not laxity or discord.

Again, we have the Mormon system, to-day one of the largest political and financial factors in the States. It is not very ancient history, the date of their arrival in Utah, and now to-day the income from the "Common Fund," as it is called, exceeds $20,000,000 annually. Governed by just four men, who invest and use as they see fit for the good of the shareholders, it is based on the old church tithe offering. The disciples of laxity and discord find short shrift in the Mormon system. They also use their system in business, agricultural, and other interests. Each man must adapt himself in harmony with the others, and also show a given amount of energy, or out of co-operation he goes. No doubt fanaticism played a good part in the upbuilding of their system, yet it was peculiarly suited to their needs, and this is in all cases, that of needs, the starting of co-operation. To-day they own trusts, railroads, refineries, mines, etc., to say nothing of one of the most beautiful cities in America. So with each individual case, whether viewed in the abstract or the concrete, that though they demand a system of co-operation, there are not any set rules by which all needs can be governed. Each country, State, or community demands a different system of its own, though it may be modified principally from the general meaning of the word "co-operation." In closing, I would like to add that co-operation does not necessarily mean the obliteration of the individual. Far from it. It is the individual who first starts these great communal helps; consequently, the more brilliant and gifted individual is accorded the positions of trust and of executive in these systems. You will notice this, be the system national, industrial, or rural, like our own; even our own new church is being built on a co-operative system, and why not the selling of our products, or the buying of our foodstuffs? Poverty has been largely a factor behind some of the greatest systems, and while we as a community are not poverty-stricken, co-operation will do us no harm, providing you look at co-operation as merely energy and harmony, two good partners on the road to success. Again I would add that there is much to criticize in this brief paper, but much more to improve on, and by applying those mental amendments of yours to this new co-operation here, I shall feel amply repaid for taking up your very valuable time.

IS THERE A LIVING IN POULTRY?

By F. J. Roberts.

(Paper read at meeting of Strawberry Hill Farmers' Institute, June 3rd, 1911.)

Mr. President and Gentlemen,—The subject I will speak on to-night is, "Is there a Living in Poultry?" Many people have started in the poultry business and have failed to make it pay, and will tell you that there is no profit in keeping poultry; but I will tell you right now that there is a good living and a good profit to be made from poultry, with eggs selling at 40 cents per dozen on the average throughout the year, and the same can be produced for 15 cents per dozen, and broilers can be raised to 1½ lb. for 15 to 18 cents each from the egg, and the market is right here for all we can produce, for British Columbia is importing to the extent of 2,500,000 dollars' worth of poultry products annually, and if you start right and not in too big a way at first, if you do not know the business. I think many failures are due to not sticking to it; many persons get disheartened and give up because they do not get the big returns at once, and you cannot expect to start any business and get a profit on the outlay right away; it will take two or more years before you can expect to get returns on the capital invested.

Poultry-farming is a business that must be developed; it cannot be built up in a month or a year; the man who starts at the bottom of the ladder and goes slow at first, will eventually get to the top. Some persons get discouraged and sell out their stock just as they are beginning to pay. They have raised their chicks too late in the season, and kept their pullets all through the winter, without an egg, and just as they are beginning to lay good they give up, and say that their hens have eaten their heads off, and that there is no profit in keeping poultry, and sell out to the first person that comes along and offers any price at all. I know from experience that there is a good living to be made from poultry, not from a fancy point only, where they breed for the show-room, and get $2.50 or more per setting for eggs and from $5 to $10 each for stock, but eggs and poultry for market alone; and I know people personally that are making from $1 to $2 per hen, clear profit, per year on every hen they keep, and every one of these people started in a small way. One started with a dozen hens and now keeps between five and six hundred. These people are making a good living and saving money besides. I think it best to start in the poultry business on, say 5 acres of land—that is as much as one man can manage—with 500 chicks. I would prefer land that sloped to the south, dry and well drained. Build your chicken-houses on the highest point facing the south; not expensive buildings, but dry and free from draughts, with plenty of ventilation, with shed for scratching in—hens, to lay, must be kept busy. Now your stock. We will say 1 dozen hens and a cock bird, of a popular variety, preferably pure-bred; then commence to breed up your flock of layers, and here is the vital point: hatch only from the heavy layers, and see that your male bird is always from a heavy laying strain. To get a good flock of winter layers the best time of the year to hatch for the heavy breeds, such as Rock, Orpingtons, and Wyandottes, is during the months of March and April, and for the lighter varieties, such as Leghorns, Minorcas, and Hamburgs, in April and May; and to have strong, vigorous chicks you must have strong, healthy, vigorous parent stock, and to have such stock there should be plenty of straw or litter for them to work in, for you must remember that activity is the life of the hen. Exercise plays an important part in the egg-production, and the number of eggs produced depends on the health of the hen, and her vigour comes from her activity to a large extent.

Feeding.—Every poultryman has his own way of feeding. Wheat is the safest and best grain to feed for the main ration, with oats, cracked corn, and barley for a change. Green feed they must have, and plenty of it. It is surprising how much green food a hen will eat; grass, clover, cabbage, anything that is green in winter; roots, such as beets, carrots, mangolds, plenty of grit and shell, fresh water two or three times a day in summer, and it should be put in the shade. All these little things must be attended to in order to make a living from poultry. A good thing to remember is that a laying hen is like a good milk-cow, every little bit extra in the way of meat, or bone, or grain that she gets she will pay back with interest in the egg-basket, and a good cow will put every extra bit of food she gets into the milk-pail. Hens are much the same as cows. You can scarcely fatten a good milch-cow, and the same with a laying hen, she produces eggs instead of fat; a fat hen does not lay many eggs and a fat cow does not give much milk, so you see the main thing is to breed laying hens, not fat ones.

Another vital point is cleanliness. The house wants to be cleaned often, at least once a week, and coal-oil or other disinfectant put around the roosts and drop-boards. Lime is a good thing around; the houses must be kept free from vermin; you cannot have eggs and vermin.

In conclusion, I will say, attend to all the small matters, and with a right start in a small way with pure-bred stock, and enlarge your plant as you succeed, and you will make a "good living from poultry."

CONSERVATION OF SOIL-MOISTURE.

By J. D. Reid.

(Paper read at meeting of Metchosin Farmers' Institute.)

Some years ago a Scotchman named Campbell was wheat-farming in the Dakotahs. For several seasons his crop had proved a failure, and he was about to give it up in despair when the unexpected happened. A mule broke loose from his paddock and ran riot in the wheat-field. When Mr. Campbell examined his wheat a few months later, he noticed that wherever the mule had rolled the wheat was strong and prolific. In the following year he inaugurated the new system of soil-tillage which has proved so successful in semi-arid regions, and is universally known as "dry farming."

A brief description of this system may be interesting. Deep ploughing and a dry-earth mulch are the cardinal principles. The land is ploughed in the usual manner; the subsoil is stirred with a plough or cultivator; the furrows are disked and packed and harrowed till a dust mulch or blanket is formed which breaks the capillaries and prevents the evaporation of the soil-moisture. The deep ploughing furnishes a reservoir for catching and holding the water that falls; the dust-blanket will not absorb the soil-moisture nor allow it to evaporate in dry weather; the frequent tillage kills the weeds, which act as little pumps in the soil, and the use of the packer sets up capillarity, and ensures a firm seed-bed. In semi-arid regions, and in countries where precipitation is insufficient to ensure good crops, and in farming operations everywhere, the benefits to be derived from this system of tillage are incalculable.

The world is governed by law. Without law there is no order; without order chaos. To be happy we must obey Nature's law, which is God's law. It has been said that everything in nature obeys except man, who is the greatest sufferer. To violate the laws of nature causes untold misery. That the soil we till is governed by the same law occasions no surprise, a law as inflexible as that of the Medes and Persians, which altereth not. The Scottish proverb, "Ilk a lanet has its ain law," is peculiarly applicable to British Columbia, where we frequently find several kinds of soil in one field, and which cannot be treated alike. Our clay soils are adhesive, and must be stirred up; our light, friable loams must be packed to assist capillary attraction and ensure germination. Nature abhors a vaccum, and every soil will produce a crop. To determine what crop is suitable and what the soil will produce is the greatest study of the agriculturist.

A diversified form of agriculture is most profitable. Most lands are easily restored to fertility by a judicious rotation of clover and grasses. Continuous cropping robs the soil, unless the constituents which form the crop are returned in the shape of manure and fertilizers. The continued raising of wheat will deplete the land of the ingredients essential to the growth of wheat. Hence the importance of ascertaining the quality of the soil before putting in a crop. Lands a thousand years old retain their fertility where the cultivation has been pursued intelligently and persistently. It is not true that soils are capable of permanent exhaustion. Plant-food remains, and requires judicious tillage to render it available. Worn-out farms have been restored to fertility by a careful rotation of legumes and pastorage. The hoofs of every kind of stock is golden. The farmer is often the farm's greatest enemy; he issues cheques on the bank account of the soil till they return dishonoured. No profession demands such unremitting study as that of agriculture; no vocation reflects so directly as that of following the plough. As a man is, so is his farm. You cannot grow grapes of thorns or figs of thistles. Gladstone said that the greatest of all studies was that of agriculture.

To the man accustomed to work on the farm—"who scorns delights and lives laborious days"—the quantity of water in the soil is a revelation. Dig a post-hole almost anywhere in winter and observe how quickly it fills with water. Even on well-drained land the same condition obtains. Dig a similar hole during summer and the absence of moisture is equally surprising. The question naturally presents itself, "Where has the water gone?" We know that clouds are formed by evaporation of the earth's moisture. It rises in the form of fog at sea and in vapour from the steaming earth, and this evaporation is constantly at work. When cultivating potatoes in the hollow, do you remember the perspiration, how oppressive the heat, how charged with humidity the air? Did you notice the vapour which enveloped you, and that the moisture in the soil was being disseminated all around?

Let me say here in passing (and I do not discriminate against any man's mode of farming), that farmers as a class are exceedingly wasteful. Where system is lacking, the waste of time and energy is serious enough; but when he needlessly wastes the fertility of the land, he is robbing his best bank account. To plough land and leave the furrows exposed to the drying winds of spring is the most fruitful waste of soil-moisture. The finest crop of oats I ever saw was sown the day after ploughing. Disking and packing, and smoothing with harrow and weeder till a fine seed-bed is assured, will enhance the certainty of a good crop, and will retain the moisture where it is most required. The preparation of the seed-bed is of paramount importance. A plough which breaks the furrow as it turns, the disk-harrow to cut and pulverize, the roller to pack, and the harrow to smooth, are implements indispensable on every farm. The use of the roller is not generally understood. It is not merely to level the land, break clods, and smooth the surface for the reaper, but its use compresses the air-chambers in the soil, thus the young plants upon germination may find food within easy reach. To roll the land after seeding, without the subsequent use of the weeder, which vibrates and pulverizes the surface particles, is most injurious. Hence the necessity of a fine seed-bed, as soon after ploughing as possible, for the amount of moisture lost by evaporation is beyond conception. But the work does not end here. Keep the cultivator going. Don't be afraid to put the harrow amongst the growing wheat, or the weeder to stir the particles of soil around the sprouted oats. Thrice a week is not too often to cultivate potatoes. The florist with his finger stirs the ground around his sprouting bulbs. How often do we see root-crops languishing for lack of moisture, the cultivator alongside idle and useless. The finer the seed-bed the more territory will plants have in which to gather food. The frequence of cultivation will often determine the crop. Good seed will not thrive in depleted soils, a poor seed-bed, or in insufficient moisture, any more than a thoroughbred animal will become a prize-winner on inferior rations.

We might learn a lesson from the hewer of wood and drawer of water, John Chinaman, who covers his seed-bed with matting to conserve the moisture and ensure germination.

I do not wish it to be inferred that the conservation of soil-moisture will in itself ensure a bountiful crop. The day heralded by the old Scots farmer is still a long way ahead. "Man Thomas hae ye heard o' this new-fangled manure they ca' guano? Its sae strong that enough to sow an acre may be carried in one o' yer waistcoat pockets." "Aye," said Thomas, "and ye'll be able tae put the crops in the ither." Fertility and cultivation must go hand-in-hand. Manure increases the water-holding capacity of the soil. Without moisture fertility is of little value; without fertility, moisture will not produce satisfactory crops. Manure means humus; humas retains the soil-moisture, and will absorb rainfall and hold it. We all know how easily ploughed the land is that has received a top dressing of manure. Our land is deficient in humus; 95 per cent. lacks potash, so essential in our orchards. Nitrogen may be supplied by clover and legumes. Every ounce of farm manure should be conserved. After one thousand years of cultivation the farms of France are becoming more productive. After thirty years we find in Metchosin—what? lands depleted of fertility; areas reverting to forest; systems of agriculture wasteful and extravagent; crops planted in soil unfitted for their production; cultivation neglected; a lack of faith in our profession; road-work, railroad-work, real estate, each and all mitigate against the success of our farms. We may be making farms, but we are not farming. We have here all the elements essential to a comfortable and contented life. As a profession, farming offers a reasonable certainity of a fair measure of success if pursued intelligently and industrously.

Wake up, Metchosin! Give the farm a show. There is money in farming, although most of us don't know it. With a climate second to none, soils that respond liberally to good treatment, good roads, good neighbours, railroad and shipping facilities, and the best market on the continent at our doors, surely it is not difficult to impress the value of the heritage which is ours. Stop the leaks, divide the farm, study intensive farming, preserve the manure, conserve the moisture, practise soiling and green manuring, ascertain the capabilities of your soil, and devote your energy to the successful prosecution of your profession. "Aye be stickin' in a tree; it will grow when yer sleepin'."

And the Lord God planted a garden eastward in Eden, and He set man in the garden to till and to dress it, and he endowed the man with thought, *to be exercised in the pursuit of his calling*, and down the ages many should run to and fro and knowledge be increased. And now we have experimental farms, and instructors in every branch of husbandry, to teach us how to farm and to live healthy and happy lives. To-day, when the cry is, "Back to the farm,"

Eighty Bushels to the Acre.

A Paying Crop.

where we all belong, the farmer is coming into his own, and occupies the position intended by nature, foremost and essential in the ranks of his brethern. He only is independent. Let him go on strike for six months and the world would starve. Wake up, Metchosin!

The sordid man most out of place in Canada to-day
Is he that grumbles and complains that farming doesn't pay.

COMMUNITY BREEDING.

By W. B. Kellett.

This idea was suggested by the remarks made by Mr. Schulmerich when he lectured in Mara last spring. There were many thoughts advanced which by their inherent truth struck the writer and most of the members present at the meeting. In part this is what he said :—

(1.) You are spreading your efforts in too many directions.

(2.) You have the finest dairying district in British Columbia; develop it.

(3.) You have a greater variety of nondescript cows than I have ever met with. You seem to have gone on the principle of breeding to a Holstein for milk; then to a Jersey for butter-fat; then to a shorthorn to get beef; and then to any old thing that comes along to get a calf. Correct this.

(4.) Adopt one dairy breed for the district and stick to it; use no other in the district, and aim at a uniform type.

(5.) With every ton of hay you ship out, you are taking out of the soil and selling away from the farm constituents which, if you had to buy them at the present market price, would cost $11.75; and that is, putting the hay-crop at 2 tons per acre, you are impoverishing your land $23.50 per acre.

There was such a directness and apparent honesty in these statements that, whether right or wrong, they carried weight. As to the first proposition, it is not necessary to say anything. In the consideration of the other propositions the first will probably resolve itself. In regard to the second—we may take the speaker's word for it—it is not necessary to make any invidious comparisons to the disparagement of other places. We have good dairying advantages—soil, water, climate, are each strong factors to our advantage. There is one other strong factor—have we got it? That is system of handling our products—system of breeding. There are localities which, assuming them to be less favoured than we are, are yet making better use of their smaller advantages, and as a result we follow in their wake, both as to production and the condition of their herds. When we come to recognize wherein we are weak we may be led to take the first steps towards a remedy, and that brings me to the consideration of the third proposition.

Permit me to digress into ancient history for a while. In 1863 the factory system was introduced into Ontario. Some time in the early 70's it was started in Middlesex. In 1879 I made my first acquaintance with the cheese-factory system. In that and subsequent years I was Secretary of the Kerwood cheese-factory in Middlesex, which had then been running about eighteen years. This factory, situated on the boundaries of the townships of Adelaide and Metcalfe, drew its milk-supply from both townships. In the early days of the factory system there was one fixed idea—the production of milk—and this led to a practice so wicked and ruthless it is no wonder dire calamity threatened. Calves were knocked on the head when born, saving a few heifer calves of more than ordinary promise; but with many even these were robbed of their natural sustenance, and in a few years the herds deteriorated to a dangerous proportion of starvelings. Any kind of a scrub was good enough to sire calves, the large majority of which were doomed to be clubbed to death in order to swell the milk-pail. It dawned upon the people what a wasteful, improvident procedure this was, and an alarm was sounded. The wealthier patrons invested in pure-bred shorthorns to breed up again. The steer calves were saved as well as the heifers; for a few days these were fed the whole milk, then supplementary feeding was instituted. Sweet whey, hay-tea, with linseed-meal, for a few weeks brought on the calves so that by the time they were put on grass they made satisfactory gain. The district became noted for its butcher cattle, and not many years elapsed before these shorthorn grade steers began to be sought after, and the buyers were soon in evidence. The introduction of the shorthorn sire so improved the grade of both cows and

steers, and feeding was reduced to such a system, that soon a monthly market was established, buyers coming from Montreal and Toronto bidding for choice lots for the export trade. In every herd on the average there are more steers than heifer calves, and on that line the shorthorn redeemed the situation, and for the last thirty years has been making wealth.

In the County of Middlesex there were in 1861, 19,006 cows; in 1901, 3,160,888. These cows were producing butter to the amount in 1861, of 1,081,805 lb.; in 1901, 3,160,888 lb.; and cheese, in 1861, 79,100 lb.; in 1901, $5,000,658 lb. Taking the product of the latter year as realizing 20 cents per pound for butter and 12½ cents for cheese shows a grand total of more than a million and a quarter dollars.

It is an axiom in animal husbandry, "The sire is half of the herd." This is recognized and admitted. We have cows and cows. Are we following out any method for their betterment? We have a trace of Ayrshire, a strain of Jersey, some shorthorn, a little Holstein, and considerable native or mongrel. But what *are* we mostly aiming at? Any special type? If not, had we not better change our methods?

Mr. Schulmerich recommended the adoption of some one type of pure-bred dairy cattle for the whole district, and breed no other, and he said, though a Jersey man himself, he thought the Ayrshire would be most suitable for this district.

For one Farmers' Institute district it would require four bulls; use a sire two years in one division, move him to the next to stand two years, and so on till every sire has served each division. There is economy in this arrangement, and besides a more marked improvement in using matured sires; and by the time the eight years' itinerary was completed we might look for heifers ranking almost as pure-bred.

I have a great deal more to say on this subject, but will refrain, hoping this will suffice to elicit a discussion, and the starting of some plan for the benefit of all.

In conclusion, I may say, though personally favourable to the shorthorn, yet will go with the majority in the adoption of any one of the six recognized dairy breeds—shorthorn, Ayrshire, Jersey, Guernsey, Holstein, and French-Canadian.

CO-OPERATIVE BUSINESS METHODS.

By D. GALLATLY, JR.

(Paper read at meeting of Westbank Farmers' Institute, February 6th, 1912.)

MR. CHAIRMAN, LADIES AND GENTLEMEN,—I will not take up much of your time, but I would like to say that, in preparing a paper of this kind, it naturally takes considerable time in order that the subject be intelligent. I have been busy since I was asked to get this paper up, and so had not the time to devote to it that I should have liked, but I will do the best I can. The reason I chose the above subject was that I thought it would be appropriate in view of the fact that Westbank will soon be forming an association to look after the interests of the fruit-growers here. Perhaps to some of you who are unfamiliar with the results obtained by individuals in the same district as an association, it would be well for me to cite a few cases.

There are many instances where better results have been achieved by associations that I am not familiar with; therefore I shall have to confine myself to a few cases in the Okanagan. Last year the buyers gave the fruit-growers from $1.20 to $1.80 per box for their apples; these were sold for from $2.50 to $3 per box. Now, if these apples had been marketed through a union of the fruit-growers themselves, a much higher price could have been obtained. The same was true in tomatoes; throughout the valley last season in August, tomatoes were bringing 90 cents per crate of 24 lb. to those who were in a position to study the markets; while the small grower had to take his crop to the canneries at from $13 to $15 per ton. For green corn the associations were getting for their members 25 cents per dozen, while the outsider could only get from 15 to 18 cents. Now, in the case of the apples that were sold to the buyers at from $1.20 per box, these apples were again turned over to a dealer at from $1,50 to $2 per box. The grower got $1.20 for his apples, and the man who bought from the grower—the jobber—made the difference between $1.20 and $2.50, which the grower should have had, less the actual cost of doing the business.

Now, there are many similar illustrations. Why is this? Business is business. If I am buying your fruit as a buyer, it is purely a matter of business with me, and I want to buy that fruit as cheap as I can get it, and sell it for as much as I can sell it for. You can't blame any business-man for doing that, because everybody does it in the business world, only limited by this consideration: if a man has a customer, if he is a man of good, keen judgment, he will pay him a price which he thinks will keep that customer satisfied; that is looking out for the future.

There was a time in this valley when nearly all the growers shipped to the large wholesale and commission houses; these skinned us so badly that we had either to find other ways of disposing of our produce or go out of the business; so the growers began to look around, and they found out what their produce was selling for on the markets, and, being men of reason, they performed a little operation in arithmetic; after subtracting the cost of shipping and handling generally, they found that they were not getting their due. The result was that shipping unions sprang up all over the valley, and wherever the unions have been perfectly managed they have been successful. The reason for an organization getting more money for the grower is, as I have already intimated, a business one. The union takes your fruit and sells it, if it is managed with equal ability, for the same price as the buyer could sell it for, and deducts from that price, without any profit, the cost of handling, and hands you the difference; in one case you get from $1.50 to $2, and in the other $1.20.

There is another reason for the need of an association in a district. Fruit-growing is one business and fruit-selling another; both require ability in their respective lines in a certain way, different kinds of ability; the man who would perhaps be the most successful fruit-grower, like the man who would be the greatest orator, musician, or editor of a paper of fiction, is not likely to be the man of shrewd business. If you are going to market your fruit, you want a man to handle that business for you who knows every trick and turn of the game, so that he can compete with the men with whom he has to do business. We who grow fruit cannot find time to do that, for most of you, I think, who have an orchard find that it takes all of your time, and I think most of you realize what a man has to do to keep posted on the market, to say nothing of the experience required to play the game. Your manager must know the conditions prevailing in all districts; he must know when there is any advance and when the season opens up; he has to keep in touch with the buyers. Now comes the expense of telegrams, which in a large shipping union amounts to from $20 to $40 per day during the shipping season. Now, no single grower could afford that; but this must be done if one is to get the top price. Another thing, directors of the union should not be men who are trying to manipulate the union for some personal gain, or for some benefit to themselves for acting as directors, and getting something that the rest of the ordinary farmers are not getting. In your district the directors should be men who are popular—men who are straight and square and known to be reliable in every sense of the word. As far as possible, your directors should be distributed all over your district, so that each director is in touch with a lot of his neighbours, and in that way you will reach your whole section. Don't expect your manager or board of directors every year to get the highest price that the fruit will sell for during the season. Every manager is only human; if he were always able to get the highest price, he had better get down to Wall street and play the game, because there is more money in it than ever you could afford to pay a manager. Now, when your association is formed, the first thing your manager should do is to get out growers' contracts, and see that they are signed by all the members; he will then have them all bound down hand and foot to stand by the association; if he does not do this, he will find that when the shipping season opens he has nothing to ship. I will give you an illustration of the folly of forming an association without contracts. A few years ago the tomato-growers of the Niagara District, Ont., were getting 25 cents per bushel from the canneries, so they got together early in the season to form a union to hold out for 30 cents per bushel. They all swore by a mountain about as large as the one back of Westbank that they would not sell for less, but they had no binding contracts. Well, everything went well until it came near picking season. Up to this time the cannery-people had said little, and some of the growers were getting uneasy, fearing that they would be left with their crops on their hands. When the cannery-men saw this, they sent agents around to these week-kneed members, and told them that if they did not agree to sell at 25 cents per bushel, that they would lose their crops. This bluff got them, and they came tumbling in, one after another. If this bunch of growers had been bound down, they would have won. My own idea of the solution of this shipping problem is, that some day there will

be a large shipping office at Okanagan Landing. This head office will control the fruit-output of the Okanagan; they will have packing-sheds at all the shipping-points along the lake; by the use of the telephone the head manager can find out each day just what he has to find the market for. This would do away with all the strife which is going on between the different shippers, and also the cutting of prices to a large extent.

With these few remarks, I will now bring this paper to a close, and I hope that when you form the Fruit-growers' Union, you will remember to stand by it through thick and thin.

REPORT OF TRIP TO KITSUMKALUM (INCLUDING LAKELSE) FARMERS' INSTITUTE DISTRICT.

By Geo. Heatherbell, of Colwood.

Left Victoria Monday, October 23rd; arrived Prince Rupert Wednesday, October 25th. Left Prince Rupert 1 p.m. for Kitsumkalum; arrived 7.30 p.m.

October 26th. Visited the following places, where we found fruit-trees supplied by the Government the previous spring: Henry Frank, who had a few that were doing fairly well, with two or three dead; Mr. Weeks, who had about twenty-five that were also doing fairly well on the bench land; Mr. Bohler had a few trees on the bottom lands that had a very good growth, but here I should be afraid of the winter frosts injuring them on account of late growth, and wood not hardening up for winter. We then went to Mr. Johnson's, some distance away, on a clay formation, who evidently had planted his trees with great care, which, with one exception, are doing well, one being affected with black-spot, which I believe had come from the nursery; this, having been cut off below the trouble, was growing healthy and strong again.

October 27th. Visited around Littleton ("Terrace"), but could not get across the river to Mr. Thornhill's place, who had some old trees, on account of not being able to secure a boat. This was a dissapointment.

October 28th. Left Kitsumkalum for Copper City 7 p.m., arriving at 8 p.m. by train and ferry.

On October 29th (Sunday) visited Mr. Stewart's place, who has the oldest orchard in the whole district. Some of these trees are ten to twelve years planted. The old trees look remarkably well and were quite clean and healthy as a whole. He had some well-grown Wealthy and Astrakan, also Yellow Transparent and York Imperial, also Italian prune. Looking over this orchard, I am satisfied that, with a fair knowledge or understanding of the care of an orchard from beginning to end, any one could make a success of growing fruit here.

October 30th. I walked from Copper City along through Lakelse Valley, visiting Mr. McNeil, Mr. Forceman, Mr. Colet, Meshan, and Pearson, who all had a few Government trees planted, and with a few exceptions were doing fairly well, bearing in mind that they had been out of the ground so long, and being so very late in the season before they were planted.

In the evening of 30th, as arranged, Mr. Rive and myself held a meeting in the Church Hall, which was called to order at 7.30 p.m., having present a very attentive gathering of forty-seven, who were much interested in the remarks made by Mr. Rive and myself. Mr. Rive took for his subject the soils and conservation of moisture, and green feeds, etc. I myself spoke on the planting and care of fruit generally, and cover crops. Those present asked many questions and showed much interest in the agricultural welfare and development of the district, and their rich and most beautiful valley.

Tuesday, October 31st, we visited Mr. Green and Mr. Howe, on the upper bench lands between Kitsumkalum and "Terrace" (Littleton), who each had a few Government trees doing fairly well. In the afternoon we held a meeting in Mr. Little's store (as arranged), for the benefit of those across the river, on the Lakelse side, who found it most difficult to attend a meeting at Kitsumkalum or Kitsalas. The meeting was called to order at 3.30 p.m., with seventeen present, who were very pleased and interested in our remarks, expressing their appreciation of the Department in sending us, and our efforts in assisting them in their endeavours to grow crops and cultivate the land.

November 1st. Went up to Kitsalas and held a meeting in the Church Tent, with some twenty present, showing as much interest as at the former places of meetings.

November 2nd. Walked back from Kitsalas to Kitsumkalum, where we found that our train was held off account of obstruction on road, and would not have a train out until Sunday, 5th.

Sunday, November 5th, arrived at Prince Rupert, and left on steamer "Camosun" at 2 a.m., November 6th; arrived at Vancouver Wednesday, November 8th; arriving at Victoria same day.

I may say that by the meetings held and places visited we came in close contact with at least one hundred people; but regret very much that we were not able to get out to Kitsumkalum Lake, where there are some thirty pre-emptions taken and quite a few residents. I would also add that Mr. Rive and myself were very favourably impressed with the agricultural possibilities of the Kitsumkalum and Lakelse Valleys, both having very large quantities of land that is highly adapted to mixed farming and fruit-growing. The size and healthy appearance of the strawberry-plants were extremely good, showing the great possibilities in that direction. I would also like to mention that the President and Secretary of the institute, and residents generally, treated Mr. Rive and myself with the greatest of kindness and consideration.

PRACTICAL IRRIGATION

By Harvey Thornber, B.S., Assistant Horticulturist.

Irrigation in itself is not a difficult art. Almost any one can learn to make the furrows and to apply the water. The greatest difficulty seems to arise where the relation between irrigation and plant-growth is not well understood. The varying requirements for different soils and different crops, one year with another, tend to confuse the beginner more than does the mere application or distribution of the water. In order to make myself clear, I will discuss a few of the most important points which a beginner should know.

The first thing to consider in starting on an irrigated tract is the preparation of the land. A few dollars extra per acre in preparing the land often means many dollars saved during the life of the orchard. The best preparation is none too good. Many people feel that the planting of the trees and the turning-on of the water are the main operations necessary for the production of an orchard. This mistaken idea is partly due to misleading advertisements and to a lack of experience on the part of the beginner.

First, the land should be cleared of all stumps, rocks, or brush and then ploughed. If any large holes or hollows exist they should be filled before ploughing. All "fills" should be permitted to settle before any trees are planted. This settling can best be secured by planting some annual crop on the land for the first year. A cover crop which may be ploughed under in the fall or spring is the best, because it adds the much-needed humus to the soil, thereby making it more congenial for the young trees. Vegetable-crops, such as potatoes or other root-crops, are often used, but are not always successful. After this crop is either removed or ploughed under the levelling may be completed. The best tools for levelling with are the ordinary road-graders or slip scrapers. If the land is fairly level the "planer" or "smoother" may be used very successfully. Its construction is described in Circular No. 14 of the Department of Agriculture.

Having the land well prepared, the planting is next in importance. In case the land is nearly level any desired system may be used as regards the irrigation. The square plan with the fillers in the rows, the way the irrigation ditches are to run, is a favourite in many sections. This makes it possible to irrigate the fillers and standards from the same ditches, and is advantageous, especially in the young orchard. However, if the land is too steep for irrigating directly down the hillsides, planting on the contour, so that the water may be used on a smaller grade, will often decrease the cost of irrigation later.

The head-ditches may be located as soon as the planting plan is decided upon. These are placed at intervals across the field, depending upon the contour of the land and the texture of the soil. If you have a clay or loam soil the ditches may be farther apart than on a sandy or more porous soil. The average distance in a clayey soil is 600 feet, while in a sandy soil 300 feet is sufficient. Slight variations from these are necessary for special conditions.

The construction of these ditches varies. Some are made by turning a furrow with a plough, while others are made of iron, wood, or cement. The open wooden flumes are the most common. They permit the water to be carried over a depression and also prevent loss by percolation, which is the great fault with the open furrow. If the location of these ditches is permanent, cement or wooden pipes placed underground are without doubt the best. This permits free cultivation and care of the orchard, and gives the advantage of water under pressure. They permit the most economical use of water, and, although somewhat expensive to install, are nearly permanent, and often prove to be cheaper in the end. The water is taken from these underground pipes by means of upright iron pipes located at each row of trees. Sometimes cement stands are built in the field and the water-supply controlled by valves placed in them.

Having located the main ditches, the rest is quite simple. The laterals are made with a single-shovel cultivator or a one-horse plough, varying from 3 feet apart in sandy soils to 5 or 6 feet, or even more, in the heavier soils. Never get them closer than a foot and a half from the tree. It not only endangers the trunk of the tree from single-tree injury, but is unnecessary, because the feeding-roots are located at the tips of the main roots and not at the base of the tree.

In irrigating vegetable, grain, or hay crops, these ditches are made from 3 to 5 inches deep, but in the orchard they may profitably be made from 7 to 9 inches deep. These deep ditches permit the water to flow on rather solid soil, thereby preventing wasting, and at the same time permitting the land to be irrigated without wetting the surface mulch. The water used in wetting the surface mulch, when shallow ditches are used, is lost by evaporation when cultivation is resumed, therefore is of no value to the orchard. These deep ditches are not always successful on light soils, but have been found very satisfactory on the ordinary orchard soil.

Irrigated crops are divided into two classes—namely, cultivated and uncultivated. In general, the uncultivated crops require more water than do the cultivated ones. Oats require more than corn, and alfalfa more than potatoes. At the same time differences are found in the same crop. Take, for example, the apple; one variety will be found to make a large growth, while another will only make a moderate growth with the same amount of water. The same variety will often vary under similar conditions. Soil and climatic conditions being similar, and one tree carrying more fruit than another, the shy bearer will make much more growth than the bearing tree. It will be noticed that all fruit-trees make less growth when in bearing; account taken of this point when irrigating will often save unnecessary pruning.

In irrigating potatoes, one often gets undesirable results. The first irrigation should not be given until needed, as potatoes do not thrive on a saturated soil. No set date for the first irrigation can be given because of climatic variations. The main points to remember are to apply the water in sufficient quantity to moisten the soil well, and then turn it off and cultivate to conserve what you have applied; this permits the ground to warm up, and growth starts again. Small applications of water at short intervals tend to cool the ground and prevent good strong growth. On the other hand, avoid letting the ground get very dry and thereby checking the growth. When this happens, the potatoes make a second growth on more water being applied, and the result is poorly shaped tubers. It is seldom necessary to apply water after they are in full bloom.

The same general principles hold true with all crops, whether grain, vegetable, small fruit, or orchard. The best results can never be obtained by applying water at stated intervals of five, ten, or twenty days. The best plan is to apply when the crop needs it; use enough to thoroughly moisten the soil beyond the roots of the crop, and then conserve it by careful cultivation. If you are limited to one day a week or two days every ten days, the best plan is to divide your land into several divisions, irrigating one well each time rather than a larger area poorly.

It will be seen from the above that careful thought and consideration must be used in order to secure the greatest returns from irrigation. The duty of water varies according to the soil, crop, manner of application, and skill of irrigator, and is continually increasing, partly because of the improved methods of application, and partly because of the increasing knowledge of the irrigator. The learning of the "why" is very important, because this teaches "how" and "when."

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1912.