ANNUAL REPORTS

OF THE

Fruit Growers' Association

AND

Fruit Branch

ONTARIO

1910

FORTY-SECOND ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

Ontario

1910

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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1911.

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TORONTO.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present the Forty-second Annual Report of the Fruit Growers' Association of Ontario.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
TORONTO, 1911.

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Fruit Growers' Association of Ontario.

OFFICERS FOR 1911:

President ..... D. JOHNSON, Forest.
Vice-President ..... J. W. SMITH, Winona.
Secretary-Treasurer ..... P. W. HODGETTS, Parliament Buildings.

DIRECTORS:

Division No. 1.—WM. ALFORD, Ottawa.
" 2.—HAROLD JONES, Maitland.
" 3.—W. H. DEMPSEY, Trenton.
" 4.—W. H. GIBSON, Newcastle.
" 5.—WM. STAINTON, Oshawa.
" 6.—L. A. HAMILTON, Lorne Park.
" 7.—J. W. SMITH, Winona.
" 8.—A. ONSLOW, Niagara-on-the-Lake.
" 9.—JOS. GILBERTSON, Simcoe.
" 10.—D. JOHNSON, Forest.
" 11.—R. R. SLOAN, Porter's Hill.
" 12.—F. M. LEWIS, Burford.
" 13.—ADAM BROWN, Owen Sound.

Ontario Agricultural College: Prof. J. W. CROW.
Auditor: D. F. CASHMAN, Parliament Buildings, Toronto.

REPRESENTATIVES TO FAIR BOARDS AND CONVENTIONS:

Canadian National: ROBT. THOMPSON, St. Catharines; P. W. HODGETTS, Toronto.
London: D. JOHNSON, Forest; C. W. GURNEY, Paris.
Ottawa: R. B. WHYTE, Ottawa; HAROLD JONES, Maitland.
Ontario Horticultural Exhibition: W. H. BUNTING, St. Catharines; J. E. JOHNSON, Simcoe; ELMER LICK, Oshawa; P. W. HODGETTS, Toronto.

COMMITTEES:

Executive: Vice-President and Secretary, with E. D. SMITH, Winona, and J. E. JOHNSON, Simcoe.

Transportation: W. H. BUNTING, St. Catharines; L. A. HAMILTON, Lorne Park; R. W. GRIERSON, Oshawa; E. D. SMITH, Winona; R. J. GRAHAM, Belleville; WM. RANDALL, Grimsby; J. L. HILBORN, Leamington; J. E. JOHNSON, Simcoe, and the Secretary.

Co-operation: J. E. JOHNSON, Simcoe; ELMER LICK, Oshawa; ROBT. THOMPSON, St. Catharines; ADAM BROWN, Owen Sound; D. JOHNSON, Forest.

New Fruits: Prof. H. L. HUTT, Guelph; W. T. MACOUN, Ottawa; J. W. CROW, Guelph; A. D. HARKNESS, and A. J. LOGSDAIL, Jordan Harbor.

Historical: A. MCNEILL, Ottawa; L. WOOLVERTON, Grimsby; HAROLD JONES, Maitland; W. T. MACOUN, Ottawa; W. DEMPSEY, Trenton; R. B. WHYTE, Ottawa.

TREASURER'S REPORT, 1910.

RECEIPTS.		EXPENDITURES.	
Balance on hand, Dec. 31, 1909.	$1,411 07	Fruit Show:	
Members' fees	261 75	Grants to special prizes	$185 00
Fruit Show:		Refunds fruit sold	1,299 35
Sale of fruit	1,377 91	Labor	251 85
Entry fees	100 60	Transportation, storage, etc.	358 33
Incidentals	1 50	Printing	13 00
Legislative grant	1,700 00	Incidentals	19 65
Interest	11 57	Annual Meeting	284 57
		Committees	207 58
		Periodicals	343 50
		Postage	75 00
		Printing	25 50
		Miscellaneous	281 64
		Balance on hand	1,519 33
	$4,864 40		$4,864 40

SHOW:		
Cash for Special Prizes:		
County Northumberland and Durham	$50 00	
Leeds and Grenville	35 00	
Norfolk	50 00	
Ontario	50 00	
		$185 00
Cash to Exhibitors:		
Norfolk F. G. A.	$568 75	
F. R. Oliver	18 75	
W. G. Watson	17 50	
A. Armstrong	5 25	
J. B. Guthrey	29 00	
W. H. Stevenson	3 60	
Isaac Rush	28 75	
Oshawa F. G. A.	326 25	
Mrs. F. F. Reeves	2 25	
Haliburton Women's Institute	1 25	
Whitby Women's Institute	2 20	
H. Jones	84 00	
A. D. Campbell	10 00	
Ontario Government	51 25	
D. Whyte	2 50	
W. H. Dempsey	5 25	
J. G. Brown	10 50	
W. H. Bunting	39 05	
Rush Brothers	22 00	
St. Catharines Cold Storage	66 00	
Mrs. T. Delworth	3 35	
Mrs. J. G. Wait	1 90	
		1,299 35
Labor:		
E. T. Reed	$125 00	
W. F. Kydd	40 00	
R. C. Ferguson	51 85	
E. T. Reed for students	35 00	
		251 85
Transportation and Storage:		
W. H. Harris & Co., 1909 (storage)	$8 74	
S. McIlroy (cartage)	11 25	
Manning Cold Storage (express and storage)	23 04	

W. H. Bunting (freight)	2 23	
E. T. Reed (freight)	19 78	
Dominion Express Co. (express)	9 92	
Canadian Express Co. (express)	36 73	
Norfolk F. G. A. (freight)	38 40	
United Produce Co. (express and storage)	21 20	
Manning Cold Storage (express and storage)	175 33	
J. H. Hurd (cartage)	5 25	
P. W. Hodgetts (freight)	1 29	
Oshawa F. G. A. (freight)	5 17	
		358 33
Printing:		
Bryant Press, cards		13 00
Incidentals:		
Miss McMaster (post cards)	$1 00	
P. W. Hodgetts, meals, car fare, etc.	7 70	
Expenses of apple packers	10 95	
		19 65
Total for Show		$2,127 18

ANNUAL MEETING:

Travelling Expenses of delegates to November Convention, 1909:		
Thos. Berriman	$2 85	
W. J. Schuyler	2 95	
F. A. Goring	2 75	
Jas. E. Parnall	3 10	
W. S. Thompson	2 75	
Robt. Thompson	2 75	
C. E. Secord	2 75	
A. Lawrie	4 50	
H. T. Foster	1 30	
W. F. Olds	2 60	
W. D. A. Ross	5 40	
R. E. Hamilton	2 90	
Niagara District F. G. A.	3 90	
D. F. Cashman (reporting 1909)	50 00	
Travelling expenses of delegates to November Convention, 1910:		
Norfolk F. G. A. delegates	$37 90	
E. F. Augustine	4 85	
F. S. Wallbridge (Director's exp.)	10 70	
B. J. Case (Lecturer) travelling expenses	16 30	
W. S. Blair (Lecturer) travelling expenses	22 05	
Supreme Court I. O. F., rent of hall	20 00	
Chas. Potter (Lantern)	7 00	
Wilson Publishing Co. (Advertising)	12 00	
Farmers' Advocate (Advertising)	5 60	
McLean Publishing Co. (Advertising)	11 67	
J. H. Dunlop (Advertising)	12 00	
Bryant Press (Programmes, cards, etc.)	34 00	
		$284 57

COMMITTEES:

P. W. Hodgetts (Meals of Directors)	$5 00
C. W. Gurney (Director, trav. exp.)	5 80
Jas. E. Johnson " " "	7 45
H. Jones " " "	16 30
R. B. Whyte " " "	18 00
W. H. Gibson " " "	5 00
F. S. Wallbridge " " "	9 25
A. Onslow " " "	4 35
F. Metcalf " " "	10 20
A. Brown " " "	7 70
E. D. Smith " " "	2 40
J. L. Hilborn " " "	14 90

Jas. E. Johnson (Co-op. trav., etc.)	5 45	
D. Johnson (Co-op. trav., etc.)	10 00	
E. D. Smith (R. R. Commission)	19 65	
E. D. Smith (R. R. Commission, Toronto)	5 40	
D. Johnson (Western Fair. Com.)	3 10	
W. H. Bunting (Various meetings)	57 63	
		$207 58
PERIODICALS:		
Periodicals for members		343 60
POSTAGE:		
Mrs. Hubertus		75 00
PRINTING:		
Bryant Press (Letterheads)	9 00	
Wm. Briggs (Envelopes)	16 50	
		25 50
MISCELLANEOUS:		
Exchange	$0 45	
Pomological meeting, C. A. Hesson (Expenses)	199 99	
G. T. R. Excursion	50 70	
J. H. Dunlop (Wreath)	15 50	
Dominion Guarantee Co.	10 00	
Affiliation fee	5 00	
		281 64

Fruit Growers' Association of Ontario.

ANNUAL MEETING.

The fifty-first annual meeting of the Fruit Growers' Association of Ontario was held at the Temple Building, Toronto, on the 16th and 17th of November, 1910.

Mr. James E. Johnson, the President, called the meeting to order at ten o'clock on Wednesday morning.

PRESIDENT'S ADDRESS.

James E. Johnson, Simcoe.

As an Association we again meet this fifty-first anniversary to review the past, and, with the aid which past experiences have furnished us, to plan to carry out a future policy of improvement. The past record of this Association has fully demonstrated the fact that these meetings are not selfish but of a broad, liberal type, obtaining and disseminating information of the greatest value.

There are many subjects on the programme of this meeting which will not receive the time they are justly entitled to, but will receive such consideration of time as will enable us to perfect our plans for the most important subjects for discussion at our Institute Fruit Meetings held in our counties during the winter months, and in preparing this programme it was the aim of your Secretary and President to have a discussion at the end of each subject, in which discussion I ask you to take a part. I believe the man who learns the most at these meetings is the one who tells the most. What he gives he gets back manifold.

In reference to the work of the Association this year, this has been, of course, largely in the hands of our committees. As you know from the price lists sent out and other reports, the co-operative committee has been active in assisting the local associations in their purchase of materials. This committee has worked with the Co-operative Fruit Growers along these lines.

In conjunction with Mr. Putnam, of the Institutes Branch, we have assisted with a large number of fruit institute meetings held all over the Province during the past year.

The Transportation Committee has been at work, but under somewhat of a disadvantage as the Railway Commission has not yet given any decision in respect to the express situation. This has been rather a serious matter and the Association ought to in some way press the matter to a conclusion. The Chairman of the committee, Mr. Bunting, has been gathering definite information in respect to pilfering of packages, which was quite a serious matter in the Niagara District this year. He and the other members of the committee have also been watching the general express situation and the matter will be fully discussed at the convention.

The special committee appointed in reference to the judging standards for fruits has also, I believe, been working under the direction of Mr. Macoun. A special discussion of the results of their work will form a part of this programme.

The Horticultural Exhibition, which now forms one of the leading features of our year's work, was for 1909 a very successful venture. The exhibits were well up to the mark in every respect, those of the box packages being especially good. The Association took entire charge of the receival and storage of all exhibits and

the placing of fruit where the parties owning the same could not attend the Show. The fruit at the close of the exhibition was sold at a price of $2 per box and $4.50 per barrel for all fruit that was packed, including both Falls and Winters. The proceeds from the sale of the prize fruit which remains the property of the Association, covered all expenses of transportation of exhibits, cold storage, cartage, labor, placing the exhibits and other incidental expenses of the Show.

The Association is again looking after this year's exhibition along the same lines, but with some additions to the prize list which it is hoped will render the Show even more educational. Special prizes have been arranged for packing of apples in boxes as well as for five-box displays of fruit. Some additional varieties have been added in the other sections so as to have the display more attractive.

The opening up of special apple shows in various Provinces and States has brought up the question as to whether this Association should not now carry on a show entirely devoted to the apple here in Ontario. The advertisement which would accrue would be far greater than we are now gaining from the present Show, which is of necessity called a Horticultural Exhibition. The apple industry should be large enough in the Province to support such a show. British Columbia has led the way this year by inaugurating an exhibition which is claimed to be larger than any other show previously held on this continent. Ontario must not fall behind, and with her extent of orchards should certainly be able to put up as good an exhibition of this kind as British Columbia with her limited area of orchards.

The Orchard Meeting held by this Association at Burlington this past summer was of great value, and by the large attendance and interest taken, our Association is justly entitled to hold several of these orchard meetings this coming year. I may ask that you as fruit growers from your respective counties do not leave all the work of suggestions to our Secretary. but take a live interest in your own county, and interview our Secretary if you wish such a demonstration held sometime during the summer.

The growers and packers of oranges, lemons, pine apples and box apples are endeavoring to put up each year a more attractive and superior article. An attractive substitute is taken in preference to a scabby, ill-appearing apple, and we must at least keep posted or the king of fruits in the East will be compelled to take a lower position with diminished consumption and declining popularity.

The apple business in the Province of Ontario for the past few years has been on the decline, caused by:

1. Insects and fungus diseases in unknown quantities attacking our orchards.
2. Careless growers not giving their orchards proper care.
3. Apple purchasers purchasing these uncared-for orchards.
4. The Department of Agriculture of the Dominion of Canada being unable to get sufficient funds to employ the required number of Inspectors to enforce the Fruit Sales Act, at the point of shipment. Many of our careless growers will not spray until they are unable to sell their apples for barreling or boxing, as their policy is to lump their orchards for the highest consideration each year. I should offer a suggestion that the fruit growers of Ontario would do well to appoint a committee to interview the Honorable James Duff, Minister of Agriculture, *re* the passing of a provincial law for the inspection of our fruit, and that the Inspectors so appointed also act as instructors and thus encourage the growers in the Province in our future fruit industry. With this improved system our apples grown in the Province of Ontario will soon be reaching the Far West apple consuming markets in attractive packages. Our possibilities as apple growers, with

our cheap value of land, soil and climatic condition, are unequalled in the world. This is splendidly demonstrated by the beautiful display of apples at the Horticultural Exhibition now in process at the St. Lawrence Arena, which will certainly elevate the standard of the apple industry in this Province. This annual exhibition has now been carried on for seven years, each year advancing in quality, improving in packing and growers' display. The committee in charge of the exhibit of Northumberland and Durham have a beautiful exhibit of which every resident in the Province of Ontario should be justly proud, especially the residents of these two counties. The county fathers did good work in granting to this committee the sum of $200 towards this exhibit, the value of which cannot be estimated. We wish them success in securing a larger grant next year.

The St. Catharines Cold Storage Company are also to be congratulated on their annual exhibit. They in the past seven years have done more than any other body of fruit growers towards the success of fruit exhibits and extension of markets.

The counties of Leeds and Grenville, Ontario, Prince Edward and Norfolk are assisting materially in this Horticultural Exhibition.

The Department of Agriculture of the Dominion of Canada has a neatly arranged exhibit of the far north apple district from their Experimental Farm at Ottawa.

The educational exhibits from Jordan Experiment Station and Collingwood furnished by the Department of Agriculture of the Province of Ontario are entitled to more than passing remarks.

The hand of death has dealt quite severely with us during the past year by the irreparable loss sustained by this Association and this Province in the death of three of our past Presidents, Mr. A. M. Smith, Mr. Murray Pettit, and Mr. Wellington, whose names stand first in the history of fruit growers in this Dominion. Only last year the former passed his fiftieth year of membership, an event which received fitting recognition from our members. Again as if to add to the bitterness of our loss comes the death of one of our most promising young members, Mr. H. S. Peart, Director of our Fruit Experimental Station. Cut down in the prime of his manhood, called from a work of value and usefulness only well begun, his untimely removal, if only by its contrast with those already referred to becomes, if possible, a greater source of deep regret.

In conclusion I wish to express my appreciation of the valuable services rendered by our Secretary, Mr. P. W. Hodgetts, who by his untiring efforts as Business Manager has made this Horticultural Exhibition such an educational success, being only a small portion of the valuable work he is doing for the Fruit Growers' of Ontario. Let us one and all render him a helping hand.

Mr. Grierson (Oshawa): There is a matter I would like to speak of, and that is whether we should appoint a deputation to interview the Minister of Agriculture of the Province with reference to appointing inspectors. Do you think the Inspectors would conflict with the Inspectors appointed under the Dominion Act?

The President: That is a point it will be necessary to work out very carefully. British Columbia has a provincial law, and I believe Ontario also could work in conjunction with the Dominion in connection with this work. I should think it might be worked out quite successfully.

Mr. McNeil: They could do the same with regard to the fruit as with the fisheries. They have inspectors both for the Dominion and the Province.

The President then called on the Secretary to read the Financial Report. The Treasurer read the report and on motion of Messrs. Grierson and Jones the same was adopted. The report appears on page 6.

APPOINTING A NOMINATING COMMITTEE.

The President called for the appointment of committees, the first being the Nominating Committee, and named Mr. A. McNeil and Mr. F. G. Stewart as two of the Committee, the other three to be named by the meeting. Mr. Robert Thompson, Mr. Wallbridge, and Mr. Harold Jones were proposed. Considerable discussion ensued.

THE PRESIDENT: I would like to get the voice of the meeting on the point as to whether the six retiring directors be on the nominating committee, or whether two should be appointed by the Chair and three by the members. The President put the question to the meeting, and after a vote was taken, declared that the retiring directors could not be re-nominated. The President suggested, however, that six members retiring should help the Nominating Committee in any way they could.

A YEAR'S FURTHER EXPERIENCE WITH LIME SULPHUR VS. BORDEAUX.

MR. R. R. WADDLE (Simcoe): The subject under discussion is a year's further experience with Lime Sulphur vs. Bordeaux. As far as the first spraying goes it seems to be generally admitted that all should use Lime Sulphur, which will control the fungus best if used in the proper time, but if neglected until the leaves peep out about a quarter of an inch you will fail to control it. This year I have been through several orchards in three counties, and I failed to find any proof that three sprayings of lime sulphur for the fungus is any better than one spraying of lime sulphur and two of Bordeaux. In a close examination of some of the orchards sprayed three times with lime sulphur I found one 90 per cent. free from fungus, while the adjoining orchard, which received the same formula, would have fungus on thirty per cent. of the fruit. In examining the orchards sprayed with Bordeaux I found they differed in the same way, whether from lack of thoroughness, difference in time of spraying, or difference in preparing the formula, it is hard to explain. After all we can figure that the lime sulphur has a few points the better of the Bordeaux for fungus, because, first, it will not cause the fruit to rust; second, we can prepare home-boiled concentrate lime sulphur a little cheaper. Of course this amounts to very little in comparison in spraying for fungus. Now, the only way I would pass an opinion as to which is the best would be to see two like machines in an orchard at the same hour using the two different formulas and watching the results.

W. F. KYDD (Collingwood): As some of you know, the Department of Agriculture took charge of six orchards in the Township of Nottawasaga this summer, and it is from the results shown from six orchards that I will speak. The first spraying was done with lime sulphur when the leaves began to come out, just peeping forth. The material did not come quite soon enough, and we were not able to do all our orchards with 1 to 10. Half the first orchard was done 1 to 10, and the second half was done 1 to 20. We were very sorry afterwards we did not continue the whole thing 1 to 10, because we found we did no damage, but we were afraid we might burn the foliage. The people in that locality were disappointed because we didn't burn the trees. (Laughter.) The next spraying was done all lime sulphur, 1 to 40 with the exception of the halves of two orchards, and they were done with Bordeaux. The Bordeaux was 15 per cent. lime to the barrel, and I

could see no difference in the cleanness of the apples either from scabs or worms, whether it was Bordeaux or lime sulphur. We had no rust to speak of at all, in fact none. Now, the proof of the pudding is the eating of it, and our apples were 85 per cent. No. 1. Probably you will say, how could you get that with only two sprayings. In the first spraying the trees got four gallons of material per tree, and the second spraying after the blossoms fell off about five. Now, I have seen a number of orchards sprayed in my travels this year, and I do not think they had enough material put on them. That is one of the things I think is neglected. This old fashioned way of only putting on a nice little mist is not as effectual as drenching the tree. Now, I think I have taken enough of your time, and I thank you for listening to me. I may say the first spraying was done when the leaves were peeping out and the last when the blossoms were just out, and it was plastered on as if it was put on with a trowel.

M. C. Smith (Burlington): The Secretary or the President notified me that I was to have five minutes to say what I had to say and I did not think it was necessary to prepare an address. I thought probably I could last that long.

Now, you all know I am a lime and sulphur man. I have done probably as much spraying with lime and sulphur as any man in Ontario, and I have had very good results. I could instance in our own orchards this year. In one orchard in Burlington, when the demonstration was held in September, we bagged almost 1,100 barrels from eight acres, and I think there were only two spoiled apples found in that quantity—not more. One gentleman from Simcoe found one, and the bagging man said there was one more spoiled apple found, and I gave particular instructions to keep all the spoiled apples.

Now, I have travelled very extensively this year throughout the apple-growing section of Ontario, and I have failed to find any Bordeaux sprayed apples that were as clean. I have seen a good many orchards sprayed with Bordeaux that were practically clean, but I believe the cleanness of the fruit depends on the thoroughness of the application. I have no doubt the Bordeaux will control the blight scab, but you have the disagreeable feature of burning. I have seen some very beautiful orchards of apples this year and in my opinion they were very badly damaged from Bordeaux. I am speaking of Simcoe. Mr. Johnson, of course, disagrees with me as to the harm that burning does the apples, but as an apple buyer, it must appear more would be paid for apples that did not have that burn or rust on.

A Member: Did you observe a good many orchards where the apples were burned where there was no spraying with Bordeaux or other things?

Mr. Smith: I did not. I noticed a little rust sometimes. If the stem end of an apple happens to hold a little water you might get a little rust that way, but there is a great difference between rust from water and rust from burning.

I believe further that lime and sulphur puts a bloom and a freshness on apples that you cannot get from Bordeaux, and I believe it is a greater stimulant to the fruit, and I believe the apples will hang on better. I might say we just finished picking out Spies last Saturday, and in one orchard where we packed over a thousand barrels of Spies I don't believe there was twenty bushels of apples on the ground. With all the wind and storms we have had it didn't seem to blow them off. In my opinion a man can get more absolutely clean fruit with lime and sulphur. It has been admitted by the friends of Bordeaux that you must use lime and sulphur for the first spraying, and I believe if you follow that up with 1 to 30 or 1 to 35 you will do better work with lime and sulphur, and you will do it cheaper, and get better fruit. The growers have got to learn thoroughness be-

fore they are going to get good fruit, and if a man has spoiled apples it is simply because he didn't cover them with the spray.

In Nova Scotia this year lime and sulphur was used first, and the only good apples they have got is where they were so sprayed. I have some photographs taken by the Nova Scotia Government, which you can see, of apples sprayed with lime and sulphur, and unsprayed, and Bordeaux sprayed. The Bordeaux did not seem to control the fungus this year and the lime and sulphur did. We always applied arsenate of lead for all the spies first. I sprayed four times using about nine, ten or eleven to thirty before the blossoms opened, and immediately after the blossoms had burst with the same mixture, and probably about a month before I finished.

A MEMBER: What portion of arsenate?

MR. SMITH: Two pounds to forty gallons.

A MEMBER: Did you try any arsenate of lime at all?

MR. SMITH: No, I did not. I used it two years ago.

A MEMBER: Did you find any injury?

MR. SMITH: I don't know that I did particularly. I used it in Bordeaux; I didn't use it in the lime and sulphur.

A MEMBER: Do you use hard water or soft water?

MR. SMITH: Used one or the other. I didn't notice any difference. I use both generally.

A MEMBER: How many gallons per tree?

MR. SMITH: I would say from eight to ten gallons a tree. They are large trees. I would want the trees drenched, and I like to spray with high pressure, and put lots of material on. I don't believe in this fine misty spraying. I believe in a high pressure nozzle so that you can drive it and cover your tree.

A MEMBER: How much did you put on the first spraying?

MR. SMITH: Five or six gallons to a tree, and later when the foliage is on, and the blossoms and fruit, it takes more material. It depends on the size of the tree. I use the Bear nozzle, as it drives a little farther than the others.

A MEMBER: Is the strongest 1 to 10?

MR. SMITH: You can use 1 to 10, or 1 to 11 even, when the leaves show like little lumps. There is no danger of burning at that time. You would think the leaves would be more tender, but I have sprayed when they were out half an inch, and I have never had any burning, and I sprayed nearly every day it was possible to spray. I never saw one burned apple. I found I could control the scab absolutely with 1 to 30 or 1 to 35.

A MEMBER: When did you use the arsenite of lime ?

MR. SMITH: Two years ago I used some in the Bordeaux formula, but I found the arsenate of lead to do better work. It is more easily prepared and it is more regular, and I might also say that applies to lime and sulphur. I would like to see every fruit grower test his lime and sulphur, and then he would know what he was getting. You can't have any variation with commercial lime and sulphur if you test the material, you know just exactly what solution you want, and if you are making Bordeaux you can't get two barrels to test alike. You might get variation in your apple scabs in that way.

A MEMBER: How often do you spray ?

MR. SMITH: I like to spray four times, but one five acre orchard that never was sprayed before I sprayed twice and had absolutely clean fruit, and the five acres was sold for $1,375 on the trees.

A MEMBER: What time did you spray ?

MR. SMITH: Just before the blossoms opened and just after. I couldn't get to it, as it was wet, and I just sprayed it twice.

A MEMBER: Do you think the season would make any difference?

MR. SMITH: You have to spray at the particular time the blossom is ready.

A MEMBER: I mean for the quantity of scab ?

MR. SMITH: Well, this is a very spotty year.

A MEMBER: Do you notice some seasons in a great many orchards the worms bore in the side ?

MR. SMITH: I did notice that. I noticed the worms working as late as September in the side of the apple. I don't believe it is the moth does it. I absolutely control the moth in the blossom. We hardly find any at all, and we grow 3,000 barrels of apples. We had some side worms.

A MEMBER: How deep did they go in?

MR. SMITH: From an eighth to a quarter of an inch, or sometimes farther. They go just inside the skin, apparently.

A MEMBER: Some of the gentlemen think with those side holes the worms go in?

MR. SMITH: No, you can look and find the end of it. The apple worms bore inside.

A MEMBER: They might get in the apple after they were barreled?

MR. SMITH: Possibly, if they were around.

A MEMBER: Do you think that is a different worm?

MR. SMITH: I do; yes.

MR. PATTISON: I went up to the Simcoe District, Norfolk County, and saw that worm, and all the growers had that opinion. They got two specimens of the Codling moth, and two specimens of that worm, and put them under a microscope, and they were exactly the same worm except in size, and the small worm had a black head instead of a red one, and I came to the conclusion that that was a Codling moth in the embryo state of development, and Mr. Caesar, who had studied the same thing, came to the same conclusion.

MR. SMITH: Well, one of the professors in Washington came to a different conclusion, so there it is. If you spray three times you can get good fruit, and a year like this is the best to do it. Of course if a man has a very large orchard, he probably will have to start to spray a little earlier in order to get over it inside of a month, but I generally wait until they get to the size of a marble or hickory nut before I give them that fourth spraying. I want to get it on the outside of the apple in order to protect it from fungus and that apple worm.

A MEMBER: What is the object of that second spraying?

MR. SMITH: The fungus develops more just at that time than it does earlier. You want to kill the fungus spores, and you kill more just before the blossom opens than afterwards. The first spraying will control the fungus to a certain extent, but that particular spraying is more for scale or oyster shell and blister mite.

MR. CAMPBELL (Morrisburg): I come from the St. Lawrence Valley, Dundas County, where the apple crop flourishes to perfection, that is, the McIntosh and the Fameuse. I think if we control the scab on those two varieties we do a good deal.

Now, I have been doing some work with those two sprays, and I am an unbiased investigator. I have watched pretty closely nine or ten orchards this summer, and in some of those orchards both sprays were used. In three of them just the Bordeaux was used, and I think in three of them just the lime and sulphur was

used, and so far as results go we could see but very little difference. In orchards which were never sprayed before, and I think we plastered it on, we did not get the apples absolutely clean. Probably Mr. Smith will say that we did not put it on thick enough, but at any rate we did not get them absolutely clean. However, I think they got excellent results, and the growers were exceedingly well pleased. In regard to the injury done, I may say that in the orchards sprayed with Bordeaux at one season of the year there seemed to be a very great deal of injury. One man who had a McIntosh orchard of three acres, and he had never sprayed at all, came in one day along in June or the beginning of July, and he spoke in very strong language against the spraying with Bordeaux. He thought there wasn't an apple in his orchard that wasn't injured, and he would just as soon have them damaged with the scab as with the Bordeaux. However, we let him talk, and he sold his orchard afterwards for a very good price, and the buyer never noticed it, and he had been a buyer of some years' standing, so he seemed better satisfied. When Mr. Hodgetts communicated with me in this matter I wrote to this man and asked him to get me some damaged apples, but he told me he had looked over two barrels and couldn't find any. It seems to pass off pretty well, but does not entirely.

Now, in orchard spraying with both materials, as I said before, we could see but very little difference in the results. Perhaps if we had taken areas and counted up the trees we might have seen something in favor of either one or the other. I may say, though, that the foliage was certainly injured to some extent by the use of Bordeaux. We noticed it particularly in a Fameuse orchard. Some sprayed with lime and sulphur (McIntosh apples which went to British Columbia), reflected credit on Ontario. Two other men used lime and sulphur and Bordeaux. Two men who have been spraying for some years have apples pretty nearly clean. They got more injury from the Bordeaux, and they are inclined to use lime and sulphur.

A YEAR'S FURTHER EXPERIENCE WITH LIME-SULPHUR VS. BORDEAUX MIXTURE.

L. Caesar, Department of Biology, O. A. C., Guelph.

In dealing with the comparative values of lime-sulphur and Bordeaux mixture we must consider them first as spring washes and second as summer washes.

Lime-sulphur vs. Bordeaux Mixture as a Spring Wash.

Any person, so far as I can see, who has studied this question, and observed the results this year and for several years back, will readily agree that for the first application, the one just before or as the buds are bursting, lime-sulphur is much the superior spray. This is because it not only does all at this season of the year that Bordeaux mixture can do, namely, destroy the early spores of such diseases as Black Rot Canker, Pear and Apple Scab, Black Knot, Brown Rot and Peach Leaf Curl, but it also does a great deal more in that it keeps under thorough control at least three of our worst insect pests—San José Scale, Oyster-shell Scale, and Blister Mite. What a boon this is to the fruit-growers can only be estimated by visiting orchards where one or more of these pests flourish; and we must not forget that Oyster-shell Scale and Blister Mite have now spread over almost the whole Province, while San José Scale is slowly but steadily extending its boundaries.

Lime-sulphur vs. Bordeaux as a Summer Wash.

Passing on to the really debatable point, of which is the best spray for fruit trees after the foliage is out, I shall first give my own experience in spraying this year, and then draw some general conclusions, based on these and previous experiments, and on information acquired in various other ways, such as correspondence, travel, and conversation with fruit-growers.

I sprayed two orchards this year and partially sprayed a third. One of these belonged to Colonel McCrae, and was situated about two miles from Guelph. The trees were from twenty-five to fifty years of age, had never, so far as I know, been sprayed before, and had received but little, if any, pruning for several years. Most of the orchard was in sod. About one-third of the trees were left as a check; the other two-thirds received three thorough applications of lime-sulphur. No Bordeaux was used in this orchard. The first application was just as the buds were ready to burst, at the strength of about 1 to 10 (hydrometer reading of from 1.030 to 1.035 specific gravity). The second application was just before the blossoms opened, at 1 to 40 (hydrometer reading of about 1.008), plus 2 pounds arsenate of lead. The third application was just after the blossoms fell, with the same mixtures and strength as the second.

Results.

1. *Scab.*—Unsprayed trees, 30 to 95 per cent. scabby. (Almost every apple on the Snows was scabby). Unsprayed foliage, very scabby; some of the crab apple trees lost much of their foliage in July with this fungus. Sprayed trees, 0 to 2 per cent. scabby. Snow apples even in sheltered parts of the orchard were beautifully clean. Sprayed foliage, just as clean as the fruit.

2. *Wormy Fruit.*—Unsprayed trees lost most of their fruit from fungus and worms. Sprayed trees, 5 per cent. wormy. Fruit hung on well throughout season.

3. *Russeting of Fruit.*—No sign of any injury from the spray, the fruit being glossy and well colored.

4. *Injury to Foliage.*—No perceptible burning; on the contrary, foliage was a rich green, clean and healthy, a great contrast to unsprayed trees.

The second orchard sprayed was the experimental orchard at Jordan Harbor. This was not so thorough a test in some ways as the McCrae orchard, because the varieties were less subject to scab, being chiefly Baldwin and R. I. Greening, with a few Spy, Ben Davis and King trees, whereas there were several Snow trees in the McCrae orchard.

The dates of spraying this orchard were somewhat different. The first application, given under the late Mr. H. Peart's directions, was before the buds burst, with lime-sulphur, and was, I believe, thoroughly done. The second was just after the blossoms fell, and was under my directions. In this application I used on half of the orchard lime-sulphur, 1 to 40, plus 2 lbs. arsenate of lead; on one row of 15 trees the same strength of lime-sulphur, with arsenite of lime instead of arsenate of lead; on half of the remaining rows Bordeaux mixture, 3, 3, 40, plus 2 lbs. arsenate of lead; on the rest Bordeaux mixture about 2, 2, 40, plus a little more than 1 lb. of arsenate of lead. This last part was the first to be sprayed and the weaker wash was due to mistaken information at first as to the capacity of the spray tank. About three weeks later the whole orchard, except three trees at one end of each row, received another application with lime-sulphur, 1 to 40, plus 2 lbs. arsenate of lead. This third spraying seemed to make very little difference in the results.

Results.

1. *Scab.*—Unsprayed fruit, 5 to 50 per cent. scabby. Unsprayed foliage, 20 to 90 per cent. scabby. Sprayed fruit, 0 to 2 per cent. scabby. Sprayed foliage, 1 to 3 per cent. scabby.

NOTE.—No difference in amount of scab could be seen in the different parts of the orchard, each mixture, even the weak Bordeaux, having given practically scab-free fruit.

2. *Wormy Fruit.*—Unfortunately I have not yet received the results of the count of clean and wormy apples that Mr. Hodgetts, at my request, gave orders to have made on twelve representative trees situated in different parts of the orchard, but judging from my own observations on September 15th I think the fruit will average about 87 per cent. free from worms of any kind.

3. *Russeting of Fruit.*—None of the fruit was badly russeted, but there was decidedly more russeting on both the Bordeaux plots than on the lime-sulphur, the latter apparently being very little, if any, more russeted than unsprayed trees.

4. *Injury to the Foliage.*—In the row on which arsenite of lime and lime-sulphur was used, 5 per cent. or more of the leaves were rather severely burned, though no permanent injury was done. In the rest of the orchard there was some burning to be seen on most of the trees, but not nearly so much as where the arsenite of lime was used, and not enough to cause any of the leaves to drop. It was somewhat worse on the Bordeaux plot than on the lime-sulphur, and was just as severe on the trees sprayed with the weak Bordeaux as with the stronger.

In addition to the spraying of these two orchards, I sprayed part of the College orchard at Guelph, chiefly as an additional test of whether arsenite of lime with lime-sulphur would burn the foliage. This mixture was used on the trees just before the blossoms opened and again after they fell, and was heavily applied, to make a thorough test.

Results.

1. From the spraying before the blossoms opened, no burning of foliage, or so little that it was scarcely perceptible.

2. From the spraying after the blossoms dropped (Codling Moth spray), very severe injury to both the foliage and young fruit of Montreal Beauty and Hyslop Crabs and to Salome and one or two other varieties of apples. Several other varieties of apples were less seriously injured, but more than one would care to risk season after season.

CONCLUSIONS BASED ON THIS AND LAST YEAR'S EXPERIMENTS, AND ALSO ON INFORMATION GAINED BY TRAVEL, CORRESPONDENCE, ETC.

1. Either Bordeaux mixture or lime-sulphur will thoroughly control the ordinary fungus diseases of the orchard, one apparently being just about as effective in this respect as the other.

2. One mixture remains on the foliage and fruit just about as well as the other.

3. There is very little difference in the price as a summer spray. Bordeaux mixture, 4, 4, 40 formula, costs 5 cents a lb. for bluestone and ½ cent for lime,

4 X 5 = 20 + 4 X ½ = 2 + about 3 cents for labor in preparation = total of 25 cents per bbl. Commercial lime-sulphur at $8.00 per 40-gallon barrel, which is equivalent to 20 cents a gal., costs, when used at the strength of 1 to 30, about 27 cents per bbl. of diluted spray; and when used at 1 to 40 costs 20 cents per bbl. Nothing is allowed for labor of preparation here, because practically none is required.

4. Whenever there is San José scale in the district or where Red Spiders are abundant on the foliage a fruit grower will act wisely in using lime-sulphur instead of Bordeaux mixture as a summer spray, in addition to the spring application of this mixture. It would also be well to use it in the same way if the orchard is badly infested with Oyster-shell scale, because the summer applications are quite valuable against this pest also.

5. Bordeaux mixture is much more inclined to russet the fruit than lime-sulphur properly diluted. In some districts very little damage is done from this cause, and in such districts, unless Scale insects or Red Spiders are troublesome, it makes very little difference which wash is used. In many districts, however, Bordeaux injury to the fruit is quite serious. Professors Scott and Waite, of Washington, D.C., both of whom have been studying this problem, state that of late years from some unknown cause there has been a decided increase in the amount of russeting of fruit and injury to foliage from Bordeaux mixture. The injury to the foliage often takes the form of small, circular, brown spots looking almost exactly like the disease known as Leaf-spot. Both these men seem to think that concentrated lime-sulphur, whether commercial or home-made, is likely to supersede Bordeaux mixture in the near future on account of this injury. When in Michigan this October I visited a famous apple orchard at Fennville and watched the packers putting up the fruit. The apples were very large and fairly free from worms, but were so severely russeted that I could scacely tell a Baldwin from the other varieties. The packers said that owing to the unsightly appearance only a small percentage of the apples would grade No. 1. In cases like these it is very clear that there should be no hesitation in using lime-sulphur instead of Bordeaux mixture.

Precautions that Should be Taken if Lime-Sulphur is Used as a Summer Spray.

1. Arsenate of lead is the only insecticide that we know to-day that is safe to use with lime-sulphur. The combination of these two substances seems not to lessen the value of either. In some seasons and localities arsenite of lime has been used without any injurious effects, but this year's experiments prove that it will sometimes burn very severely, especially in the later sprays of the season. Paris green likewise cannot be safely combined with lime-sulphur.

2. The strength of lime-sulphur that should in my opinion be used for the different applications are as follows:—For the spring applications 1 gallon diluted with water to 10 (if there are no scale insects in the orchard this may be diluted to 12); for the application just before the blossoms open 1 gallon diluted to 30 or 35; for the application just after the blossoms fall (the time for the Codling Moth spray), 1 gallon diluted to 35, or preferably to 40. If a later application is given it should be at least as weak as 1 to 40 if applied at all heavily.

In the above I am taking as a standard a commercial wash with an hydrometer reading of between 1.300 and 1.320 specific gravity. 1 to 10 at this strength

gives an hydrometer reading of 1.030 to 1.032 specific gravity, while 1 to 30 gives a reading of about 1.010; 1 to 35 gives about 1.009, and 1 to 40 about 1.008.

Most of the commercial companies recommend a uniform strength of 1 to 30 for summer use, but I have known several cases in Ontario, and have been informed of several more in Oregon and in Michigan, where this strength was found too strong for the heavy application required at the time for the Codling Moth spray, and I know that 1 to 40 gives excellent results.

If a home-made concentrated spray is used on the foliage, it should be so diluted that each barrel will contain 4 lbs. of sulphur in solution; for instance, if the formula used be 100 lbs. sulphur, 50 lbs. good stone lime and 40 gallons water boiled vigorously 1 hour. It is clear that, as with ordinary care almost all of the 100 lbs. goes into solution, this should therefore make for summer use about 25 barrels of spray. For spring use each barrel should contain about 13 lbs. of sulphur, so that the above 100 lbs. sulphur would be sufficient to make slightly over 7 barrels when diluted.

In conclusion I wish to say that it would be a most desirable thing if a guaranteed standard of strength could be set for the commercial washes and stamped on each barrel so that the fruit grower would be able to rely on the mixture being of uniform density. The standard might read from 1.300 sp. gr. to 1.320 sp. gr., or from about 33 to 35 Beaume. The adoption of such a standard would help the companies as well as the fruit growers.

A Member: How is it they have more rust on the other side than here?

Mr. Caesar: I do not know, unless they have been on it longer.

A Member: Do you think the weather has anything to do with it?

Mr. Caesar: Perhaps. This year has been a serious year for russeting.

A Member: In mixing the solution, has the stirring not something to do with it?

Mr. Caesar: It must be stirred while it is being boiled, and care must be taken to see that the little lumps are broken up. Work them through a screen beforehand, and try to keep them broken up as you go along.

Mr. Jones: For the practical farmer, 5 to 40 gallons of water makes it about right. I mean 5 gallons of the concentrated.

Mr. Caesar: That depends on how much it is boiled down. There are not five men I think in this audience who will get by boiling 100 lbs. of sulphur and 50 lbs. of lime and 40 gallons of water a strength that will on the average exceed 1.210. So you see that it is not more than two-thirds the strength of the commercial wash, and you have always to take that into consideration. The difference in the cost is not so great as one might think. I was working it out last night, and I decided if you took everything together there is not much difference. That 40 gallon barrel of home-made will cost you about $6, and the 40 gallon barrel of commercial will cost you close on to $8 at the ordinary price.

Mr. Thompson: How do you figure that out?

Mr. Caesar: The sulphur will be two cents a pound, and for 100 pounds you have $2. Lime will cost in most districts forty cents a bushel. It will cost at least that. You might allow thirty cents for fifty pounds of lime. That is $2.30. Then I am allowing fifteen cents a barrel for making it, which I think is too low. Twenty cents would make $2.50. Then $1 for each barrel, and I am allowing fifty cents for the cost of your plant, that is to every barrel. Your plant will cost you $7 or $8, or perhaps more. That makes $4. Now every barrel is just two-thirds the strength of the commercial, so you have to add $2 more to each barrel.

That makes your $6, which I think is fair. It was a surprise to me when I made it up.

A MEMBER: Are you speaking of the average man? How about the co-operative associations?

MR. CAESAR: I am not talking of co-operative associations.

A MEMBER: If you were in an association you could cut it down one-half.

MR. CAESAR: One-third, possibly.

A MEMBER: Then you have to have sufficient pure material to compare favorably with the home-made.

MR. CAESAR: The home-made concentrated I find gives good results. I used a lot of it in Jordan Harbor, and I used it at home. A certain American professor is wrong when he said our side worms were not Codling moths. I am certain of it, that a large proportion of our side worms are Codling moths, but there are quite a few of them that are the Lesser Apple Worm. I do not suppose ninety per cent. of this audience can define the Lesser Apple Worm from the Codling worm. They are the same color and the same appearance, and almost identical. The Lesser Apple Worm in this Province I think does not amount to more than five per cent., taking in the side worms and all. The professor is a pathologist, and I do not think made the statement very seriously.

A MEMBER: What is the particular peculiarity of the Lesser Apple Worm?

MR. CAESAR: It causes a large blotch wherever it works on the side of an apple or at the stem of the apple, or at the calyx end of the apple. It does not go in more than a quarter of an inch as a rule. It just works underneath the skin, but feeding near the surface it naturally covers a large area.

A MEMBER: The curculio is a different cut altogether?

MR. CAESAR: The curculio injury in the fall of the year is entirely different from the spring. In the fall they are all feeding punctures, and there is a circle made. I mean to say there is a little hole made through the skin, and then the insect, having a long beak, eats all the flesh it can reach through this hole, and that causes the skin to turn brown. Sometimes it will cut it all out and make quite a large hole.

A MEMBER: When is the proper time to spray for that?

MR. CAESAR: You can control it better by clean cultivation.

A MEMBER: I come from the County of Kent, and we are troubled with scale. If we miss the scale on the first spraying, would you make the lime-sulphur strong enough to kill it later?

MR. CAESAR: The lime and sulphur as a summer spray will help to supplement your spring spray for the San José scale. The young scale appears early in June, but not till June. Your spray for the Codling moth begins usually around the first of June, and by that time you cannot use lime and sulphur very strong. One to thirty-five is as a rule as high as is safe, but Mr. Smith has used in a good many places one to thirty, and I would judge you could use that strength. A great many use one to thirty and get no injury, but some do get injury. If you use one to thirty that is as strong as you can use, and it will supplement the other a great deal.

ORCHARD FERTILIZERS.

PROFESSOR ROBERT HARCOURT, O. A. C., GUELPH.

I have been asked to say something on the use of orchard fertilizers, because there seems to be a feeling that the time has come that we must use something to supplement the ordinary farmyard manure in order to get the best results.

All plants require at least ten elements in order that they may make full and normal growth. Fortunately, of these ten there are only three, or in some cases four, elements to which we need pay special attention. Usually the soil and the air contain sufficient of all other elements to produce full and normal crops. The three which are sometimes present in insufficient quantities are: Nitrogen, potash and phosphoric acid. In some cases lime may also be deficient, but our experience would go to show that there are very many cases of Ontario soils where lime is absolutely needed.

The function of nitrogen is to produce large leaf and stem growth, and it is a prominent constituent of protein materials. Where there is an abundance of nitrogen we will usually have a deep green healthy-looking plant. Too much nitrogen, however, will over-stimulate the growth of wood and leaf to the detriment of the production of fruit. Potash apparently has to do with the formation and transportation of carbohydrates, starch, sugars, etc., within the plant; consequently, in all plants producing large quantities of carbohydrates potash is required in considerable quantities, or, in big, fleshy-leafed plants we usually find that large quantities of this constituent are essential in producing the best results. Phosphoric acid has to do with the formation and transportation of the protein materials, so that it is said to follow the proteins. Phosphoric acid seems to hasten maturity, and thus may to some extent overcome the retarding effect of nitrogen on maturity. Excessive quantities of nitrogen tend to make leaf and stem growth at the expense of the maturity of the fruit, whereas the phosphoric acid has a tendency to bring on maturity.

Before speaking particularly of the results obtained from the use of fertilizers, too much emphasis cannot be put upon the fact that artificial fertilizers will give their best results only when used along with farmyard manure, and that we should never think entirely of replacing stable manures with fertilizers; rather, they should be used in conjunction with it. Furthermore, the full results of fertilizers can be obtained only when they are used in conjunction with the very best of cultivation; consequently, the presence of humus and thorough cultivation should always be associated with the use of fertilizers.

So far as I am aware, very few continued experiments with fertilizers have been carried out on the fruit crops of this country. Numerous experiments have been conducted in the United States and in Germany. The German investigators seem to have fairly well established the fact that the mineral constituents required per acre for the full development of fruit trees do not materially differ from those required for root and vegetable crops. Repeated extensive experiments have also proven that hoed crops, such as potatoes, sugar beets, etc., make a better use of farmyard manure than fruits. Among the fruits, apples are more successful in gathering their food from the farmyard manure than the stone fruits. Experiments carried out at the Diemnitz Experiment Station and at Strassfurt in Germany seem to clearly indicate that in the case of core fruits, and especially with apples, that fertilizers containing the three essential mineral constituents, nitrogen, potash and phosphoric acid, can be used with profit, and that potash affects the

results more than any other one constituent, nitrogen being assigned the second place, and phosphoric acid the third. It has been repeatedly noticed that when potash was not supplied, even though light dressings of stable manure were made every three or four years, the trees assumed an appearance of those grown under adverse conditions on poor soil; *i.e.*, the growth of wood is arrested and the leaves are small and have an unhealthy color and are covered with yellow spots. After the fruit is matured there is some growth of wood and the next spring there is put forth an abundance of blossom, of which, however, few develop, owing to the lack of proper nourishment. In spite of the fact that there is an abundance of phosphoric acid and nitrogen in the soil, most of the fruit falls off during the summer, and, in consequence, the yield when potash is not supplied will be very little greater than when no fertilizer is used. However, these conditions are not general; some varieties show a marked ability to thrive under unfavorable conditions, particularly in the fact that they are able to throw off the superfluous fruit which the tree is not capable of fully ripening. Lack of nitrogen in the soil has been shown to have a somewhat similar effect upon the development of the fruit, although not so pronounced, while the absence of phosphoric acid is even less noticeable. At Strassfurt, in Germany, in an experiment in which we are given the yields for eleven consecutive years from an orchard, we find that the total fertilizers used on the complete fertilizer plot during this period were worth $166.60. The increase due to the use of these fertilizers was worth $1,190.50, leaving a handsome profit for the use of fertilizers. Where the potash was omitted the results were very much decreased. German experiments have also fully demonstrated that the use of fertilizers has a very marked influence upon the yield of plums. Their results in general seemed to indicate that the yield of stone fruits is more influenced by phosphatic and nitrogenous manures than the core fruits. It is quite possible that this is due to the fact that stone fruits have a large kernel which is rich in phosphoric acid, and as the proportion of kernel to fruit is much larger in stone fruits than in core fruits, the former have the greater need for phosphoric acid. These results have been fully confirmed by fertilizer experiments on peaches reported from the New Jersey Experiment Station.

From a German source we take the following results of a long continued experiment of fertilizers on plums:

The value of the fertilizers during the experimental period of 13 consecutive crops is $193.50; increased yield of crop worth $1,709.05. Profit, $1,515.45. When potash was left out the profit was reduced to $140; without the phosphoric acid there was only $108.57 profit, which was still further reduced to $69.03 when nitrogen was the constituent left out in the experiment. In this particular case it is evident that the lack of nitrogen influenced the results more than the lack of either potash or phosphoric acid.

Quoting again from German investigations on gooseberries, the following results are also very interesting:

The total value of the fertilizers used through 13 continuous years of cropping was worth $203.50; total value of the crop due to the fertilizers, $2,035. It is apparent that this would leave a profit of $1,831.50. When any one constituent was omitted the profit was very much reduced. With most of the varieties used in the experiment potash had the greatest influence, phosphoric acid next, and the nitrogen least. Evidence goes to show that different varieties of the same kind of fruit make use of the various mineral constituents in different proportions.

Strawberries have been found to respond very readily to the application of

commercial fertilizers. A study of the requirements of this crop is not so difficult as that of the other fruits in as much as the strawberry crop does not occupy the ground for so long a time, and therefore experiments do not have to be continued for such long periods. Experiments seem to show that the complete mixture of fertilizers will give the largest yields, but that on ground in good condition the plot receiving no nitrogen gave nearly as good results as where this constituent was added, while if potash or phosphoric acid were omitted the yield seriously diminished.

One point particularly demonstrated in all experiments with soft fruits is that an excessive amount of nitrogen seems to produce soft fruit which will not ship well and which decays early. This is particularly true in wet seasons and with the strawberry.

Regarding the influence of fertilizers on quality and flavor of fruit, experiments seem to show that an abundance of phosphoric acid and potash in the food plant is extremely important, and that, on the other hand, where nitrogen is somewhat deficient the effect on the quality is scarcely perceptible. Considerable work has been done in determining the influence of the several ingredients, that is, the nitrogen, potash and phosphoric acid, on the size of individual fruits. With core and stone fruits the experiments are not far enough advanced to warrant definite conclusions, but with berries a greater number of results have been obtained, and these appear to indicate that the lack of phosphoric acid did not materially decrease the size of the berries, as compared with those grown where a complete mixture of fertilizers was used, but when potash was not supplied the berries were small, and where nitrogen was left out they were still smaller.

There is very little definite data to show that color in the fruit is influenced by the nature of the fertilizers used. It is supposed by many that the use of potash and phosphoric acid will influence the color, and it is quite probable that they do, but I fancy that the influence of these may be very easily overshadowed by the effects of excessive quantities of nitrogen in the soil. It is quite possible, and even probable, that too late in the season there is apt to be so much leaf growth that the fruit is too much shaded, and the leaf and stem growth once strongly started is not easily checked, and as a result we have fruit lacking in color and often really lacking in maturity. It seems likely that if cultivation was stopped early in the season, and cover crops sown, that better results would be got. The cover crop will use up a great part of the moisture and thus check growth and cause ripening of the fruit. If this be true, cultivation in the orchard cannot be stopped at any set time from year to year, or in one orchard as compared with another. The time to cease cultivation is dependent upon condition of the growth, which will be influenced by the nature of the weather and the richness of the soil in plant food.

It is our intention this coming year to place a number of experiments which we hope to continue for a series of years. We wish to see what effect fertilizers will have on the fruits and also to study the influence of fertilizers and other factors on the color of fruit. I shall be very glad to co-operate with anyone who wishes to take up this matter seriously, in order that we may get the experiment started on some really good basis. It is useless to start experiments on orchard fruits unless they are to be continued over a number of years, so that the full effects of the fertilizers on the trees and fruit can be definitely studied.

A Member: What effect does it have on the color?

Prof. Harcourt: We cannot get any really clear statement with reference to the effect on the color as a result of fertilization. There does not seem to

be any authoritative information on that point. Many of the Germans seem free to admit that the mineral constituents such as potash and phosphoric acid do affect the color, but it is difficult to get proof. These that I have given you are the results of experiments.

A MEMBER: Can you give too much fertilization? Can you overdo it if you use a certain proportion as a guide, or do you only overdo it when you use too much at one time?

PROF. HARCOURT: You can overdo it with nitrogen. As I said before that is the constituent that forces the big leaf and stem growth, and this is not always followed with a good development of the fruit. On the other hand you can put on all you like of potash or phosphoric acid without fear of hurting the plant.

A MEMBER: Can you overdo it?

PROF. HARCOURT: Oh, yes, you can put more fertilization on than you can hope to get money returns for.

A MEMBER: What is the limit?

PROF. HARCOURT: That varies, a great deal depending on the soil upon which it is going to be applied. I have no doubt many of you have land where it is doubtful if the fertilizers would give good results, or they might have to be used in small quantities, whereas on another man's land they would have to be used in large quantities in order to get the best results from it. It depends on the need of the plant in that particular soil. We cannot give any definite formula which will suit all soils. We have to study the characteristics of the crop and the deficiencies of the soil before we can use fertilizers with any degree of success.

A MEMBER: Where you have exceedingly heavy crops every year does the nature of the soil amount to much?

PROF HARCOURT: If you are comparing a light sand to clay you would have to feed your sand heavier than you would the clay, but of course if we have two soils equally rich it is a question of increasing that which is available to the plant.

A MEMBER: Does an apple orchard in clay require potash?

PROF. HARCOURT: It may or may not. We cannot say that, because in clays we have so many conflicting elements or interests, and reactions going on in the soil. I may say all our soils contain enough potash to grow apples for years and possibly hundreds of years to come, but the difficulty is the getting of that potash into a form that is available for the plant. Some soils will bring that into an available condition faster than others, and you might then have crops without the use of much additional food, but if we do not get that condition then we have to add the additional substances.

A MEMBER: Do you think we should first get the soil into proper condition before using these foods?

PROF. HARCOURT: Any man who uses a fertilizer without first getting the soil into the very best possible condition chemically and physically, and every other way, is throwing money away. Now, if you are going to use fertilizers do not start by making them take the place of manure or cultivation. They can only bring you results when you use them with the very best kind of cultivation and under the very best possible conditions.

A MEMBER: Do you think the mustard family, such as turnips, have the faculty of taking the phosphoric acid in the soil and storing it up in their roots so that the plant can get it? Do you know of any experiments along that line?

PROF. HARCOURT: No. On the other hand if you wish to aid a crop of turnips it should be with phosphoric acids in some form. Turnips and rape, and so on, have greater difficulty in getting phosphoric acid than any other constituent—

more difficult than potash or nitrogen. It is possible when they do get it they hold it in their roots, but they do not hold any more in their roots than they get out of the soil. A turnip crop will take a little larger proportion of phosphoric acid out of the soil than will some other crops.

MR. PATTERSON: Do you think the climate has any effect on those things. I mean to say that a series of experiments conducted in Germany and a series of experiments conducted in the United States would be different. I ask you that because a series of experiments have been conducted in the United States with apple orchards, over a considerable number of years, and they have found what retarded the apple growth was the lack of nitrogen. I believe it is Prof. Stewart who puts forward the theory, with which I agree, that whenever an apple orchard is not doing what it should be doing it is owing to some deterrent or something which limits it, such as pruning or spraying or cultivation or some element in the fertilizer, and it is up to the grower to find out what that is.

PROF. HARCOURT: That is correct.

A MEMBER: Is there any different result with fine ground and coarse ground?

PROF. HARCOURT: We have done nothing yet to follow these questions up.

A MEMBER: Is there likely to be very much difference?

PROF. HARCOURT: The fine ground will give results quicker than the other.

A MEMBER: What proportion of phosphoric acid do you recommend in the fertilizer?

PROF HARCOURT: That will depend somewhat upon the conditions, whether it is strawberries or what it is.

A MEMBER: An apple orchard?

PROF HARCOURT: Perhaps the Thomas Phosphate would be as good a formula as you could get. It would come cheaper, and it has this advantage that it will also liberate potash.

A MEMBER: Who handles that?

PROF. HARCOURT: Almost any of the fertilizer dealers would handle it.

A MEMBER: What is the charge?

PROF. HARCOURT: I don't know that I could answer that exactly.

A MEMBER: Down in Nova Scotia they quote $27 a thousand.

PROF. HARCOURT: That is the kind that is used in large quantities down there.

A MEMBER: I understand there is no data with reference to the coloring of fruit by fertilization. I have heard that iron increases the color of fruit. I have large beautiful apples, but I do not seem to get the color.

PROF HARCOURT: We really have no authoritative data on that point. We have lots of statements, but I do not know how much they are to be depended on. It is stated that the mineral constituents will do it, and that other substances may do it. With reference to the question asked a few minutes ago as to the difference in climate, in the discussion, it was stated that the controlling factor in the United States was the lack of nitrogen. We may have different controlling factors depending on the soil, and then there is the ability of the plants to take up the food they require, to be considered. Of course if the soil is very deficient in nitrogen that would be a factor.

A MEMBER: I suppose the potash you get in wood ashes is worth as much per pound as what you buy in the form of fertilizer?

PROF. HARCOURT: You would have to know how much potash there is in the ashes. I believe the land is suffering to-day for this reason that the ashes are sold out of this country. We have analysed wood ashes and found one and a

half per cent., and we have analysed them up to six per cent. You can't tell by the look of them how much is there.

A MEMBER: It would depend on the kind of wood, and the care that has been taken, and the moisture that is in them. If you could buy them on the basis of their analysis then they could be safely bought. If you could go around amongst your neighbors and they were willing to give you their ashes, and if you knew the nature of the wood and the care they had had, then you would be safe in buying them.

A MEMBER: Has applying ashes to an orchard any effect on the color of the fruit?

PROF. HARCOURT: Some say yes. That is just the same thing as saying that potash and phosphoric acid will develop color. We get some samples with double the amount of moisture that there is in others, and this will affect the percentage of the other constituents, and the difficulty is to know what you are buying. We have analysed samples as low as one and a half, and it is being bought on the basis of five per cent.

A MEMBER: Elm gives very good results. If you can get anybody using elm slabs in a mill don't hesitate to get hold of his ashes as fast as you can get them.

A MEMBER: How much would they be worth a bushel?

PROF. HARCOURT: Perhaps twenty-five or thirty cents a bushel.

A MEMBER: Is swamp muck valuable as a fertilizer?

PROF HARCOURT: It has very little value as the constituents are in the wrong condition. It ought to be drawn out and piled up and allow the acids to neutralize.

A MEMBER: Is plowing in a green crop better than manure?

PROF. HARCOURT: That is a question I cannot answer definitely. I believe we can get humus into the ground quicker with a green crop than with farm yard manure, but I believe every time we plow farm yard manure into a field we are re-seeding that soil with organisms that cause decay in that soil, and I think frequent and small aplications of farm yard manure is very much better than large applications at long intervals. However, I think we get a greater accumulation of the humus matter through the plowing in of green crops than with the application of manure, but I really believe when we are putting on manure we are re-seeding that soil with organisms which cause decay, and to that extent the farm yard manure will hasten the availibility of plant food in the soil.

A MEMBER: Does lime hasten it?

PROF HARCOURT: Of course lime is an indirect fertilizer, and some of our soils require a good deal of it, but lime also acts as a liberator. Not only does it hasten the decay of the organic matter in the soil but it also liberates a certain amount of potash. Soils, of course, differ in their nature.

A MEMBER: How much lime would you put on?

PROF. HARCOURT: I do not think it is safe to put more than a ton or a ton and a half of lime to the acre. In the Old Country when they found the value of lime, they commenced using it up to five or six tons to the acre, but they have come to the conclusion that lime without manure will make the father rich and the son poor. Over stimulation can take place in soils as well as in other things. The longer the soil has been under cultivation the more likely it is to need lime.

A MEMBER: Have you had any experience with straw?

PROF. HARCOURT: That would have a benefit on clay as well. The question of the color of fruit is all tied up with the pruning and the rank growth of the

tree, because you cannot get highly colored fruit on a tree so covered with leaf as to keep the fruit entirely from the sun.

A MEMBER: Do you not think the sunshine has a great deal to do with it?

PROF HARCOURT: I think so. I think the pruning has a great deal to do with the color. I think it may be influenced by the mineral constituents, but we have no definite data. I think it would be well for this organization if we could get fertilization experiments started in one or two districts and let them run on for a number of years to see what the effect would be.

A MEMBER: Do you find that fruit which is not colored has not got the flavor?

PROF. HARCOURT: That would really indicate immaturity. Too much nitrogen will mean immaturity and will mean uncolored fruit. Wherever we have a large amount of nitrogen and much leaf and shaded fruit we have lack of maturity, and that is as true with vegetables as with fruits.

A MEMBER: What would you do with an orchard where you have lots of leaf and lots of fruit but no color?

PROF. HARCOURT: I would not use any farmyard manure on that. I would use some of the mineral constituents to balance up. That soil must be rich in nitrogen when you get that big development in leaf. Is there anything growing between the trees?

A MEMBER: No.

PROF HARCOURT: I would put on a good heavy crop to use up that nitrogen.

A MEMBER: The best crop of apples I ever grew was a year when it was planted with corn, but there has been so much said on the subject I didn't do that again.

PROF. HARCOURT: Yes, but you have an off condition. I would certainly advise there to crop between the rows and use up some of that excessive plant food. In your case it might pay to use rye, or something of that nature. It has been said that plowing down good sod is equal to eight tons of farm yard manure per acre, but I have no definite figures to base that on, and I am not giving that as an exact statement.

THE PRESIDENT: I think we should experiment in our own orchards in some systematic way, and we would then know exactly what our own soil is lacking.

PROF. HARCOURT: Of course I will be quite willing to co-operate with you in that work.

ORCHARDS IN PRINCE EDWARD COUNTY.

M. B. CLARK, WELLINGTON.

At the time the Department of Agriculture opened a branch office at Picton and placed a District Representative in charge, very few fruit growers were practising modern methods of orchard management, as was plainly evidenced by the conditions of the orchards generally throughout the county.

Bark-lice were very prevalent and gaining ground each year, leaf blister-mite had arrived and was spreading rapidly, sun scald and winter injury had left footholds for canker, a great many orchards were in sod or growing crops other than apples, and few, if any, were spraying satisfactorily.

Our first representative, R. M. Winslow, was an enthusiastic fruit man and was tireless in his efforts to acquaint himself with the condition of Prince Edward

orchards, and also to create an interest among their owners in improved methods of orcharding.

The first Fruit Institute was held in November, 1908, at which spraying received particular attention. Special fruit meetings were held by the Farmers Clubs throughout the county, and a few fruit men decided to get after their orchards in a thorough manner.

The lime and sulphur spray was used generally for the first spraying, for bark-lice, leaf-blister mite, etc., and the Bordeaux mixture for the summer sprayings. Cultivation, pruning, scraping and fertilizing were also practised, and those who made a worthy effort were delighted with their results. The success attained by these few men became widely known throughout their respective sections and resulted in a very successful and enthusiastic Fruit Institute last winter, at which the many problems encountered by fruit growers in Prince Edward were discussed and made clear by such men as Prof. Harcourt and Mr. Caesar of the O. A. C., Mr. W. McCalla of St. Catharines and Mr. E. Lick, of Oshawa.

This year a large number have handled their orchards in a very thorough manner, using the lime and sulphur for both scalecide and fungicide and adding the arsenate of lead for the insecticide and their results have convinced them that fruit growing can be made the most profitable as well as the most pleasant line of agriculture. There is still, however, a very small percentage of fruit growers taking any special care of their orchards, many hundreds of acres of orchard have been planted in the last twenty years, and no small share of them have died, principally from neglect, although that a large number of them have survived is very noticeable in driving through the county.

There has been a greater effort made at Wellington to encourage the growing of better fruit than at any other part of the county. A small Fruit Growers' Association was formed last winter with about sixteen members, all supplies were furnished at cost, and all possible encouragement and assistance was given to the members, both by the officers and the District Representative. A system of orchard management was discussed and adopted by all. As the season approached for the different operations, meetings were called, at which a full discussion and explanation of the principles of the work in hand was carried on. Special emphasis was laid on the necessity of spraying at the right time, using good material and lots of it, and maintaining a good pressure. The results obtained, both in the quality of the fruit and the improved health of the trees are highly satisfactory.

There is just now a general inquiry among fruit growers as to how they should handle their orchards. Two years of thorough treatment have proven that there are few orchards so far gone but that they can be redeemed, hence all possible assistance should be given to encourage and develop the work already started.

Demonstration work is necessary, especially in spraying and pruning, many hundreds of acres of young orchards are just beginning to bear, the Lime-Sulphur spray has proved to be the great panacea for the many insects and diseases common in our orchards and all that remains to be done is to conduct an energetic campaign for orcharding and the revenue from Prince Edward orchards can be doubled in three years time.

THE PRESIDENT: We have fifteen minutes for discussion upon this paper.

MR. CAESAR: Just to start the ball rolling I would like to mention one or two things about Prince Edward County and their work there. It is only three years, you might say, since they started into this matter of looking after orchards, and the results in that county I think are simply great. If all the counties of Ontario were coming up as quickly in orchard improvements as Prince Edward

County is, and if we had the same enthusiasm as quite a number of the men are showing there, the apple industry of Ontario would go forward very rapidly. It is a delight to go through Mr. Clark's orchard. I went through it last year, and he had some of the cleanest and nicest fruit to be found in the Province.

MR. CLARK: In the last ten years there have been grown a large number of Ben Davis. You will find in the young orchards from five to fifteen years old possibly fifty per cent. Ben Davis. You will find Spies, Golden Russets, Tolman Sweets and the early winter apples among the older varieties. Snows, Baldwins and Greenings are not being set out in that county on account of the climate being too severe. Although the trees are bearing very well, very few are setting them out at present.

A MEMBER: What do they expect to do with Ben Davis?

MR. CLARK: The buyers take a great many Ben Davis. There is no trouble in getting rid of them.

A MEMBER: Have you had much experience of top grafting in these varieties?

MR. CLARK: I have had no experience along these lines myself. I know several who have done it, but it is not generally adopted. A few are doing it successfully, but as a rule those who are setting out apples now are leaving Baldwins and Greenings out.

THE PRESIDENT: I may say I have not noticed in our orchards the foliage being injured by the use of the Bordeaux mixture, but I have heard quite a number express the view that the fruit looked far worse a month before picking time than it did at picking time. As the color developed, it showed through the rust. For instance, what our friend has on exhibition here is practically all Bordeaux mixture sprayed. At the same time, I don't want you to think I am condemning the lime-sulphur, because I think it necessary that you should use lime-sulphur, especially at the first spraying. Arsenite of lime with lime-sulphur mixture is something I am not acquainted with.

MR. CLARK: There were a few who used arsenite of lime with lime-sulphur; but they quit it and used arsenate of lead. Just at that time Mr. Caesar sent out word through the papers warning the growers against using it; that there was a possibility of getting some burning. Some got some burning and they quit it and used the arsenate of lead.

MR. CASE, New York: Experiments were carried on at my place with arsenite of lime, with the lime and sulphur, and scorched the foliage terribly, although it outgrew it later and there was really a pretty good crop of apples there, and the crop of apples was clean, but it took about one-third of the foliage. Of course they are very thorough in their experiments.

A MEMBER: In Norfolk County did you use the pure arsenite of lime?

THE PRESIDENT: Half Paris green usually, but some arsenite of lime. That is with the Bordeaux mixture. Do not get that mixed up with the spraying with the lime and sulphur, because in Norfolk County we only use the lime sulphur in the first spraying, and then only a few of the orchards, probably not to exceed five per cent.

A MEMBER: What proportion of the arsenite did you use in the water?

THE PRESIDENT: I think twenty ounces.

PROF. HARCOURT: Did you boil that in?

THE PRESIDENT: We boiled it, and mixed it with the lime before we mixed it in our boiler.

A MEMBER: The question I asked about grafting the Baldwin trees was because we found six years ago the Baldwin trees all around died, and the Cranberry also was pretty tender, and part of them went, but we top grafted, and find they are standing still, both the Baldwin and the Cranberry. That is in Prince Edward County.

MR. CLARK: I would like to mention the results we had in using lime sulphur. A year ago we had about fifteen Maiden Blush trees in our orchard and they were very badly infected with leaf spot and blister mite, so I made a special point to give them a good spraying of lime sulphur. I did my work as thoroughly as I knew how, and gave a good pressure on both sides. Mr. Caesar inspected them this year, and we could find a very small percentage, possibly one-half of one per cent. It is mighty hard to find a leaf infected at all, just in one year's thorough treatment.

A MEMBER: When did you spray?

MR. CLARK: Just as the leaves were budding.

A MEMBER: What strength did you use?

MR. CLARK: We used it about one to nine, commercial lime sulphur.

MR. GIBSON: I used the same treatment and it did not do my orchard a particle of good. I got a worse dose of blister mite and scab this year than I ever had in my life. I am sure I have lost over $500 with the blister mite.

MR. CAESAR: A few years ago I tried to get a few good tests for blister mite in Ontario, where I knew there were trees very badly infested, and I examined those under the bud scales. Just before I sprayed the leaves, the buds had actually burst, and the leaves were out a quarter of an inch. I examined underneath those bud scales, and I could find from twenty-five to one hundred of those blister mites under these scales. I gave those one thorough spraying, and all through that summer I was unable to get more than two leaves on a tree that had any mite on them. I might also mention half a dozen places in Prince Edward County where we got excellent results.

MR. LICK, Oshawa: The question was raised a moment ago about lime sulphur not killing blister mite. There must have been something wrong with the lime sulphur put on those trees, for we have abundant evidence for two years in our section of the country that where the home-boiled has been put on thoroughly it has made a thorough job.

A MEMBER: Can you tell me the difference between leaf spot and blister mite?

MR. CAESAR: It is a little difficult to explain what is the difference in the appearance between leaf spot and blister mite. The leaf spot is nearly always a small circular brown area on your leaf, not any thicker than the rest of the leaf. It will vary from one-eighth of an inch to sometimes as much as one-quarter of an inch. The blister mite on the other hand is a slight swelling on the under side of the leaf. In the early part of the season it is a yellowish color and quite small, not any bigger than the head of a pin, on the under surface of the leaf. Then as the season goes on it turns gradually brown and gets to be a reddish brown. On pears it turns black. They are very small, and there is a little elevation on the under surface. The little mites lay their eggs there and they hatch out there. They tunnel in between the upper and lower surface. You would never mistake the two if you saw them side by side. It is chiefly by that little swelling that you can distinguish it.

ORCHARDING FOR PROFIT.

B. J. Case, Sodus, N.Y.

I asked your President last night what he wanted to bring me over here for. I was down in the arena looking at your exhibits of fruit, and I cannot see what you want of me. Now, I am not a scientific man. I had to leave school when I was fifteen years of age and go to work on the farm, so I am just an ordinary fruit grower, who is trying to use all the helps he can get from the scientific men when they make it practical. We have no use for scientific work if it is not practical. I know I have said a good many times, and perhaps I may repeat it, that I hadn't any use for an experiment where you had to count, weigh or measure. I want it so apparent that you have not got to count, weigh or measure a thing in order to know if it is any good to you. If it is so close that you have to count, weigh or meausure, I haven't any use for it. I want it very decided in all experiments I put in myself.

Now, I have 170 acres in fruit of different kinds. Quite a lot of it is young yet and has not borne. I grow all kinds of fruits that are grown in our market except the berries. I used to grow lots of berries, but haven't so many of late years.

A Member: Is it at all possible to have large fruit in connection with small fruit?

Mr. Case: I am hardly able to answer that question. In some instances it is and in some instances it is not. I grew this small fruit, such as berries, when my young trees were growing, and after my orchard got larger we cut them out, and I have arrived at the conclusion after years of experience that I don't want any berries amongst my fruit trees. The time is past when you are going to grow fruit as our fathers grew it; that is, that you can set out a tree and go off and leave it, and come back in ten years or twenty years and gather the fruit. That time has passed, with the increase of insects and diseases. I see my first note is "Keeping Books." I would like to know how many there are in this audience who will hold up their hands to show that they know just how much money they have made out of an apple orchard or a peach orchard or a plum orchard. Is there anybody in this audience who knows and can prove it by figures? I see three. It seems to me the weakest point of the farmer to-day is not keeping books. Any man of practical sense, if you will take a set of books and show him he is losing money, will either change it so as to make money or quit. It is so easily done. Now, I want to beg your pardon for not thinking of bringing over some time cards I have used for several years. They are not copyrighted, so anybody can print them. It is a very simple thing, but I didn't think of it. The card is so arranged that I can tell for the last twenty years, or nearly that, what every man has done every day he has worked for me. It is a card about eight inches wide and perhaps twelve inches long, and good cardboard, so that you can write on it with a pen. Down at the bottom there is a space for the man's name, and the price. Then it is laid off in squares, and the dates are down one side. Then it starts at the top with the hours worked. Then "Apples," "Peaches," "Pears," "Plums," "Grapes," "Berries," or anything a man may keep. Then I take a little stamp, which you can buy for ten cents, with the word "Sunday" on it, and the first thing we do when we start the first of the month is to write down the man's name and the wages he gets, and then we take that stamp and mark the Sundays where they come through the month. Then we take a little file, which

we buy for a quarter, and clip them on. Every man and every horse has a card and it is on this file, and it is kept there for the month. For instance, here is John Legacy, my foreman, $1.60 a day. I start up here at the top, and it shows he works ten hours, and I put down that "10." Then, say he is trimming, and he spent three hours on the peaches, I put 48 cents under "Peaches." Three hours on apples, 48 cents under "Apples." Then the other four hours he was trimming, I put four under there, showing what the man has done. If anyone would like a card, if he sends me two cents for postage, I will send him one, and it will show you just where you are making your money. That is the thing that drove me out of the grain growing years ago, and it is that I have got as the outcome of it.

Now, I started working my father's farm on shares. There was about ten or twelve acres of apple orchard on it and the rest of it was general farming. I found with that system at the end of the year we made about ten dollars an acre on wheat. When we got through and made an inventory and balanced it up, we found that was all we could do, and it was more liable to fall below that than go above it. I could do a little better on barley. I never could make any money on corn; I did well if it balanced. But when we came to that ten or twelve acres of apple orchard, there was $600 or $800 clean profit. It did not take me long to figure it out that it was the fruit business I wanted. However, that is a good many years ago.

The next heading I have is "Trimming." Now you want to know when you have got through here if you have made any money on your orchard or not. One man says, "I sold $2,000 worth of apples this year." What did they cost you? You don't know. You have kept no account of it. Now, suppose Ontario has done the same thing as New York State in regard to trimming. I haven't seen many of your orchards for twenty years. Twenty years ago I went over to Belleville one fall evaporating apples. In these older orchards we have been trimming our apple trees until on the older trees we have got a circle ten or fifteen feet in diameter in the centre of the tree that does not bear anything practically. All these years in trimming, if a limb runs out with some side limbs on, you have cut off the side limbs and kept on sawing it off till you have got that great circle in the centre of the tree that does not bear anything. Just imagine the strain on the limb that runs out fifteen or sixteen feet, or in many instances twenty feet, carrying a bushel of apples. If you have that bushel of apples five feet nearer to the centre of the tree there would be nothing like the strain on it. I claim we have been making a mistake all these years in cutting the short limbs. Where you have a long limb and a short limb, cut the long one instead of the short one, and force the bearing weight back into the centre of the tree. At the same time you must realize you have to thin out those trees. You have got to thin them until the sun will shine on every leaf as far as possible, for every leaf the sun does not shine on is of no benefit to that tree. It is an actual detriment. Now, if you will follow that plan on these old trees, you will find it an advantage. We have stopped setting out these trees that we set thirty feet apart diagonally. We wouldn't do that to-day. There is no trouble to get into that tree and cut the diameter of that tree down three feet a year, at the same time leaving some of those suckers, so that you can force the bearing weight right back.

A Member: What time of year would you trim?

Mr. Case: When the saw is sharp. That needs to be qualified. Remember this fact, that winter pruning stimulates growth and summer pruning stimulates the setting of fruit buds.

A Member: A railway is now coming through our part of the country and

cutting through our orchards, and the people do not know what price to ask for those trees. What is your idea as to the value of trees cut out in that way.

MR. CASE: I can give you instances where orchards have paid year after year 10 per cent. net on a valuation of $1,000 an acre—that is, apples.

A MEMBER: Is there any special time for pruning a tree?

MR. CASE: We trim all winter whenever the weather is mild enough. In fact, we would never get through trimming if we didn't. As soon as we can see what wood to cut out, we trim all winter long. I don't believe it makes much difference.

A MEMBER: In cutting back those trees, how large a limb would you stop at? You would have some limit in cutting them back?

MR. CASE: That is a good point. Of course, most of the agriculturists tell us we must not cut big limbs. I imagine in cutting the big limbs we do shorten the lives of those trees, but we are doing it. We are cutting limbs four inches in diameter. That would be about the limit, unless it is some dead limb.

A MEMBER: Would you recommend that in an old orchard?

MR. CASE: No, I wouldn't, but we are going over the outside of trees and right over the centre, and we are cutting limbs as large as my wrist. You cut the long limb and leave the short one. You will find if you look at the tree that there is a limb runs away out here and there, and you can spare that limb. There is plenty of wood growth there without it.

A MEMBER: How large a limb would you stop at running out?

MR. CASE: Well, I have found instances where they have cut down four inches in diameter.

A MEMBER: They never heal over.

MR. CASE: No, I don't think they do. We most always paint them, but of late years we have been using a thin grafting wax. There are quite a few of our growers who like a thin cement that they paint over them. I have never tried it, but they speak very well of it. Anything that will preserve the wood will do.

A MEMBER: Where they trim all winter, how low does the temperature go?

MR. CASE: It hardly ever goes much below ten or twelve below. I have known it 22 below, but they wouldn't do any trimming at that time; it is too cold.

A MEMBER: Do you have much snow in the winter time?

MR. CASE: Quite a little. Of course, when it is storming, and there is a large amount of snow on the ground, you can't work to good advantage, but we do have a lot of good weather in the winter. They do sometimes work when the thermometer is down to 20. It depends on the wind.

A MEMBER: In planting a new orchard, how far apart would you recommend planting the trees?

MR. CASE: We are setting all our apple trees 20 by 24—Baldwins, Greenings and Spies. I mention these three, because they are big bearers.

A MEMBER: Diagonally?

MR. CASE: No, right in squares.

A MEMBER: Using some of them as fillers?

MR. CASE: Sure, but we do not mix up our apples. I do not take any stock in cross-pollination. I can show you orchard after orchard in our country where they are all Baldwins or all Greenings, and if a man takes care of his orchard it bears just as well as where they are mixed.

A MEMBER: What do you say about all Spies?

MR. CASE: There are very few Spies grown in our section. I was trying to think of a Spy orchard. I have never set any Spies until late years. I have got

a young orchard of Spies, because I take the position we ought to set apples which are in their home, and where we are not going to have another section competing with us, because to-day the transportation facilities have almost annihilated distance. We know we have got to go into competition with apples from the Pacific Coast.

A MEMBER: Mr. Powell has some Spies.

MR. CASE: I am four hundred miles from him. They grow good Spies down where he is. I found when I was down at Poughkeepsie they couldn't grow good Spies. They didn't get the color.

A MEMBER: What treatment would you recommend for an old orchard, probably 25 or 30 years old, set about 28 and 33 feet, and it is now considered too thick? Would you recommend removing a part of these trees, or would you cut back a certain portion from the outside each year?

MR. CASE: Twenty-eight feet is pretty close, but at 33 feet I think you can cut those trees back, but you want to be sure every time you cut a limb that you don't stub off the limb. I don't like that at all.

A MEMBER: You would recommend that rather than taking out every other tree?

MR. CASE: Yes, I think I would. Of course, 28 feet is pretty close. I think any of you will admit a lot of the fruit growers on the other side, and I imagine on this side, are growing paying crops of apples in seven years. It used to take 20 years, but we are learning to do it quicker, and we are coming to the low headed trees.

A MEMBER: Are you getting Baldwins in that time?

MR. CASE: Yes, paying crops of Baldwins in seven years.

A MEMBER: By top grafting?

MR. CASE: No.

A MEMBER: You have rather a longer season than we have.

MR. CASE: I do not think it makes much difference. Your season is not so much shorter than ours as to amount to anything.

A MEMBER: Is it Paradise stock?

MR. CASE: No, but start your tops away down, two feet or two feet and a half from the ground. You understand you get bearing wood three years quicker by doing that than if you start your tops higher. Of course, I have been held back ten years, but I have known for some time those low-headed trees were the best. I have been held back ten years with figuring out some way to cultivate under those trees.

A MEMBER: How do you do it now?

MR. CASE: With the gasoline engine. Sure thing. I had one built for me this year, but I didn't get it out in time to do very much cultivating with it. I hauled most of my apple crop with it. It is coming. We are going to put a gasoline engine in there and clean it from tree to tree up to 24 feet. We are going to put a gasoline engine there that will haul those 12-inch plows.

A MEMBER: Do you mean to put the motor at one end of the row?

MR. CASE: No, right in, so you can put your plows in ten feet without any side draught, but your engine goes right through the centre.

A MEMBER: If you start a tree that low you can't get even a plow under it.

MR. CASE: The plows have got to be made lower. We are going to have them made differently and they will go right under those limbs.

A MEMBER: This gasoline engine you speak of is a compact machine?

MR. CASE: I will describe the one that was built for me. It has an eight-foot

wheel base and it steers like an automobile. All four wheels are forty inches in diameter, and made so that when you steer the front wheels one way the hind wheels go the other, and still we have got the power transmitted to all four wheels. It is a 35 horse power.

A MEMBER: What do they cost?

MR. CASE: The people there are just forming the company and getting started, but probably about $2,000. I understand they have taken out their patents for the United States and have just taken out Canadian patents as well. They are overcoming a lot of difficulties that have been in the way. There is no wear out to the gasoline engine itself hardly.

But that is getting away from my subject. You took me off this 20 by 24 seven years' crop. If you don't do it you are not on your job and that is all there is to it. Now, trees set 20 by 24 will not crowd under 15 years and you have had a chance of having eight crops of apples there. Then when they commence to crowd you take them out diagonally and you have 31 feet each way, and then they are good for 25 years.

A MEMBER: Should you ever let them crowd?

MR. CASE: I wouldn't let them crowd. Just as soon as they commence to crowd I would take them out.

A MEMBER: I understand from your system of pruning you can keep a tree just where you have a mind to.

MR. CASE: I am talking about a big tree that is covering 30 feet now.

A MEMBER: You are crowding your new wood into the centre and cutting out the old wood.

MR. CASE: I don't believe you can take a Greening or a Baldwin and afterwards hold it at 20 by 24 feet. You might, but I doubt it.

A MEMBER: Did you mean 25 additional years?

MR. CASE: No, 25 altogether. Then, if they commence to crowd, you take out the odd trees and you have got them 40 by 48, which is the ideal distance for Greenings, Baldwins, and Spies.

A MEMBER: When your trees are taken out diagonally the first time how far apart are they?

MR. CASE: Thirty-one feet.

A MEMBER: It is said in the humid districts in British Columbia they can grow their trees low, but in our districts, where we haven't humidity, we have to grow our trees high. In other words, we are troubled with all sorts of fungus growths if we don't.

MR. CASE: Well, that is a new thought to me. Yet I have got such faith in the lime and sulphur that I think we are going to hold anything that comes along. Of course, you are breeding a lot of insects and diseases that we do not know anything about to-day that our boys will have to study out later.

A MEMBER: What would you do with an orchard planted 40 feet apart and has not yet started? The trees are three or four years old.

MR. CASE: Are they natural fruit?

A MEMBER: It was intended for a Spy orchard and not grafted yet. They are planted 40 feet apart. What would you do with that orchard?

MR. CASE: I would fill it in, and the reason I would do that is, you may be all right on this side, but in New York State there is hardly one of those cropped. You set an orchard out 40 feet apart each way and you want to do something with that land.

A MEMBER: I should have said it is already planted. I want to know what

you would do with those trees if they were yours, in order to get a good apple orchard.

MR. CASE: I would graft them or bud them.

A MEMBER: Would you cut the limbs, and how low? They have been set three years.

MR. CASE: You will have to ask some of these scientific men.

A MEMBER: You interest me very much when you say a tree should bear in seven years, or ten years. Would you advise cutting those trees and grafting them for a low top?

MR. CASE: How high are they trimmed now?

A MEMBER: Just ordinary, fairly low trimming.

MR. CASE: Well, I doubt if you can get them budded at two feet without anything to draw the sap, and get your graft to live. I doubt it very much. You might in instances, but still I don't think you would have a good result all through the orchard. The only thing to do with that orchard is to graft it just as well as you can and leave enough to draw the sap.

What I was going to say is this, if they set them 40 feet apart you want to try and grow something in between there. On the other side we grow grain, beans, potatoes and general farm crops, and with the rate of wages we have got to pay over there, if they will take my system of keeping accounts to know just where they are, they will find they are just swapping dollars. You are just giving an old bill to get a new one. You put an old bill in in the spring and get a new one out in the fall at the wages we are paying. At the same time look at the fertility you are drawing out of that soil unless you put something back. Now, my plan is clover. I have experimented with all the cover crops that have ever been suggested, and clover gives me the best results. Among those young trees we cultivate till perhaps the 1st of July or the middle of July, or sometimes till the 1st of August, and seed them down with the clover and let that clover grow till the next spring. Then if you wanted a little horse feed I wouldn't object to mowing it for one year through the centre, but if you will keep sowing that clover every year and plowing it under every spring and sow it in clover again, you are storing up a lot of humus and fertility in that soil that that orchard will not forget.

A MEMBER: Will you not make your orchard clover sick?

A MEMBER: Most of them are sick for the want of it.

MR. CASE: That is easily got rid of.

A MEMBER: Is mammoth clover better than the ordinary red clover?

MR. CASE: It strikes me it is a better nitrogen clover. We came to that conclusion.

A MEMBER: Do you prefer clover to hairy vetch?

MR. CASE: Yes. I sowed that one year. Maybe I should have tried it again, but I didn't like it. I had to sow it under the trees, and I had to sow it earlier than I wanted, to get a good growth.

A MEMBER: When do you sow the clover crop?

MR. CASE: On old bearing orchards we commence on the 15th of June or so. We are governed by the growth of the tree.

Now, these men who have been talking about the color of your apples; I have been all through that and have had that same thing. It is too late cultivation, in my opinion. Some of the professors had a great set-to over that, and I put in an experiment of my own, and my plan knocked them silly. If an orchard is making much growth and you get a big rank growing foliage, I stop it right there about the first of June, or certainly by the tenth, and seed it right down, and then I get

color. I am getting better and better color every year. This year I was away from home during that period and they didn't get the seeding done quick enough, and I lacked the color. I think if that clover had been in ten days sooner I would have got much better color.

A MEMBER: Have you got any other fertilizer?

MR. CASE: Yes.

A MEMBER: Why do you think the clover is better?

MR. CASE: Some of you scientific men correct me if I make any mistake, but this is what I have picked up and put into practical use. My theory is this, that you stimulate a big growth, a big foliage. and you shade your fruit. We always mow twice. For instance, you mow this clover by the 15th June and by the 20th July it is all weeds. By the way, I would just as soon have weeds as any other cover crop except clover.

A MEMBER: When do you plow it under?

MR. CASE: Again the next spring.

A MEMBER: Clay soil is a difficult soil to plow in the spring of the year. Do you think it would be advisable to plow under your cover crop in the fall?

MR. CASE: No. That gasoline engine is coming.

A MEMBER: My orchard is clay, and I can't do it in a few days. Do you think the color is a matter of shading?

MR. CASE: Yes. I think that was covered this morning. We have been all over the ground in regard to putting in potash and phosphoric acid, and while it probably does affect the color a little, it takes the sun on the apple, I believe, to get the color, and if there is a big foliage you won't get color. The point is to shrivel up that foliage and get the sun into it.

A MEMBER: Do you think you would get the quantity?

MR. CASE: Not quite, maybe. Now, there is one point I have been pretty fully decided upon that I want to give to you, and that is that an apple tree is like an animal in this respect, that during the incubation period it wants the best of food, and food so it can get it. Now, you know that great care is taken of a stallion during the breeding season, and the mare must be in good health in order to get good results, but as soon as the flesh is formed that feed must be stopped or it will go to fat. Now, I claim with an apple tree you are doing the same thing, and that during the months of April, May and June, when that apple is forming, first the blossom, and the embryo seeds and the apple, and getting ready for the fruit buds during the next year which it forms in July and August, that during that period the tree must get the very best of food which those little rootlets can get hold of, but after that apple is formed and commences to grow, if you keep up that food, it will go to wood. I don't know whether that is scientific, but I can prove it by actual experience anway. I have twenty-five acres of apple orchard, and I have just harvested my eighth crop in succession. But now comes another important point, and that is thinning. I will give you the history of that. We sent some apples to a chemist to have him analyze them so that we might know what they were taking out of the soil, and what we had to give back to the soil, in order to grow those apples. The chemist came back at us and said the flesh of that apple is nearly all water; there is just a taste of potash and phosphoric acid in it, but he said the seeds were high in potash and phosphoric acid. You can see where our reasoning would lead us. We claim it does not exhaust the soil or strain the tree to pump water up out of the soil to make the flesh of that apple, but what does exhaust the soil and strain your tree is to pump potash and phosphoric acid up out of the soil to make the seeds of that apple, and the bigger apples you grow and the

less seeds you grow the less you exhaust your soil and strain your tree. Now, how are you going to do it? The great point is to get those apples off, and we started in September. They may come off in July. We tried to save them, but they must come off, and I pulled off hundreds and hundreds of bushels this last year, and have for three or four years. Now, the point is here, you can go out here among your Baldwin trees that have borne a crop of apples—last October you could anyway—and you could find fruit buds there, but you go there next spring and see if you can find them? And even if they do come through off comes your blossoms or your apples; they will not grow. But if you will carry those trees through in a healthy condition, and do not let them overbear, what few buds you have got you can carry through and they will fetch you in a crop of apples the next year.

A MEMBER: What time would you start?

MR. CASE: Just as soon as the chief drop is over and you know what you have got.

A MEMBER: Do you use commercial fertilizers?

MR. CASE: I certainly do, and Dr. Jordan and Prof. Hedrick and I have had many a battle over it. They claimed at the Experimental Station it didn't do a bit of good, but I never grew such crops of apples until I used commercial fertilizer. I do not use very much barnyard manure. I kept a lot of cows there for years and years and I couldn't make them pay, and I thought they ought to pay, and I got them to a point where I reckoned about $2 a load for every load of manure, and still I could not make those cows pay. The last year I sold my butter for 30 cents a pound in Rochester, nearly all of it, but when you take your inventory at the end of the year it tells you whether you make any money or not, and I never could make any. Then I sold all my cows but two. One I couldn't sell and the other I wouldn't. Now, you take those things and figure them in that way from a fair business standpoint, and you will find where you stand.

Now, as to the fertilizer question: I use a little barnyard manure, but very little. I like to put a little on every year. I use the clover as I have told you, sowing it so that my orchards now are all covered with a mat of clover and weeds and stuff that we have mowed. We have mowed it twice.

A MEMBER: Do you keep the clover that you mow?

MR. CASE: No, sir. We leave it out there till spring and plow it all under.

A MEMBER: Would you plow it late in the fall?

MR. CASE: I think you are losing a whole lot of fertility the whole winter long. It is nature's way that that land should be covered during all the winter. I am talking about these orchards being cultivated. Of course, it is different if you have an old tough sod. Then I use 112 pounds of sulphate of potash and 600 pounds of ground bone per acre. You ask me why I use sulphate instead of muriate. My land is retentive; it is naturally wet. I have got miles and miles of underdraining, and a lot more to put in yet. I try to get a drain between every row of trees if the land is very wet. Of course, that is not necessary for the land where it is dry, but I run my drain through the hollows, and then run the other way, a three-inch tile between every row of trees, leading into the main drain.

A MEMBER: How old are your apple trees?

MR. CASE: There was one orchard was set there in 1853. It is 58 years old. Another one was set in the fall of 1852, and another was set in the 60's. One was set in 1881 and another in 1882. That is the bearing orchards.

A MEMBER: Were those underdrains put in then?

MR. CASE: No. Some of them have been in 20 years.

A MEMBER: Are your trees set 20 x 24?

MR. CASE: We only have been setting them 20 x 24 for a few years. My father set out the orchard that was set out in 1853 and he set them 33 x 49½. Of course, I have been sorry that he did. The 33 feet we have had to keep cutting, but, of course, with 49½ feet there is room to drive through yet.

A MEMBER: Do you think there is any difference between grafting a tree and budding?

MR. CASE: There is a great difference. I don't understand budding very well.

A MEMBER: I heard the other day that winter killing could be caused by being grafted instead of budded.

MR. CASE: I don't know much about it.

A MEMBER: I would like to know what we can make. I know one tree that raised 18 barrels of apples and the tree was over 100 years old. I would like to invest in it, if you can prove that all trees will bear 18 barrels per year. (Laughter.) I have got a 25-acre orchard in which was planted 2,900 trees 30 years ago. A great many trees have died down, so that I believe there are about 2,000 now. Would you take the orchard as a gift?

MR. CASE: Sure. I don't take much stock in the 18 barrel business, but there is no trouble in making an ordinary tree bear four or five or six barrels. We all know that can be done, and if that will not figure up enough money, I think you are pretty grasping.

A MEMBER: Some trees bear 23 barrels.

MR. CASE: That is 69 bushels. I have known in my life of a few of those tremendous big trees that have 40-foot spreads, and occasionally I have known them to produce 50 bushels, taking those that drop on the ground and everything, but that is very exceptional.

A MEMBER: If you have a great many on a tree one year will you not get only a few next year?

MR. CASE: Yes.

A MEMBER: I would like to know at what depth you put your drain in your orchard.

MR. CASE: Nothing less than two to two and a half feet in the shallowest place. Of course, you can't get them all the same depth if your land is rolling.

A MEMBER: Would it be necessary to plant one year old trees in order to cut the heads down that way?

MR. CASE: I think we are all coming to that.

A MEMBER: With reference to that commercial fertilizer, do you use the treated or untreated, or do you put it on raw?

MR. CASE: We use what is known as bone meal.

A MEMBER: Is it treated with sulphuric acid?

MR. CASE: I cannot tell you.

A MEMBER: Do you mix your bonemeal and potash together first?

MR. CASE: No; there is not a man who could live in the same building if you did.

A MEMBER: We have not found out if there is any profit in raising apples yet?

MR. CASE: Now, there have been experiments carried on on a farm near Rochester, where they have ten acres of apple orchard, and they have cultivated half of it and have half in sod. You will find a controversy between Professor Hedrick and Mr. Collingwood in a paper called "The Rural New Yorker," where Mr. Collingwood advocated the Grant Hitchings system and Professor Hedrick advocates the cultivation of orchards, and to clinch the argument he instanced an

orchard where half was cultivated and half was sod, where accounts were kept by the Experimental Station, and it was proved that the five acres of cultivated apple orchard paid a net profit for four years of ten per cent. per year on a valuation of $1,000 per acre. You can find that in the files of "The Rural New Yorker" over Professor Hedrick's signature. Now, don't whistle when I tell you this story. I took four years and I struck 14½ per cent. per year on a valuation of $1,000 per acre. Now, where is there any business equal to growing apples?

A MEMBER: Do you cultivate?

MR. CASE: Yes. It is a mixture between the cultivated and the sod. I stop cultivating between the 10th and 15th June.

A MEMBER: Do you remember the figures for the sod cultivation?

MR. CASE: No, but it is much less.

A MEMBER: Do you cultivate every year or let it remain for some years?

MR. CASE: I cultivate every year, but stop yearly.

A MEMBER: How deep do you plow?

MR. CASE: Just as shallow as we can plow and turn the sod under, four or five inches. If we had some tool for cutting off that clover I wouldn't plow at all. In fact, I have not plowed my vineyard for many years. (Applause.)

MR. A. MCNEILL (Ottawa): May I be allowed the privilege of moving a vote of thanks to Mr. Case. Somehow or other he appeals to me. This is the first time I have had the pleasure of hearing him, and it strikes me he is one of the right kind. He is one of the fellows who is doing things and not merely thinking them. Thinking is all right. It has got to be done. Every castle has got to be in the air before it comes down to earth, but Mr. Case's address has been particularly interesting to me, because he has gone into this thing and has given us his rich experience, and has done it in a way that goes to the bottom of our hearts. Now, I am further pleased, as I believe he has modern methods, according to the professors. I rather like the professors. I have got a sneaking regard for them, although in public it does not do to admit it. Mr. Case has got the right idea, and I am particularly pleased, because I have a couple of thousand trees planted in exactly that same way, low-headed, close together, smaller trees and more of them on the acre, and easy to spray and easy to pick and easy to prune. It is perhaps because I am doing just as he did that makes me think so, but he has made an impression upon us, because he has actually done these things, and he can indulge in automobiles. You cannot get around the argument of a man who has got an automobile. (Laughter.) Therefore, I have the sincerest pleasure in moving this vote of thanks to him. I would also like to add that this is one more "case"—(laughter)—and it is a hard case to get around, when we can welcome a brother from the other side of the line at this particular time when there is so much turmoil and unrest in Europe and in America, and I think we cannot do too much to band ourselves as brothers together. We must all come to the conclusion that we are brothers, and we must stand together for the betterment of the world, and Mr. Case is an apostle of that kind.

MR. GRIERSON: I have much pleasure in seconding the motion.

The President put the motion, which, on a vote being taken, was declared carried.

ONTARIO APPLE SHIPPERS' ASSOCIATION RESOLUTION.

Mr. Nesbitt: I have the honor to represent a body of men who in the past have purchased between 750,000 and 850,000 barrels of apples in the Province of Ontario. The situation has been getting worse and worse from year to year until finally we have decided, which the resolution I will read to you directly will show, that unless we can get apples that have been sprayed it is the intention of the great majority of these people who are buying the apples to go out of the business. To a certain extent perhaps the speculator has been to blame. We all know, and I am not blaming the grower of apples one bit, he was always asking any kind of an old price for any kind of an old apple that grew upon any kind of an old tree, and you always found some person who was buying apples as representatives of people in Great Britain or people interested in Ontario—you always found some person ready to pay those prices. Now, if there was a normal crop of apples this year, and I think I am talking to growers who know this, you could not have sold the crop that was grown upon the trees, because the men who are representing the large interests would not have bought them. However, as it stood the crop was very low, and we knew it in the month of July. It was estimated about 60 per cent. of the crop of last year was grown east of Toronto, and 20 per cent. of the crop last year was grown west of Toronto. As a matter of fact there has been less than that. Nevertheless, with that shortage in their minds their buyers went out around the districts where these apples were to be bought, especially east of Toronto, and where they found orchards that were sprayed they went into them and tried to make a purchase. The orchard immediately adjoining that which was not sprayed they did not waste any time over it at all. They secured as many apples as they could that were sprayed, but the crop was so much shorter than they expected they went back the second and third and fourth time, and eventually picked up all the fruit that was to be found in these orchards that were not sprayed. But that kind of thing will not obtain very much longer, and the result of the conference we held this morning is this: "Moved by Mr. Shourds, of Wellington, seconded by Mr. Douglas, of Newcastle, that the members of the Ontario Apple Shippers' Association agree for themselves that they will not purchase apples from any grower who does not spray his apples with lime and sulphur and arsenate of lead, or some other equally good insecticide." That was passed unanimously. The proceedings of the Apple Shippers' Association will now be mailed to some of the larger growers and other co-operative associations in Ontario, and what the result may be I don't know; but I can tell you now that I have attended a great many meetings of apple buyers in the last ten or twelve years and I have not seen so unanimous a feeling in all my experience as was shown yesterday and to-day, and we have determined that if people will not grow good apples we do not want them at any price. A large proportion of them, or a considerable proportion of them at any rate, ought to be put in evaporaters, but we do not get a chance to get them there. The buyers, on the one hand, and the farmers on the other, are forcing all kinds of stuff into barrels, and the result is we are losing the reputation that Ontario has had for apples. It appears to me you are up against a serious condition, as compared with British Columbia and the Pacific Coast, and the sooner you recognize it the better. We have the advantage in some ways over these places on the Pacific Coast. We have got a better flavored apple, and we have got a better Spy than they can produce anywhere on the continent, and why we do not take advantage of it and get the results is beyond my comprehension.

THE CHIEF DIFFICULTIES IN THE SUCCESSFUL SHIPMENT OF FRUITS.

W. H. Bunting, St. Catharines.

I want to congratulate you upon this very enthusiastic and largely attended meeting that we are having here in Toronto on the fifty-first anniversary. I have been wondering whether it was the popularity of the presiding officer or the awakening that has taken place in the Province of Ontario that is responsible for it. There is another factor in connection with it that I have noticed, and that is the very broad and complacent smile on a great many of our growers who have come up to our convention after a profitable season. The gentlemen who are here to-day are the men who are practising the methods that the last speaker has urged upon the growers of the Province of Ontario, namely, the spraying of the orchards. I want to say for Mr. Nesbitt's information that I think the resolution which he has presented will meet with the hearty approval of every gentleman here present, and that we will, as a body, only too gladly support any further measures that will assist in increasing the number of people who will take the best of care of their orchards. It is the only thing that can be done with any degree of satisfaction, and I am sure if persuasion and education will not accomplish that work perhaps a little coercion on the part of gentlemen like the Apple Shippers' Association will have a beneficial effect. There is another feature in connection with our Exhibition and Convention this year that has struck me as a very good one, and that is the very large number of intelligent young men that I have seen about the Exhibition for the past few days and during our Convention to-day. It speaks well, I think, for the future of fruit growing in the Province of Ontario that we have joining the ranks of the Ontario Fruit Growers' Association the flower of the yeomanry of the Province of Ontario, and I feel certain while there are a number of us who are getting gray in the service, and who perhaps are getting a little too old to learn new methods, that the hope of the fruit growing industry of Ontario rests with our young men, and I feel, sir, it is in good hands.

The Secretary has placed me on the programme to speak for a few minutes with reference to the chief obstacles in the successful shipment of fruit. The Secretary has enlarged upon my subject, and I had not proposed to-day to speak upon the chief obstacles connected with the shipment of fruit, but only a few of those obstacles with which we have to contend. This is a very large subject, and to undertake to discuss all the obstacles and all the various ramifications that come up in connection with placing our fruits on the market in the best condition would be too big a subject for me to handle and would take up too much of our time during the present session. However, there are two or three things I would like more particularly to refer to and emphasize. As I take it there are three parties to this transaction—the producer of the fruit, the carrying company, the transportation company, the railway or otherwise, as the case may be, into whose hands we are obliged to place our product, and then the man at the other end, the customer or the ultimate consumer. Now, in order that this transaction should be successful it must, in the first place, be satisfactory and profitable to the producer. In the second place the middle man, the carrier, must have a fair and reasonable return for the services rendered. In the third place we must have a satisfied consumer at the other end, and one who is prepared to repeat the operation of ordering more of the same commodity. Unless that transaction is carried out on that mutually satisfactory basis, if any of the links of the chain fail, it seems to me, to a very

large extent, the whole transaction falls to the ground. This Association was formed for the purpose of educating the Fruit Growers' of this Province in the very best methods of producing fruits of the very best quality. For 51 years we have been preaching the gospel of good tillage, the selection of good varieties, care in handling, good packing, and all the other things that pertain to the production of first-class fruit. Sometimes progress has been slow, but I think, Mr. Chairman, that I am well within the mark in saying that the rank and file of the members of the Ontario Fruit Growers' Association to-day are engaged conscientiously in an endeavor to do the best they can in these respects. While there are some things we would like to see improved, while there are many of our neighbors and friends who do not attend these meetings and are not connected with our organizations, and who are not endeavoring to do as we would like, yet we feel there has been great progress made and we have hopes for the future. When it comes to the next factor in the transaction, that is the carrying companies, as many of you know, during the past ten or twelve years through this Association, through this Committee and through its members, we have been engaged in an effort to improve the conditions that obtain as to the carrying of our perishable fruits, not only in America, but across the ocean. Some progress has been made. Better rates have been obtained. I think this Association was one of the first Associations to move in the appointment of the Railway Commission, and we have it to our credit that we supported that movement and succeeded in having the Railway Commission appointed, a body of men who have succeeded in doing untold good, not only in our own industry, but to all the commercial activities of this Dominion of Canada.

Now, in connection with these efforts, we have, as I say, succeeded in getting some improvements and some redress, but there are still some things which require attention. One of the things I wish to refer to here is in connection with the delays in transhipment of fruit by the fruit service. Some years ago, in pressing our claims before the Railway Commission, one of the things we asked was that responsibility should be fixed in connection with delays connected with the transhipment of fruit by our fruit service, and that the Railway Companies give us a schedule of shipment. They tell us they will, at the present time, endeavor to place our fruits in the Winnipeg market, for instance, with a schedule of 4½ days; they give us a schedule of 24 hours to Montreal from the Niagara Peninsula; they give us a schedule of 12 hours to the city of Toronto. Now, it is reasonable to expect that these schedules should be carried out, and if they are not carried out that the responsibility for failure to carry out those schedules should be fixed. Now, as a matter of fact, during the past year there has been a good deal of difficulty in connection with this very point. Instead of a 4½ day service during the early part of the season, 7 and 8 and 9 days frequently obtain. Instead of a 24-hour service to Montreal it was frequently 36 and 48 hours, causing the bunching of cars in the Montreal market. Instead of a 12-hour delivery to the city of Toronto, an 18 and 20-hour delivery was frequently the case. These things caused a very great deal of loss and damage to the shippers. Now, it seems to me that these matters should be pressed still further home to the Railway Commission, if they have jurisdiction in this matter, and I have reason to believe they have jurisdiction, and that the responsibility of these delays should be fixed where it properly belongs. So much, sir, for the freight end of the matter.

As far as the rates are concerned, I think we have nothing to complain of in connection with the freight rates to the various points which I have mentioned. There are some details which might be improved upon in that respect in connection with shipments farther west.

Now, there is another phase of the matter. It is not possible for us to handle all our goods in bulk in carload lots. It is necessary, owing to the nature of circumstances, that a very large proportion of our shipments should be carried by the Express Companies of this country. We have a number of Express Companies who are operating, and the very facts that have been shown in the enquiry before the Railway Commission, that these Express Companies have not only been making 14 per cent., as Mr. Case spoke of with reference to his orchard, but three or four times that percentage has been made upon the capital of those companies, and those revenues have been made upon the products we have furnished, gives us an idea what they are doing.

Now, in connection with the handling of fruit by express the statement has been made frequently that this service is unsatisfactory, and to-day I wish to emphasize this fact that the service during the past year has been unsatisfactory, and more than that, that in connection with one of our companies that no very great effort has been made to improve the service, and that while this matter has been the subject of protest for years, the same thing has obtained from year to year. We are practically to-day where we were a number of years ago in this respect. During the past year it has been my privilege to endeavor, personally, to cater to a private order trade by express, and I have had very great difficulty in conducting that business with satisfaction to my customers largely from the fact that conditions, over which I had no control, were of such a character that dissatisfaction arose amongst my customers. In connection with that matter I was obliged finally to address the following letter to the Chairman of the Railway Commission. With your permission, Mr. Chairman, I will read this letter:

"The Honorable Mr. Mabee, Chairman of the Board of Railway Commissioners, of the Dominion of Canada, Ottawa, Ont.:

"Honorable Sir: I am taking the liberty of writing to you at this time in connection with a matter, which in its indivdual aspect may seem somewhat trivial, but which effects to a greater or less extent all those who are engaged in the transhipment of perishable fruits by the Express Companies of this country.

"It would seem that notwithstanding all the care that may be taken by the producer of fruit to select and pack his fruit in a careful manner, that when it is handed over to the Express Companies for carriage, it is subject to depredation and pilfering by the employees of the said companies. This condition of affairs has been brought to your notice in a general way during the Express Enquiry.

"During the present season, however, I have been engaged, to some extent, in catering to a select list of private customers scattered over a considerable area. In a number of cases specific instances of which I herewith append, these consignments have been subject to pilfering before reaching their destination. In some cases the consignees have refused to accept the goods. In others they have been accepted and complaint has been filed with me.

"I take the liberty of bringing this matter before the Board in order that, if possible, some plan may be devised in connection with the adjustment of the Express enquiry that will result in this unfortunate condition being, if not entirely abated, at least very considerable minimized.

"I have the honor to be, sir."

I had the following letter in reply to that communication:

"My Dear Sir,—I have gone over the copies of letters you enclosed to me with much interest. I have, ever since this matter of pilfering and rough-handling was first ventilated before the Board, felt the seriousness of it from the public point of view. That something should be done needs no argument, but the question is what? The difficult is brought about by careless and dishonest employees, in whose hands the Express Companies are compelled to entrust their business. The Company should not be unfairly dealt with, because of the occasional wrong-doing of its employees. It is liable for loss sustained through this pilfering or rough-handling. The proper place for the shipper to establish his claim and make recovery is in the Division Court. What other system could be established to take the place of this? The Act, as it now

stands, gives the Railway Commission no authority to deal with these claims or to say within what time Express Companies should make settlements, or as to whether they should make settlements at all or not. If any change is made, it will have to be made by Parliament.

"I hope that in the course of another month the conclusions reached with reference to the Express Enquiry will be in a position to be made public."

Now, Mr. President, in connection with that matter I addressed a letter in the same tenor to Mr. Bryce, General Superintendent of the Canadian Express Company, and also enclosed to him a number of communications bearing upon this point, and I must say up to the present time, while I have received several letters from Mr. Bryce, the General Superintendent of the Canadian Express, these letters are extremely unsatisfactory in their tenor and offer no sort of relief to the shipper in that respect. Now, with your permission I will read a few extracts from some of the letters I have received during the past six weeks bearing upon this point, and showing this is a matter of the very greatest importance. Here is a letter from my accountant:

"This evening at 6.30 o'clock (twelve hours late) I received 27 baskets grapes, 3 of the lot in very bad order; 1 basket being ½ empty; about 1-3 of the balance are badly shook up.

"I have put in a claim to the Express Company for the damage and shortage of the 3 baskets received in bad order. You can put in a claim for the three baskets that are short delivered. I understand you shipped 30 baskets. This shipment was carried past Kingston this morning and returned this evening.

Here is a letter from a gentleman of Port Dalhousie, who has made some shipments. He says, in a shipment made to Mariposa on September 29th of 10 baskets peaches and 10 baskets grapes, the covering of all the peaches had been removed and fruit taken out, and one basket of grapes had but one bunch left:

"On September 13th I sent a basket of mixed fruit per Canadian Express to Brighton. This package was well packed and covered, and the lady wrote me that the covers were torn and part of the paper removed and top layer of fruit all removed.

Here is another letter:

"Your letter came last night. The peaches came on Monday night, but they did not let me know anything about it till yesterday. I found them with the baskets all broken, the handles broken off, and all had been opened and a lot of the fruit taken out. The peaches were jammed up as though something heavy had been put on them, or else they had been piled up into a corner and heavy things laid upon them."

Here is a letter from the manager of the Humberstone Club:

"The five crates of melons received this morning must have been handled very roughly, as they were well packed, but when I got them here they were in a very bad condition. There were seven of them knocked to pieces.

Here is a letter from Winona:

"Received three baskets of grapes, which I ordered. I find an unreceipted bill enclosed, etc. The grapes had been pilfered. The cover of the Delaware basket was broken and a lot taken out. The Red Rogers had also been robbed. The weight was 3 pounds less than the quantity billed."

Then here is a letter from Montreal:

"At 10.30 this morning the peaches came and fortunately I was in at the time. Both baskets had been tampered with, being about two-thirds full. There was 35 cents to pay, but I refused to take them. Please see Mr. Bunting and show him this letter, so that he may take the matter up immediately with the Express Company."

Then here is a letter from Walkerton:

"Please find enclosed the sum of six dollars, for which please send six baskets of Crawford peaches. Saw your ad in the Toronto *World*. Please when sending do them up, so as the baggage men cannot help themselves, as quite often the fruit comes baskets half empty. Trusting to hear from you in the near future."

Then here is the other side of the story:

"I wish to thank you for the splendid fruit you sent to Mrs. Cook for me. It was so well packed that it arrived in excellent condition. Enclosed please find cheque to cover the same."

Then here is another:

"I enclose P.O. order for five dollars and fifty cents, the amount which I owe you for fruit purchased from you. I only got the cash a few days ago or I would have sent it before. The fruit reached me in good condition and was satisfactory in every respect."

I just read those letters to show that an effort has been made to do the packing carefully. Then I have an extract from a letter of Mr. Bryce's which I wish to read, and then a letter from a gentleman, an eye-witness of some of the handling. Here is an extract from the letter of Mr. Bryce, dated the 26th October:

"As you are aware, we have had this matter up before the Railway Commission, and if at any time you would like to travel in our fruit train, say to Toronto, or take it right through to Montreal, to see how we handle the fruit, I would be only too pleased for you to do so, and I feel convinced it would demonstrate to you the careful way in which this fruit is handled, and also the way in which the fruit settles in the basket, and so you may have a personal knowledge as to what the Express Companies are doing to get the fruit to its destination in good order."

Mr. Bryce makes the charge that the fruit is thrown into baskets:

"As regards the packing; well, I have been too long in the business not to know about that. It is quite obvious to see when fruit has been thrown into the baskets, for the result is, as previously stated, that the fruit settles in the basket."

Now, I have a letter from a gentleman who is one of our most careful packers and shippers, and a gentleman who is conservative in his views, and who handles his stuff with the greatest care:

"Dear Sir,—Although not often at the station at express time, on Wednesday, September 14th, I was at the Welland Station when the one o'clock fruit express was being loaded, and noticed that some of the fruit was handled in an extremely rough way. Baskets were sometimes thrown 2 or 3 feet, landing with a thud on the floor of the car. I also saw baskets thrown on top of each other, the upper basket tilting at such an angle as threatened to throw the contents out through the leno of the cover.

"Since at home we handle these soft fruits with the utmost care to prevent bruising, and since the success of our business depends on the fruit reaching the consumer in good condition, it is shameful to have it so carelessly handled. It would seem, too, that it were in the interest of the Express Company that their service should give satisfaction both to the shipper and the consumer."

I have read these extracts, not that they are anything new, I presume, to a great many of the gentlemen here present who are engaged in the shipment of fruit, but simply to refresh their minds as to the instances that have occurred in their own personal experience and are occurring every day, and to present the matter to the Association for a little discussion on this question, in order that some method or some plan of procedure may be adopted that may, if not entirely do away with this unfortunate state of affairs, at least minimize it to a very great extent. I

leave the matter, Mr. President, with the meeting. If I can answer any questions in connection with it I shall only be too pleased to do so, and I now ask for suggestions and for assistance from the rank and file of the Fruit Growers Association.

THE PRESIDENT: I think this should be thoroughly discussed at this meeting. It is an important subject, and I may say I am one of the sympathizers, as I have suffered in the same way. I sent a shipment to Morrisburg and I took extra pains in having it doubly covered, and I received a letter saying that the top layer of the peaches had been removed. I think this matter should be taken up and thoroughly gone into by this meeting.

MR. AUGUSTINE: I might speak as an eye witness of the way peaches are handled. Coming up from London Fair, I got off at Glencoe, where there are a great many peaches shipped. I saw them piled up in the express car probably six feet high, and if the engine stopped or started very suddenly, I suppose two or three hundred baskets all went down, and I saw the express agent just take his foot and shove them back in one corner. I suppose twenty or thirty baskets were just pushed away back into the corner, and the rest were thrown about just like you throw sacks.

MR. DICKIE: It appears to me whatever action is taken it should be brought very forcibly to the attention of the Express Company. I was shipping a quantity of strawberries a year ago, and I saw the express messenger on the train take them and upset them in the car. I was somewhat enraged about the matter, and I wrote down to them and I got a letter saying they would give it their earnest consideration, but I never heard of it again. This summer I had occasion to ship half a dozen baskets of pears to my father, living in Muskoka, and I got a letter back saying when they arrived there they had been broken open, and they emptied the six baskets into three and a half.

MR. PATTISON: I have been connected with the paper which has taken this question up and argued it very strongly before the public in the interests of the Fruit Growers as against the Express Companies, so strongly that we received a lawyer's letter to say if we didn't stop that things would be made very unpleasant for us. To that we replied that we intended to hew on in the same old direction, and if they wanted to make it unpleasant, why, let them come on with their unpleasantness, because we considered that it was of most vital importance to every man shipping fruit by express to-day. I am not going to go into the question of complaints. Mr. Bunting has given you ample evidence, and every fruit grower who ships by express could supply you with a lot more. The question is, What are we going to do about it? It seems, reading this letter of Judge Mabee's to Mr. Bunting, that the Railway Commission do not feel that they have power to make any ruling at present, and they suggest our remedy is in the Division Courts. I would throw it out as a suggestion that this Fruit Growers' Association take it up as an Association and appoint a committee, or appoint some of the members, to get up some cases, or a case, and push it home. Let them send out detectives or collect in some way the particulars of the grievances of the growers, and have a test case made, and have it pushed right home and these employees fined or sentenced to imprisonment. That stealing and pilfering is very common I know exceedingly well from my own experience, but there is another thing that is almost worse, and that is, when just complaints of injury to fruit go in, there is unusual delay. The express companies, I may say more particularly the Canadian Express Company, admit that these growers have cause for complaint, and still continue to put off adjusting the complaint with letters, and they drag it out so long that finally the grower becomes disgusted, and gives the whole matter up.

I think, perhaps, there are two other points where good could be done. One is that it should be widely advertised in the papers that customers, both private and otherwise, who receive these fruits are not compelled to receive them at all, and that they should refuse them at once and send in a complaint. At present there are a number of people, especially private customers such as Mr. Bunting refers to, who think they have no redress, and are obliged to receive the fruit in whatever condition it comes. The proper thing to do is to refuse the fruit and send it right back to the railway company and lodge a complaint, and communicate with the parties who have sent it, and demand redress.

I may add that I was deputed by a leading medical man of Hamilton this year to purchase some peaches for him to send to his mother, who lives in a small town in the north. I bought him the finest peaches that could be got, packed and shipped them myself, and in three days he got a letter saying that what was left of the peaches were very fine, but although there were four baskets arrived, there were only two baskets of fruit in them. I took the matter up with the Dominion Express Company, and I got this doctor to do the same, and through the agent, Mr. Dobson, of Hamilton, I am glad to say we got prompt restitution. The full damages were returned to those people. Now, that is the way an express company should do, but it also should go further than that. It should send out detectives, or have its system so managed that there would be no need of constant complaints. There is no doubt, although the evidence is absolutely overwhelming, that the express companies, and more particularly the Canadian Express Company, have pooh-poohed all these complaints, and have said that the packers were the people who were doing the pilfering, and any way, what did it matter if there was a little fruit taken away. Now, there are a great many, city people particularly, who think that the fruit grower is a sort of universal philanthropist, and if a little fruit is taken it makes no difference; whereas, if you go to a lawyer and ask them for a little law you will have to pay a mighty fine price for it, or if you go to a doctor and ask him to give away a few of his pills, no matter how poor they may be, you will have to pay for them. I think that a committee should be at once appointed and that some test case should be taken up and let the offenders be fined, and that the fact should be advertised that the fruit may be refused when it is in a damaged state and damages demanded.

Mr. A. E. Sherrington: This is an important matter. There is another question and that is the question of the delivery by the Express Company in the cities and towns to which the shipments are made. We find in nearly all the towns, and more especially the cities, that we are charged with a certain amount for the delivery of the fruit. I believe the Express Companies ought to deliver to everybody within the corporation, no matter what size the city or town is, and it should be delivered free. I think we ought to urge this upon the Railway Commission and ask them to order all the Express Companies to make free delivery of fruit within the city limits, irrespective of the size of the city or town. I ship a great deal of fruit to the City of Toronto and I am charged pretty heavy rates for delivering, and we pay them a pretty heavy rate for carrying the fruit. It should be delivered in the city free, the same as in the smaller towns.

Mr. Bunting: I think Mr. Sherrington is in error. I think there is free delivery.

A. W. Smith: In many parts of Toronto it costs more for delivery of the goods after they arrive at the express office than it does to send them to the express office. It is a very serious matter. I pay 25 cents for express, and 40 cents for delivery after it arrives.

MR. SHERRINGTON: I have never made a shipment to Toronto but I have had to pay delivery.

MR. SMITH: In the City of Toronto they do not deliver past the Dundas Street bridges. They deliver within a certain limit, but they do not deliver to other parts of the city, and you have to pay extra.

MR. SHERRINGTON: They do not make free delivery to the wholesale houses, only across Front Street..

MR. BUNTING: There is just one point I wish to refer to before the discussion closes, and that is the matter of bringing cases of this kind into the Division Courts for settlement. It seems to me that the Canadian Express Company has been referred to this afternoon as being the greatest offender in this respect. I may say I do business almost entirely through the Canadian Express Company for the reason that the Dominion Express Company does not extend from St. Catharines to a number of points. I have heard that the Dominion Express Company has been, as Mr. Pattison has stated, very much more amenable to making amends when difficulties of this kind arise, but I have at the present time some eight or ten claims ranging from one to five or six dollars against the Canadian Express Company. These claims have been filed some six weeks, some two months, and up to the present time I have heard nothing definite from them whatever. They are in process of investigation, or have probably been pigeon-holed. A gentleman here suggests they have been put in cold storage. However, you can easily understand that it means I have to bring parties from all parts of the Dominion of Canada, you might say, to endeavor to prove claims of this kind, when the Company itself has records and knew before I did that there was something wrong with these very shipments and knew the particulars from the time the shipment left the shipping point till it reached the consignee. I would like to ask any gentleman here who has been in the habit of shipping fruit if in his recollection at any time an Express Company's agent has come to him and stated such and such a shipment he made at such a time to such a party was in bad order, and they were anxious to make a settlement. Does any gentleman know of any such thing occurring in the Province of Ontario? In my experience of 30 years I have not heard of such a thing. Now, the companies have the records and they know the circumstances from start to finish, and without any claim on the part of the shipper, without any effort or process on his part these claims should be settled, and settled promptly, and an effort made to obviate a recurrence of the same from time to time. It disorganizes a man's business and it prevents giving satisfaction to his customers. I think that is the important part of it, it is a clog on the wheels of progress and the future prosperity of the fruit growers of this Province.

MR. MCNEILL: What form would you like the resolution to take?

MR. BUNTING: It strikes me a strong resolution going direct to the Express Company should have a beneficial effect. Mr. Mabee, the Chairman of the Railway Commission, has expressed his inability to undertake to remedy this matter, and you can see the force of his argument. I do not think we could ask Parliament to deal with a matter of this kind very well. I think it is a matter between our Association and the companies themselves.

MR. AUGUSTINE: Mr. Bunting made the statement that the rates were satisfactory. Are the rates satisfactory as far as express charges are concerned, because I was going to say we could not all say that.

MR. BUNTING: No, the freight rates in carload lots.

MR. AUGUSTINE: In large fruit growing centres they have a decided advantage over an isolated fruit grower who is perhaps the only one who is growing

small fruit. He has to pay in some cases nearly twice the rate to a certain point as they have to pay from the Niagara Peninsula. I do not think that is fair. They have to run the express cars anyway and they have the messenger there and it does not cost them any more. I do not see any good reason why we should not have the same rate.

MR. BUNTING: I said there had been an effort to have the frieght rate re-adjusted, and as far as I am aware, with one or two exceptions, from the large shipping centres the freight rate at the present time, more particularly in car-load lots is not very unsatisfactory. There are some exceptions to that. However, as far as the express rates are concerned that matter was brought before the Railway Commission a year ago last January in Toronto, and as Mr. Mabee has stated in his letter to me the expression of the Railway Commission's judgment on the matter is to be issued inside of this coming month. The committee appointed by this Association made a presentation to the Railway Commission suggesting a schedule of rates and if those rates are adopted and accepted I think the Association will feel that the Committee has done its duty in that respect.

MR. THOMPSON: There are quite a few exceptions. There are places where the freight rates are very exorbitant and it has got to be a serious matter when you have to pay $300 per car instead of $160.

MR. BUNTING: I think Mr. Thompson refers to rates to the far West. I think I mentioned they were not satisfactory, but other points have been rectified.

THE PRESIDENT: Mr. Bunting, you have this matter far better in hand than anybody else here and I would like to ask whether you would suggest whether or not this should be referred to the Resolution Committee?

MR. BUNTING: My chief object in bringing the matter before the meeting to-day was that a large representative meeting like this, a representative opinion, would back up whatever committee might be appointed for the coming year, and enable them to feel they have the support and co-operation of every grower in the Province of Ontario, which I take for granted they have. I think an expression of opinion from this Association would very much strengthen the hands of the committee at the present time.

MR. AUGUSTINE: There is one other matter I would like to mention. It was suggested some time during this meeting to bring in a resolution, or to bring up the matter anyway, that the inspection in regard to the Fruit Market Act be made to cover the open package as well as the closed. There is a great injury being done at the present time by shipping in open baskets. I don't mean the baskets, but the barrels that are being shipped to the North-West during this last fall. They are simply trash, and the difficulty is you might say that is nobody else's business if somebody has a mind to buy those apples that way. But the question is that the people who are consuming those apples are paying prices that they ought to get good ones for, and if people operate in that way there is no chance for a person who is trying to do a legitimate business and who complies with the law. I do not know whether it comes properly into this business that we are discussing now or not, but I would like to get an expression of opinion on that, as to whether we should include the open package in the inspection as well as the closed. We go into competition with British Columbia, and if we are going to allow people to send that stamp of apples to consumers in the North-West, no wonder we hear the cry of poor fruit that is being sent from Ontario.

MR. MCNEILL: The open packages are subject to the Fruit Market Act, to this extent, that the open face must agree with the rest of the package all the way through, and the Inspector inspects it to that extent. Mr. Augustine is com-

plaining really of a real grievance in as much as there has been a great deal of poor fruit sent away to the North-West in those open barrels, but there is no way of getting at that except by opening up a new principle which I do not think the majority of fruit growers would agree to. A man can ship anything he pleases provided there is no fraud in the matter. There is no fraud in these open packages if the top is the same as the bottom, and you can see what you are buying. I am told that Mr. Vair, of Barrie, undertook to put a linen cover over these barrels and still call it an open package. Mr. Augustine will be pleased to know that we laid an information against Mr. Vair, and a telegram from Winnipeg announces that yesterday Mr. Vair was fined. And Mr. Vair, if he continues in the practice, will be increasingly fined, until I think a $100 fine will convince him that shipping in these barrels with linen covers, which is just to get over the law, will not pay.

Mr. Bunting: I had a case in point a few days ago. I happened to see a car of cider apples, and I also saw another car loaded with basket apples, and I thought a good many of those basket apples ought to have been put in the cider car. However, I was curious enough to follow up those apples, and I enquired from the wholesale man what he was getting for them, and he said he was getting 20 cents a basket. I do not think there is very much profit to a shipper at 20 cents a basket, and I thought he would not care to keep on doing it. As a matter of fact there is a class of people that would like to get a cheaper grade of fruit, and I do not think we can say that a man shall not ship poor fruit, as long as it is shipped on its merits.

Mr. Jones (Maitland): When the question of these open packages was up some of the people in Quebec Province spoke very strongly on the matter, because they said most of the fruit growers in the vicinity of Montreal shipped an immense amount of fruit into the market at Montreal in open packages, and that was a trade that they had to fill, and it was a trade the city looked for and expected and there were purchasers of that kind of fruit. When the discussion took place with regard to the Act this question was taken up and it was decided to have the Act read in such a way that open packages can go into any market provided the face of the package represents the contents as regards grade. It simply protects those who want to do that kind of a trade.

IS THE PRESENT ACTIVITY IN THE EXTENSION OF ORCHARDS LIABLE TO BE OVERDONE?

Robert Thompson, St. Catharines.

To answer this inquiry briefly, I do not think it is likely to be overdone at the present time. Outside of a few lines I do not think we are planting enough to keep pace with our market. It is true sometimes on account of not being able to market our fruit, and not knowing what markets would be open for it, we have had to take a low price, but knowing the high and excessive prices we have got for our fruit this year it seems to me there is an opening for a lot more planting than is being done. The southern part of Ontario is an apple-growing section, and there are going to be more apples planted this spring than has been planted in the last ten years. In other portions of the Province they are going back. However, with the openings and the possibilities of the markets of our Dominion I think we can

market one hundred times as many apples as we are doing at the present time. I was amazed when the apple buyer was speaking in the early part of the meeting about what they were doing and the way the philanthropists were giving us so much money. I remember the time they came very early in the season and offered us big prices. I have in mind a man that sold his orchard for $500 and they took out over 1,000 barrels. At present prices you can figure out who is the philanthropist.

Mr. Case was speaking to you about the low-headed apple trees. I saw some people shaking their heads. If they could have gone back no longer than four years you would have seen the same thing happen when we talked about low-headed peach trees. To-day we have got them down and I have seen the men selecting fruit within a foot of the ground which is as good as at the top of the tree. As far as the apple trees are concerned there are orchards being set out with the idea of growing them and handling them the same as our peaches, and I agree with that from what I have seen during the last few years, that we can get apples in paying quantities in a very short time. Of course some years we may have to take lower prices. Take peaches, for instance. We may have to take a lower price than we have been taking for the last few years, but that will only help to extend our markets. Our own increase in population, with the railway extensions, and better transportation for handling the fruit will mean that much more fruit will be required, and I think our markets will double every year and we will be able possibly to sell our fruit for less than we are doing at the present time and make more money. I remember when grapes were sold at 4 cents a pound and people had to go out of the business, and now they are selling them for a good deal less.

Mr. Jones: In speaking from the standpoint of the part of the Province in which I live, I may say I do not see any danger at all with regard to over-planting of orchards. With the exception of the result of some good work that A. D. Campbell has done in the County of Dundas, there is practically no planting being done. In Leeds and Grenville, where I live, they are so wedded to the cow's tail they cannot get away from it, and the consequence is the orchards there at the present time are being seriously neglected. I think the owners forget they have such a thing, and the consequence is the fruit is being neglected, with very few exceptions indeed. The fruit this year was almost *nil*. There is practically no planting being done. Agents come through there and say they cannot do any business. It is a matter of sentiment, I think, in some localities. Now, I think what sentiment and enthusiasm we have in connection with one of the best paying branches of the farming industry should be encouraged to its fullest extent. Our markets are extending in every direction. A few years ago when we took such low prices for our fruit there were practically no markets in the North-West. It was the land of the Hudson Bay Company for getting furs, but to-day we have a large consuming population there and they cannot grow fruit. They are looking towards British Columbia to supply the Western Provinces, but this year even though they say they have large crops of first-class fruit, more Ontario fruit has been sold than ever. They are not able to supply the demand, and I do not think British Columbia will ever supply the demand in the North-West Provinces. We are getting better transportation across the ocean to the European markets, and the orchards are not increasing in Europe in acreage to any extent. The population of our own towns and cities is increasing to a greater extent year by year than our rural population, and I feel we have very bright prospects for a continued profitable

market for our fruit. I cannot see that there is the least danger of over-production. I may be wrong, but I think I am right.

MR. WALLBRIDGE: How do you account for more Ontario apples being sold in Winnipeg?

MR. JONES: I think there were two reasons. One reason was our packing this year. The fruit has gone into the Winnipeg market, in better shape than it has ever gone before, and the other reason was, I think, that British Columbia, with all the noise they make with regard to their immense crop of fruit, did not have the fruit to put there. It was recognized this year that our fruit was very superior, in packing, to what it had been previously.

MR. WALLBRIDGE: How did the prices compare?

MR. JONES: I do not know how the British Columbia fruit sold, but the prices from the West this year to the Ontario growers were very satisfactory. In one case I sold one carload of fruit, and it was practically the run of the orchards, graded into firsts and seconds and thirds, and shipped out to points west of Winnipeg, at $3.25 a barrel, and on that car the purchaser paid $293 freight, so that the apples cost him something by the time he got them.

MR. SHERRINGTON: I do not think that we should have any fear of the over-production of fruit in this country. Where there are a thousand trees being planted to-day there are nearly that many dying or becoming unproductive. What is the use of all our work, and attending all these conventions, and all this money that is expended, if we throw cold water on the prospects of the fruit industry of the Province of Ontario and try to frighten the growers by saying we will have over-production and we will have to take lower prices. Now, even if we do have to take a little lower price, I for one think I can live on a little less than 10 per cent. on a basis of $1,000 per acre of orchard. I have been making myself this year 17 per cent on a basis of $1,000 per acre, and on the basis of $200 a year which the land cost me six months ago—it was not all in apples—88 per cent. I am making some money, but I can live on less than that, and I am quite willing to take a little lower price. What we want, I think, is greater activity in planting out. and greater activity in the production of a higher class of fruit. We have a large percentage of a low grade of fruit and what we want is a larger percentage of a higher grade of fruit, and let the prices take care of themselves. I think it is a mistake to throw out any hint or suggestion in any way that we are going to have any over-production of fruit in Ontario, for the simple reason that the markets are widening. In our Canadian North-West there is a greater consumption, and over the whole continent of Europe there is an increasing demand, as I understand it. In the United States in a few years they will have no apples to export. They are buyers at the present time, and they will pay any price for our Canadian Northern Spies. And not only that, but there is greater consumption right here at home. I think if they were all as great consumers of apples as I am they would need to plant out new orchards pretty fast, for it takes half a dozen to a dozen apples to do me a day, and I would like to say right here that people cannot eat too many apples, and therefore I have no fear as a grower of over-production of fruit of any class.

MR. MITCHELL (Clarksburg): I do not think we need fear very much for the next few years at any rate, and perhaps in our life time. As the last speaker said, I think it is going to fall into the hands of specialists who will grow a high class of fruit. We have enquiries from Sweden, Norway, Belgium and South Africa, to say nothing about our North-West, and if we had 100,000 barrels of apples this year we could sell them. I think if we go to work and plant good

varieties of high-class apples and take good care of them there will be no fear of over-production.

Mr. Case: That is a bugaboo about the over-production of apples. I remember I set out my first apple orchard in 1882. I had an uncle who lived on a farm adjoining me from the fall of 1827, and he was a very thorough man, the man by the way that started me out in farming. He knew such a thing was so but he couldn't tell why, and now our friends, the scientific men come and tell us why such things are so. I had this orchard set out with the trees 40 feet apart each way for the apples and 20 feet apart for the peaches, and blackcaps set in between, three rows to a row of peaches. I think that figures 3 feet and six inches. I got them all set and growing. I had been in the habit for a number of years of taking this uncle around as I wanted his criticism. We would walk over the farm as long as he was able to walk, and when he couldn't walk I would get a horse and we would drive over everything and through everything for the sake of having him see it. He was a man that everything he said came right from the shoulder. There wasn't any palaver about him at all. As we were going through this orchard I said, "Uncle James, what do you think about it? Do you think we are setting too many apple trees?" He says, "I don't know, I can best illustrate that by telling a story. I moved on to that farm in 1827, and where that apple orchard sets down in there was all grown up with blackberries, and I went at it and cleaned it up, and in 1833 I set it with an apple orchard, two acres and a half of trees. Uncle Elihu Granger came down to visit me and I showed him the apple orchard. The trees were set right and were growing nicely, and he says, 'Boy, you are making a mistake setting all those apples out. What are you going to do with them when the apple trees grow out? You can't grow anything there. See what land that is for wheat and corn and barley, and what are you going to do with your apples? When apples are high you can't get but 25 cents a bushel, and when they are cheap you can't get that. So' he says, 'you had better tear them out.'" Well, Uncle James said he didn't want to tear them out, and he grafted them with a lot of sweet apples, because he knew he could feed them to the cattle and hogs in the winter, and when he built his house he looked out for a good cellar where he could keep them. "Now," said my uncle, "all these years have gone by—that was in 1882, and that orchard was set in 1833—and I haven't got any figures to prove it, but I thoroughly believe that that two and a half acres of apple orchard has made me more clear money than all the rest of the two-hundred acre farm put together. I have sold apples out of that orchard for five shillings a barrel, and that means 62½ cents, and I have sold apples out of that orchard for $5 a barrel. Now," he said, "you go on and take care of your apples. With all the hundreds of thousands of apple orchards that have been set out since that time, with the increased transportation facilities so that you can distribute them so much farther, you can get rid of them, and then the best thing of all, we are just commencing our evaporating. There is the best thing of all for," he said, "you can ship them to the ends of the earth, and you can carry them over from one year to another. Take care of the apple orchard." Now, that is a good while ago. It is pretty near thirty years ago. I have a sister in Rochester, who has brought up seven boys. Her husband was in the lumber business and six of those boys are now in the lumber business in Rochester. They have been very successful and are worth a lot of money. The seventh boy is a banker. My sister came down last spring, I think it was, and it was the first time in several years that she had really appreciated what I had done with that old farm of father's. I was showing all I had

done with it in getting the stones off and under draining it, and I think it was the first time she appreciated it. She stayed there a day or two, and one day she said, "Bryan, Fred (that is the teller in the bank) thinks you are making an awful mistake." I said, "How is that?" "Well, he says there isn't any question but what you have made a great success in growing fruit and marketing it, but he says you are ready to tell anybody anything they want to know about growing fruit or selling it or anything else. Now, he says that the men that he knows, if they have studied something and get a good idea they don't tell anybody about it; he says philanthropy doesn't pay, and you ought to keep those things to yourself and not tell everybody how to grow these apples and take them to market." I said, "Look here; there is more in life than the actual money you pile up (hear hear), and perhaps to live so that when I come to drop out in the section that I live in and the people who knew me can say, and say truthfully, that the section I lived in was better for my having lived in it, is better. (Hear, hear.) But now the apple business is very different from the lumber business," I said. "Your boys sell a bill of lumber for a house, and when that house is built there is no more lumber wanted for that house, and you have got to hunt up another house before you can sell any more lumber; but with the apple business it is entirely different. I don't care how many apples you grow in Western New York or how many you grow in Canada, there will always be a market for them. It is the poor apples that make the trouble." I said to her that one barrel of poor apples on the market will hurt that market more than ten barrels of good ones. (Hear, hear.) She couldn't see it at all. "Well now," I said, "I will take it right home to you. You go in the morning to buy your day's supply for your family, and you go into a grocery store and they have got a barrel of poor apples there, and they are cheap, and you think you will buy a peck of apples for your boys, and you buy them and take them home and put them on the table in the evening and the boys taste the apples and perhaps they eat one and perhaps they don't, and the next morning you still have your apples. Well, you put them into pots or make them into sauce to save them. You go down to the market the next morning to buy your supplies and you say to yourself, 'my boys don't like apples, I guess I won't buy any this morning, part of that peck is there yet.' Now, if there is a nice barrel of apples there you look at them and the price is pretty high, but you say, 'I guess I will try it,' and you take a peck home to your boys, and you bring them and put them on the table after supper, and the boys take an apple and say, 'That's a good one, I guess I will have another,' and the next morning you say, 'Where are my apples?' 'Why,' they say, 'they were so good we finished them.' Now, when you go down to the market the next morning you are certainly going to buy some more of those apples for your boys, and you will buy peck after peck right straight along. Now, if we produce good apples there is a place for every apple we can produce, and you will make a profit out of them."

It seems to me the future of apple growing never looked so bright as it does to-day. I agree with the gentleman that spoke before me here when he said we are getting too much money for our apples. We have no business to have so much; we are getting more than our share when we can get ten per cent. or fifteen per cent. on a valuation of that kind, but at the same time, as a grower, I am going to get all I can. (Applause.)

Mr. Johnston (Forest): I think I can only repeat what has been said by some of the gentlemen who have spoken. If we travel through the length and breadth of this Province we will find orchards that were planted with the hope of being a profitable source of revenue neglected and left to fall a prey to oyster

shell or San Jose scale or Codling worm, or something else. I don't believe there are as many apples grown in the Province of Ontario to-day as there were five or six or even ten years ago, but in the County of Lambton we have confidence in the fruit industry as we are going into the planting most extensively. Right around the town of Forest I know at the present time there are fifty thousand trees ordered for the coming spring, and it is estimated that from one hundred thousand to two hundred thousand trees will be planted in the county next year. I think this is proof that we believe in the prospects of the fruit growing industry. We are also growing peaches up in the County of Lambton. We are planting peaches most extensively. A few years ago people imagined there was no place peaches could be grown but in the Niagara District. They thought down there they were in the banana belt and nobody could grow peaches but themselves, but let me tell you we have also a banana belt in exactly the same latitude, and we have some fifty thousand acres of land just as productive, and the result is people are going into peach growing very extensively. Many years ago people there were growing peaches and growing splendid fruit, but growing in a small way, and when the peach leaf curl appeared upon the scene and not knowing how to overcome it they gave it up. However, now the new peach orchards are coming in, and I think in perhaps four or five years we will come up to Niagara. We think we have a district which, without detracting from the Niagara District, will rival even that famous locality.

MR MCNEILL: There is not the slightest ground whatever for any pessimism in the matter of fruit growing. I have gone very thoroughly into the matter, particularly with respect to apples, and I have this to say, with intelligent marketing we could market a hundred times as many apples as we are growing to-day. There is not the slightest reason why we should not capture the English market completely in the early as well as the later species. Then there is a splendid market opening up in Germany, and the rest of Europe is looking for apples and we can get in there. Then there was a fair quantity sent to Sweden last year, and also to South America, and then our neighbors to the south of us will be willing to interchange their earlier with our later ones, if we let them. There is nothing but the brightest outlook for the fruit growers. Now there is a "but" to it. But the day of the careless, shiftless fruit grower is gone. The fellow who will not spray and will not look after his fruit is not going to get along. Fruit growing in the light of modern science is a different proposition to what it was formerly. We see in different parts of the Province the orchards being neglected which used to produce an abundance of fruit. I look down in the County of Norfolk where there were thirty thousand barrels of apples sent down this year, and I am perfectly certain that the same trees would not have produced three thousand barrels of apples if it had not been for the efforts of this Association. Now, the battle is going to be with the up-to-date fruit grower, and the up-to-date fruit grower hasn't the slightest ground for fear. I can hardly express to you my appreciation of the markets that are opening up for the fruit grower, and I would just say there isn't the slightest difficulty about that.

MR. WALLBRIDGE: You spoke about the people of the United States being willing to interchange their earlier apples for our late apples. They grow late apples.

MR. MCNEILL: We can grow, and I will say it in the presence of our friend from New York, in many districts twenty-five cents a barrel cheaper than they can. They have to add the price of cold storage facilities to their winter apples, and when they are doing business at no profit we have a profit of twenty-five cents a

barrel, so you can see our winter apples are not likely to be soon run out of the market. I don't think they will run us out of the markt with their early apples either, because I have just enough confidence in the bull headedness of the people that we will never have reciprocity, and we will have protection whether we want it or not.

Mr. Robertson: I may say, following what Mr. Johnston has said, that we have been growing peaches for quite a few years down in the Niagara District. Towards the end of the nineties we used to get abundant crops, and I remember in 1897 I had some thousands of baskets and low prices. Then the next year was cold and damp and the leaf curl took the leaves off the trees, and the fruit that was set dropped off, and we had a short crop and high prices. With the advent of the low prices it didn't pay, and the setting out of peach trees practically stopped. The result is the prices this last few years have gone abnormally high. Now, what do we find. Young fellows are coming in, and many of them, I am sorry to say, never will be fruit growers, and they are subdividing their farms into five-acre lots and they are setting them all out in peaches. We find those trees that are coming into bearing are affected in some parts with peach yellows. Now the law is if we get the signature of twenty-five growers we can ask the County Council or the Township Council to employ an inspector, but who is employed? A fellow fruit grower who has more than he can do already, and it doesn't amount to very much. We can tear out our peaches when we see they are affected with the yellows, but there is only a rail fence betwen us and our next neighbor, or a wire fence, and he says "I will mark them," and there they are sometimes in the spring, and not only that tree but the four or five next to them are as badly infested, and that kind of thing is spreading the peach yellows. I think the present activity along this line is certainly going to be overdone.

I think it is time for our Ontario Fruit Growers' Association to ask the Department of Agriculture to appoint inspectors in the peach sections especially, to go around and inspect our trees like they do in New York State. If they appoint an inspector they see that he does his work, and they give him power to enforce the law. I think it would be in place as Ontario Fruit Growers to ask them to take it into their consideration at least.

Mr. Case: Professor Whetzell has proven in an experimental way what I have proven in a practical way in regard to the apple fungus. Professor Whetzell has proven that the spores of the apple fungus are carried over the winter on the leaves on the ground. It was a great surprise to us. We supposed it was carried over on the trees. All it requires is for warmth to be applied and the rain to come and the spores will swell up and burst, and when it bursts it shoots its summer spores right into the air. Now, we have all heard for years and believed it that if we had a lot of wet weather during the blooming period, and the bloom didn't set and the apples dropped off, it was due to a lack of fertilization. I don't believe it to-day. It is because of the wet weather all right, but not from lack of fertilization. Now, if you look you will see those fine pistils stand right in the centre of the stamens; they stand right around it with the blossom leaves on it, outside it. I claim you only want two or three or four hours of fairly bright weather with quite a little breeze blowing to blow those blossoms across that to do the work—you only want one in twenty fertilized—but, according to Professor Whetzell the cause has been that the spores of the fungus has got around that delicate stem, and what we have been blaming to a lack of fertilization is due to the choking of that delicate stem with the roots of the fungus. That is what Professor Whetzell

has proved in an experimental way and a scientific way. This year we tried to overcome that. Now, as the bud commences to grow, if we spray before they open out we have bad dropping of the fruit, but we found if we caught them after they had opened out so that the spray could be driven in there so as to cover all those stamens nearly every apple stayed, and we had to pull off hundreds and hundreds of bushels to save our trees.

MR. JOHNSTON: You sprayed just before they opened?

MR. CASE: Just before the bud opened, or even if some were open.

A MEMBER: The bud or the blossom?

MR. CASE: The blossom is open, so that you can drive the spray right in onto those blossoms. You understand there are three or four or sometimes five in a cluster.

MR. CAESAR: I do not understand with regard to your time of spraying?

MR. CASE: It is when they open up or separate. You will find there is a point when they separate before the bud really opens, or a few of them are open—just before the blossom opens.

MR. WALLBRIDGE: How long before the blossom opens?

MR. CASE: Just ahead of it. You can have a few days there to do it. The spores get into these delicate stamens, and if they don't choke it off they at once, after the apple turns over you have it on the stem. That is what Professor Whetzell claims, and a lot of us have followed his instructions this year and we have had beautiful crops of apples.

MR. THOMPSON: You don't think it is better to plow in the fall. Don't you think it would be better to turn those leaves under the ground.

MR. CASE: I took that up with the Professor, and the point is you can't get all those leaves under, and if you have two or three leaves left when they develop they will inoculate all the trees around.

MR. JOHNSTON: Do you spray before that spraying?

MR. CASE: This is the second spraying. That one ahead of the bloom we claim is the important spraying for fungus.

A MEMBER: How many days have you to do this work?

MR. CASE: You have a few days. You have to get a sufficient force to do it and do it quick. Professor Whetzell tried to kill those spores and he couldn't kill them except by burning, and you can't get every leaf.

MR. CAESAR: I agree with what Mr. Case has said with regard to this. It is a most interesting and complicated thing. There are two kinds of spores in the year. The winter spore that is formed on the old diseased leaves is a different thing from the summer spore. They are so light they go into the air very easily and they get into the lower leaves and if you watch carefully in your orchards just about the time the blossoms are out you will see the leaves beginning to turn a dirty brown color or a yellowish brown color. I can hardly describe the color. That is where the fungus has already started on those leaves just before the blossom has come out. Then in a few days that lower set of leaves to which the spore has reached is ready to send out a different kind of spore, which is carried by the wind from the lower limbs all through the tree and around through your orchard. That is the way it spreads. Then, if you want to protect your fruit what Mr. Case has said is just right, by spraying just before the blossoms come out. You cannot go to every tree and look, with all the varieties of apples, and select the ideal time. We wouldn't get through our orchard if we did that, but if you take them just as the blossoms are beginning to burst, and perhaps a few of them will be out. It wouldn't do to spray when the buds are open, but you may

have an occasional blossom out. Then if you follow that up as soon as ever the blossoms fall and cover your little fruit you will control your apple scab. Those two in most years will absolutely control your apple scab. I would differ slightly from the Professor and Mr. Case when he says the second one is the most important. There was a man here last year who sold 1,400 barrels of apples. He sprayed last year according to the ordinary method in the spring with lime and sulphur and then immediately before the blossoms burst, and then immediately after they fell. This year he left off the spraying immediately after the blossoms burst, and he wrote to me a few weeks after the apples had got about an inch in diameter, and said, "I have got some apple blight in my orchard and I don't know what it is. I wish you would come out and see it." I went out and I found that every leaf in that orchard and every apple nearly, that last year he kept so clean, was simply covered with apple scab fungus, and I believe it was due to the fact that he didn't spray just before those blossoms burst.

A MEMBER: How long will those spores retain vitality?

MR. CAESAR: A long time.

MR. ROBERTSON: May I put that in the form of a motion, to amend the present law in connection with the Fruit Inspection Act—that the Inspectors be given full power and that the power for the appointment of Inspectors be taken out of the hands of the Township Councils and placed with the Provincial Government, on condition that twenty-five ratepayers ask for the appointment of an Inspector.

MR. THOMPSON: I second that. The only change is that the Department appoint the Inspectors instead of the Township Council. With all due respect to some of the Townships, I know for a fact there are others which do not do it.

MR. WALLBRIDGE: There is the expense in connection with it. The Government in all probability would not go to the expense of appointing an Inspector for each little district. They would be willing to appoint an Inspector for a municipality if the fruit growers in the district pay the expense.

MR. THOMPSON: There is no change in regard to that. The law is on the petition of twenty-five ratepayers the Council have to appoint an Inspector, and the Government pays one half of the expense. All we ask is that the Government appoint the man instead of the Council, and that they see that a competent man is appointed. The expense is apportioned just the same.

MR. PATTISON: I think the point is well taken. I was over to the Niagara District examining into this very thing, and to my certain knowledge, just as he says, there are only two or three townships that appoint really competent men, and if the fruit growers haven't confidence that the man knows his job you can hardly blame them for refusing to take the trees out.

THE PRESIDENT: The motion that is before us is this: "That the Fruit Inspection Act as it now stands with regard to Township Inspectors be changed, and that the Inspector be appointed by the Government on the application of twenty-five members from the district so wishing this Inspector, on the same basis of expense as at present."

The President put the motion, which on a vote having been taken, was declared carried.

FIRE BLIGHT SUCCESSFULLY COMBATTED.

D. H. Jones, O. A. C., Guelph.

I presume there is no one knows so well as the fruit grower that the enemies he has to contend with in the successful production of fruit may be referred to as legion, and the method of combatting the different enemies vary according to the particular nature of the enemy. I have no doubt that many fruit growers are tired of being told that such and such an enemy requires such and such treatment and that another enemy requires a different treatment, so that at the present time we have quite a number of sprays and washes and other methods of treatment in order to keep in check and to stamp out as far as possible the enemies that prevent the successful production of fruit.

In order to successfully cope with a disease, whether it be a disease of animals or of plants, it is most desirable to know its specific cause and its methods of attack. Practically all that is known concerning the precise nature of infectious diseases both of animals and plants has been learned during the last 30 years or so. Everyone now is familiar with the precautions necessary to prevent the spread of typhoid fever, cholera, tuberculosis and anthrax, and other infectious diseases in man and animals. Individuals suffering from these diseases are isolated as far as possible, and care is taken that all discharges from their bodies are burned or otherwise disinfected. These precautions are necessary because these diseases are the result of micro-organisms gaining access to the body through water, food or wounds and there rapidly multiplying. Their multiplication produces the symptoms of the disease, and as millions of the germs are soon produced in the body from a few that have gained entrance, some of these are given off in the discharges and if these are not destroyed they are liable to spread the disease to whoever comes in contact with them.

The disease of some trees, known by the various names of fire blight, pear blight, apple twig blight, body blight, and blight canker, is a bacterial disease, and hence if its spread in our orchards is to be prevented precautions must be taken somewhat similar to those found necessary in dealing with bacterial or infectious diseases of man and animals.

So far as is known, the disease is peculiar to North America, where it has caused immense losses to pear and apple growers. In addition to being found on the cultivated and wild varieties of apple, pear and quince trees, it is quite common on the juneberry, hawthorn and mountain ash, and occasionally it is found on the plum.

The disease is caused by a microbe known as *Bacillus amylovorus*, which on gaining entrance to the bark of a tree subject to its attack, rapidly multiplies there, and in doing so kills the bark. If the bark attacked be that of a twig, the twig with its leaves, blossoms or fruit will wither, turn brown and die. If the bark attacked be that of the trunk or main limb, the result is a canker of the area attacked. The cankered area is usually darker colored than the healthy part, is somewhat sunken, and usually surrounded by a crack. If the cankered bark be cut, it will be found to be brown and tough instead of being white or light green and tender. The canker in the apple tree does not usually spread to very great dimensions except in a few varieties, principally the Russian varieties. With the pear tree, however, it is different, for when the bacillus finds entrance to the bark of the trunk or a main limb of a pear tree it usually continues to spread there until it has killed the tree outright.

For the disease to spread rapidly in a tree it is necessary that the affected bark be juicy. The bark of the large limbs and trunk of the pear tree is softer and more juicy than that of most varieties of apple trees. Hence it is that the disease spreads more rapidly and does much more damage in the trunks and large limbs of the pear than in those of the apple. On the other hand, the bark of the twigs and young shoots of the apple is softer and more juicy than that of the pear twigs, and consequently blight of the apple tree is usually in the form of twig blight, all the young growth on the tree often being killed out in one season.

Trees in sod are not so sappy as those under cultivation. Hence it is that the disease kills off trees in well-cultivated orchards more often and more rapidly than in orchards that are in sod. However, sod is not the ideal condition for an orchard. It not only curtails the production of fruit and hinders the development of the tree in general, but it harbors numerous orchard insect pests for which it is a good breeding ground. We must, then, if we are to get the best results from our orchards, cultivate them and find some other means of keeping the blight in check than by leaving them in sod.

How it is Spread.

1. Insects.—Insects, more than any other thing, are responsible for spreading the blight. It was demonstrated a few years ago that bees, wasps and other blossom-visiting insects often carry the germs of the diseast on their bodies, especially their mouth parts, to the blossoms they visit in the orchard. When they insert their proboscis into the flower to get the nectar, they deposit a few germs in the nectaries, and here the germs develop rapidly, kill the flower, and pass down the bark of the flower stem to the fruit spur, kill it and all the other blossoms on it; they then continue to work their way in the bark, passing on down the twig to the larger branch, and thus we get a typical case of "twig blight."

When the disease is active in a sappy tree, there is often a gummy exudate from the part affected. This is usually amber colored, and may be seen on the outside of the diseased bark, sometimes in globules and sometimes slowly streaming down the surface. This gummy material is teeming with the disease germs, and many insects like to feed on it, and in feeding on it they get their feet and mouth parts covered with the germs, and these, when they fly away, they take along with them. So when they fly from a diseased tree to a healthy one, they are liable to inoculate the latter with the disease germs from the former. The inoculation is made either through the flower by the honey-seeker or else by a puncture of the bark by biting or boring insect such as a beetle or by a sucking insect such as the various plant bugs and aphids.

We found as a result of our observations made in the college orchard, and many orchards in the Niagara, St. Catharines and Whitby districts, that fifty per cent. of the total amount of twig blight on apple trees in 1909 was due to its spread from twig to twig, from tree to tree, and from orchard to orchard by aphids (*Aphis mali* and *Schizoneura lanigera*), and that practically all the twig inoculations that were made after the blossoming season were made by these same orchard pests.

It is well know to orchard men that the aphid's favorite feeding place is on the water sprouts, suckers and young twigs of the tree. It is here they find the tender bark which they can easily puncture to obtain the plant juice which is so plentiful there. It is the tender, juicy bark that, as we have before mentioned, supplies the ideal conditions for the blight germ to rapidly develop in. An aphid,

when feeding, punctures the bark, from which it draws the sap with its sucking tube. Should the twig which it punctures have the blight, the sucking tube which is inserted in the bark will be contaminated with the blight germ, and large numbers of germs will be drawn into the body of the insect, and will cover its mouth parts, and so when the aphid moves to another twig it will carry the germs along with it, and on puncturing the fresh twig will inoculate it with these germs. We found this to be happening in practically all the orchards we visited during June, July and early August. We found many young trees that had not yet born a blossom and that were absolutely free from blight before the aphids came in June, to have, after this date, all their young shoots killed out by the gradual spread of the disease, from the tips downward, after they had been inoculated by aphids. We also found large numbers of suckers and water sprouts on the older trees develop the disease after the aphids visited them, and rapidly die. In many cases, when the disease reached the base of the water sprout or sucker, it entered the limb or trunk on which the shoot grew, and there formed a canker, sometimes large and spreading, if the bark was juicy, and sometimes small. The bark immediately surrounding such cankers is liable to harbor the disease germs through the winter, then in the spring, when the sap begins to run once more, the germs rapidly develop, spread further through the bark, thus enlarging the canker and often girdling the limb, which results in its death.

Spread of the Disease in Nurseries.

We found aphids to be the principal means of spreading the blight in apple tree nurseries. Wherever in nurseries the aphids were kept in check there was practically no blight. While in the nurseries in which the aphid was allowed to have its way there the blight flourished in all directions.

While aphids and "twig blight" are both common on the apple, neither are very prevalent on the pear. Blight, however, kills off many more pear trees than apple trees. How, then, is the blight carried to the pear trees? It is sometimes carried to the blossoms by bees and wasps, and it is such inoculations that are responsible for most cases of "twig blight" in the pear. "Body blight," however, is more common that "twig blight" in the pear. This is the same disease working in the bark of the trunk and larger limbs. How do the germs get into this old bark? Sometimes they enter it at the base of the twigs which have been inoculated at the blossoms. We found, however, during the last two seasons cases of direct inoculation into the bark of healthy trees made by the fruit-bark-boring beetle (*Scolytus rugulosus*). This is the same beetle that works in the bark of the peach and cherry, causing them to exude large quantities of a gum-like material. The pear tree does not exude this gummy material, and as the hole made by the beetle is very small, and is usually underneath a bud or spur, it is not readily seen. This beetle bores in the bark, and is more common on weak or diseased trees than on healthy ones. We found the beetles in the bark of blighted trees to be literally covered with blight germs, and we found the disease to be developing around the fresh punctures made by these beetles in the bark of healthy trees. The fruit-bark-boring beetle, then, is one means of spreading the blight among pear trees.

2. Pruning Tools and Cultivators.—The pruning knife, saw, chisel, shears, harrows, cultivators, and other tools used in the orchard, after coming in contact with a diseased tree, are potent carriers of the disease. We have seen numerous cases of blight that could clearly be traced to this source of infection; and we proved in a number of experiments how easy it is for the disease to spread in this

way. After using a knife and a saw on the diseased part of a tree and then on a healthy tree, nitching the bark or cutting off branches, we found that in seventy-five per cent. of the experiments the healthy tree contracted the disease at the point cut.

Scraping healthy trees with diseased trees when removing the latter from the orchard is also a common method of inoculating healthy trees.

Eradication and Prevention.

When once the disease enters a tree, whether it be in the fruit, twig, branch or trunk, there is no remedy for the affected part. The only measure to be adopted is to cut out and burn it right away. To cut off an affected twig will save the branch on which it grows, and to cut off a diseased large branch will save the tree.

In cutting dead or diseased tissue from a tree, care must be taken to cut from six inches to a foot below the blighted area, as the germs always extend further than the visibly affected part. Whenever the pruning tool comes in contact with the disease in pruning operations, it should be disinfected by being wiped with a disinfectant, as corrosive sublimate—1,000 or 10 per cent. formalin. These may be carried in a glass bottle. If a wire is run through the cork, so as to project into the bottle, and a piece of rag tied around the end of the wire, this may be used as a convenient swab for applying the disinfectant.

The best time to cut out blight is the first time it is seen, as every case of active blight is a potent source of infection for innumerable other cases. However, it is not always practicable to locate every case of blight as it occurs. The best time for systematic action in an orchard is in late fall or early winter. At this time the diseased parts are more readily noticed than in late winter or early spring; and if precautions are taken to burn the material cut out, this will ensure the destruction of the beetles, aphids, and other insects harboring on and in it.

If an orchard be cleared of the blight during the winter, there will be no germs there for insects to get contaminated with in the following spring. Hence, as the bees and wasps go from flower to flower they will not infect the blossoms. The blossoms not being inoculated, there will be no early twig blight; so that when the aphids come later in the season, there will be no source of infection for them. If, however, there should be affected trees in the neighborhood of the orchard, which is usually the case, then the only way to keep the disease out of the orchard is to control the insects.

The aphids may be kept in check by spraying the trees when the buds are just beginning to swell with home-boiled lime-sulphur, preferably of the strength of twenty-five pounds of lime, twenty pounds sulphur, to forty gallons of water. This is to kill the eggs which may be seen on the twigs and small branches of the tree. To destroy the aphids in summer, give them a thorough drenching with kerosene emulsion. In the fall observe if any aphids are present on the water sprouts, where they will be found if there are any on the trees at all at this time of year. If present, cut off the water sprouts and destroy them.

Several bad outbreaks of the fruit-bark boring beetle in peach and cherry orchards have been traced to wood piles made from diseased and dead wood taken from the orchard. It is in such wood that the beetles winter over and in the spring they issue from it in large numbers and make their way usually to the orchard once more. This shows the necesssity for burning dead and diseased wood taken from the orchard before spring.

Several orchards that two years ago were badly infected with blight, are now,

after being carefully treated as above outlined, free from the disease, and it will now be a comparatively easy matter for the owners to keep their orchards free from the disease by making an occasional inspection during the growing season and cutting out the fresh inoculations that are brought by insects from neighboring property.

We feel certain that if concerted action such as indicated be taken by all fruit growers in any district, the disease may be wiped out of that district and be prevented from entering it any more.

A MEMBER: Is the cutting out the only remedy?

MR. JONES: Cutting out is the only remedy for diseased tissue. In California, where the disease has done so much damage, some enterprising individuals conceived the idea of inoculating trees by treating the trees in such a way that they would imbibe through their roots or through the bark the material with which the trees were treated, ostensibly with the object of giving the tree what an animal pathologist would speak of as antitoxin, to counteract the evil effects of the germs developing in the tree. Well, take it from me that such a method is absolutely worthless. It will have no good effect on the tree but it might be injurious.

A MEMBER: Is lime-sulphur of any benefit in controlling the disease?

MR. JONES: Only in so far as controlling the insects that carry the blight. It is beneficial indirectly.

A MEMBER: If you have a watersprout growing on a large limb, is it necessary to cut off the large limb?

MR. JONES: If the disease has got into the large limb, such as I showed you in the picture of the canker at the base of the watersprout. You may cut around that canker, but the germs are inside the bark. If you cut well around the cankered portion and then swab the exposed area with the disinfectant and paint it over with white lead, you will have the disease cut out and the prevention of the disease spreading.

A MEMBER: If you had several in succession, as there are some in orchards, it would almost mean taking the bark off the top of the limb.

MR. JONES: It would mean taking off the bark around the diseased area, no matter how much that might be.

MR. PATTERSON: You have compared that disease to typhoid fever, Mr. Jones. It has been claimed that you can render a person immune to typhoid fever. Why can you not do so with pear blight, supposing you can discover something of the same nature?

MR. JONES: Well, typhoid fever is a disease which results from the developing of the typhoid bacillus first of all in the intestines, and from there it passes into the blood and is carried around the system in the blood stream. Now, it has been found in some diseases, of which typhoid is one, bodies can be generated within the blood that will have a detrimental effect on these germs, and in fact in some diseases bodies may be produced in the blood stream which will not only counteract the poison produced by the germs, but will also kill the germs themselves. In this condition in the pear tree and the apple tree you do not find the germs in the moisture of the tree passing from the roots to the limbs. We find it in the adjoining tissue. It is a difficult matter at best to produce those antitoxins, and it would mean about twenty times the trouble that you would otherwise go to, without producing the desired effect. You cannot produce an antitoxin for the tree in the same way as you can produce antitoxin for animals.

A MEMBER: Is that disease likely to spread more than it has now?

Mr. Jones: Well, it is the same as with typhoid, notwithstanding that it appears to become quiescent, we must take every precaution to prevent it. Wherever the germs are, there is a centre for the further spreading of the disease, and the disease may be carried by insects or transmitted from diseased trees by the pruning tools.

A Member: Have you noticed this peculiarity, that on Russian trees where there is a very heavy growth, you will find a lot of the twigs killed back for a distance of twelve or fifteen or perhaps eighteen inches, without the formation of very much canker on the limb, or you will find a good deal of canker on the limbs, without very much blight on the ends of the twigs.

Mr. Jones: My experience has been the very reverse, the Russian varieties having much more canker than in the Russets I have examined.

A Member: The Russet seems to be more susceptible to canker.

Mr. Jones: Maybe I may throw some light on the matter. Is it a black canker. There are two kinds of canker. There is the canker produced by the fungus as well as the canker produced by this bacillus. In one case the canker is a swelling on the tree, and it will be very rough on the surface, and will be black when it is matured.

A Member: And the dead bark adheres very tightly.

Mr. Jones: That is the case also with the bacterial canker, but in cases of that kind we have a sinking of the bark rather than the swelling of it, and we do not get that roughness of the surface, and we do not get that blackening of the canker, as if soot had been powdered over it.

A Member: My experience has been in the Russian trees it has been mostly in the end of the twigs, without the development of canker on the limbs.

Mr. Jones: Those large cankers I showed you were on Russian varieties of trees. We have the Roman Stone, and I forget the name of the other varieties, but all these cankers that I showed you starting in the body and on the larger limbs were on Russian varieties.

A Member: Would the fungus canker be readily controlled by spraying?

Mr. Jones: I would not say readily controlled, but you can do much good by spraying, because the spraying kills the spores, the spores fly off and are blown by the wind and lie on the surface of the limbs, and these are killed by the spray, although where there is a large canker present the spraying would not do a great deal of good. It is better to get at the canker.

The Chairman: Mr. Jones has expended a great deal of care and time in connection with this subject, and he deserves the thanks of every member of the Association, especially the pear growers, for the information he has given us. Mr. Jones is connected with the College at Guelph, and I am sure he would be only too pleased at any time to correspond with any of our members and offer any suggestion or advice that he could give.

COVER CROPS IN THE ORCHARD.

Prof. S. Blair, Macdonald College, Que.

I am sure it is an inspiration to me to meet with the Fruit Growers of the Province of Ontario. In our Fruit Growers' conventions in Quebec we do not have such a large attendance as you have here, nor do we have the interest in fruit growing that I see manifested around me in this meeting. You are to be con-

gratulated on the excellence of your show, and the interest that has been manifested in that show. There is nothing in my mind more attractive than the farm. and especially horticultural work. Cover crops and their value in orchard practice has been discussed many times at your annual meetings. The only apology I have to offer for addressing you on this subject is that I consider it one of many important operations in orchard management which should receive more attention if we hope to produce fruit most economically.

The three methods of culture usually recommended in orchard practice are: 1st, The Cover Crop Method; 2nd, The Clean Culture Method; 3rd, The Sod Mulch Method.

There are some who advocate growing trees in sod, but this is undoubtedly an unwise method, and is adaptable to very exceptional conditions, and should not be recommended.

The cover crop method briefly is to cultivate the ground from early spring until the first of July, sufficient to keep a fine earth mulch on the surface, and, at the time of the last cultivation, seed to a cover crop which will produce a good mat of vegetation to work under, either in the late fall or the following spring. The clean culture method is similar to the above except that no cover crop is grown and the ground is left bare, or to be occupied by an occasional weed after the last cultivation early in July.

The sod mulch method is to mulch, usually with manure, the area occupied by the tree sufficient to prevent great evaporation from the soil, and to keep all grass or weeds cut, not allowing them to grow taller than six inches, and letting this material also remain as a mulch. This practice is advisable if conscientiously followed, especially on hilly, rocky, or very open gravelly soil, but what some growers practice and call the sod mulch method, I would call the large hay crop method. It is not the purpose of this address to discuss any of these methods except to place clearly before you the cover crop method of orchard tillage.

If the clean culture method is followed some means must be adopted to get humus into the soil. Without humus our soils become unproductive. Humus not only aids in conserving moisture, but gives as well a better mechanical texture to the soil. It lightens up heavy soils, and makes an open soil more compact. Humus in the soil assures an ever present supply of nitrogen, and prevents the leaching from soils of potash and phosphoric acid. Bacterial life in the soil is largely dependent upon humus, and we must not forget that these lowly forms of life are very large factors in rendering a soil productive.

Commercial fertilizers do not add humus to the soil. They can only be used most economically on a soil not deficient in humus, for otherwise a continuous supply of available food material is not within reach of the plant. I do not mean to say anything against commercial fertilizers, for they can be used to advantage by the orchardist. But what I want to impress upon you is that humus in some form is essential, and if the clean culture method is followed stable manure, or litter of some sort, must be used to furnish it. Manure is not available for many growers, and besides, if cover crops can be grown in the orchard to supply the humus, and not be a detriment but rather an advantage to the growing tree or ripening fruit, why not make use of it?

Many orchards are located on hillsides, and if cultivated a serious washing may occur during the fall or early spring rains, if not prevented by means of a cover crop of some sort.

Nitrogen, one of our most costly elements of fertility, may be largely supplied through a leguminous cover crop, and the purchase of fertilizers confined to the

potash and phosphate manures. If clean cultivation is followed, this free nitrogen cannot be secured. The above reasons are, I think, sufficient to warrant one in advocating the cover crop method of orchard cultivation.

Let us now look at another phase of the subject, namely, the proper ripening of the wood for winter. Winter injuries may result from improper ripening of the wood or it may be due to improper nourishment. Instances of the latter are found in cases where there has been heavy fruitage, which drains the tree of its vitality unless there is sufficient food available to supply the growing tissue as well as the fruit. Nature directs all her effort first to the development of seed to perpetrate the species, and the tissues of the plant are supplied only after this want has been met. Were we to place within the reach of our trees food as required, I think we would hear less about the winter killing of our bearing trees. The improper ripening of the tissues of a tree may be due to an excessive food supply, or excessive moisture conditions in the soil, or to a continued high temperature. The temperature and food supply are largely influenced by the moisture conditions, although a combination of these factors are responsible for late growth. The moisture conditions are in a measure within our control by the use of cover crops. In irrigated districts the grower has absolute control of this factor and can ripen off his trees when he wishes by the withholding of water. We have no such absolute control in the use of cover crops, for excessive rains at a certain period may largely counteract any drying effect we wished to produce through the use of a cover crop that tends to dry out the soil.

The following table will give some idea of the relative drying effect of various cover crops. These experiments were conducted in our young orchard, and show the percentage of moisture in the soil on the middle of September: Millet, 7.24; Oats, 10; Rape, 10.1; Winter Rye, 11.6; Crimson Clover, 11.8; Buckwheat, 11.8; Red Clover, 12.3; Vetch, 12.8; No Cover Crop, 14.9.

It will be noticed that the strong growing cereal crops and rape will run down the moisture contents of the soil very rapidly, and for this reason they may be advisable in some cases. The oat plot had four per cent. less moisture than the check plot growing no cover crop. Crops that form a dense mat prevent evaporation from the soil, and this is one reason probably why the clovers and vetches do not so materially reduce the moisture contents. It was found also that the quick growing cereal crops reduced the moisture of the soil earlier in the season than the clovers, especially than the red clovers, which requires a longer period to form much leaf area.

The following experiment, however, proves quite conclusively that the soil moisture conditions can be controlled more effectively by the date of seeding than by any particular cover crop. Crimson clover was sown on June 15th and on July 15th. The soil samples taken on the 1st of September showed 6.1 per cent. of moisture for the early seeding as against 12.03 per cent. for the later seed plot. These results are what one would expect, and the date of seeding advisable for different sections and different types of soil can only be determined by conducting similar experiments in your section. After conducting various tests we have settled on the last of June or early in July as the most suitable in our section for ripening young trees.

If trees are carrying a good crop of fruit there is little likelihood of the fruit not ripening well, and it would certainly be unwise to dry out the soil too much by early seeding of the cover crop, for this reason I advise later seeding in the bearing orchard; say the middle of July. It is well also to keep in mind that cover crops make a much more rapid growth in a young bearing orchard, where

there is little shade, than in an old one heavily shaded, and the transpiration in protected areas is not nearly so great as in the unprotected.

I would say also that whereas a cover crop may dry out the soil early in the season, that does not imply that the soil will continue dry until late fall, and injuries from dry winter freezing result, for our experiments go to show that when a dense covering is formed it so protects the soil that little evaporation takes place in the late fall, and the ground by fall will actually contain more moisture than the areas not so covered. Winter-killing of the root is more liable to occur in a dry soil. This is not of special consideration in northern sections only, for winter-killing is often caused by alternate freezing and thawing, which has greater range in a somewhat dry soil than in a moist soil, for the more water a soil contains the less liable is it to frequent alternate freezing and thawing.

Cover crops were first used for the purpose of keeping frost from penetrating the ground and at the same time prevent alternate freezing and thawing. It will prevent the latter, as we all know from experience, and experiments go to show that a moderate mulch on the surface will keep the frost from penetrating less than half the depth that it will on unprotected area. The frost penetrating the soil may not prove injurious, but alternate freezing and thawing must be guarded against.

It is usually not advisable to plow under a cover crop in he fall. There is much less liability to washing of the surface soil, and the mulching effect is better if it is on the surface. It also serves to hold the snow, which is one of the best protective covers we can have.

Personally I think it does not matter whether the cover crop stands the winters or not. In fact, the only advantage that I can see in having one that will stand the winter is to dry out the ground early the following spring. The danger, however, is that we may allow them to grow too long before plowing under and rob the ground of much moisture that might have been conserved, and as well deprive the tree of its full early spring breakfast.

The following experiments, which I personally conducted, show the effect of winter rye and red clover in reducing the moisture contents of the soil, as compared with the early cultivated crimson clover plot. A plot of oats sown on a adjoining plot on June 20th was also compared as to the percentage of moisture at different dates. These plots show how quickly the moisture contents of the soil can be reduced by crops in the orchard in the spring and early summer months:

Date Samples were taken.	Winter Rye.	Oats sown June 20.	Crimson Clover plowed under May 13th.	Red Clover not plowed.
May 12	18.41	20.	20.88	18.93
" 26	17.21	18.02	21.21	18.97
June 9	12.52	17.84	20.31	14.04
" 23	10.46	17.40	20.46	11.65
July 7	9.06	16.70	19.14	11.22
" 21	7.46	13.43	20.54	12.06
Aug. 4	8.23	9.49	18.11	10.36
" 18	9.80	10.30	20.26	13.66
Sept. 6	17.79	16.99	24.04	20.22
" 20	14.91	16.31	18.09	19.87
Oct. 31	21.33	19.77	26.02	19.71

The clover plot was given clean culture, and no cover crop was used on any of these plots. The fall was a moderately wet one, and these plots each contained approximately 20 per cent. of moisture, which amount our experiments indicate

is about right for the most successful wintering of the tree. One of the bad effects of drying out the soil early in the spring is that the subsoil water is lost, whereas it should be retained for the crop later on, as it is this water on which the crop depends later in the season. The tabulated data shows only the condition of the soil to one foot in depth, but soil to a greater depth would show as great a variation.

It is advisable, except in cases where the ground has an excess of nitrogen, to use leguminous cover crops. The crimson clover and common vetch we prefer. Both of these make an ideal cover. The mat is not objectionable at picking time and it forms a good protective covering. We find that the clover can be worked under with greater ease, and for that reason we use it principally. The two mixed together are good.

Red clover does not make sufficiently rapid growth in my opinion, and we do not use it, except in our comparative tests. We get a much better protective covering with the crimson clover, and a very much greater bulk of material to turn under.

A mistake is often made in using too little seed. Never use less than 25 lbs. of crimson clover seed and 75 lbs. of vetch seed per acre.

In seeding to clover we run over the ground with a tilting spike tooth harrow, sow the seed and harrow with this tool again, having the teeth upright, and again harrow with the teeth tilted, to leave a perfectly smooth surface. The seed can be safely worked in to a greater depth than is the case with the smaller red clover seed. In seeding vetch I prefer to use the spring-tooth harrow, which leaves the soil more in ridges, and after seeding this is again used, followed by the levelling harrow.

I have never yet had any difficulty in getting a good catch from seeding on a properly cultivated area. If the ground is thoroughly dried out on the surface there may be trouble, but in such cases I would advise working in the seed more deeply.

There are other points we could profitably discuss, but I feel that I have already taken up too much of your time.

A Member: Do you not think that cover crops harbor mice?

Prof. Blair: Yes, I do. I think the only way is to buy wire protectors for the trees, as they protect your trees in cultivation and also from the mice. They cost very little, and it prevents your work of four or five years being all undone.

A Member: Crimson clover is an annual. Over a great portion of this Province it is not hardy enough.

Prof. Blair: I do not think it makes any difference whether you use a crop that will winter or not. In fact, I prefer one that will not winter.

A Member: How many pounds of vetch do you use?

Prof. Blair: Seventy-five pounds.

A Member: Do you plow close to the trees?

Prof. Blair: Yes, but we run the plow over as we come to our young trees. If you plow close to your trees from the start, you will see it will result in forcing the trees to deep root.

A Member: Is that the hairy vetch you use or the common vetch?

Prof. Blair: No, we do not use the hairy vetch.

A Member: What do you find with reference to nitrogen gas with the hairy vetch? We find the hairy vetch makes too great growth. With the ordinary vetch do you get as large quantities?

Prof. Blair: Yes, I think you would with the same clover. We have never carried on any soil analysis with these different cover crops.

THE CIDER INDUSTRY.

LOUIS MEUNIER, PARIS, FRANCE.

Great improvements have taken place within the last few years with regard to the growing and shipping of apples. Thanks to your Fruit Growers' Associations, Canada is coming rapidly to the fore, and you can now supply the European markets with fruit in better condition than their own. Some Canadian growers think that the Canadian Apples have a bad reputation on the other side, but in this I do not agree with them. To give you an idea of the popularity of your fruit, not only on the British market, but even in France, I will tell you what I heard in Paris. A pedlar stood in a crowded street with a fine load of apples. "How pretty they look," said a lady passing by, "They are Canadian apples, are they not?"

It is quite apparent that you take better care of your orchards than the growers in the Old Country. Here pruning and spraying are the rule, as well as good packing. And yet you complain because you cannot compete with the Australian and Californian growers. They pack in boxes and it seems that it suits the dealers better. But the trouble is chiefly caused by the culls being mixed with the better grades. Notwithstanding the greatest care, you get a certain amount of scabby, worm-eaten, ill-shaped apples, as well as sound windfalls. Practically these culls have no value, whilst the first and second grade are always sold at reasonable prices. Temptation is inherent to human nature, and in most cases the packers try to raise the culls up to the level of the first or at least the second grade. As long as it is not possible to turn the culls to good account, it will be very difficult to avoid this trouble.

Some months ago, when in London, I asked an apple dealer, "How can you explain the superiority of the Australian apples sold on the English market?" He answered that in Australia they use the culls to feed hogs and make cider, only shipping the best grade.

Can you do the same, and will it pay?

Let us study the question.

There are already many growers who feed the culls to their hogs. Let us consider what 10 lbs. of culls would produce in that way.

Apples are very poor in nitrogen and you can't build up a pound of flesh without a good deal of that element. I calculated that 60 lbs. of green fruit are needed to make a pound of flesh. If you estimate it at 12c. a pound, you see that 10 lbs. of green fruit will only give you a return of 2c.

Let us now turn our attention to cider-making.

The juice of culls is the same as the juice of sound apples, the only difference being in the appearance of the fruit. Therefore, there is no reason why you could not make good cider with cleaned culls.

What is the wholesale price of cider in Toronto, for instance? 16c. a gallon on the average, and how many pounds are required to make a gallon. By the French way, not more than 10 lbs.

In this Province, even for a very small factory, the cost of the making and shipping will not exceed 8c. a gallon. Therefore, turned into cider, your culls will give you 8c. per 10 lbs.

And now the pomace (that is to say the pressed apples) should not be thrown away, as is generally done. This pomace is much richer in nitrogen than the apple itself, as the nitrogen, being insoluble, is not crushed out with the juice. In other words, you can fatten nearly as many hogs with your pressed apples as

with the green apples themselves. Every ten pounds of green fruit will consequently give you a return of 1c. at least by feeding hogs with the pomace.

That is to say that 10 lbs. of culls will give you a return of 9c. by making cider and feeding hogs.

It will pay you $1.35 a barrel, which shows that they are worth saving and profitable without shipping with the better grades. The culls will pay 90c. per 100 lbs., whereas the driers and canning factories give you only 50c. per 100 lbs. for high grade culls, and very often they could do no better without losing money.

Therefore, cider making is a profitable business, and yet I have heard of many failures in this country.

When in Montreal I said to friends that there was no better drink than cider, and I backed my opinion with quotations of celebrated English and French people.

My friends ordered a barrel of cider. The day after they received it, very naturally, I went to pay them a visit. As soon as I arrived, I was told that they had sent a barrel of vinegar by mistake. My friends thought it was vinegar, but it was really a very hard, very sour, and poor quality of cider. To get a fair price you don't only want to make cider, but to make good cider, and to do this you want the right apparatus and process.

It is quite obvious that you are not satisfied with my statements. Why? Let me follow your thought.

This Province has to get rid every year of several million bushels of culls. If we turn it into cider will there be enough people to drink it, and, supposing so, what will be the price?

Well, I was sure you intended to object in that way, and I prepared my answer: "Is there no market in the world but that of the Province?" On the contrary, it seems that for cider you can hardly find a smaller market than here. To get important sales and high prices you have to reach other countries. Great Britain, Quebec and South America are fit markets for cider, but any cider is not fit for these markets, and if you don't ship the right cider to the right place, it will always be a failure. The wholesale price in London is, on the average, 28c. a gallon. Therefore, by shipping to England, you can obtain a much higher profit than by selling your cider here. Some Nova Scotian and Ontario cider makers have fully realized this fact, and, thanks to them, the exportation of Canadian cider has increased very quickly.

In 1903 they shipped cider to the value of $810. In 1906 this export had increased to $9.400, while in 1909, 135,244 gallons were shipped, representing a value of $27,953. This looks very much, but it is just a drop to quench the thirst of John Bull. And yet, do not think that John will drink every kind of cider. If you don't send him the right one, don't expect to make him a good customer. English people like Devonshire cider. You can't change their minds. You have nothing to do but to make cider of the same kind, if you intend to supply the English market. Can you do so and succeed? Certainly. Many of your varieties of apples suit this industry, but you must employ the right method, as a certain Nova Scotian cider maker already does.

And now let us look at Montreal. Nearly all the dealers I saw in this town say that they have more demand than offers, and the price in Montreal is much higher than in Toronto, and besides the consumption of cider by each inhabitant is much greater in Quebec than in Toronto.

Is there a kind of cider preferred by the French Canadians? Certainly, and as you may guess they like the cider prepared in the French way. Generally the

Canadian apples are not fit for the making of this cider, and the success will greatly depend upon the choice of the varieties. You know that the rule in France is to blend at least three kinds, one acid, one sweet, and one bitter. On the average, the Canadian apples are acid varieties, and so you have to make a selection. I would suggest the following blending as suitable:—Spy, Talman Sweet, and some crab apples. But you want more accuracy, and consequently a careful study of your varieties from the cider-making point of view.

Let us now talk about a third kind of cider, that is the German cider. The makers of Frankfort and Stuttgart call it Aepfelwein, that is to say, apple wine, and their process is such that they make a kind of cider which reminds one of white wine. The great advantage of the German process is that one can employ every variety. Some of the German factories are very important and supply not only the European markets, but also some African and South American countries. They ship to the latter hundreds of thousands of gallons, and the price of cider in Frankfort is more than 20c. a gallon. From that statement you can see the advantage offered by the Sourth American market.

I will now leave this question of the cider industry and try to resolve the following problem: Are there any other ways in which we may turn the culls to very good account? Yes, we can make apple-juice, liqueurs, cakes, etc., and some of these industries will pay as well, and, perhaps better, than cider-making. Thanks to the campaign of temperance, there is now a big demand for apple-juice. Many of the apple-juices sold, however, are far from being free from chemicals and preservatives, and in that way they are much more injurious than the strongest cider. But there are methods to make apple-juices without preservatives.

In France a sweet liqueur made with apples has a great sale, and it is quite apparent that with your delicious eating apples, as Snow, Spy and King, you could do the same.

Apple cakes are sold in England at the rate of 10c. a pound, and you can make them with cleaned culls.

In short, you have many good ways to make a lot of money from the culls, and doing so you will at the same time get a higher price for your sound apples.

The Co-operative Fruit Growers' Associations are thriving in Ontario. It seems to me that if they were to take this matter of cider-making in hand it would be very profitable, and a great benefit to the Canadian fruit growers.

Here are the results if my investigations. I am much obliged to the Department of Agriculture, who gave me all suitable introductions for my study. I am particularly thankful to the Honourable Minister, Deputy Minister, and Director of the Fruit Branch, who assisted me in my researches.

Moreover, I am glad to say that the President and Professors of the University of Toronto were kind enough to give me all accommodations to carry on some experiments with regard to a more extensive use of the Canadian apples.

Mr. Case: I would like to know if this gentleman can tell us anything about the chops. During the last year this trade has fallen off. What are those chops used for in France?

Mr. Meunier: The chops were used in France to make ordinary cider, but now the people are not allowed. There is a new law for pure food. In the large centres, such as Havre and Paris, there is a great consumption of that kind of cider made with your chops.

Mr. Case: Is the demand for it liable to increase?

Mr. Meunier: I think so. I would like now to show you some samples of

cider to make quite apparent the difference in the two kinds. I have here a bottle of cider made by the English way, and, as you see, it is perfectly clear and of a very light color. This other bottle of cider reminds one of the French cider, but not by its taste. As you see the English cider is quite clear, and this other is rather turbid, and the English people will say, "This is not cider at all; it is just mud." If you ship this English cider to France the people will say, "It is much too clear, it is just water and chemicals." I have also some cakes here to show you.

RESOLUTIONS.

District Representatives.

"Resolved, That this Association appreciate the work of the Department of Agriculture of Ontario in extending agricultural instruction by District Representatives to some of our Counties, and recommend that they will speedily extend the system to as many other Counties as possible."

Losses to Fruit Growers through Express Companies.

"Resolved, That this Association respectfully call the attention of the Express Companies to the annoyance, inconvenience and serious loss sustained by shippers and consumers of fruit on account of the pilfering from express fruit packages in transit, and also the careless handling which results in the broken and damaged condition of the package, these evils having become so notorious as to constitute a positive injury to the business, which curtails consumption and exposes the shipper to a serious financial loss, for which compensation is practically refused by the Companies."

Short Courses on Agriculture in Public Schools.

"Resolved, "That this Association recommend to the Ontario Government to further extend the good work done by the District Representatives, by giving short courses in the public schools on the rudiments of agriculture, giving special attention in fruit districts to insect pests and fungus diseases injurious to fruit trees and fruit."

Mr. Smith: I am sure you will all agree with me that Ontario should take a more prominent position than she does in the consuming markets of the world with respect to her apples. British Columbia, as most of you know, has done a great deal to advertise that Province. They never lose an opportunity to advertise and display their fruit. It is a well known fact that a country which produces such excellent fruit is a country worth going to. Now, I dare say there are thousands of men going to British Columbia from Great Britain, men with means, and it is largely due to the fact that that country is advertised. I think all of you will agree with me that this Province presents greater opportunities to men of limited means who desire to make a home than any other Province. We can grow apples to perfection, as well as peaches and grapes and other fruits, and the districts where these can be grown are greater than we thought they were. It seems to me it ought to be the duty to a great extent of the Government of the Province, and it is up to us to consider whether the time is not opportune. I have a resolution here as follows:—

Canadian National Apple Show.

"Whereas, It has been proposed that a Canadian National Apple Show should be held annually in Canada, and, whereas, the first Show of this nature has been held this year in the Province of British Columbia, proving a great advertisement for the fruit-growing possibilities of that Province; and, whereas, the fruit-growing resources of the Province of Ontario are not realized as they should be either at home or abroad, be it resolved that the time is opportune for the holding of a Canadian National Apple Show in the Province of Ontario on a mammoth scale, and that this Association take steps at this Convention, by the appointment of a Committee, to further consider the matter, and, if deemed advisable, to later proceed with arrangements for the holding of such a Show in Ontario in the Fall of 1911."

The adoption of the resolution was voted on and carried.

Mr. Smith: I would make a suggestion that that Committee be the Board of Directors of the Ontario Fruit Growers' Association.

Mr. Robertson: I second that.

The motion was duly put to the meeting and declared carried.

Mr. Smith: Then there is another resolution:—

"Resolved, That, in view of the possible negotiations with the United States in regard to reciprocity of tariffs, the Ontario Fruit Growers' Association wish to put on record our unqualified disapproval of any reduction in the duties on fruit coming into Canada without consulting a Committee to be appointed by this Association, the duty being now much lower on an average than the duties on manufactured goods, and lower than they ought to be in view of the fact that there can be no monopoly or combine in fruits, the prices being fixed absolutely by the law of supply and demand within the Dominion, which contains ample territory suitable to produce in the utmost profusion all the fruit that the country can consume for at least many decades to come, which insures that the consumer cannot be injured in the long run, and the fruit industry can be extended in proportion to the growth of the population, with some assurance of a permanent market at home."

Mr. Robertson: I second that.

Mr. Lick: It seems to me that should not pass without discussion. I would move that it be laid on the table, and if there is any time later it should be taken up and discussed.

Mr. Thompson: I think some of those resolutions that require discussion could be dealt with a great deal easier if they were referred to a special Committee. We haven't time to properly discuss them.

Mr. Smith: I don't see how any Committee could deal with this. This is supposed to be a representative meeting of the Fruit Growers of the whole Province, and they alone can finally express an opinion with regard to this.

Mr. Pattison: It strikes me it is time enough to cross the bridge when you come to it. We have a pretty long programme laid out, and I would suggest that a representative committee of this Association be named, and that the resolutions be referred to that Committee.

Mr. Smith: That would mean that this Committee would either have to submit to the Government its own recommendations, or else a meeting of the Ontario Fruit Growers' Association would have to be called to discuss the question, and I think you would get a small gathering. This is an opportune time now. The

grain growers have been down to the Government already, asking that duties be taken off many articles, and the wholesale merchants of Winnipeg, I understand, have been before the Government, and I think this is the right time to discuss the question. When will there be an opportune time if it is not when the Government is proposing to negotiate with the United States, and those who want duties removed have already put in their views. Are those of us who are interested in the industry going to sit still and not make a move in this matter? When the Government have their negotiations with the United States it will be practically settled.

MR. THOMPSON: I think we all agree with the resolution. As I understand it, there is to be no change, but it is possible there might have to be some change. We don't know what might take place. I for one would be willing to leave it to any half-dozen of our fruit growers to meet the Government, as we did on two occasions before. We are all agreeable that we don't want the tariff lowered at all, but there are some things that might be changed the other way.

MR. A. W. PEART: There is a great deal of truth in what has been brought forward by all the gentlemen who have spoken so far with regard to reciprocity. I fail to find any difference of opinion, so far as the principle of the resolution is concerned. There appears to be no difference in the opinion that reciprocity is not desired by the fruit growers of this Province. However, it is just possible there may be inequalities in the tariff which it might be well to have modified in some way, and for that reason it might be better to appoint a representative committee to deal with matters of that nature, and adopt the principle of this resolution.

MR. THOMPSON: I would move an amendment to the amendment if necessary, and I think Mr. Peart will second it, and that is a Committee should be appointed to look after our interests. My amendment is that the principle is all right, but a Committee should be left to work it out.

THE CHAIRMAN: I think it would be better to appoint a Committee and consider it later on. I think it is hardly fair to force this on the members, as they have not had time to consider it, and they would hardly be in a position to give a fair vote. I think the matter should be left over for future discussion.

MR. SMITH: I did not mean by this resolution that there would be no reduction on any one thing, but no reduction on the average.

MR. BUNTING: How would this answer, "To express our disapproval of any change being made in the present tariff without consultation with the Association," and then appoint a Committee to deal with the matter.

MR. SMITH: I am quite willing to put that in.

MR. BUNTING: Don't you think as fruit growers you are occupying a little too modest a position? For instance, the grain growers are going to press hard for a change, and the fruit growers only say, "We beg there will be nothing done without consulting us." I think it is not occupying a strong enough position.

MR. LICK: I did not intend to take part in the discussion, but I wish to call your attention to this fact, that the majority of the apple growers in this Province would be better off if we had free trade in apples, but we do not want to be a party to anything that is going to work an injustice to any fruit grower who has invested his money. The present tariff is certainly a very serious injustice to Canada. If something of that kind had been worked into the resolution I could have supported it much more heartily.

MR. WALLBRIDGE: It would be a bad matter for us if the United States apples were let it free.

MR. SMITH: I would suggest this: "That we put on record our unqualified disapproval of the principle, and that no change should be made without consulting a Committee to be appointed by this Association."

MR. THOMPSON: I withdraw my amendment to the amendment and support this.

The Secretary read the resolution as amended, and, on a vote being taken, it was declared adopted.

MR. BUNTING: I would move that MR. THOMPSON, MR. LICK, and MR. SMITH be a Committee to name the Committee who would deal with this matter at the proper time, and report to this Convention.

The motion was duly seconded, and, on a vote being taken, was declared carried.

PROFITS FROM MY APPLE ORCHARDS.

R. R. SLOAN, PORTER'S HILL.

Let us take for a basis a ten-acre orchard, and try to figure out the cost and expenditure per acre for four years. We will take a section of orchard containing 350 trees. I do that on account of part of it being grafted, and did not bear at the same time. Ten acres usually contain about 400 trees, or 40 trees to the acre. We will go back to 1907. Of course I will not give you all our profits or all our losses, but we will take it so as to get as near as we can to the subject allotted for discussion. In 1907 we had 700 barrels of apples from these 350 trees, and they were sold at $1.65 per barrel on the ground, or $132 per acre. The varieties consisted of Ben Davis, Baldwins, Greenings, Spies, and Kings. In the following year, 1908, the crop was much lighter, only 250 barrels from the same area, at $1.50 a barrel, or $45 per acre. In 1909 we harvested a heavy crop of apples, upwards of 2,000 barrels, the section referred to producing 750 barrels at $2.25 per barrel, or $192.80 per acre. In 1910, the present year, the apple crop in Huron County was almost a complete failure. Nevertheless, we harvested nearly 100 barrels off these 350 trees, at $3.75 to $4 a barrel, or $43 per acre, giving a total of $413.40, or $103.35 as the average for four years off trees from 17 to 20 years of age. Mark the age of those trees. They are only young trees.

Now, let us look at the cost of production and maintenance of the trees. It would cost $2.35 per acre for plowing. Of course that may not correspond in all districts, as you can get labor and horses cheaper in some sections of the country than others, but that is about an average. Then $1.05 an acre for cultivating three times; $3.75 per acre for pruning; $8 to $9 for a man to spray. That is the total cost for three sprayings using bordeaux mixture. Last year we used lime and sulphur, which cost a little more, for the first spraying, an arsenate of lead along with it. Then there is fertilizing at the rate or $2.50 per acre up to $3, for manure and ashes. It is sometimes difficult to get ashes, but we get a great deal of manure at 50 cents a load and draw it ourselves. Of course, the benefit of fertilizing is spread over a number of years. The cost of pulling at 10 cents a barrel would be practically $9 per acre. That makes a total of $27.60 as the

total cost per acre, without counting anything for cover crops, which in some sections would cost much more than others. We generally grow clover, and if we don't we always have sufficient snow. Of course we grow the clover for its manure value. This deducted from $103.35, the average for four years, leaves a balance of $76.35 per acre, or $763.50 for ten acres. We have some sections of older orchard, which, of course, gives much better results. I will not go into details, but give you one example of what they have done on several occasions. One plantation sixty years of age, consisting of 35 Spy trees, have run as high as $18 per tree, and even at the low price of $1.50 per barrel have yielded $530 per acre. I may just say Huron County this year has the lightest crop of apples that it has ever had in the past twenty years. Last year we had a quarter of a million barrels, and this year we hadn't a thousand barrels of apples in the whole County, not enough for home consumption. The failure this year was attributed to the cold, wet spring, along with the blight which covered the whole country. I have asked several here, and it hasn't been universal in the Province, but it seems to be in the Georgian Bay district and along Lake Huron. This blight came on the trees just about the time the blossoms were setting, and it blackened the leaves to a certain extent, and in the unsprayed orchards the trees were in such an unhealthy condition many of them fell off in the month of September, whereas they should have stayed on till nearly the present time. In the orchards that were sprayed the leaves seemed to get over the blight and become quite green again and stayed on the trees. We sent some samples to Guelph to Mr. Caesar, and he examined them and reported that there was no bacterial or fungus diseases that he could find, so we do not know what it was yet. However, we attribute it to the cold, wet weather along with two rather severe frosts we had at that time. Huron this year was unable to make an exhibit because we didn't have the product with which to do it, but I think if we have the apples we can make a display that will compare favorably with any exhibit put forth by any of the Counties.

ORCHARD PROFITS IN GEORGIAN BAY DISTRICT.

J. G. Mitchell, General Manager The Georgian Bay Fruit Growers, Limited.

Your Secretary, Mr. Hodgetts, asked me to prepare a short paper that would give some idea of the profits that could be derived from apple growing in the Georgian Bay district. This was supposed to have been a bad year, but for all that the orchards that were cared for had splendid crops.

Generally speaking, it is a well-known fact there were practically no good apples worth considering in the Counties of Bruce, Grey or Simcoe this year, except the demonstration orchards of the Department of Agriculture near Collingwood, and a few orchards owned by stockholders of the Georgian Bay Fruit Growers, Limited, at Thornbury.

Now, was the year to blame, or was it the growers, for the tremendous failure of the district this year? Let us see. These orchards of the Georgian Bay Fruit Growers, several of which I own and control, and the others receiving about the same treatment, were a most signal success. There was nothing done for them that other growers could not just as well have done. They only received reasonable care and attention, which any orchard to be a success must have. This in-

cludes pruning, spraying, cultivation and fertilizing. It is unnecessary to give a detailed statement of all these orchards, but I will submit figures of one. This is a small orchard of about two and one-half acres, and had not been pruned, sprayed or cultivated in fifteen years. When I took it over last spring it was more like a forest than an orchard. It had not borne much for years, only from 20 to 40 barrels a year, and this mostly No. 2. This fall I harvested 170 barrels, grading 80 per cent. No. 1, with practically no culls, except windfalls. The proceeds of this orchard were as follows:

170 Barrels apples, No. 1 and No. 2	$540 00	
Windfalls and culls	20 00	
Total receipts		$560 00
Expenses:		
Orchard work, pruning, spraying, etc.	$170 00	
Harvesting crop	67 00	
Barrels	68 00	
Total expenses		$305 00
Balance orchard profit		$255 00
Less rent paid		60 00
Net profit for year		$195 00

This is, I think, a fair representation of what the other orchards did that received the same treatment. Next season we expect to get still better results, as these orchards are just beginning to show the effects of proper attention.

Now this ought to be a pretty forcible object lesson for the great many who are neglecting their orchards in our district. Had they all done what we did, in my opinion there would be no reason to cry bad year. If all the growers had given the proper attention there would have been about 300,000 barrels in our district, and I believe this to be a conservative estimate. As it was, many had no apples for their own use.

This will give you a little idea of what the orchards of our district can produce if the growers will only wake up, and I certainly think they will.

Q.—How many trees in that orchard?

Mr. Mitchell: I could not say. I did not count them.

Q.—Were they planted pretty close?

Mr. Mitchell: They were planted in the old way. I tried to persuade the owners to prune it up, and they said they couldn't be bothered with it. I told them I would run it for them if they would put a reasonable price on it. I said, will you take $50 for it, and of course they jumped at the chance. Well, I said, I will give you $60, but you must allow me to do as I please, and we drew the lease in that way. I said there are some trees I want to cut out. So I had absolute control of the orchard for five years, and I have given you the results. I expect 300 barrels next year.

Q.—What kinds are they?

Mr. Mitchell: There are a few Spies and Greenings and a few Gravensteins and Colverts. It is a mixed orchard.

Q.—Did you plow it up?

Mr. Mitchell: No, I didn't plow it; but we will cultivate it next year. It was so very thick the sun couldn't shine through it.

Q.—Did you manure it?

MR. MITCHELL: Yes, the manure is included in that expense. Now, if you talked to our farmers through the country about spending a hundred dollars an acre to get some apples they would go crazy. They would almost die in their tracks: but they will have to get busy and do it, or they won't get the stuff. The apple orchards in this country are starved. It is about fifteen years since the apple business in the Georgian Bay began to go down and it is getting worse, and it is the poor stuff that is being shipped away that is killing the market and ruining the reputation of our apples.

Q.—About what percentage of the top of each tree was removed?

MR. MITCHELL: We removed probably from two to ten feet.

Q.—Did you take that off the top or two-thirds off the top?

MR. MITCHELL: If there was a lot of dead stuff in it, we cut that off first. There hadn't been a saw in it for fifteen years, and we had to take a cross-cut saw sometimes. Then when we got this cut away from the bottom, we could get up to the tops and cut out what we considered necessary, from two feet up to ten feet. We cut them back where there was a branch getting too long, not straight across of course.

Q.—What proportion of the tree do you suppose you took away?

MR. MITCHELL: Well, some of them, I suppose one-third. We got them so we could pick them with ladders.

A MEMBER: I went into a similar orchard myself this season, and we have cut at least half the top out of each tree, and the point I want to get at is whether I could have taken them out all at once profitably?

MR. MITCHELL: Well, we went around from the outside. There were people came from all over the country because it was known to be an orchard that was no good, and I rented that orchard more for a demonstration than anything else. I thought if I took hold of the worst orchard I could find and put it in shape people would say if he can make that orchard pay we will take care of ours next year. There was another orchard was taken care of according to my directions, and it was sprayed, and had a good crop of fruit when the other orchards all around had nothing, and the others say now they will have a proper outfit next year.

Q.—When did you do your pruning?

MR. MITCHELL: In March, and I did the spraying just as the buds were showing to burst.

Q.—Could you have safely pruned those trees in January?

MR. MITCHELL: Well, I suppose you might, but we don't do that. It is too cold.

Q.—Would you take a tree that has been badly neglected in that way and trim it down in one year?

MR. MITCHELL: I couldn't tell you without seeing the tree. As a rule I wouldn't do it all in one year, as there is a possibility of shock. It might stand it, but there is a danger. We have some pruning to do in this orchard yet.

Q.—Do you charge all your personal work to that orchard?

MR. MITCHELL: Yes, everything is charged up there. It is all hired help.

STANDARDS FOR JUDGING OF FRUITS AT EXHIBITIONS.

APPLES.

HAROLD JONES, MAITLAND.

It has been recognized for a long time that there is a lack of uniform standard and wide differences in opinion by both exhibitors and judges as to the kind of fruit that should be shown to make the best plate, and judges differ so in their opinion that confusion is made worse.

Score cards have been printed for the use of judges by several societies, but they have been found faulty and very few judges will use them as the scale of values have led in some cases to awarding prizes in contradiction to their own judgment.

At the last annual meeting of this Association a committee was appointed to take this matter in hand and try to draft a scale of points or score card and adopt a uniform standard for exhibitors and judges. The chairman of this committee, Mr. W. T. Macoun, has kindly loaned me a copy of a score card proposed by the Fruit Growers' Association of Nova Scotia, which has since been adopted by that Province, Prince Edward Island, New Brunswick Associations and also Quebec.

This card gives for Single Plates named:

Points—25	Freedom from blemish
25	Color
20	Uniformity.
15	Form.
15	Size.
100	

The following score card is for Collections:

Points—20	Freedom from blemish.
15	Color.
10	Uniformity.
10	Form.
10	Size.
10	Commercial value.
10	Quality.
10	Nomenclature.
5	Arrangement.
100	

And appended is an explanation of the terms used.

Freedom from Blemish. Any injury by insects, fungus, bruises, loss of stem or other cause lessening the value of appearance of the exhibit may be called a blemish.

Color. Bright, clear, well-developed color characteristic of the variety.

Form. Represents the perfect or normal type of the variety.

Uniformity. Specimens should be as nearly alike in size, form and color as possible.

Size. Indicates care and skill in production, and usually, other points being equal, size wins.

Commercial Value. Standard known market varieties, as grown in and suited to the district, preferred.

Quality. To be considered in collections, seedlings, new varieties on trial, or other sorts in competition.

Nomenclature. Exhibits must be correctly named according to the nomenclature adopted by the Society, Association or exhibition at which they are shown.

Arrangement. Taste and skill in staging so as to attract attention and add to the general appearance of the exhibit.

Season. Collections should contain varieties that prolong the season of use.

The score for single plates named will work out with splendid results. The one for collections might be changed slightly, giving five points for nomenclature or correct naming instead of ten and adding five points for season.

It is the intention of societies and associations when they offer prizes for the best seedling to bring to the attention of the public any new variety. It is just at this point that the average judge breaks down. The prize lists generally give a first and second for the best seedling. When the judges consider these exhibits they find them entered on number and in at least 50 per cent. of the entries known named varieties are shown.

The first problem is how many of these are named varieties, and the judge feels that he is in duty bound to name the varieties and rule them out or give the prize to the plate with the best points.

I have judged fruit more or less for over 25 years and I have never felt perfectly satisfied with my work at this point on account of the possibility of awarding a prize to a named variety that I could not identify and classing it as a seedling.

I would suggest that a special score card for seedlings be drawn up giving:

Points—	10	Freedom from blemish.
	20	Color.
	10	Uniformity.
	15	Form.
	15	Size.
	25	Texture and quality.
	5	Season—meaning the length of time or period of its usefulness.

I would suggest further that our Association use every means in their power to have every agricultural society or county fair board and exhibition committees print in their prize lists every year the scale of points for judging fruit, with the explanation of terms and have all exhibits of seedlings shown under the owner's name with his post office and county and the age of the tree, leaving off the exhibitor's number so that there would be no key by which the judges could identity any fruit he might have in the general exhibit. The associations to provide suitable cards for the purpose.

This last clause would add to the value of the exhibit and simplify the work for the judges.

I do not wish it understood that I would advocate the scoring of a whole exhibit for that would entail work upon the judges that would be practically impossible to accomplish in the time usually allowed for such work, but have the scale of points as a guide and help at the deciding point and as a means of overcoming differences of opinion between judges.

To give a case in point: I was judging with an acknowledged authority at one time and we had a rather good lot of Fameuse to work on. It simmered down to three plates, and then to two, for first prize. One of these had full points on color, uniformity, and everything except size. The other was perfect in everything

except color, and it was off four or five points in this respect, but was at least one-sixteenth larger. My fellow judge said, "Consider the earliness of the season; see what the color will be in a week or two; size is everything in Fameuse, etc." I gave way to his judgment, but was not quite satisfied.

This brings up the question of judging immature fruit at county fairs. I leave it to the meeting for discussion.

MR. WALLBRIDGE: It seems to me there is a very important matter that should be attended to in connection with the inspection of apples. You will see many of our fruit growers and many of the public inspecting the apples who do not know what varieties they are, and it would only be a matter of trifling cost to have little cards printed and put on each box. It would be instructive to have them.

MR. JONES: Every plate is supposed to have the name of the variety on it, and it must be on there or the judges cannot act. That is one of the rules of the Association, and that is general all over the Province.

MR. WALLBRIDGE: It is important that the boxes and barrels of fruit should be labeled.

MR. JONES: It is a very important thing. We can throw it out as a suggestion to our societies that they should provide printed cards with the name of the varieties suitable to their districts.

MR. WALLBRIDGE: I was speaking more particularly as to our annual Exhibition at Toronto. Looking at the fruit myself last night and to-day I saw numbers of people that were asking what the different varieties were. Fruit grown in one district is so different to what is grown in another district, although it is the same variety, it is difficult often for a person to tell what the fruit is, and if this Exhibition Association would have cards printed and put on them and just laid loosely on top of the boxes and barrels it would be very instructive to the public.

MR. JONES: That would be a good point. Our own Executive can attend to that matter. However, with regard to the County Fairs throughout the Province, as it is at present, nearly all packages and barrels shown are named, necessarily so, or the judges could not act.

THE CHAIRMAN: Just at this point it would be interesting to have the report of the committee, and I will ask Mr. Macoun, of Ottawa, to give it.

STANDARDS FOR JUDGING FRUITS, APPROVED BY THE ONTARIO FRUIT GROWERS' ASSOCIATION FOR TRIAL IN THE YEAR 1911.

W. T. MACOUN, OTTAWA.

The following is the report of the Committee on Standards for Fruit Judging:

APPLES AND PEARS.

Single Plates:

Form	15
Size	15
Colour	25
Uniformity	25
Freedom from Blemish	20
	100

PEACHES.

Single Plates:

Form	15
Size	20
Colour	25
Uniformity	20
Freedom from Blemish	20
	100

PLUMS.

Single Plates:

Form	10
Size	25
Colour	15
Uniformity	25
Freedom from Blemish	25
	100

CHERRIES.

Single Plates:

Form	10
Size	20
Colour	20
Uniformity	25
Freedom from Blemish	25
	100

SEEDLINGS AND "ANY OTHER VARIETY."

Single Plates:

Form	15
Size	15
Colour	20
Uniformity	10
Freedom from Blemish	10
Quality and Texture	25
Season	5
	100

GRAPES.

Single Plates:

Form of Bunch	10
Size of Bunch	15
Size of Berry	10
Colour	10
Bloom	5
Freedom from Blemish	20
Quality	25
Firmness	5
	100

COLLECTIONS OF APPLES, PEARS, PLUMS, PEACHES, CHERRIES AND GRAPES.

On Plates:

Form	10
Size	10
Colour	15
Uniformity	10
Freedom from Blemish	20
Quality	10
Commercial Value	10
Nomenclature	5
Arrangement	5
Season	5
	100

BARRELS: APPLES.

Fruit:

Size	10	
Colour	20	
Uniformity	15	
Freedom from Blemish	15	
Texture and Flavour	15	
	—	75

Package:

Material	4	
Finishing	6	
	—	10

Packing:

Facing	6	
Tailing	2	
Racking	3	
Pressing	4	
	—	15
		100

BOXES: APPLES, PEARS, PEACHES.

Fruit:

Size	10	
Colour	20	
Uniformity	15	
Freedom from Blemish	15	
Texture and Flavour	15	
	—	75

Package and Packing:

Material	3	
Finishing	4	
Fulness or Bulge	4	
Solidity or Compactness	5	
Attractiveness and Style of Pack	5	
Alignment	4	
	—	25
		100

EXPLANATION OF TERMS—FRUIT.

Arrangement. Taste and skill in staging so as to attract attention and add to the general appearance of the exhibit.

Colour. Bright, clear, well developed colour, characteristic of the variety.

Commercial Value. Standard, known market varieties, as grown in and suited to the district, preferred.

Form. In all cases, except seedlings, refers to the normal type or shape of the variety, but in the case of seedlings it refers to shape as desired in a commercial variety. A roundish apple is of the most desirable shape, and oblate and oblong apples least desirable.

Freedom from Blemish. Any injury by insects, fungus, bruises, loss of stem, or other cause, lessening the value or appearance of the exhibit shall be called a blemish.

Nomenclature. Exhibits must be correctly named according to the nomenclature adopted by the Society, Association or Exhibition at which they are shown. The use of the standard of nomenclature adopted by the American Pomological Society is recommended to such bodies.

Polishing. Fruit on exhibition shall have as much of the natural bloom as possible. Judges should discourage polishing.

Quality and Texture. To be considered in collections, seedlings, new varieties on trial, or other sorts in competition.

Season. In collections it is desirable to have as long a season as possible represented by the varieties shown. Varieties past condition shown for the purpose of lengthening the season will not, however, score as high as apples in condition though of later season.

Size. While size in some cases indicates care and skill in production, it is not usually found with the highest color and with freedom from blemishes and as large size is not as important as high color and freedom from blemishes, the largest fruit should not take the first prize unless it is equal or better in other respects than those in competition with it.

Uniformity. Specimens should be as nearly alike in size, form and color as possible.

Explanation of Terms—Packing and Packages.

Alignment. Alignment refers to the rows of fruit in the box—the straighter and more regular the rows the better is the alignment.

Attractiveness and Style of Pack. When the box is opened the fruit should look attractive. The skill and good taste of the packer is shown in the appearance of the fruit and the style of the pack. There are many styles of pack, but the one should be used which lends itself best to the variety and size of fruit packed. The diagonal pack with solid sides is preferred. The fruit should be as nearly alike in size and color as possible. The box also should be clean and attractive looking.

Bulge. A bulge or swell in the top row of fruit is necessary in order to ensure the fruit carrying well. Before the top is put on there should be a bulge of one and one-half inches in the centre of the top row and the fruit should be one-quarter of an inch above the top of the box at the ends. When the cover is on there should be a bulge of three-quarters of an inch at the centre, at both top and bottom.

Facing. When facing a barrel, or when beginning to pack a barrel, the apples for the first row should be put carefully in with the stem end down, the stems having been first cut off so that they will not injure the fruit when pressed. If slightly smaller apples are used in the outside rows and larger ones in the centres it improves the appearance of the face. A second row is now put in, in the same manner as the first, and these apples should be arranged so they will show through the spaces between those in the first row. These two rows constitute the face of the barrel. The fruit used for the face should fairly represent the fruit throughout the barrel, but the apples in these two rows should present as attractive an appearance as possible. The law in regard to facing, as defined in the Inspection and Sales Act, is as follows: "No person shall sell or offer, expose, or have in his possession for sale any fruit packed in any package in which the faced or shown

surface gives a false representation of the contents of such package, and it shall be considered a false representation when more than fifteen per centum of such fruit is substantially smaller in size than, or inferior in grade to, or different in variety from, the faced or shown surface of such package." Apples in barrels for exhibition should be packed as required by law.

Finishing. By finishing is meant the heading, lining, cleating and marking of the box or barrel. The heads of the barrel should fit snugly into the chine. For barrels, six rosined nails in each head are usually sufficient. They should be skillfully driven through them and through the top or bottom into the ends of the box. The sides of the boxes should be nailed with four nails at each end of each side of the box. The nails used should not be smaller than those known as fivepenny.

Marking. The marking of barrels and boxes should be distinct and attractive. It should comply with the regulations of the Inspection and Sales Act, which call for the initials of the Christian names of the packer, his surname, and his address; the name of the variety of fruit, and the designation of the grade, whether it be "Fancy," "No. 1," "No. 2," or "No. 3." Such mark may be accompanied by any other designation of grade or brand if that designation or brand is not inconsistent with, or marked more conspicuously than, the one of the said four marks which is used on the said package.

Material for Barrels. The standard barrel must be large enough to contain at least 96 quarts of fruit. Smaller barrels should not be exhibited. The barrel in general use in Ontario has staves 30 inches in length. In Nova Scotia the staves are 28 inches long. The dimensions called for in a standard barrel of minimum size are: Between heads, 26½ inches wide, inside measurement; head diameter, 17 inches, inside measurement; middle diameter, 18½ inches, inside measurement. The barrel generally used in Ontario is 27½ inches between the heads, 17 inches in diameter at the head, and with a middle diameter at the bilge of 19½ inches. A good barrel should have sixteen staves with 9-16 jointing, cut five to two inches and averaging four inches in width at the bilge, and be free from large knots or shakes. The head should not be less than one-half an inch in thickness, dressed clean and sound. The hoops should be about one and three-eighths inches in width and eight in number. The barrel should be new and clean.

Material for Boxes. The box should be made of material strong enough to withstand handling in transportation. The heads or end pieces should be each of one piece of wood and not less than three-quarters of an inch thick. The sides also should be each of one piece and not less than three-eighths of an inch thick. The top and bottom boards may be of one or two pieces, preferably two, but not more than one-quarter of an inch in thickness. They must be thin, so that they will bend readily when the box is closed. There should be two cleats each for the top and bottom. Dovetailed boxes are not desirable. The standard box must be used. This is 10 inches deep, 11 inches wide, and 20 inches long, inside measurement.

Pressing. Apples are often over-pressed. If the barrel is racked well there need not be much pressing. The proportion of fruit that is injured by pressing will be evident when the barrel is opened. The less fruit that has been injured by pressing the better the barrel has been packed, provided, always, that the pressing given has been sufficient to scure the required firmness. Barrels loosely packed frequently show more injury to the fruit through shaking than barrels over-pressed.

Racking. All barrels of apples should be racked when being packed, so that

the fruit will settle, and the packer thus be able to tail his barrel so that the fruit will carry well. When the barrel is opened the fulness or slackness will indicate how well the fruit has been racked. Over-pressed fruit is usually found when apples have not been racked well.

Solidity. This may also be expressed by the terms firmness and compactness. The more solid the pack the better the fruit will carry.

Tailing. By tailing is meant the putting and placing of the last fruit into the barrel. All that is necessary in good tailing is to have the surface as level as possible with the stem end down when the apples are pressed. The care in tailing will be known when the barrel is open by the manner in which the fruit has been bruised when pressing.

Q.—Why do you give marks for quality in plums and cherries and not in apples?

MR. MACOUN: The reason for that is in plums and cherries there are comparatively few seedlings which are shown, and we thought it better to use only one score card for those, and use quality. In all score cards except the one in Nova Scotia, quality has been included. We include quality in this because in the case of plums, for instance, where you have a comparatively small collection you can test the quality, and the same with the cherries. There are a large quantity on the plates, and there is not the same competition as a rule as with apples and the other fruits.

Q.—Don't you think the percentage of tails is an important matter? You spoke of 2 per cent. Mr. McNeill emphasizes it as a very important part in the packing of the barrel?

MR. DEMPSEY: The tailing of the barrel is very expensive, and that is not the part we put up to sell the barrel. A barrel tailed to carry well to any market, the apples should be put in so they will be level, no matter whether they are on their sides, tail up, or heads up. Mostly we think that percentage is sufficient. The face of the barrel is the most important part, how the face is put in, and then the apples through the barrel should be the same. The tail is simply where we press it in and we shouldn't have to put on so much expense or take so much time in tailing up the fruit.

MR. WALLBRIDGE: If the tailing is right your face is more apt to be right. I think you ought to give more points to the tail because of the way it brings out the face.

MR. DEMPSEY: Not at all. You can get a man to get that tail level for much less money than you can have a man make the tail look exactly like the face.

Q.—Don't you mean both tail and face?

MR. DEMPSEY: No. If you are going to give a lot of points for the tail then the tail must be equal to the face, and that is the point we want to discourage.

Q.—According to Mr. McNeill's statement it was as important?

MR. DEMPSEY: Well, I am speaking from practical work for a great many years in my own business as a grower and we have to pay more money to get a man to do fancy tailing than we do for fancy facing. It is easier to get a fancy face than it is a fancy tail, and why should we encourage tailing? It is not the tailing that sells the barrel.

Q.—Are you speaking of the English market?

MR. DEMPSEY: I think that would apply to all markets.

MR. LICK: When you go to the Western market you must pay more attention to the tailing. We have had to change our method for the Western market.

Mr. Dempsey: I have been putting up my apples for Chicago.

Q.—What is the reason that they require it different in the West?

Mr. Jones: They have gone a little crazy in the Chicago market with regard to tailing a barrel anyway. I had some packers only a year or two ago from Chicago, and they hadn't packed anything but Ben Davis, and they tailed them on their sides and pressed them down about three inches and a half, and when they got through I would have wanted about $1.50 off for demurrage on those barrels. There was nothing left but the face and probably six inches of apples below the face, and the rest of the barrel was bruised. The tail being so heavily pressed in and being on its side, the apple hasn't the same resistance as it has on its stem end, and those apples on the tail were completely ruined. Now, those men were considered to be expert packers and they knew actually nothing about packing a snow apple. They ruined a lot of apples, a matter of some 600 barrels, and I wouldn't have taken them back off their hands at 50 cents a barrel after they were done. They spent a lot of money at that work, too. Those men were in there at $2 a day and they spent a lot of time on that tailing, and just ruined the apples. Don't go and press it and have your fruit packed so that it will show pressure more than three apples back from the tail. It will travel from here to the north of Scotland or to the other end of Alberta, and there will be no scars.

Mr. Dempsey: I would like to give a little instance of what we have had to contend with in the last three or four years in connection with the Northumberland and Durham exhibit. We had some apples packed up by some of the best packers in our section this year and they came up for exhibition, and I am sorry to say there were a great many of those barrels we couldn't use at all, simply because they had been filled right up full and pressed, and there were only two or three apples at the face we could use. There were other barrels put up by the growers that were barely filled and very slightly pressed, and every apple of those barrels has gone into the exhibition. I don't know why we should have those barrels tailed so much and pressed down that way to go any place. It certainly destroys them.

A Member: That is all right to send as far as Toronto.

Mr. Dempsey: They will carry to the Old Country with much less tailing and pressing than the buyers are doing.

Mr. Smith: I think Mr. Dempsey's argument is a good one. Are you going to put as much value on the tail end as the face? It seems to me the face end is what is looked on in the market and what it is sold by, and it is the end that has the most importance, and it ought to have more marks. I don't want to enter into any argument or criticism, but there is a point worth considering. It seems to me it is necessary to have a score card fixed up by experts, something you can go by. There is one thing that struck me as being very important to us if we go into a National Apple Show, if we have to compete with British Columbia, for instance. We in Ontario would adopt that score card and there are no points for flavor, and flavor is one point particularly that we excel in in Ontario, and if British Columbia or Washington or Oregon comes into competition with us and no points for flavor we will fall down. Of course I can see good reason for leaving it out in competitions in our own Province. We could, of course, adopt a new score card for national apple shows, but we would have this precedent before us.

Mr. Dempsey: I think Mr. Smith is under a misapprehension. In plates, say, of all Kings or all Baldwins or all Spies, that is the only place the quality is left out.

MR. SMITH: There would be plate competition, I suppose, in a National Apple Show as well as barrel and boxes, and I think we would fall down before the Western men.

MR. MCNEILL: In the case of a National Exhibition I think we would need a special score card for that show. We don't need the quality points where we have the show in Ontario.

MR. MACOUN: I move the adoption of the report.

MR. JONES: I second the motion.

MR. MACOUN: Before that resolution is put to the meeting there is something in what has been said about it being impossible for this meeting to go over all the points. I should suggest that this meeting adopt it for this year. It will only be a small cost to have 10,000 printed, and then next year we can go over the score card again and revise it in any way the Association thinks fit. My idea would be to have a small card for Eastern Canada, and I don't think it would require much change to have it for all of Canada.

Q.—Is there anything in the report as to whether the apple is to be polished or left with the bloom on it?

MR. MACOUN: There is nothing in the score card referring to whether the apple should be polished or not, but in the explanation given there will be something of that character. In Association shows all fruit is polished. I myself do not believe in that except perhaps for barreled and boxed fruit. For plate fruit I think it is better not polished.

MR. SMITH: I think it is a good idea to adopt this for one year and have copies printed, and another year we will be prepared to criticize it.

The Chairman put the motion, which on a vote having been taken, was declared carried.

MR. JONES: I have a motion to present. I move that a sufficient number of copies of this report be printed by this Association and be sent to the Fair Boards and the Agricultural Societies, and the district representatives, and the colleges and experimental societies for use next fall at the fall exhibitions, with a circular letter, and that a copy of this report be slipped into each prize list when they are mailing them out in the fall of the year to their prospective exhibitors, and also that a copy of this report be handed to each judge as he goes to perform his duties in the fall at the local fairs.

MR. SMITH: Why could you not say that without adopting this absolutely as the guide of this Association? The only reason for not adopting it absolutely is that which I spoke of before, that if we should have a national apple show within a year, although you might change the score card for that purpose, yet it might be thrown up to us that we have a score card for Ontario and you don't use your own score card.

MR. MACOUN: If this Association would authorize the printing of a sufficient number it might be a good idea. The thing will cost very little and I think there will be a sufficient number of copies printed to get it well distributed.

MR. DEMPSEY: I second Mr. Jones' motion.

The Chairman put the motion, which, on a vote being taken, was declared carried.

MR. JONES: Referring back to another motion in reference to what Mr. Wallbridge said, I might move that this Association provide name cards for all boxes and barrels and packages for the Ontario Horticultural Exhibition next year.

The motion was duly seconded, and on a vote being taken was declared carried.

WHAT IS THE MATTER WITH CO-OPERATION?

S. E. Todd, Petrolea.

If I were a poet or a musician I would try and work out a parody on "What is the Matter with Father? He's all right." "What is the matter with co-operation? It's all right." Co-operation, I think, is really the answer to the great question of how to produce and market our fruit properly, but in order that we shall be able to co-operate properly we must understand what co-operation means. If there is anything wrong with co-operation it is with the people who are in business, not with the principle itself.

There is no doubt about it, because it has been proved in so many countries in the world to be a perfect success. This idea of co-operation is no experiment. In the countries of Denmark, Germany, England, Ireland, France, Switzerland, and Italy co-operation has proved itself to be able to answer whatever problem it has been put up against, and it has been put up against a great number of problems, and a great variety of problems. In Denmark it has been applied to the question of marketing the farmers' products. In Germany it has been applied to the question of supplying the farmers with cheap credit. It has become his bank account, his means of getting credit with which to perform his work, and to get capital to carry on his business. It has freed him from the Jew money leader who was there and who was exacting tremendous interest from him, simply by getting together and working together as a co-operative body.

In France it has been applied to the business of producing. Over in France there are co-operative vintries and co-operative dairies, a number of farmers joining together and producing together. While that is so, it seems to me in Denmark that conditions more nearly resemble ours than they do anywhere else, and it is from Denmark we can learn the greatest lessons. Over there they have organized their industries in such a way as to bring them greater returns for their outlay. Denmark has had the same trouble that the people of this country have had and are having all along, and that is to get adequate returns for their effort. Their problem has been one of marketing, just as ours has, and wherever co-operation has attacked the question of marketing there it seems to be most eminently essential, and it is the consensus of opinion of a great number of men who have been engaged in this for 30 or 40 years, that the main thing which co-operation is able to do is to answer the question of marketing.

When the farmer and the fruit grower is provided with an adequate market, when he sees if he produces, and produces any quantity, that that is going to bring him a market which will fulfil all that he needs and will give him expansion and that will allow him to go on and produce more and more with perfect confidence, then he is able to go ahead. It seems to me that the answer to the question that has been asked time and time again of the farmer of Ontario is why he is not producing more? That is the question that seems to be large in the minds of a great many people in Canada and the United States to-day. Why is the Ontario farmer not producing more? The answer generally is that the markets are not in a condition to give him returns for that product, not that the produce is not dear enough, but that he is not receiving the benefit he should receive from that high price, and co-operation seems to be the way to give him that market.

Now, I believe I am to talk about the question of why failures have occurred in the co-operation system. I will not go further into this other subject, because I want to get right into that. I think the chief thing that is wrong, and the rea-

son we have had more failures than in any other thing, is simply that we do not understand what co-operation means, nor the principles involved.

Every country in Europe that has been successful in the co-operation effort has had what they call a central organizing body. This body is a small association whose business it is to go through the country and organize co-operation associations. They start in by studying what has been done in all the other countries. With that knowledge then they are ready to go into a new section of country and organize it, with the experience gained by other countries.

The principal problems which they have to attack are of course different in the different countries because their business is to organize, and they have to study just how it is done. The mistake which is made in organizing one society is not made in organizing the next society, and so by means of this central organizing body they are able to go on from one success to another, till they work out a system that is peculiarly adaptable to the country in which they are working. This is the only way, I may say, that co-operation has been successful in any country, that is, through a central organizing body whose business it is to organize individual societies. The work of that body is to organize societies, to advise how managers shall be paid, and to settle disputes. They have those three main points to look after and these three are of very great interest.

Q.—What control has this central organization over the other? Has it power to make changes in the smaller bodies?

Mr. Todd: That all depends on the Legislature in the country in which it is. In some countries, take, for instance, France, small societies can only be organized through the central. That is, small societies are only recognized as co-operation societies when organized through the central Association. In Denmark this is not followed, because they have worked out there a universal plan and they never think of organizing except along certain lines. Just at this point there is a question comes up. You go to a man in Denmark and you ask him what about a man withdrawing from those societies, and he will tell you no one ever withdraws there; they never think of such a thing. The whole success of their country is bound up with the co-operation system of manufacturing and marketing their products.

Now, the fact that there is in this country no central organizing body had led to a great diversity of associations of every kind and description, and every person who wishes to organize what they call a co-operation society can go in and do so. It may be co-operation or it may not. The people of Europe, in fact all the countries of Europe, have agreed on certain things that they lay down as co-operative principles, and they do not recognize anything else as co-operative. If they have a society requiring capital they have two forms. One is for the whole association as an association to go in and borrow the money with unlimited liability, each person going in for the whole amount of the liability of the association—that is the most popular method; or, on the other hand, they have a share system as we have in this country, but they have changed that share system from the way it is commonly used in joint stock companies. The share system as used by co-operation societies has two differences, and one is that no matter how many shares a man may own in the Association he has only one vote, and so can never gain control of the society. Then the dividend paid on the shares held in an Association is always fixed so that it amounts to interest on the money which is invested in the Association in the form of shares.

This lack of a central organizing body has led to all the other mistakes which

our associations are also plagued with and that have caused so many failures. We have no general body and there has not been gathered from the mistakes of others the experience with which to go on and form more successful associations. Each association is working separately and blindly, and for that reason the co-operation associations of this country have not made nearly the headway they should have made, or would have made, if they had proper and skilful direction.

MR. PATTISON: Don't you think one of the chief reasons in addition to what you have pointed out is that the spirit of the people in this country is totally different from the spirit in those other countries? The people here largely are too individualistic, too selfish, too disinclined to make any sacrifice for the benefit of others? In other words there is a spirit of mutual distrust instead of mutual faith, which is largely absent in the countries you have mentioned?

MR. TODD: I think probably human nature is not different in one country to what it is in another. Human nature is pretty nearly the same everywhere. If there is a difference it is a difference of education. Let us go into the history of the formation of co-operation societies in other lands. In Denmark in 1854 there were probably no more individualistic people anywhere. The English farmer has been noted for centuries as being individualistic, and to-day he is recognizing the value of co-operation. The Irish farmer has always been known to be "agin the Government," and everything else that had anything to do with working together. They were always afraid some one was going to skin them, and they got skinned a good many times because they were afraid. Yet in Ireland things are entirely changed, mainly through the work of Sir Maurice Plunkett, who has spent his life in doing that.

Q.—What remedy do you suggest?

MR. TODD: I think there is probably only one way out of it, and that is by some means to get a central organizing body. To suggest how that shall be done is beyond me at the present time, for I may say I am a little too young in the business, and I think that will have to be worked out through the combined ideas of the men who are in the co-operative work. What I am doing at present is pointing out what has made the success there, and what has caused a great deal of the failure that we have had.

Q.—Would you not have to get some legal standing for the central committee?

MR. TODD: Yes, we would. That is one of the things we lack in Ontario.

Now, coming down to some of the individual reasons why our associations have failed. One of the things that strikes a person who goes over to Denmark, for instance, is the business methods with which the farmers of the country are imbued. Each farmer has an exact record of what his farm is producing. He knows exactly what is being done on that farm. The co-operation societies there all issue a form of bookkeeping which each member of the society is expected to carry out all the time, and they employ expert accountants who go from place to place. They are experts in the cost of production, and they point out where the cost of production has been too high and where they could succeed very well somewhere else, and so on all the way through. These men travel through the country and are in the employ of the co-operation societies and partly of the Government. These business methods in which the people are trained aids them in dealing with the co-operation society. They recognize just what their own living is worth; they recognize what it costs to run a business, and they recognize that you cannot get anything without paying for it.

Now, that brings up the question of running a society in this country. One

of the great reasons why we have failed, I think, taking individual reasons, is that we have never learned as farmers that it costs money, and just exactly what it does cost to run anything. We start a society and we pay say five cents a barrel for packing apples and it amounts to about six or seven hundred dollars, or three or four hundred dollars for the man who is handling it, and we expect him to spend the biggest part of his time running the society for that much money. We have not had sufficient training in business to know what it costs to run an association and the expenditure necessary in handling that Association, and we are not prepared to pay a good man a good thing in order to get his services. I think that is one of the great difficulties. You can't get any thing without paying for it, and in order to make a success of anything we have got to have brains behind it, and if you are going to have brains behind it you have got to pay for it, and in order to get a good manager you have got to pay him a good thing no matter who he is or what his business is. On the other hand there is a point where the manager's salary should stop, and every society should know exactly what their manager is getting. If he is being paid by commission they should know exactly what he is getting.

It has been said that perhaps the greatest cause of trouble in an association is jealousy. That probably is true, but jealousy is caused by suspicion, and suspicion is caused by ignorance. If we had more knowledge of what the whole system is doing, if every three months all the transactions were laid before the society, that would be a great means of disarming jealousy caused by the ignorance of the members of what has been done in the society. Another cause of our troubles has been the quality of the goods. The quality has often not been what it should have been. We place a brand on the goods that go out and that brand becomes the standard of what the society is putting up. If you are putting up a good article it is going to give your brand a good name, and if a poor article it is going to give the brand a poor name. That is absolutely certain, and that is one of the things that every society must recognize. In dealing with the causes of failure, as I have been going through the country and trying to find out from those societies that have failed, I have found that one of the greatest causes is that the quality has not been what it should have been at all, and the brand itself got a bad name and of course then the society had to die.

Another trouble has been the forms of organization under which we have labored. We have had joint stock companies formed who have called themselves co-operation societies, when they were anything but co-operative. A few members owned the biggest part of the stock, and the great bulk of the results was going to a few. That has been a very general cause of trouble. Then there are two kinds of societies very often within one, selling societies and buying societies. An Association will have two ends to it. It will pack and sell the man's product, and on the other hand it will buy. Now, unless those two businesses are kept absolutely separate there is sure to be a mix up. If the manager is selling on commission, the members will generally think he is getting too much commission. The plan that has worked out best in the European countries has been separate societies for each of these purposes. The members, of course, will be the same, the manager may be the same, but the Board of Directors will be different, and the President and Secretary will be different. This has been found the only way over there of handling the thing to good advantage.

Now, about this question of jealousy. In talking to one man this forenoon he told me that perhaps the biggest trouble that there was in co-operation societies was

the question of jealousy between the members. We can go on and preach and preach for all we are worth that men ought to love one another, and not be jealous of one another, and not be suspicious of one another, but the way I think to get over that trouble is to disarm suspicion by running the business in such a way that every dollar's worth of business done shall appear before the members so that they will have nothing to talk about. If a society is paying their manager on a commission basis then every dollar's worth of goods sold and the commission on that should appear in the statement so that the members would know right along just exactly what the manager is getting. If he is selling apples on commission every dollar's worth that he sells should appear, and should appear often enough so that they would know exactly what he is getting. There is nothing that would disarm suspicion and would throw down jealousy so hard as a system of that kind. There would be no room for jealousy because every one would know exactly what they were doing.

Q.—I understand in Alberta the Government built a creamery building and they receive the milk and sell the product?

Mr. Todd: Alberta is a section of municipal ownership, which is a different thing. That is where the whole country is a co-operative society. The co-operation idea as it is generally understood is confined to members only. Whether that will be a success or not is hard to say. It is still in the experimental stage. I have been trying to find a parallel in some of the older countries and I have not yet done so. New Zealand, I think, has the nearest approach to the Alberta system of anything I know. They have been running there something on the same plan and are more or less successful, but the plan that seems now to be more successful in New Zealand is the co-operation society, and they have carried it to such perfection that they have confederations of their societies which have agencies in London, England, and there they sell all their products directly to the consumer or to the small markets in London, England. Now, they handle butter, eggs, hides and so on, and also do a banking business for the farmers in New Zealand.

A Member: The gentleman who spoke just before is mistaken in supposing that the Government builds the creameries in Alberta. The Associations which are organized build the creameries and pay for them. The Government is at present running a few of the creameries. They rent the creameries from the owners or the farmers that built them and run them for a time. The idea is to put them on their feet until they get the confidence of the people.

A Member: The idea being, I suppose, as soon as they are self-supporting then they will go back to the owners.

A Member: I don't know what the idea is of the Government of Alberta at the present time, but I know that was the idea of the Dominion Government when they were operated by the Department of Agriculture.

Mr. Peart: I have been very much pleased with the address by Mr. Todd. In regard to the principle of co-operation as applied to handling apples I think he has struck the nail on the head when he said that one of the causes of failure is in not securing a competent manager. There is no doubt if you want to get a good man you have got to pay a good price. I am a member of an association which is about twenty-five years of age, at Burlington, and we call it a co-operative association. We ship apples and pears, and we have been doing business continuously for a quarter of a century. We engaged a competent manager, and under our system each member of the association packs his own fruit. He packs under general rules that are laid down by our association, and it is supposed to come up to that stand-

ard. Now, the great beauty in our association is that each man is paid for his own stuff. As I understand it, in the standard Co-operative Apple Associations the results are poor. For instance the chairman and I may each send ten barrels of No. 1 Spies in a car to some point. His ten barrels of Spies are No. 1's but of a higher degree of No. 1 than mine. All of you who know anything about the peculiarities of the Northern Spy know that there are a great many degrees in a No. 1 apple. Now, his apples are a degree or two better than mine, and yet when it comes to pooling the price he is given a price the same as my inferior No. 1's. I consider that is a weakness. But I just wish to bring forward the fact that under our system there is no dissatisfaction among the members in regard to the price they get. The more brains, the more capital, the more labor I put on my apples and pears the better results and the better prices I get and I reap the results of my own work.

Mr. Buchanan (Beamsville): Perhaps the best way I can begin is to give some of the circumstances under which we organized, as it will throw some light on some of the points that Mr. Todd has so well set forth. We organized down there in Western Ontario, and when we commenced to organize it was perfectly plain that there were two classes of fruit growers in the peninsula. In the first place there were a small number of men who were growing fruit and who were business men or retired professional men. The business men as a rule did not know very much about fruit farming. On the other hand there were a large number of fruit growers who were very good farmers, but who did not know very much about business. Unfortunately a very large number of farmers think they know a whole lot about business. They think because they can send out quotations, and because they can draw drafts on their customers, and discount a note in the bank, and so on, that they are acquainted with all the intricacies of business. For myself, I know very well I don't know anything at all about business, and we people who organized got the idea into our heads that it was necessary for us to hire a man to do our business in the same way as we hire a solicitor or a doctor. It is perfectly clear that no man who employs a solicitor will have any success if he assumes he knows as much about law as the solicitor and tries to bring his knowledge of the law into the case; and in a similar way if farmers get together into a co-operation association they must definitely make up their minds that their manager whom they have hired is a business expert, and they can have no idea if the means he adopts in carrying on business is the best way or not. They must, of course, have a Board of Directors, but they must on the whole leave things to their manager, and it is necessary that he should be an expert business man, and he must be a sort of prime minister. That was one point that we held as essential. We also held that a co-operation association to be a success must be large one. There are a great many reasons for that, such as the fact that unless it is large it cannot be influential enough to make its weight felt with the railways and the Railway Commission and a great many other organizations. But those reasons are really side issues. The real reason why a company must be large is that they must be powerful enough to hire the best business expert they can get. A small association of ten or twenty or thirty members cannot do that. For example, if we were paying our manager the same rate per individual that some of the smaller associations are paying their manager we would be paying him something like $10,000 a year. We are paying him a very good salary, but very much less than that. We organized our Association with a great deal of difficulty on account of the Canadian law. Mr. Todd has alluded to the fact that there is no Canadian law for co-operation associations. I was

one of the unfortunates who was on the committee of organizations, and it looked to me as if it was something like that old game of bagatelle where you shoot a ball through a lot of pins, and every time we got through one pair of pins there was another pin stuck up that we had to get around also. We organized as a joint stock company with a Dominion charter, and we had a great deal of difficulty in getting our charter through the Department. We found there were rulings to this effect and rulings to that effect that made it almost impossible to get a co-operation association.

MR. TODD: May I ask how much business you did?

MR. BUCHANAN: If it had been in carloads it would have amounted to 400 carloads.

MR. TODD: In dollars, roughly?

MR. BUCHANAN: I couldn't say exactly. It would be $200,000 anyway. You can figure that from the carloads.

We got our charter and our company was organized first of all in local associations. At each shipping point there is a semi-independent local association, with its own chairman and secretary, to carry on such of its local affairs as it sees fit. The whole company is co-ordinated under one Board of Directors elected by the shareholders at large, but our charter is so drawn that each separate part of the Province can elect its own directors quite aside from another part of the country. We also arranged that each local association should contribute one member to the Price Committee. Our object in that was this, that the Price Committee is a very important part of the company, and we purposed in making that arrangement that our Board of Directors would be elected from amongst our strictly business men quite irrespective of their knowledge of farming. On the other hand, we arranged that each local association should be able to send a competent farmer to act on the Price Committee. Now, that organization has been found to work very well this year. We have had very little friction. The principal difficulties we have had in our company this year were of a clerical nature, probably because we have done double the business that we expected to do. In other words, our expert staff in the office has been simply swamped all summer. Our company, as I said, has been organized on a co-operation basis. That is to say, no matter how many shares a member has, he has only one vote, and although it is a joint stock company, there has been no such thing in it as any promotion stock. We think under the present Canadian law that is about the only way an association can be formed.

MR. TODD: As a joint stock company?

MR. BUCHANAN: Yes. We consulted a very eminent firm of solicitors who got our charter out for us and smoothed away a great many of our difficulties. There is just one point I would like to mention. Mr. Todd said the lack of business ability had a great deal to do with the failures of associations. My opinion is most co-operation societies fail on account of their system of accounts. We put our accounting affairs into the hands of chartered accountants from the very start. I will be very happy to comply with your suggestion.

MR. TODD: There are three points in connection with co-operation societies. First of all be sure that you have the right form of charter, then get a good manager, and do everything on a business basis. If that is done nearly all the jealousy will disappear. If it is conducted on business lines I do not see why it cannot succeed the same as any other business.

THE PRESIDENT: The Committee appointed to deal with the tariff question have sent in their recommendation. It is moved by Mr. Albert Thompson, and

seconded by Mr. E. Lick, that the following names go upon that Committee: A. Onslow, Niagara; J. W. Smith, Winona; A. W. Peart, Burlington; R. Thompson, St. Catharines; H. Jones, Maitland; W. H. Dempsey, Trenton; E. D. Smith, Winona; D. Johnson, Forest; R. W. Grierson, Oshawa. These are the names of the members of the Committee to deal with the tariff question. The President put the motion which, on a vote being taken, was declared carried.

SHIPPING PEACHES TO GREAT BRITAIN.

C. A. Dobson, Hamilton.

In the fall of 1909 a few gentlemen accompanied me down to a farm that I have coming into bearing at Jordan Harbor. They had just recently returned from England after a short visit and they admired the fruit on the trees and passed the remark: "Now, if you could only ship some of that fruit to the gentleman we have visited in England, we think we would be kind of squaring ourselves." However, as the undertaking seemed to be rather an expensive proposition at that time I didn't think seriously of it then. I had in mind previous to this sending a few packages over to my personal friends there, as they were the first peaches that came off the orchard, and I made a proposition to these gentlemen, and said, "I will prepare a certain number of packages along with my own, and I will send over to our agent at Liverpool and write him asking him how to despatch them from Liverpool to the respective places." The destinations were London, Liverpool, Bristol, Manchester, and Glasgow; in all we forwarded some sixty crates packed after the Georgia style. These crates had capacity equal to eleven quart baskets, or 120 peaches each. We picked them very carefully, wrapped them, and got the best color we could. These were shipped, and in every instance we had the most glowing and flattering expressions, and they were astonished and amazed to think that we had such fruit in Canada, especially Ontario. One gentleman immediately wrote back and said he wanted me to set aside twenty packages for his own personal use and his neighbors and friends. That is equivalent to forty baskets. Towards the Christmas season a gentleman from London called into my office at Hamilton, so I raised the question with him about the peaches, and the possibilities of the market there. He seemed to look very favorably on the outlook, and I asked him when he went back to put me in touch with a first-class firm with whom I could take the matter up thoroughly, and he sent me the name of Parsons & Company. They wanted nothing but a white peach in the Old Country, they said, and Parsons seemed to have the idea that we had nothing but a yellow-fleshed peach here. However, I told them our peaches were not exactly yellow.

Our experimental shipments to our friends led us to believe that it would be advisable to adopt a different kind of packing or package, and we began to examine as to how these peaches arrived in London that were exported from South Africa, and finally, through the courtesy of Parsons & Company and the Agricultural Department, we had the privilege of examining one of these packages. Then I took up the question with Parsons & Company as to how many they could handle, and I asked them if they could handle one, two, or three thousand packages a week. I got their maximum and minimum prices for the South African peaches, and it occurred to me if we could get a few of their maximum in with their minimum prices we wouldn't mind making a test of it occasionally.

I laid my plans for giving them about a thousand packages a week, but owing to the fact that our peaches must arrive there in perfect condition, the size must be large, the color must be good, and the flavor must be right, the number was reduced.

We got the first shipment off by express from Jordan station to Montreal. When the fruit had been sealed up in the cold storage compartment of the boat I received a telegram the following day from the Dominion Inspector that the consignment was a little over ripe, and unfortunately the temperature of the fruit when being transferred from the express car to the steamer was found to be unreasonably high. However, the shipment went forward, and, to make a long story short, the price I received for that particular consignment, the average net price, was 95 cents per box. These boxes each contained from fifteen to twenty peaches. The next consignment, some 309 boxes, averaged $1.21 net. The next consignment of 529 boxes was $1.29 net. The next consignment of 600 boxes met with a little misfortune in the cold storage compartment, through the cold storage pipes leaking, and I can't say whether there will be a loss or not at the present time. These peaches were distributed in London, Liverpool, Manchester, Glasgow, Birmingham, Brussels, and Paris, so that all those cities have had a taste of Ontario-grown peaches.

Now, if you anticipate going into this business, bear this in mind, send nothing but A1 stock, and such that would only afford you pleasure to hand out to your dearest friends. They pay great attention to the size. Of the size we had at Jordan later in the season we could only force about fifteen into a box. The first two shipments consisted of Early Crawfords, and the later shipments were Elbertas. They say over there they must have a peach with lots of color and good size and some flavor attached to it, and if we send that kind we will get our money out of them.

Mr. Ruddick: Before I left Ottawa I was authorized by the Minister of Agriculture to arrange for another conference of fruit growers from all over Canada to take place next autumn at whatever time you thought would be best. Probably a week later than this, just after the fall meetings are over, would be a good time. I think it would be desirable for this Convention to appoint their delegates to that conference now, and set them at work on the subjects they are to discuss. I also intend to ask the delegates to this conference from this Province to prepare special exhibits of the leading varieties of apples from their respective districts. It need not be a very large exhibit, but probably a dozen varieties from each of the localities. Now, I may say for your guidance that it has been decided that the conference will be organized on the same basis as the last one, and that will give this Province nine delegates. There will also be the Department of Agriculture and the Ontario Agricultural College, as well as the others, asked to send delegates. This Association will be entitled to name nine delegates. As the time is so short I will not say anything further now. Probably anything more can be made a matter for correspondence with the delegates that are appointed.

The President: The chair will appoint Mr. Smith, Mr. Johnston and Mr. Jones to pick out the delegates for this meeting. They can bring in a report right away.

Mr. Robert Thompson: I see I have been asked to say a word or two on this. Last year in this room, when we were discussing the question about what was to be done, I think I was asked the question what, as fruit growers, we ought to do,

and my answer was I thought the Dominion Government ought to do something, the Ontario Government ought to do something, and the fruit growers ought to do something to help to send those experimental shipments through. The two Governments expressed their willingness, and an appropriation was secured. Along early in the spring, when the wild cat stories got about with reference to the peach crop, I met some of the gentlemen that were afraid we wouldn't be able to put those peaches in at a fair price. It was supposed to be at the market price, and it meant extra work and care in regard to them. I assured Mr. Ruddick that there would be no trouble, that they would get the peaches at St. Catharines, and we undertook to put up 2,000 boxes. Owing to the weather we were not able to put up quite so many. We had two weeks of bad weather this year, one week with Labor Day in it, and we had to put the peaches up on the first three days of the week to get them ready for the boat, and we had to work on Sunday there, as they had to in some other parts of the Province. Now, Mr. Moore and Mr. Ruddick, will give you the particulars, and I am not going to go into any details. Mr. Dobson said there were two sides to the question, and he, of course, took the rosy side. I am a grower, and I am not in the habit of taking the rosy side. I feel it is right to say that at the present time there is nothing that has made my indignation rise so much as to hear some of those men tell stories of what great profits were made, as we see in the papers. They do not say, on the other side, what the cost is to produce, and if we get seemingly a large amount out of it, we have got to a pay a great deal out which the public does not know about. I heard a gentleman sitting opposite me to-day saying, how are you going to reconcile the fact that the apple men are coining money? I said it isn't so. I said you have got to have an explanation of that. Now, for instance, the expenses of this meeting have to be taken into consideration in growing your fruit. All those things have to be taken into account, and that is the reason I don't want to say that because we have received a good price for those peaches it is going to pay us for all the extra trouble we have taken in regard to it. I am glad to say this though, that it was successful. We didn't expect we would come out ahead. I just wanted to say this for fear some of our growers would follow Mr. Dobson's example and think that each and every one could go and make shipments to the Old Country and be successful. It is only a large association with large bank accounts, or men like Mr. Dobson, that can handle that. We had some twenty odd growers that participated in sending this fruit into the packing house, and when you consider that we had to get excelsior to put into the packages, and take it out to the orchard, and then pick the peaches off the trees and select them and pack them so that no two peaches touched, and then take them out again and lay them to one side, and all that extra handling and care, you can see it requires a good deal of extra expense. I won't say much about the quality, because some varieties haven't much quality about them. The receipts are apparently high; on the other hand, the expenses are very great, and I think we have got a good deal yet to learn with regard to the varieties to send. I think we should get the assistance of the officers of the two Governments in trying to advertise the shipments to the Old Country, and help us out in that way at least. I think it is one of the best advertisements that Canada has ever received. I was amazed to read an article in a British Columbia magazine about the fact of the successful shipment of peaches to England, and it didn't say where they were from, and British Columbia got the same glory as we did.

COLD STORAGE FOR OCEAN SHIPMENTS OF FRUIT.

W. W. Moore, Ottawa.

The two previous speakers have told you about the shipping of peaches to Great Britain this season, but I want to impress upon you the fact that this export trade in tender fruits has been made possible only through the action of the Dominion Department of Agriculture in reserving cold storage space in the ocean steamers, which enabled a shipper to send one case or one hundred cases in cold storage at the regular rate of freight for cold storage goods.

Reservation of Cold Storage Chambers for Fruit Only.

On August 9th the Dairy and Cold Storage Commissioner sent out a notice to fruit shippers, stating that in order to assist in the establishment of an export trade in tender fruits and early apples, he had arranged with the steamship companies for the reservation of cold storage chambers for fruit only on steamers sailing from Montreal to Glasgow, Bristol, London and Liverpool, on the following dates:

To Glasgow—September 8th, 17th, 24th, and October 1st.

To Bristol—September 15th.

To London—September 17th, 24th, and October 1st.

To Liverpool—September 17th, 24th and October 1st.

The Department guaranteed a certain amount on one chamber on each of these steamers, and when the actual earnings fell short of the guarantee, the Department paid the difference.

In addition to the steamers referred to above, the Commissioner arranged for cold storage space for Mr. Dobson's shipments on the steamer *Tortona,* which sailed from Montreal to London on September 10th, and on the *Cairnrona,* which sailed on October 8th.

To illustrate the benefit conferred upon shippers by the policy of the Department in regard to this matter, I may say that when Mr. Dobson found he would have a shipment of peaches ready for the week ending September 10th, he endeavored to get cold storage accommodation, but was turned down by the steamship companies because he did not have a sufficient quantity to make it worth their while to open a chamber. He was, therefore, absolutely blocked, and appealed to us for help. We promptly took the matter up with the Robert Reford Co., and arranged for the necessary space in the *Tortona.*

Refrigerator Cars for Shipments of Fruit from the Niagara District to Montreal for Export.

The Commissioner also arranged with the Grand Trunk Railway Company to run one refrigerator car from St. Catharines on Wednesday of each week to connect with steamers sailing from Montreal September 17th, 24th, and October 1st. Only export fruit could be put in these cars. The Department guaranteed minimum carload earnings, plus icing charges, and shippers were charged the l.c.l. rates only. If the freight collected on each car fell short of the guarantee, the Department made good the deficit. A notice was sent to shippers at Grimsby, Vineland and Burlington that an iced car would be furnished them at any time on terms similar to the above, provided that not less than half a carload was shipped at one time.

In passing I might state that the St. Catharines car was run as per schedule, but that it carried little besides the Department's shipments of peaches. One car was shipped from Grimsby and one from Burlington.

CANADIAN PEACH SHIPMENTS, 1910,

The total quantity of Canadian peaches shipped to Great Britain during the season of 1910 was approximately as follows :—

Date shipped from Montreal.	Shipper.	Market.	No. Single Layer Cases.	Total Number Cases.
1910.	*1st Week.*			
Sept. 10	C. A. Dobson, Jordan Station.....	London	.....	600
	2nd Week.			
" 15	Dept. Agriculture, Ottawa.....	Bristol	50	.....
		Cardiff via Bristol	25	.....
		Birmingham	24	.....
	Total for Bristol and	District	99	.....
" 16	Dept. Agriculture, Ottawa.....	Liverpool	51	.....
		Leeds via Liverpool	12	.....
		Manchester "	12	.....
	Total for Liverpool	and District	75	.....
" 17	Dept. Agriculture, Ottawa.....	Glasgow.....	93	.....
" 17	" " "	London	150	.....
" 17	C. A. Dobson, Jordan Station	London	309	.....
	Total for 2nd	week.....	.....	726
	3rd Week.			
" 24	Dept. Agriculture, Ottawa	Liverpool	102	.....
		Leeds via Liverpool	24	.....
		Manchester via Liverpool.	24	.....
	Total for Liverpool	and District	150	.....
" 24	Dept. Agriculture, Ottawa	Glasgow.....	177	.....
" "	" " "	London	342	.....
" "	Biggs Fruit and Produce Co., Burlington	Liverpool.....	27	.....
" "	" " " " " "	Glasgow	68	.....
" "	" " " " " "	London	105	.....
" "	C. A. Dobson, J rdan Station	London	529	.....
	Total for 3rd	week.....		1,398
	4th Week.			
Sept 30....	Dept. Agriculture, Ottawa	London via Liverpool	198	
" 29....	Biggs Fruit & Produce Co., Burlington	Bristol	67	
Oct. 1.....	Biggs Fruit & Produce Co., Burlington	Glasgow.....	15	
" 1.....	C. A. Dobson, Jordan Station	London	600	
" 1.....	D. Johnson, Forest.....	London	9	
" 1.....	Miscellaneous.....	London.....	27	
	Total for 4th	week		916

CANADIAN PEACH SHIPMENT, 1910—Continued.

Date Shipped from Montreal.	Shipper.	Market.	No. Single Layer Cases.	Total Number Cases.
	5th Week.			
Oct. 8.....	C. A. Dobson.....	London....	.....	19
	6th Week.			
" 15.....	C. A. Dobson.....	London....	.....	84
	Total quantity	Shipped....	.....	3,743

SUMMARY.

Shipped by Dept. Agriculture, Ottawa.....	1,284	Cases
" " C. A. Dobson, Jordan Station.....	2,141	"
" " Biggs Fruit & Produce Co., Burlington.....	282	"
" " Miscellaneous Shippers.....	36	"
Total.....	3,743	"

TEMPERATURE OF PEACHES IN TRANSIT TO, AND AT, MONTREAL.

All the peaches shipped by Mr. Dobson and the Biggs Fruit and Produce Co. were carried to Montreal by express whereas those shipped by our Department were carried by refrigerator car and fast freight, with the exception of the Bristol consignment, which was shipped by express. The peaches in this lot were at a temperature of 60 degrees when unloaded at Montreal. In the three subsequent shipments by refrigerator cars thermographs were carried, and the temperature in the first two cars during transit to Montreal ranged from 50 degrees at the start to 44 degrees when the cars were unloaded, and in the third car from 56 to 40 degrees. The actual temperature of the fruit at Montreal, *ex* the first refrigerator car, was 44 degrees for those peaches which had been pre-cooled before shipment, and 54 degrees for those packed the day of shipment and loaded without pre-cooling. In the second car the average temperature of the peaches was 50 degrees, and in the third car 45 degrees. The express shipment left St. Catharines on Tuesday at noon, and was delivered to the steamer at Montreal about noon the following day. In each case the refrigerator car left St. Catharines on Wednesday about 6.30 p.m., arrived at Point St. Charles, Montreal, before 7 o'clock Friday morning, and was placed alongside the steamship sheds on the dock about 2 p.m.

The temperature of Mr. Dobson's peaches, *ex* express cars, on arrival at Montreal was as follows:

September 10th—S.S. Tortona.....64 degrees
September 17th—S.S. Hurona.....60 degrees
September 24th—S.S. Devona.....56 degrees
October 1st—S.S. Cervona.....58 degrees
October 8th—S.S. Cairnrona....58 degrees

The condition of the Cervona lot was referred to by the fruit inspectors at Montreal as "very soft" and that of the Cairnrona as "soft." All peaches shipped by our Department were reported as in firm condition at Montreal.

The temperature of one lot of peaches shipped by the Biggs Fruit Company on the "Cervona," October 1st, was 60 degrees.

It will thus be seen that the express service was about twenty-four hours faster than the freight, but that the peaches carried in the iced cars were at a much better temperature than the others. If there is any delay *en route* peaches will not receive any damage in a well iced car, whereas, if they are carried by express, a delay in transit to or at Montreal at the temperatures mentioned above is dangerous. That this is liable to happen was shown in the case of Mr. Dobson's first express shipment, which, owing to an accident to the car, arrived in Montreal on the evening instead of the morning train, and, as a consequence, was not delivered on the dock until 11.30 p.m., the peaches being loaded in the steamer between one and two o'clock in the morning.

Inspection of Shipments at Montreal and at Ports in Great Britain.

All the peach shipments were closely looked after by our cargo inspectors at Montreal. Cars in which peaches were carried, whether by express or fast freight, were looked for by our Chief Cargo Inspector, and the officials of the Harbor Commissioner's staff (who have charge of the switching of export cars at the head of the docks) were urged by him to have the cars placed alongside the steamers with the least possible delay. Care was taken to see that the peaches were promptly loaded in the steamers, and that proper care was exercised in handling the packages and in stowing them in the chambers. Cases were well dunnaged in the steamers (by dunnage, I mean the placing of strips of wood between the tiers of cases, both horizontally and vertically, so as to insure a good circulation of air) and thermographs were placed in each chamber.

In London, Liverpool, Glasgow, and Bristol our inspectors were on the alert and remarkably quick deliveries were made. For instance, London peaches were on the market within three hours from the time discharge of cargo commenced. Our inspectors also made a careful report regarding the condition of the fruit on arrival and the prices realized by the brokers, although in some instances it was not possible for them to obtain accurate information on this latter point.

Condition of Canadian Peaches.

All the peaches shipped by our Department were landed in excellent condition. Mr. Dobson's shipments were also in good condition when discharged, excepting those *ex* the "Cervona" and "Cairnrona" which were reported over-ripe. Favorable reports were received *re* the condition of peaches shipped by the Biggs Fruit Company.

Temperatures in Refrigerator Chambers on Steamships.

Our instructions to the steamship companies were to carry peaches at a temperature of from 34 to 36 degrees, with a gradual rise of 55 degrees during the last day of the voyage in order to prevent sweating or the condensation of moisture on the cold fruit when removed from the refrigerators and exposed to a warmer atmosphere. Thermograph records in the steamers sailing to London, Glasgow and Bristol were satisfactory, but in the case of the three Liverpool boats in which our Department had shipments of peaches, through a misunderstanding, no rise of temperature occurred at the end of the voyage, the peaches being re-

moved from a temperature of 35 degrees to a temperature of 60 degrees, and, while our inspector reported that the peaches were landed in good condition, they did not appear to stand up as well as those shipped to the other ports, and I have no doubt that the reason for this was owing to the abrupt transition from a low to a high temperature.

I might mention here that South African peaches are carried by the Union Castle Line at a temperature of from 34 to 36 degrees, the voyage occupying seventeen days from Cape Town to Southampton by the fastest boats, which means between three and four weeks from the time the fruit leaves the orchard to the time of arrival at the port of discharge in Great Britain. The South African shipping season extends from the 1st of January to the end of March, so that they have the advantage of landing their peaches in England during cold weather.

Memo. showing number of days from port to port taken by steamers carrying Canadian peaches, season 1910, and extra time until discharge in the case of those which arrived in port Saturday or Sunday.

Steamer.	Date Sailed from Montreal.	Date of Arrival at port in Great Britain.	No. of Days on Voyage.	Extra Time until Discharge began.	No. of Days from Sailing Date until Discharge began.
Liverpool—					
Megantic	Sept. 16	Saturday, Sept. 24	8	2	10
Dominion	" 24	Monday, Oct. 3	9	1	10
Laurentic	" 30	Saturday, Oct. 8	8	2	10
Bristol—					
Ry. Edward	Sept. 15	Thursday, Sept. 22	7	..	7
Ry. George	" 29	" Oct. 6	7	..	7
London—					
Tortona	Sept. 10	Tuesday, Sept. 20	10	..	10
Hurona	" 17	Thursday, Sept. 29	12	..	12
Devona	" 24	Friday, Oct. 7	13	..	13
Cervona	Oct. 1	Saturday, Oct. 15	14	2	16
Cairnrona	" 8	" Oct. 22	14	2	16
Iona	" 15	" Oct. 29	14	2	16
Glasgow—					
Hesperian	Sept. 17	Sunday, Sept. 25	8	1	9
Ionian	" 24	" Oct. 2	8	1	9
Grampian	Oct. 1	" Oct. 9	8	1	9

NOTE.—The Department of Agriculture, Ottawa, made one shipment of peaches to London, via Liverpool, shipping on the Laurentic, which left Montreal on September 30th, arrived at Liverpool Saturday, October 8th, and discharged the peaches Monday morning, October 10th. The peaches left Liverpool by refrigerator car at 7 p.m. same day and were delivered in London at 7 a.m. the following morning, October 11th, or within eleven days from the time they left Montreal. These peaches were all sold by October 14th.

SHIPMENTS BY DOMINION AND PROVINCIAL DEPARTMENTS.

Many of you doubtless have noticed a recent press paragraph commenting in a "too many cooks spoil the broth" strain on the fact that both the Dominion and Provincial Departments of Agriculture had apparently made shipments of peaches to Great Britain this year, and I want to say a word or two in explana-

tion of the position of our Department in the matter. First, let me point out that it has always been generally recognized that the work of a Provincial Department lines along educational and instructional lines. In agriculture, for instance, the Department at Toronto is engaged in an endeavor to have two blades of grass grow where only one grew before, or, in other words, to convert the poor and indifferent farmer into an efficient and up-to-date agriculturist. On the other hand. to the Dominion has been relegated matters of transportation and trade and commerce, which include the extension of our markets abroad for Canadian products. Therefore, in making trial shipments of peaches to the Old Country this season our Department was engaged in a work which was eminently proper for a federal department to carry on.

The shipping of tender fruits to Great Britain by the Dominion Department of Agriculture is no new thing, as in 1897 we forwarded trial shipments of over 7,000 cases, of which over 1,400 cases were peaches. Since then, more particularly during the last four or five years, we have shipped, peaches, grapes, etc., to various parts of Europe for exhibition purposes. These lots, selected and packed by members of our staff, have always reached their destination in first-class condition.

Last year the Commissioner decided that it would be advisable to make a few trial shipments of peaches in 1910 in order to procure data regarding the proper degree of maturity at picking time, best method of packing, proper temperatures during transportation, etc. If shipments are made by private individuals or firms information of the above character is not readily available for the general public, so that it becomes necessary, if full and exact particulars are required, for the Department to make shipments itself.

An appropriation was secured during the Session of 1909-10, active preparations commenced in April, and all preliminary arrangements completed with the growers at St. Catharines by the first week of June. About this time Mr. Ruddick received a letter from Mr. Hodgetts, Director of the Fruit Branch, Toronto, intimating that his Department might send several shipments of peaches to Great Britain during the season. The Commissioner, in his reply, gave an outline of our plans, and pointed out that we were particularly well organized to carry on work of this nature with little extra trouble or expense. On June 14th, Mr. Hodgetts replied, and after stating: "It was our intention to arrange with a number of parties in the Niagara Peninsula for the shipment to London of experimental lots of peaches, sending forward three or four consignments according to the ripening of the more suitable varieties," he added, "I feel, however, that as you are in a better position both financially and otherwise to undertake the work on a fairly large scale, we will leave it entirely in your hands."

We very much appreciated Mr. Hodgett's graceful acquiescence with our point of view, and we went on with our arrangements. A little later we received a letter from Mr. Dobson, stating that he intended shipping several thousand cases of peaches to London, and asking for our assistance. During the remainder of the season our correspondence with Mr. Dobson was lengthy, and we rendered him all the assistance we could. None of his letters, however, contained any hint that the Provincial Department of Agriculture was in any way connected with his shipments, and only on October 21st, long after our last shipment had gone forward, did we learn (by a letter from Mr. C. C. James, in reply to one from Mr. Ruddick asking for information on this point), that it was the Ontario Government that had made the shipments from Jordan Station, and not Mr. Dobson,

although the latter supplied the peaches, made the shipping arrangements, and assumed all the financial responsibility.

Markets, etc.

As is indicated by the statement presented at the commencement of my remarks, the peaches shipped by our Department went to the ports of Liverpool, London, Glasgow and Bristol. The two Liverpool shipments were each divided between that market, Leeds and Manchester. The Bristol lot likewise served three markets, viz., Bristol, Cardiff, and Birmingham. The claim has been made that it would be better to have all the Canadian peaches which are exported shipped to London and distributed from there to the various markets, but to my mind the proposition is unsound. London is undoubtedly the best market for peaches, but it does not seem reasonable that fruit intended for sale in Liverpool and district should first be forwarded to London, and, after a delay of one or two days there, be re-shipped by rail to Liverpool. Apart from the extra expense and the risk of injury from extra handling and exposure during fairly warm weather, there is the important question of time in transit to be considered. As is shown by the preceding statement the boats in the Montreal-London service are slower than those running to Liverpool, Glasgow or Bristol, and peaches shipped *via* London would require from twelve to eighteen days to reach either Liverpool or Glasgow, as compared with ten and nine days by direct boats. The argument applies with even greater force to Bristol, which has a seven-day service from Montreal once every two weeks. The cold storage freight rate to each of the ports mentioned is the same, viz., 25s. a ton of forty cubic feet.

All of the peaches we shipped were sold by private sale excepting the two Liverpool lots of 51 and 102 cases, which were sold under the hammer. Cardiff made the highest price, viz., 6s. 6d. ($1.58) per case of 23 peaches, while the highest average price received was $1.45 per case for 72 cases "Old Mixon" sold in London. At the same time 78 cases "Elbertas" made an average of $1.39. In Cardiff, 25 cases "Crawfords" averaged $1.30 per case; Manchester made $1.33 per case for 12 cases and Leeds $1.22. On the other hand, 198 cases "Elbertas" sold in London for 94c. per case, 24 cases sold in Birmingham for 83c. per case, and 177 cases in Glasgow for 85½c. per case. The whole shipment of 1,284 cases sold at an average price of $1.04 per case, while the charges averaged as follows: Freight from St. Catharines to Montreal, 4c. per case; ocean freight, 9.6c.; selling charges in Great Britain, including commission, 9.7c.; total charges, 23.3c. per case, leaving average net returns f.o.b. cars St. Catharines of 80.7c. per case, or about 13½c. per pound. From this must be deducted, of course, the cost of the package, packing material and extra labor.

In conclusion I want to say that in my opinion a mistake was made this year by London brokers in holding for the last penny they could squeeze out of the retailer. When the latter was forced to pay 6 shillings and upwards for 18 or 20 peaches it meant retail prices of 12 to 16 cents per peach. At this price sales would be slow and the trade restricted. Many of the retailers in order to get their money back held the peaches too long, decay set in and they lost money on the transaction. Where this happened they naturally became prejudiced against Canadian peaches and will not want to handle them another year at any price. It is much better to have the brokers clear the peaches quickly at a fair price and give the retail dealer a chance to dispose of them rapidly at a reasonable profit

than to have them hanging around the market and the shops until they lose their flavour and become wasty or rotten. In this connection I think the following excerpt from "Fruit, Flower and Vegetable Trades' Journal," London, dated October 8th, 1910, is to the point:

"The Canadian peaches have turned out well, and quite up to the expectation of those who are handling them. Another consignment is now due. In boxes of 20's, selling at 5s. to 6s. 6d. per box, they should be handled by the majority of fruiterers. It will be wise if those handling consignments do not aim at higher prices than will make this fruit sell freely, for although English peaches are up to 24s. per dozen this week, it does not follow that the Canadian article is worth more than is being asked for it, and to raise the price will probably be to spoil the market, for it must be remembered that it is not every fruiterer that can handle peaches, or will some of those who might, until they become better acquainted with the quality and condition of these consignments. Of course, very few shops can handle peaches that cost two shillings apiece wholesale, but at threepence or fourpence each a good trade should be done at this time of year."

A Member: I think it would be advisable for the Department to find out from South Africa the exact varieties they are shipping there. I think it would be well to get buds from South Africa, and then we could plant the varieties that they are shipping from South Africa, and the sooner we get into the right varieties the better for ourselves.

Mr. Moore: If you write us for that information we have it right in the Department at Ottawa and we will give it to you.

The President: I have the names which have been submitted as delegates to attend the conference in 1911. Harold Jones, Walter Dempsey, R. W. Grierson, James E. Johnson, E. D. Smith, W. H. Bunting, Robt. Thompson, A. W. Peart, D. Johnson.

It was moved and seconded that the above members should be delegates to the conference.

The President put the motion, which on a vote being taken was declared carried.

RESOLUTION BY THE HISTORICAL COMMITTEE.

"Whereas the McIntosh apple tree grew till 1908 on the farm and on the spot where it was planted as a chance seedling over a century ago, and

"Whereas this variety has taken its place as the highest type of dessert fruit; and whereas it has shown its adaptability to a wide range of territory over the whole of the apple area of North America,

"We, therefore, wish to show our appreciation of the efforts of the people of Dundas County in the laudable object of erecting a suitable structure to mark the site of this tree.

"Resolved, therefore, that this Association contribute fifty dollors to the cost of this memorial."

The President put the resolution to the meeting, which on a vote being taken, was declared carried.

The Convention then adjourned.

FRUIT PRIZE LIST AT ONTARIO HORTICULTURAL EXHIBITION, 1910.

APPLES.

Class 1.—Barrels for Export.

Baldwin: 1st, Stork, R., Brooklin; 2nd, McGregor, W. E., Whitby; 3rd, Dempsey, W. H., Trenton.

Ben Davis: 1st, Dyer, W. D., Columbus; 2nd, Hamilton, Wm., Collingwood; 3rd, Osborne, J. J., Dunedin.

Golden Russet: 1st, Bunting, W. H., St. Catharines; 2nd, Ovens, Wm., Dunedin; 3rd, Hamilton, Wm.

Greening: 1st, Michael, R. R., Brooklin; 2nd, Bunting, W. H.; 3rd, Rush Bros., Hatchley.

King: 1st, Bunting, W. H.; 2nd, Crawford, M., Whitby.

Spy: 1st, Rush, Isaac, Norwich; 2nd, Groat, Chas., Brooklin; 3rd, Hamilton, Wm.

Stark: 1st, Smith, Alex., Enfield.

Any other variety: 1st, Stork, R.; 2nd, Bunting, W. H.; 3rd, Rush Bros.

Class 2.—Boxes Ready for Export.

(*Unwrapped.*)

Alexander: 1st, Oshawa Fruit Growers' Association; 2nd, Dempsey, W. H.

Baldwin: 1st, Bunting, W. H.; 2nd, VanDyke, J. W., Grimsby; 3rd, Hamilton, Wm.

Cranberry: 1st, Dyer, W. D.

Fameuse: 1st, Watson, W. G., Dixie; 2nd, Bunting, W. H.; 3rd, Goring, Geo., St. Catharines.

Golden Russet: 1st, Ovens, Wm.; 2nd, Blackburn, S., Creemore; 3rd, Brown, J. G., Humber Bay.

Greening (Rhode Island): 1st, Hamilton, Wm.; 2nd, Michael, R.; 3rd, Watson, W. G.

King: 1st, Bunker, S. C., Pickering; 2nd, Dempsey, W. H.; 3rd, Bunting, W. H.

McIntosh: 1st, Watson, W. B.; 2nd, Baker, Whitby.

Spy: Blackburn, S.; 2nd, Hamilton, Wm.; 3rd, McGregor, W. E.

Class 3.—Boxes for Export.

(*Fruit wrapped.*)

Fameuse: 1st, Bunting, W. H.; 2nd, Goring, Geo.; 3rd, Watson, W. G.

Gravenstein: 1st, Lick, E., Oshawa; 2nd, Thompson, R., St. Catharines.

King: 1st, Dempsey, W. H.; 2nd, Bunting, W. H.; 3rd, Goring, Geo.

McIntosh: 1st, Watson, W. G.

Spy: 1st, Hamilton, Wm.; 2nd, Bunting, W. H.; 3rd, Stainton, T., Taunton.

Wealthy.—1st, Crawforth, W.; 2nd, Brown, J. G.; 3rd, Hamilton, Wm.

Class 4.—Domestic Varieties—Barrels Ready for Shipment.

Blenheim: 1st, Brown, J. G.

Gravenstein: 1st, Lick, E.

Ontario: 1st, Westney Bros., Audley; 2nd, Guthrey, J. B., Dixie; 3rd, Dempsey, W. H.

Tolman:

Roxbury Russet: 1st, Ovens, Wm.; 2nd, Dempsey, W. H.; 3rd, Bunting, W. H.

Any other variety not in Class 1: 1st, The Biggs Fruit & Produce Co., Burlington; 2nd, Rush, Isaac; 3rd, Oliver, F. R., Lorne Park.

Class 5.—Domestic Varieties—Boxes Ready for Shipment.

(*Unwrapped.*)

Blenheim: 1st, Brown, J. G.; 2nd, Watson, W. G.; 3rd, Grierson, Oshawa.

Gravenstein: 1st, Lick, E.; 2nd, Stevenson, W. H., Oshawa; 3rd, Thompson, R.

Ontario: 1st, Dempsey, W. H.; 2nd, Westney Bros., Oshawa; 3rd, Guthrey, J. B.

Ribston: 1st, Hamilton, Wm.; 2nd, Osborne, J. J.; 3rd, Werry, Fletcher, Oshawa.

St. Lawrence: 1st, Watson, W. G.; 2nd, Goring, Geo.; 3rd, Bunting, W. H.

Any other variety not named in Classes 2 and 3: 1st, Bunting, W. H.; 2nd, Watson, W. G.; 3rd, Goring, Geo.

CLASS 6.—STANDARD WINTER VARIETIES—5 BOXES OF EACH.

(*Unwrapped.*)

Baldwin: 1st, VanDyke, J. W.; 2nd, Ovens, Wm.; 3rd, Bunting, W. H.

CLASS 7.—DESSERT VARIETIES—PLATES OF FIVE.

Fameuse: 1st, Westney Bros.; 2nd, Bunting, W. H.; 3rd, Goring, Geo., St. Catharines.
Golden Russet: 1st, Thompson, R.; 2nd, Brown, J. G.; 3rd, Guthrey, J. B.
Gravenstein: 1st, Stevenson, W. H.; 2nd, Thompson, R.; 3rd, Brown, J. G.
King: 1st, Bunker, S. C.; 2nd, Bunting, W. H.; 3rd, Goring, Geo.
McIntosh: 1st, Watson, W. G.; 2nd, Everett, Nicholas, Iroquois; 3rd, Michael, J. G
Wealthy: 1st, Guthrey, J. B.; 2nd, Brown, J. G.; 3rd, Remmer, H., Whitby.
Spy: 1st, Michael, R.; 2nd, Hamilton, Wm.; 3rd, Henderson, H. T., Paris.
Spitzenburg: 1st, Goring, Geo.; 2nd, Thompson, R.; 3rd, Bunting, W. H.
Any other variety: 1st, Watson, W. G.; 2nd, Bunting, W. H.; 3rd, Westney Bros.

CLASS 8.—COOKING VARIETIES—PLATES OF FIVE.

Alexander: 1st, Lee, W. T., Orillia; 2nd, Brown, J. G.; 3rd, Guthrey, J. B.
Baldwin: 1st, Bunting, W. H.; 2nd, McGregor, Wm.; 3rd, Henderson, H. T.
Blenheim: 1st, Watson, W. G.; 2nd, Thompson, R.; 3rd, Brown, J. G.
Cayuga: 1st, Bunting, W. H.; 2nd, Thompson, R.; 3rd, Stewart, F. G., Homer.
Greening (Rhode Island): 1st, Michael, R.; 2nd, Bunting, W. H.; 3rd, Brown, J. G.
King: 1st, Brown, J. G.; 2nd, Guthrey, J. B.; 3rd, Thompson, R.
Ribston: 1st, Guthrey, J. B.; 2nd, Brown, J. G.
Spy: 1st, Wait, J. G., Wicklow; 2nd, Biggs Fruit & Produce Co.; 3rd, Palmer, W. E., Marshville.
Any other desirable variety: 1st, Guthrey, J. B.; 2nd, Biggs Fruit & Produce Co.; 3rd, McGregor, Wm.

CLASS 9.—STANDARD WINTER VARIETIES—TEN PLATES OF FIVE SPECIMENS EACH.

Baldwin: 1st, VanDyke, J. W.; 2nd, Stork, R.; 3rd, Guthrey, J. B.
Greening: 1st, Brown, J. G.; 2nd, Watson, W. G.
Spy: 1st, Palmer, W. E.; 2nd, Henderson, H. T.; 3rd, Guthrey, J. B.

CLASS 10.—CONES OF FRUIT.

Ben Davis: 1st, Palmer, W. E.; 2nd, Dyer, W. D.
Baldwin: 1st, Stork, R.; 2nd, VanDyke, J. W.; 3rd, Guthrey, J. B.
Blenheim: 1st, Brown, J. G.; 2nd, Watson, W. G.; 3rd, Grierson, Oshawa.
Gravenstein: 1st, Whyte, D., Woburn; 2nd, Lick, E.
Fallawater: 1st, Stork, R.
Fameuse: 1st, Watson, W. G.; 2nd, Guthrey, J. B.; 3rd, Stainton, T.
King: 1st, Watson, W. G.; 2nd, Guthrey, J. B.
McIntosh: 1st, Watson, W. G.; 2nd, Farlinger, Ernest, Morrisburg; 3rd, Lee, W. T.
Ontario: 1st, Guthrey, J. B.; 2nd, Westney Bros.; 3rd, Watson, W. G.
Spy: 1st, Henderson, H. T.; 2nd, Watson, W. G.; 3rd, Palmer, W. E.

PEARS.

CLASS 11.—PLATES OF FIVE.

Anjou: 1st, Guthrey, J. B.; 2nd, Stewart, F. G.
Bosc: 1st, Read, M. A., Port Dalhousie; 2nd, Furminger, S. D., St. Catharines.
Clairgeau: 1st, Guthrey, J. B.; 2nd, Stewart, F. G.
Duchess: 1st, Stewart, F. G.; 2nd, Thompson, Robt.
Hardy: 1st, Read, M. A.
Howell: 1st, Stewart, F. G.; 2nd, Thompson, R.
Kieffer: 1st, Stewart, F. G.; 2nd, Thompson, R.
Lawrence: 1st, Stewart, F. G.; 2nd, Thompson, R.
Winter Nelis: 1st, Read, M. A.; 2nd, Stewart, F. G.
Any other desirable variety: 1st, Stewart, F. G.; 2nd, Thompson, R.

CLASS 12.—EXPORT VARIETIES—BOXES READY FOR SHIPMENT.

(*Fruit wrapped.*)

Anjou: 1st, Robertson, G. A., St. Catharines; 2nd, Stewart, F. G.; 3rd, Thompson, R.
Bosc: 1st, Thompson, R.; 2nd, Bunting, W. H.; 3rd, Robertson, G. A.
Clairgeau: 1st, Thompson, R.; 2nd, Stewart, F. G.
Duchess: 1st, Stewart, F. G.; 2nd, Robertson, G. A.; 3rd, Thompson, R.
Winter Nelis: 1st, Stewart, F. G.; 2nd, Thompson, R.; 3rd, Furminger, S. D.
Kieffer: 1st, Robertson, G. A.; 2nd, Stewart, F. G.; 3rd, Thompson, R.
Lawrence: 1st, Robertson, G. A.; 2nd, Stewart, F. G.; 3rd, Thompson, R.
Any other desirable variety: 1st, Stewart, F. G.; 2nd, Furminger, S. D.; 3rd, Thompson, R.

GRAPES.

CLASS 13.

Agawam: 1st, Dewar, R. H., Fruitland; 2nd, Robson, W. M., Lindsay.
Concord, 3 bunches: 1st, Dewar, R. H.; 2nd, Bunting, W. H.
Lindley, 3 bunches: 1st, Dewar, R. H.; 2nd, Stewart, F. G.
Niagara, 3 bunches: 1st, Dewar, R. H.; 2nd, Bunting, W. H.
Vergennes: 1st, Bunting, W. H.; 2nd, Stewart, F. G.
Wilder: 1st, Thompson, R.; 2nd, Furminger, S. D.
Any other desirable variety: 1st, Dewar, R. H.; 2nd, Bunting, W. H.
Black Grapes, 9 lb. basket: 1st, Dewar, R. H.; 2nd, Stewart, F. G.
Red Grapes, 9 lb. basket: 1st, Bunting, W. H.; 2nd, Dewar, R. H.
White Grapes, 9 lb. basket: 1st, Dewar, R. H.; 2nd, Bunting, W. H.
Black Grapes, fancy package: 1st, Dewar, R. H.; 2nd, Furminger, S. D.
Red Grapes, fancy package: 1st, Dewar, R. H.; 2nd, Thompson, R.
White Grapes, fancy package: 1st, Dewar, R. H.; 2nd, Stewart, F. G.

COLLECTIONS.

CLASS 14.

Exhibit of apples in commercial packages, space limited to 60 square feet for each exhibit: 1st, St. Catharines Cold Storage Co.; 2nd, Stewart, F. G.
Display of apples, not in commercial packages, table space limited to 60 square feet for each exhibit: 1st, St. Catharines Cold Storage Co.; 2nd, Stewart, F. G.

CLASS 15.—BOX OR BARREL BRANDS.

1st, Oshawa Fruit Growers' Association; 2nd. St. Catharines Cold Storage & Forwarding Co.; 3rd, Stewart, F. G.

CLASS 16.

Commercial package of unwrapped apples, any variety: 1st, Hamilton, Wm.; 2nd, Dempsey, W. H.; 3rd, St. Catharines Cold Storage & Forwarding Co.
Commercial package, wrapped apples, any variety: 1st, Osborne, J. J.; 2nd, St. Catharines Cold Storage Co.; 3rd, French, P. E., O. A. C., Guelph.

PRESERVED FRUITS.

CLASS 17.—QUART SEALER OF CANNED FRUIT OF EACH OF THE FOLLOWING VARIETIES.

Blackberries: 1st, Morningstar, S., Goderich; 2nd, Depotie, Mrs. P., St. Catharines; 3rd, Delworth, Thos., Weston.
Cherries, black or red: 1st, Reeves, Mrs. F. F.; 2nd, Thompson, Mrs. R.; 3rd, Hassard, Mrs., Markham.
Cherries, white or yellow: 1st, Depotie, Mrs. P.; 2nd, Stewart, Mrs. F. G.; 3rd, Hassard, Mrs.
Gooseberries: 1st, Thompson, Mrs. R.; 2nd, Stewart, Mrs. F. G.; 3rd, Wait, Mrs. J. G.
Grapes, black or red: 1st, Delworth, Mrs. T.; 2nd, Morningstar, S.; 3rd, Wait, Mrs. J. G.

Peaches (white fleshed): 1st, Depotie, Mrs. P.; 2nd, Stewart, Mrs. F. G.; 3rd, Bennett, C. A., Burlington.

Peaches (yellow fleshed): 1st, Bennett, Mrs. C. A.; 2nd, Stewart, Mrs. F. G.; 3rd, Hassard, Mrs.

Pears: 1st, Morningstar, S.; 2nd, Depotie, Mrs. P.; 3rd, Speight, Mrs., Markham.

Plums, blue or red: 1st, Depotie, Mrs. P.; 2nd, Stevenson, Mrs. W. H., Oshawa; 3rd, Wait, Mrs. J. G.

Plums, green or white: 1st, Thompson, Mrs. R.; 2nd, Depotie, Mrs. P.; 3rd, Stewart, Mrs. F. G.

Raspberries, red: 1st, Wait, Mrs. J. G., 2nd, Bennett, Mrs. C. A.; 3rd Thompson, Mrs. R.

Raspberries, black: 1st, Bennett, Mrs. C. A.; 2nd, Reeves, Mrs. F. F.; 3rd, Depotie, Mrs. P.

Strawberries: 1st, Wait, Mrs. J. G.; 2nd, Stewart, Mrs. F. G.; 3rd, Delworth, Mrs. T.

Class 18.—Pint Jar of Jam of each of the Following Varieties.

Currant, black: 1st, Whyte, David, Woburn; 2nd, Speight, Mrs.; 3rd, Bennett, Mrs. C. A.

Gooseberry: 1st, Hassard, Mrs.; 2nd, Bennett, Mrs. C. A.; 3rd, Stewart, Mrs. F. G.

Grape: 1st, Delworth, Mrs. T.; 2nd, Hassard, Mrs.; 3rd, Bennett, Mrs. C. A.

Peach: 1st, Thompson, Mrs. R.; 2nd, Stewart, Mrs. F. G.; 3rd, Depotie, Mrs. P.

Pear: 1st, Wait, Mrs. J. G.; 2nd, Morningstar, S.; 3rd, Hassard, Mrs.

Plum: 1st, Stewart, Mrs. F. G.; 2nd, Morningstar, S.; 3rd, Thompson, Mrs. R.

Raspberry: 1st, Depotie, Mrs. P.; 2nd, Bennett, Mrs. C. A.; 3rd, Speight, Mrs.

Strawberry: 1st, Bennett, Mrs. C. A.; 2nd, Thompson, R.; 3rd, Speight, Mrs.

Class 19.—Half-pint Jar of Jelly of Each of the Following Varieties.

Apple: 1st, Bennett, Mrs. C. A.; 2nd, Hassard, Mrs.; 3rd, Delworth, Mrs. T.

Crab apple: 1st, Morrison, Mrs. C., Woburn; 2nd, Whyte, David; 3rd, Mrs. W. H. Stevenson.

Currant, red: 1st, Morrison, Mrs. C.; 2nd, Stewart, Mrs. F. G.; 3rd, Thompson, Mrs. R.

Grape: 1st, Depotie, Mrs. P.; 2nd, Bennett, Mrs. C. A.; 3rd, Stewart, Mrs. F. G.

Quince: Thompson, Mrs. R.; 2nd, Stewart, Mrs. F. G.; 3rd, Depotie, Mrs. P.

Raspberry, red: 1st, Stewart, Mrs. F. G.; 2nd, Whyte, David; 3rd, Morrison, Mrs. C.

Class 20.—Grape Juice, Etc.

Grape Juice, unfermented, 1 quart bottle: 1st, Hassard, Mrs.; 2nd, Thompson, Mrs. R.; 3rd, Stewart, Mrs. F. G.

Display by any branch Women's Institute to consist of Ontario grown fruits and vegetables, preserved, canned, dried, pickled, or put up in any other way intended to prolong keeping qualities for food; not more than 2 jars of any one kind: 1st, East York Women's Institute; 2nd, Queenston Women's Institute; 3rd, Bobcaygeon Women's Institute; 4th, Whitby Women's Institute.

SPECIMEN APPLES.

Class 21.—Specimen Apples of Standard Varieties.

Baldwin: 1st, Osborne, J. J.; 2nd, Thompson, R.

Fameuse: 1st, Bunting, W. H.; 2nd, Guthrey, J. B.

Greening (Rhode Island): 1st, Michael, R.; 2nd, Watson, W. G.

King: 1st, Bunting, W. H.; 2nd, Dempsey, W. H.

McIntosh: 1st, Watson, W. G.; 2nd, Stephens, C. L., Orillia.

Spy: 1st, Ovens, Wm.; 2nd, Michael, R.

Wolf River: 1st, Huggard, R. L., Whitby.

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REPORT

OF

FRUIT BRANCH

Department of Agriculture

ONTARIO

1910

Published by the Ontario Department of Agriculture, Toronto

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1911

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To the Honourable JOHN MORISON GIBSON, K.C., LL.D., ETC., ETC., ETC.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Fruit Branch of the Department of Agriculture for 1910.

Respectfully submitted.

JAMES S. DUFF,

Minister of Agriculture.

Toronto, 1911.

CONTENTS

REPORT OF THE FRUIT BRANCH

1910.

To the Honourable JAMES S. DUFF, *Minister of Agriculture*:

I beg to transmit herewith for approval a report of the work carried out by the Fruit Branch of your Department for the year 1910. The expenditure, as given below, covers all of the regular lines of work but all expenses in connection with orchard surveys was borne by the Incidental Vote of the Legislature which includes special investigations in agricultural conditions and production of crops.

EXPENDITURE, 1910.

Grants to Associations	$ 5,300.00
Orchard spraying demonstrations	4,170.08
Inspection of apiaries	2,554.43
Exhibitions, cold storage	4,500.42
Horticultural Experiment Stations, salaries, etc.	12,822.84
Horticultural Experiment Station, boiler, etc.	393.48
Expenses of Experiment Stations, etc.	1,525.42
Inspection of nurseries and orchards	3,775.17
Salaries	3,140.00
Contingencies	1,399.39

Your obedient servant,

P. W. HODGETTS, *Director.*

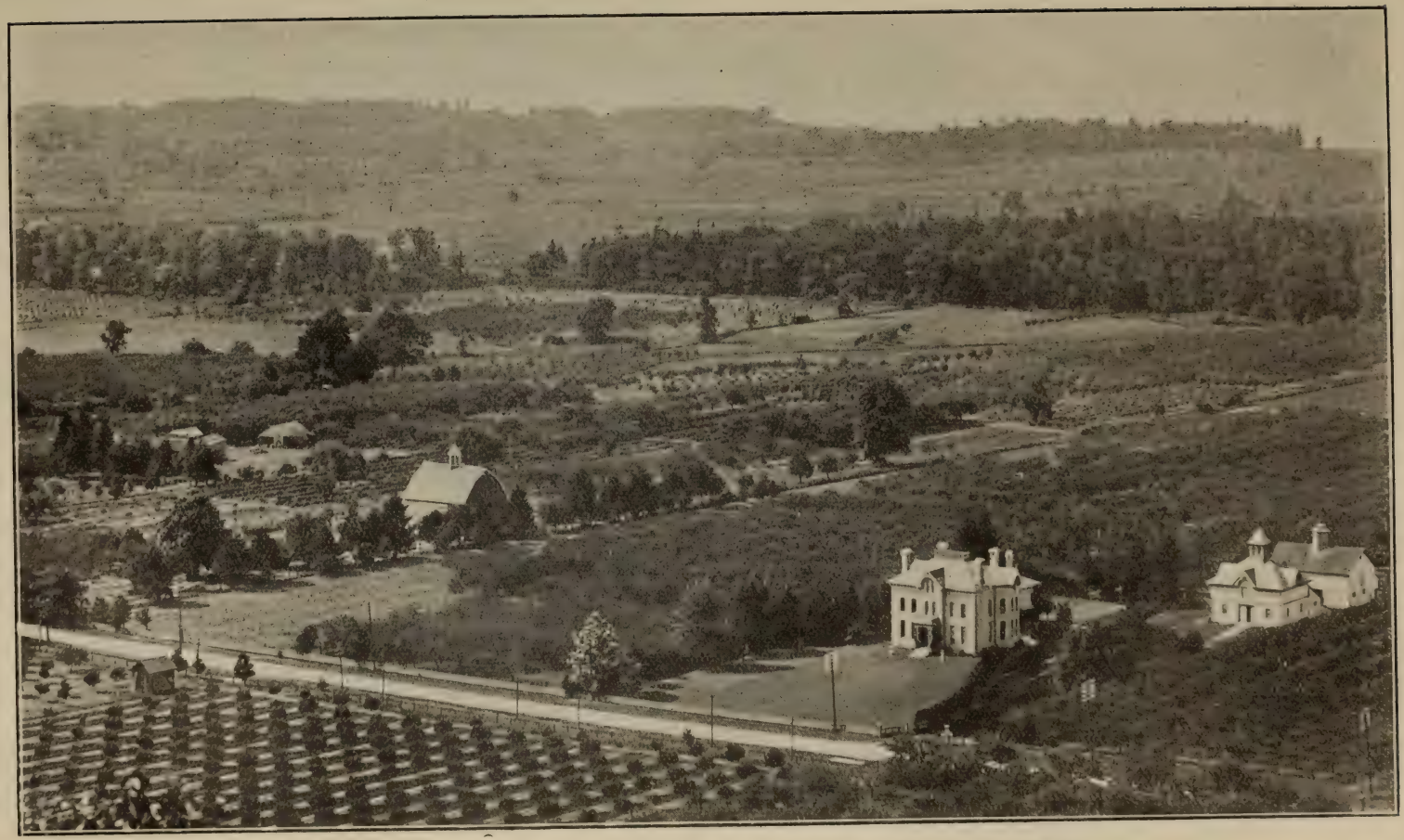
REPORT OF THE FRUIT BRANCH

WORK OF THE FRUIT GROWERS' AND BEEKEEPERS' ASSOCIATIONS.

Perhaps no other branch of agricultural industry on the American Continent has shown such advancement in recent years as has that of fruit growing. Undoubtedly much of the interest aroused is due to the advertising campaign carried on by the western real estate agents who have been reaping a rich harvest from the sales of lands for the growing of fruits and truck crops at high figures. These agents have painted glowing pictures of the enormous profits that await the man, experienced or otherwise, who would buy these lands and plant them in orchard or vineyard. The average man, of course, required some statement of profits already made before he would accept the bait held out to him. This was easily found by the wide-awake westerner, and while his methods of computation are open to criticism, the figures that he gave out seemed to catch the popular mind. Single trees in the orchards already in existence would often give a remarkable crop which would be sold at high figures. From this it was easy enough to calculate the returns to be expected from an acre of similar trees. With splendidly illustrated pamphlets and attractively worded advertisements thousands of men from the eastern farms and cities were induced to take up their homes in the far Western States and Provinces.

A well-cared-for 2-year-old peach orchard on the farm of C. E. Fisher & Sons, Queenston.

The experienced and somewhat conservative eastern fruit grower has been hard to convince that the enormous profits reported are entirely reliable. They have themselves learned that there are many individual cases, both of trees or of small orchards, that have given very handsome returns from fruit growing in this Province. What has happened, however, is that the figures given by the western men have led our own growers to investigate more closely the financial part of their business. They have now the idea that by improved conditions all along the line in orchard work much greater profits will result than in the past. Realizing that the big markets of the east will take an enormous quantity of fruit,



Prosperous orchards in Niagara district viewed from the Niagara escarpment.

not at fabulous prices, but at a high enough figure to give the grower a fair profit, they are seeking methods whereby the cost of production can be reduced, the quantity and quality of the fruit increased and the result a better outlook for their business.

In looking over the fruit districts many records have been found of sales from small areas that are quite good enough for the eastern grower. For instance, one of our largest fruit growers of the Niagara District reports that from four acres of sweet cherries the crop was 3,800 baskets, which gave a net profit of approximately $700 per acre. This was in a year of big crops, and prices were much lower than normal. Since then this grower has reported that the returns have greatly exceeded these figures.

Small orchards of apples by proper care also give splendid returns as shown by the following:

1st—Orchard of 33 Trees.

Spray material	$ 4.59	17 bbls., class 1	$56.10
Work account	23.35	107 " " 2	321.00
177 bbls. at 41c	72.57	4 " " 3	10.60
177 commission at 20c.	35.40	49 " " 4	115.15
Cheque to balance	410.56	Peelers and ciders	43.62
	$546.47		$546.47

Net returns, 1909 ..... $410.56

2nd—Orchard of 1½ Acres.

Spray material	$16.22	31 bbls., class 1	$102.30
220 bbls. at 41c.	90.20	104 " " 2	312.00
220 bbls., commission at 20c.	44.00	18 " " 3	47.70
		66 " " 4	155.10
		1 " " 5	2.00
Cheque to balance	539.04	Peelers and cider	70.36
	$689.46		$689.46

Net returns $539.04

Attention is called to the details given under the orchard demonstration work of the present season, which will be found on page 14. In these latter cases the orchards had been planted years ago, but practically neglected and were chosen for demonstration purposes in most cases on account of their poor condition.

We wish, however, to give rather the returns from commercial orchards so that the prospective orchardist may gain some idea as to the profits which he may expect to receive in future years. Instances are here given of yields from apple and peach orchards in this Province which have been gained by intelligent and careful methods and for which all of our fruit growers should strive:

Twelve Acres Apples—300 Trees.

	Net returns over expenses.
1903	$1,200.00
1904	650.00
1905	1,000.00
1906	1,000.00
1907	1,000.00
1908	1,600.00
1909	2,000.00
	$8,450.00

A farm in Halton County containing two orchards gave the following returns: 10 acres planted out in Spies netted the owner $2,500, the buyer assuming all the risk and the cost of picking and packing. The other orchard consisted of 15 acres of mixed varieties from which were exported 1,700 boxes with a big balance disposed of locally. The returns gave the owner of the orchard from $4.50 to $7.00 per barrel, which would make a very nice profit on the investment in this farm.

One of our eastern apple growers, who has made a specialty of Snows and McIntosh, states that from a careful record of sales made from the product of four acres of Snows, dating from 1894 to 1903, a period of nine years, he received an average net return of $800 per annum, or $200 per acre after paying all expenses except the cost of barrels. In 1904, after an extremely heavy crop, which was not thinned, the orchards were injured by a severe winter, since which time the net returns have run from $400 to $900 per annum. The largest returns any one year were $1,310.

A prominent peach grower of the Niagara District was awarded a Wilder silver medal by the American Pomological Society for the following record of his peach orchard:

Area, 23½ acres; age, nine years; varieties, and number of each, Elberta, 700; St. John, 1,500; E. Crawford, 800; N. Prolific, 1,000. Total, 4,000.

Gross receipts	$11,008.29
Express and commission	2,137.85
Net	8,870.44
Expense of orchard	1,077.75
Management (supervision)	750.00
Profit	7,042.69

All of these instances show a profit of over $100 per acre, some for a long term of years. Perhaps no other farm crop in Ontario can show anything near as great a net profit per acre as do these trees. What we now need is the planting of commercial orchards, large areas of few varieties in well defined districts. Too many of the present orchards contain varieties that are unprofitable even under the best of conditions, varieties which also when unloaded on our markets tend to demoralize conditions there. Fortunately hundreds of thousands of these trees are so far advanced in years that their number will steadily decrease within the next quarter century, and we can look forward to the time when Ontario will be producing fewer varieties of better quality and in much larger quantity, a condition which is much to be desired from a commercial standpoint. As a result of fifteen years or more of experimental work we know exactly what varieties are suitable to the various apple districts of the Province.

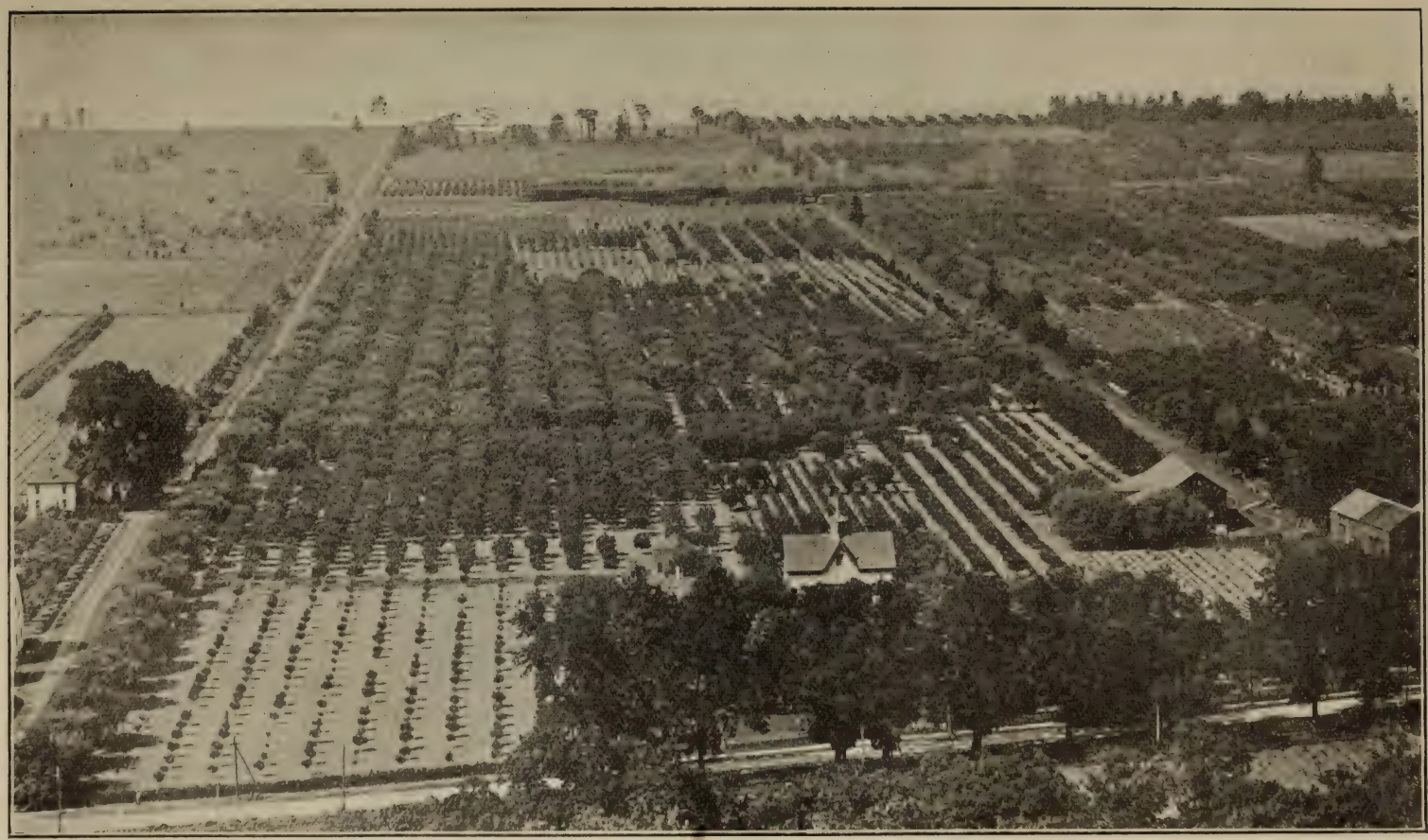
Sales by our nursery companies for the past few years show that enormous plantings have already taken place and it should be the aim of every fruit grower to bring these trees into bearing under the best known conditions of the present day. That great interest is being taken in orchard care is shown by the enormous demand for horticultural literature of all kinds and for instruction and advice in all matters relating to fruit growing.

Partly as a result of this boom in orcharding in Ontario there have been organized a number of companies for the buying and leasing of orchards. While it is quite a common practice across the border and in British Columbia for companies to purchase blocks of land and set these out in orchards, the leasing of large blocks of trees already in bearing seems to be something quite new. As a result

of the claims of profits in orcharding, business men have been investigating the industry as a source of investment for capital and apparently satisfied with the opportunities offered, have invested quite largely. One concern has leased and purchased over 100,000 full grown apple trees, and claims that it will shortly double this number. These trees have been secured as far as possible in well-known apple growing counties along the lakes, and in sections where several orchards can be procured in close proximity. Two other companies control blocks of orchard from 200 to 600 acres in extent, while others would average from 100 to 200 acres. The business men at the heads of these concerns have employed the best men procurable at good salaries to manage the orchards, and the result will be that when their staffs have been properly organized the orchards under their care should be models for the surrounding country. In addition the fact that these concerns believe that money can be made from orchards will lead many of the farmers in the same localities to pay more attention to their own trees. The leases obtained by these concerns generally run from five to seven years, with the option of a further extension for three years. The prices paid for the leases vary from 50 cents to $1 per tree per annum, net, to the owner of the orchard. Where a man has been neglecting his trees this seems to be a fair profit, and in many cases the leases were signed without much trouble. Fruit growers, however, who had been paying attention to their trees realized that they could make much more out of the orchard themselves, and the companies had difficulty in such instances in securing a lease. Here in many cases the orchards were purchased outright at a good figure and one of the companies claims that it owns one-half of the trees that it is managing.

In line with the above practice there has been great activity shown in the purchase of large blocks of farm lands, particularly in the counties of Lincoln and Norfolk. These lands are being rapidly planted to fruits of all kinds, especially peaches and apples, one block alone of 65,000 peach trees having been set out. The intention in these cases is not always to make money out of the sale of the products of the orchards. Advertisements are already appearing, particularly in the Old Country papers, offering subdivisions of these blocks to intending fruit growers. The company will either turn the lands over now to the purchaser, or will carry on the cultivation of the trees until they are in bearing for a fixed sum per acre. Most of these small holdings will go to well-to-do settlers from Great Britain, although many residents of our big towns and cities are investing with the hope some day of going in for the fruit growing business. These classes have proved to be a distinct gain in many cases to the farming communities. The excellent business training which most of them have received goes far to make up for the inexperience which they may have in general farm management. They come to the business without any preconceived ideas as to what is required, and are willing to adopt up-to-date methods that the ordinary farmer might look on with a great deal of hesitation. The claim has often been made that the success obtained by a number of the well-known western fruit sections is due to the presence of these men who have received their business training in the cities of the east.

Since the opening of the London office of the Ontario Government, in charge of Mr. N. B. Colcock, there has been a decided demand for information respecting Ontario fruit lands, fruit crops, etc. Every year now quite a large number of well-educated Old Country men come to our office for direct information about the various districts, the kinds of fruit grown there, prices of fruit lands and other information which will aid them in selecting the best locality to settle. To prevent these men from falling into the hands of land agents who would take advantage of their inexperience, we have always advised that the intending fruit grower should



Beautiful orchards, viewed from mountain near Grimsby, Niagara district.

be in no hurry to purchase, but that he should, if possible, spend the first season in working with some of the fruit growers who are already in the business, preferably one from Great Britain. Then in the fall of the year he could look about for a suitable place to purchase with the idea of getting it in shape in plenty of time for the following spring's operations. The greatest difficulty, however, is in securing positions for these men during the fruit season. This is always a very busy time with the growers, and few of them care to have an inexperienced man on the farm, even though the pay for the same be much smaller than he would ordinarily have to give. To partially meet this difficulty an Old Countrymen's Association has been organized in the Niagara District, where the majority of these men desire to settle. This Association has given much advice to the intending settler, and has saved a great many from purchasing lands at figures which were much too high for their value. Some criticism has been made of the Ontario Government for not still further pushing in Great Britain the opportunities for men of means to invest in fruit and other kinds of farms in this Province. Unless some system of training and supervision could be devised it would not be advisable to have too many of this class reach the country in any one year. While there is an unlimited demand and plenty of work for the ordinary farm laborer, there are not the same opportunities for those of a better class to secure the training which they should have before they start out in the business.

LEGISLATION.

A number of amendments were made in the Fruit Pest Act to cover certain objections that had been offered to it since its passing in 1909. The Act as amended is published herewith:

AN ACT TO PREVENT THE SPREAD OF INSECT AND FUNGOUS DISEASES.

1. This Act may be cited as The Fruit Pest Act.

2. In this Act "Minister" shall mean the Minister of Agriculture for the Province of Ontario. "Plant," shall mean any tree, vine, shrub or plant. "Disease" shall mean the following insects and diseases in any stage of development: Codling Moth, San Jose Scale, Yellows, Little Peach, Black Knot, Pear Psylla and Pear Blight.

3. On the recommendation of the Minister, the Lieutenant-Governor in Council may appoint one or more competent persons to act as inspectors, whose duties shall be to enforce the provisions of this Act.

4. No person shall import or bring, or cause to be imported or brought into the Province of Ontario, for any pupose whatsoever, any diseased plant or fruit, or sell or dispose of, or offer for sale any fruit infested with San Jose Scale, Yellows or Little Peach. Wherever such diseased fruit exists or is believed by the Provincial Inspector to exist, he may make an examination and inspection, and may order any fruit so infested, or such part as he may deem advisable, to be destroyed.

5. No person shall keep or have, or offer for exchange or sale, any diseased plant.

(a) All persons, owning, leasing or managing any orchard or collection of plants, other than a nursery, shall, when any plant therein becomes diseased and forthwith on becoming aware, whether by notice or otherwise, of such disease, destroy, such plant by fire or shall effectually treat the disease by fumigation or spraying with such material as may be prescribed by the Minister.

(b) The Council of any city, town, township or incorporated village may, and upon the petition of twenty-five or more fruit growers who are ratepayers, shall by by-law appoint at least one inspector to enforce the provisions of this Act in the municipality and fix the amount of remuneration, fees or charges he shall receive for the performance of his duties. All such appointments, as well as such remuneration, fees or charges shall be subject to, and be only operative on the written approval of the Minister, communicated by him to the clerk of the municipality. The

by-law shall not take effect unless and until approved by the Minister of Agriculture, and shall remain in force only for the calendar year in which it has passed. The clerk of the municipality shall transmit a certified copy of every such by-law to the Minister of Agriculture before the first day of March after the passing thereof.

(c) Upon the report of the Inspector appointed by the municipality to the Inspector appointed under Section 3 of this Act, that there is disease upon the plants on any lot within the municipality, the latter Inspector shall direct the former Inspector to give notice personally or by registered letter to the owner or occupant of the lot to have the plants forthwith sprayed or to have them destroyed by burning, as may be determined by the Inspector appointed under section 3 of this Act; and in case this is not done within ten days after the notice has been given the Inspector appointed by the municipality may cause the spraying or destruction by burning to be done, and on notice being sent to the Clerk the cost of the work shall be charged on the lot and be collected as a special tax in addition to the other taxes imposed by the municipal council on the lot.

(d) All such inspectors appointed shall be subject to and observe the regulations and directions of the Minister, and shall be subject and subordinate to the inspector appointed by the Minister, and in case of any neglect of duty such inspector shall be subject to the penalties prescribed by this Act.

(e) The council of the city, town, township or incorporated village shall pay the remuneration, fees or charges of such inspectors and shall be entitled to receive from the Department of Agriculture one-half of the amount so paid upon furnishing the Department with statements of the sums so paid, certified to by the inspector appointed by the Minister, provided that such statements are submitted to the Minister on or before the fifteenth day of December of the year to which they apply.

6. The owner or proprietor of any nursery shall not send out or permit any plant to be removed from his nursery without the same being first fumigated by hydrocyanic acid gas in accordance with regulations prescribed by Order of the Lieutenant-Governor in Council.

7. No person shall sell or dispose of or offer for sale any plant obtained, taken or sent out from a nursery unless the said plant has been previously fumigated by hydrocyanic acid gas in accordance with the above regulations.

8. In case the inspector finds disease in any nursery, and so reports to the Minister, the Minister may thereupon inform in writing the owner or proprietor or manager of said nursery of the existence of disease in his nursery and the owner or proprietor or manager of said nursery shall not thereafter permit any plant or plants to be removed from the said nursery until he is notified in writing from the Minister that the Inspector has reported to the Minister that it is safe in the public interest to permit the said nursery stock to be removed after fumigation.

9. For the purpose of scientific investigation the Minister may from time to time, by writing given under his hand, except such persons as he may deem proper from the operation of the two preceding sections, and while acting under such permission such persons shall not be subject to the penalties imposed by this Act.

10. Any person having reason to suspect that any plant in his possession or in his charge or keeping is diseased shall forthwith communicate with the Minister in regard to the same, and shall furnish the Minister with all such information in regard to the source or origin of the said infestation and nature of the same as he may be able to give.

11.—(a) Whenever disease exists or is supposed to exist on any plant, the Minister may direct a competent person to make an examination and inspection, and may order that any plant so infested, or such part as he may deem advisable, shall be immediately destroyed by burning, either by the person appointed to make the inspection or by the person owning or having possession of the said plant, or some other person so directed in writing, and the person so directed shall make a full report to the Minister in writing as to the nature and extent of the work so performed, together with a fair estimate of the value of the plants destroyed.

(b) If, in the case of an orchard or collection of plants, the inspector finds disease on plants located in several different parts of the orchard or collection, and decides that it is advisable in the public interest to destroy all the plants in such orchard, or in any part or parts thereof, and so reports to the Minister, the Minister may direct that an examination or inspection shall be made by an additional inspector and upon their advice in writing he may direct that all the plants in such orchard or such collection of plants or in such part or parts thereof shall be destroyed, without requiring that every plant in the said orchard or collection shall be first examined.

12. Any person appointed under section 3 of this Act to inspect or destroy any plant for the purpose of enforcing the provisions of the Act, and any inspector appointed by the Council of any municipality, shall, upon producing his authority in writing, have free access to any nursery, orchard, store-room, or other place where it is known or suspected that any plant is kept.

13. Any person neglecting to carry out the provisions of this Act, or any person offering any hindrance to the carrying out of this Act, shall upon summary conviction be liable to a fine of not less than twenty dollars nor more than one hundred dollars, together with costs, and in default of payment thereof shall be subject to imprisonment in the common gaol for a period of not less than ten days nor more than thirty days.

14. The Lieutenant-Governor in Council may, by Order, direct that other diseases than those mentioned may be included in the provisions of this Act, and thereafter during the continuance of such Order-in-Council the word "disease" in this Act shall include all such other diseases. Public notice of such Order-in-Council shall be given by publication in two successive issues of "The Ontario Gazette."

15. The Acts known as The Yellows and Black Knot Act, The Noxious Insects Act, and the San Jose Scale Act are hereby repealed.

DEMONSTRATION ORCHARDS.

This season a new line of work was undertaken by this office with the hope that a decided renewal of interest would take place in some of our orchard districts. What are known as demonstration orchards were selected, and work carried on in them throughout the season. The idea was to go into some section where there already existed numerous orchards whose owners not having obtained much profit from them had practically ceased caring for them in any way. A number of small orchards were selected, generally with a view to having them near some much-used highway. The owners agreed to allow the Department to prune and spray the trees without any expense to themselves, while they were to undertake the cultivation, manuring, sowing of a cover crop and the harvesting of the fruit. Where desired the Department agreed to find sale for the apples. An experienced orchardist was placed in charge of each district and spent is whole time supervising the pruning, spraying, etc. Large signs were placed on the sides of the road calling attention to the orchards and a number of orchard meetings were held throughout the season when the work was being carried on. Two sections where the Department already had representatives were chosen for the first year, namely the northern part of Simcoe County, where Mr. I. F. Metcalf had his office at Collingwood, and Dundas County, with Mr. A. D. Campbell at Morrisburg. The latter handled all of the work directly through his office with some assistance from this Branch. The work in Simcoe County, which covered a wider area, was in charge of Mr. W. F. Kydd, of Simcoe. The results are very gratifying even for the first year, and a great deal of interest was shown, with the result that not only were many old orchards put into shape the past winter, but also many orders had been placed for nursery stock to be set out in the spring of 1911. The figures from a number of these orchards showing the expense and returns are given herewith. It will be noted that the charge made by the farmers for their teams is very low, but this would be offset in an ordinary season by much lower cost of pruning.

1st Orchard of 50 Trees.

Expenses:

1. Scraping, 1½ days at $1.50	$2 25
2. Pruning, 16½ days at $1.50	24 75
3. First spraying—	
4 men, 5 hrs. each at $1.50 a day	3 00
Team, 5 hrs. at $1.00 a day	50

Materials—

8 gals. commercial lime sulphur at 20c.	1 60
8 lbs. Arsenate of lead at 13c.	1 04

4. Second Spraying—

4 men, 4 hrs. each at $1.50 a day	2 40
Team, 4 hrs. at $1.00 a day	40

Material—

4 gals. Lime Sulphur at 20c.	80
12 lbs. Arsenate of Lead at 13c.	1 56

5. Working Orchard—

Hauling brush, man 2 days ($3.00)	
Team 1 day ($1.00)	4 00
Plowing, man and team 1 day at 2.50	2 50
Cultivating, man and team ½ day at 2.50	1 25

Demonstration orchard, Nottawasaga township. John Osborne, Dunedin.

6. Cover crop—

Man and team ½ day at $2.50	1 25
Barley	1 00
Total	$48 30

Returns:

22½ bbls. at $2.50 per bbl.	$56 25
82 bbls. at $3.00 per bbl.	246 00
15 1-6 bbls. culls at 60c.	9 10
	$311 35
Cost of picking and packing 104½ bbls. at 75 cents per bbl.	78 38
Net returns	$232 97

2ND ORCHARD OF 192 TREES.

Expenses:

1. Scraping, 3 days at $1.50	$4 50
2. Pruning, 39 days at $1.50	58 50
3. First Spraying—	
4 men, 18 hrs. each at $1.50	10 80
Team, 18 hrs. at $1.00	1 80
Material—	
40 gals. commercial Lime Sulphur at 20c.	8 00
14 lbs. Arsenate of Lead at 13c.	1 82
4. Second Spraying—	
4 men, 24 hrs. at $1.50 a day	14 40
1 team 24 hrs. at $1.00 a day	2 40
Material—	
22 gals. Lime Sulphur at 20c.	4 40
66 lbs. Arsenate of Lead at 13c.	8 58
5. Working Orchard—	
Hauling brush, man and team 2 days at $2.50	5 00
Plowing, man and team 4 days at $2.50	10 00
Cultivating, man and team 3 days at $2.50	7 50
6. Cover Crop—	
Man and team, 2 days at $2.50	5 00
Buckwheat	1 50
Total	$144 20

Returns:

37 bbls. at $2.50 pe rbbl.	$92 50	
129 bbls. at $3.00 per bbl.	387 00	
21½ bbls. culls at 60c. net	12 90	
30 bbls. windfalls at $1.25 net	37 50	
	$529 90	
Cost of picking and packing—		
166 bbls. at 75c. per bbl.	124 50	
Net returns	$405 40	

Requests for similar work from many sections have been already made and an extension into other districts will undoubtedly be required.

In two other districts where orchard conditions were somewhat better, representives of this Branch were stationed throughout the season from the time of spraying until the harvesting season began, to give advice to the fruit growers. These men went from orchard to orchard under the direction of the District Representatives holding small meetings or visiting in person the owners, and answering any requests that might be made for advice. In one section, which was badly infested with the San Jose Scale, an expert in the handling of the lime sulphur mixture spent the spring months in demonstrating the making and using of this insecticide, which is now recognized as the best for combatting this pest.

APIARY INSPECTION.

With the discovery of what is known as European or Black Foul Brood in the eastern part of the Province a further re-arrangement of the inspection districts was found necessary to look after the work. Mr. Morley Pettit, Provincial Apiarist, has been given more direct charge of the inspectors, and has spent considerable time personally in investigation and supervision. Sixteen districts were arranged for and the apiaries in these were gone over closely as was permitted by the appropriation which had been voted by the legislature.

It has been found that disease in either of the two forms existent is widespread throughout the Province. Very few of the smaller beekeepers seem able to detect the disease without a visit from the inspector, and even after being shown many of these men will not give the short time required for proper treatment.

Apiary of Homer Burke, Highland Creek.

This has resulted in our inspectors being called back year after year to cases where one or two visits should have been enough; and has handicapped the Department in its work entailing a great deal of expense and loss of time needed for other sections. It is absolutely impossible for these men to visit all of the apiaries in Ontario within the limited time when proper treatment can be given. It would almost seem advisable that the inspectors, where carelessness is shown by the owners of bees, should destroy the colonies rather than leave them to prove a source of infection for the surrounding districts. A list of the divisions and inspectors for 1910 is given herewith:

1. Bruce and Huron—J. S. Schrank, Port Elgin.
2. Waterloo and Perth—D. Chalmers, Poole.
3. Wellington and Grey—John Artley, Blantyre.
4. Lambton, Kent and Essex—W. A. Chrysler, Chatham.

5. Middlesex and Elgin—Jno. Newton, Thamesford.
6. Norfolk, Haldimand and Welland—Jas. Armstrong, Cheapside.
7. Oxford and Brant—W. Bayless, Grand View.
8. Wentworth and Lincoln—Alex. Robertson, Waterdown.
9. Halton, Peel and Dufferin—Arthur Adamson, Erindale.
10. Simcoe and Muskoka—Hy. Johnson, Craighurst.
11. Ontario, York, Victoria and Durham—J. L. Byer, Mount Joy.
12. Peterborough, Northumberland, Hastings, and Prince Edward—W. Scott, Wooler.
13. Lennox and Addington, Frontenac and Leeds—J. B. Checkley, Linden Bank.
14. Renfrew, Lanark and Carlton—R. J. Stead, Lanark.
15. Russell, Prescott and Glengarry—Alex. Dickson, Lancaster.
16. Grenville, Dundas and Stormont—Homer Burke, Tayside.

FRUIT EXHIBITS.

The exhibits directly under the charge of this Branch were again confined to Winnipeg in the west, the Canadian National, and the Ontario Horticultural Exhibitions in Toronto. The western exhibit was in charge of Messrs. Revett, Roadhouse and Lee, of the Department of Agriculture, and proved to be fully up to those of past years. Owing to the tremendous growth of the West and to the rivalry which exists between Ontario, British Columbia and the Western States for this market we will of necessity have to continue our displays of fruit at this point, and should possibly extend to some of the other western exhibitions. With the decided improvement in the packing of our tender fruits and apples that is now taking place, Ontario is in a position to compete on fair grounds with the western fruit growers. Owing to the extension of our orchards the large dealers and co-operative associations are now able to sell either straight or mixed carloads and can quote prices that will compare very favorably with those from the Western States where fruit is raised in large quantities. Our growers are quite willing to take a fair profit on their fruit providing the markets will handle the increased quantities which are now being raised, not only in the Niagara District, but in other parts of the Province as well.

The Winnipeg exhibit was made up of apples held in cold storage from the season of 1909, and tender fruits such as cherries, raspberries, blackberries, currants, and gooseberries of the present season's crop. Many inquiries were received in reference to our fruits and a number of representatives from eastern dealers and associations were present at the time of the Exhibition to meet with possible customers there. Winnipeg is at present the centre of the wholesale fruit business, and on account of the number of railway lines radiating from it will likely continue for many years to be the most important fruit distributing point in the West.

THE CANADIAN NATIONAL EXHIBITION.

The Department of Agriculture was, as usual, represented by a mixed exhibit of fruit, grain, minerals, etc., from the Province generally. Owing to the large number of visitors attracted to this Exposition from outside States and Provinces, it is necessary that such a representative exhibit should be there so as to give

these visitors an idea of what the Province can produce. It is also necessary to make a good display of both fruits and grains to counteract the exodus of our rural population to the West by showing our farmers that we can produce just as good crops here of the kinds grown West, and make as much money. Then we can hope in time to regain some of the ground which we have lost in recent years where statistics show that the population in our towns and cities has been rapidly growing with a corresponding falling off in the country. With fruit lands here much cheaper on the average than in British Columbia or the coast States, and with profits correspondingly high there is no reason why any one from Ontario should leave here to engage in that industry in the West.

A part of the exhibit of the Fruit Branch, Canadian National, 1910.

The exhibit at the Canadian National is not of an educational nature in so far as the fruit grower is concerned, except to show what can be produced. The educational part of the work has been handed over to the Agricultural College at Guelph, which has a large exhibit on the grounds. The fruit exhibit consists of a well-arranged display of the very best fruit of the different kinds raised in Ontario, and is shown to impress, not only the visitors from other countries, but also our own people, with the fact that we can in this Province produce the finest fruit of all kinds that is raised on the American Continent. Any country that can produce the best of fruits will also excel in any other agricultural product.

ONTARIO HORTICULTURAL EXHIBITION.

The seventh annual exhibit, which was held again in November, excelled all of those of past years in the exhibit of boxed fruit. One of the chief aims of the Exhibition when it was organized was to teach our fruit growers the proper methods of packing and handling the standard apple boxes. That rapid development has taken place was well illustrated by the difference between the exhibits held in 1904 and 1910. A great many of the growers are now competing in the numerous classes which call for boxed apples, and in addition quite as many more attend the Exhibition to get a knowledge of the methods required. There are always in attendance at this Exhibition the most up-to-date of our fruit growers, and also those of the Government service who are qualified to give advice

A View at Ontario Horticultural Exhibition, 1910.

as to packages and packing, so that the Show forms the very best opportunity for the fruit grower to secure any information which he may desire in reference to this important part of the industry. That the exhibition is growing in popularity is shown by the increase in the attendance from outside points. While the city of Toronto still furnishes the greater part of those paying admittance at the gate, the railway coupons have shown a very rapid increase during the past three years. The attendance also at the Fruit Growers' Convention, which is held the same time, shows that this week is being looked forward to by the fruit growers of the Province as the one time in the year when they should gather together to discuss matters of importance relating to the industry. The only difficulty now in the way of a still further improvement in both Exhibition and Convention is the lack of suitable hall accommodation at some central point in Toronto. If this can be overcome there is no doubt that future exhibitions will still further represent the improvement which is taking place in fruit growing all through the Province.

FRUIT SHIPMENTS TO GREAT BRITAIN.

The Province of Ontario has been noted for many years for the extent of its export trade in apples with Great Britain, especially with the ports of Liverpool and Glasgow. The season of 1910 was remarkable for the shortage in the apple crop, and as a result the exports dropped to about one-third of the 1909 figures. The amount of the export trade was somewhat influenced by the general scarcity of apples in all of the districts and the consequent increase in the demand for local use. Some of our best sections, notably the Georgian Bay and Lake Huron districts, did not have enough for more than their own use. Prices were correspondingly high, and those sections having apples, even if the quality was poor, were able to make very handsome returns. The shortage in the crop permitted of a large increase in the shipping of boxed apples from the western coast States to the big centres of trade in Great Britain. This increase will likely continue, and Canadian apples will have to compete with these goods, which are generally of magnificent appearance and well packed. The increasing use of the box package for our better class of apples should be encouraged.

A very profitable trade in pears is being worked up in Great Britain, and could be very well increased if the fruit were available. An extended planting of this fruit is recommended. The Burlington district has perhaps led in the trade with Great Britain, and growers there are enlarging their pear orchards. Other districts could quite well go in for the raising of this fruit with profit to the growers.

The 1910 season witnesses the first shipment of peaches to Great Britain on a commercial scale. This Branch in 1909, acting on instructions from the Hon. Mr. Duff, Minister of Agriculture, sent forward a shipment of Elberta peaches to our London agent, who placed the fruit in the hands of Messrs. Parsons & Co., of Covent Garden Market. The reports on the fruit were on the whole favorable, though some criticism was offered on account of the varieties being yellow fleshed instead of white fleshed, as are those grown in Great Britain, France, and South Africa.

As a result of this shipment it was decided to send over a considerable quantity in 1910 of different varieties to determine more definitely what the opportunities were for this trade. The Dominion Department of Agriculture had, as usual, arranged cold storage space for tender fruits on a number of steamers sailing to Great Britain, and had also decided to experiment with shipments of peaches. At first it was thought wise to leave the matter in their hands, simply giving what assistance we could to them in the packing. This was carried out by sending Mr. T. B. Revett, of the Fruit Branch, to help with the putting up of the fruit at the St. Catharines Cold Storage Company's plant, from where the Dominion shipments were made. Later on in the season Mr. C. A. Dobson, of the Jordan Harbor Peach Ranch, requested the help of the Ontario Department in putting out some large shipments to the London market. Mr. Dobson's request was acceded to, and this Branch took charge of the work of picking, packing, and shipping the fruit until the time it was placed on the steamers at Montreal. Messrs. Parsons & Co., of London, England, handled the goods on their arrival at that port.

The peaches, consisting largely of Crawfords and Elbertas, were packed in small cases holding from 15 to 25 fruits, a layer of wood wool was placed in the bottom and top and each peach, after being wrapped in fine paper, was surrounded with a roll of the wood wool. The packing as reported on by the receivers was pro-

nounced perfect and fully equal to that of the South African shippers who had been sending peaches forward to London for some years. The fruit sold at from 3s. 6d. to 8s. per case. If these prices could be maintained it would mean a very fair profit to the shipper. The chief difficulty lies in the cold storage on the steamers, one shipment of 700 cases being seriously damaged by leakage from the brine pipes, due to a too sudden change in the temperature as the boat approached the other side. On the whole the shipments were fairly satisfactory and will likely be continued in 1911. It is a trade that would, however, be largely in the hands of large growers or co-operative associations that could get together a considerable quantity of fruit on short notice.

One of the most important points in connection with the shipments was the obtaining of a good grade of wood wool. This Branch, through our London office, imported two tons of very fine aspen wood wool manufactured in Norway. This material was very soft and absolutely odorless. Enough was obtained to supply the shipments for both the Dominion and Provincial Departments. The former tried to use a layer of the Ontario made wood wool for padding the top and bottom of the case, but reports received from Great Britain state that the fruit was more or less tainted as a result.

The shipments from St. Catharines consisted of 1,284 cases, which were shipped to a number of points in Great Britain. The Jordan Harbor shipments were 2,400 cases, all of which were sent direct to Parsons & Co., of Covent Garden, and from there distributed to points in the British Isles and on the Continent.

HORTICULTURAL EXPERIMENT STATION.

The work at this Station during the past season was somewhat deranged owing to the illness and death of the Director, Mr. H. S. Peart. Mr. Peart had been in charge of the Farm since it was taken over by the Department from Mr. M F. Rittenhouse. He had been largely responsible for the carrying out of the planting of the orchards as directed by the Advisory Board appointed by the Department, and was in very close touch with the experiments which had been outlined. It was the intention to continue the plantings during the spring of 1910, so as to complete all the experiments in hand, but under the circumstances this was not carried out. Mr. A. J. Logsdail, expert in plant breeding, acted as Director of the Station until the appointment of Mr. A. D. Harkness, of Irena, in December. Owing to the work that this entailed on Mr. Logsdail his own plans for the plant breeding were more or less interfered with. Mr. Logsdail has, however, given in this report a brief summary of the results of the year's work.

With the change in the staff, the Minister of Agriculture has also made a slight alteration in the supervision of the work there. Mr. Harkness will be superintendent and Mr. Logsdail expert in plant breeding, both directly responsible to the Director of this Branch. This change was decided upon to keep the Department here in closer touch with the work and expenditure on the farm.

With the tender fruit orchards coming rapidly into bearing, it is hoped that something of value to the fruit growers of that district will soon be determined upon as a result of the experiments already begun. In connection with the plant breeding work a specialty has been made of strawberries, and the coming season will see about twenty thousand plants growing for testing purposes. Quite a large number of other fruits are also being brought on. A completion of the planting and the erection of a fruit house will be necessary for the season of 1911.

NURSERY INSPECTION.

In the year 1909 the Fruit Branch made a special inspection of all nursery stock grown in the Niagara District, with a view to finding out what percentage of stock was infested with the San Jose Scale and other fruit tree pests. Owing to the prevalence of the scale in this district it was though better to continue the inspection in 1910 and in following years. Unfortunately, however, the necessity for an early inspection of stock for the Brown Tail Moth used up a large part of our appropriation, and it was decided to discontinue the later inspection for San Jose Scale for the season. A further appropriation for this work will be asked for, so that the summer inspection of stock can be resumed in 1911.

Our local inspectors were directed to spend as much time as was available in clearing up infested orchards, and seedling trees in the neighborhood of the blocks of nursery stock. As the latter are removed at frequent intervals the spread of the scale in the nursery would not be serious if it was possible to prevent reinfestation. A considerable cleaning up of these places was effected, but there still remains quite a bit of it to be done. The chief difficulty is that many of the local inspectors are not given the moral backing required from the fruit growers in the section, and are afraid to enforce the regulations of the Department. Our chief inspector has received instructions personally to supervise this work, and we hope within a short time to place the nurseries in a much better position in this respect.

Further help was provided in inspecting the fumigation of stock both for spring and fall digging. Every year, however, we receive reports of orchards recently planted that have been found with scale on the young trees. In most cases, so far these have come from our Ontario nurseries, and show either carelessness or disregard of the law. The proper fumigation has proven by numerous experiments to be absolutely fatal to scale in any stage of its existence, and the endeavor of the Department will be to see that treatment of the stock is properly carried out. Four inspectors devoted their whole time to this work in the spring and fall of the past year.

Local inspectors under the Fruit Pests' Act were again appointed in most of the tender fruit growing districts, and also in some of the apple growing sections. A list of the inspectors and their districts is given herewith:

Township.	Inspector.
Thorold	Albert Nelson, Fonthill.
Niagara	Theodore Brooker, Virgil.
Saltfleet	W. E. Biggar, J. P. Vanwagner. Bartonville.
Clinton	John Reid, Chas. Watson, Beamsville;
North Grimbsy	J. M. Kelson, A. T. Hunter, H. L. Walker, Grimsby.
Barton	Harry F. Burkholder, Bartonville.
Louth	E. J. Fisher, A. D. Broderick, Lewis Haynes, St. Catharines.
Walkerville	J. B. Forrest, Walkerville.
St. Catharines	Wm. Elliott, St. Catharines.
Grantham	Norman Foster, Port Dalhousie.
Leamington Town	Wm. Roadhouse, Leamington.
Pelham	Harry Arnold, Ridgeville.
Middleton	J. G. Herron, Courtland.
Derby Township	Henry Hilts, Owen Sound.
Beamsville Village	Frank Culp, Beamsville.

A request was made to the Department during the year that these local inspectors be appointed by this Department, the system of pay to be the same as at present, *i.e.*, one-half the expense to be borne by the townships and the other half

by the Province. The feeling among some of the fruit growers was that if outside inspectors could be appointed the law would be more strictly enforced. On the other hand, there existed a feeling in many quarters that a local inspector, if properly backed up by public opinion, would do better work, as he would be better acquainted with the district in which he was living.

The matter was discussed at three different meetings of the Niagara Peninsula Fruit Growers' Association, which represents the Niagara fruit growing section, and it was decided that the fruit growers make an effort the coming season to have the very best men available appointed for the positions, and to back up their work in every way possible by the influence of the district association. It is hoped in this way to secure a better enforcement of the Act during the coming season.

Sour Cherries in Norfolk County intercropped with Tomatoes.

ORCHARD SURVEYS.

This term has been applied in the United States to a careful census made of the orchards in certain districts. The plan consists in sending one or more men with a knowledge of horticultural conditions to visit all of the orchards in a district, securing from the owners detailed information concerning the trees. Such information is afterwards compiled and the results given out in bulletin form to show just what conditions along all lines of orchard practice have given the most satisfactory results. The States of New York and Oregon have gone to considerable trouble to compile these resports from a number of their best fruit districts.

In the years 1909 and 1910 Prof. J. W. Crow, of the Agricultural College at Guelph, in co-operation with this Branch, arranged for surveys to be made in the Counties of Simcoe, Huron, Lambton, Elgin, Lincoln, Wentworth, Durham, Northumberland, and Prince Edward. The field work was placed in the hands of students of the College, who, during the summer vacation, visited all of the orchards in these districts, making a detailed report on each farm. To show how thoroughly this was done a copy of the form used is given herewith.

ORCHARD SURVEY

ONTARIO DEPT. OF AGRICULTURE
AND
ONTARIO AGRICULTURAL COLLEGE

Owner.....

P. O.....

County.....

No.....

Date.....

Township.....

Location.....Acres in farm.....Acres in fruit.....

Kind of fruit.	No. bearing.	Age of bearing	No. non-bearing	Distance	Acres

Site.....Aspect.....

Planting plan.....Nature of other crops.....

Varieties.....

Type of Soil.....Depth.....Subsoil.....Drainage.....

Tillage—Kind and Frequency.....

Cover Crop.....No. of Years.....

If Sod—Kind.....No. Years.....Method Treatment.....

Fertilizers—Kind.....Quality.....Frequency.....

Pruning—Time.....Method.....Frequency.....Severity.....

Thinning.....

Spraying—Machinery.....Mixtures and Times of Applying.....

.....

Diseases.....

Insects.....

Present Condition.....

Packages.....Packing.....

	19	19	19	19	Where and How Sold
Yields					
Price					
Income per Acre					

Remarks.....

.....Observer.....

With the information obtained the reports of the work were prepared and are printed as part of this volume. The Counties of Simcoe and Kent were not completed, and for the present are not printed.

The results as shown here prove very clearly, by comparison between different blocks of orchard treated under different methods, the value of proper care of both soil and tree. A careful study of the tables will prove of interest to all of our fruit growers, not only those residing in the counties mentioned, but in other parts of the Province. These districts are typical of conditions existing everywhere along the Great Lakes, where the bulk of the fruit is at present grown. A further study of counties inland and along the St. Lawrence and Ottawa Valleys will be necessary to complete the work.

Hoeing young nursery stock near Fonthill.

CO-OPERATIVE WORK.

The short crop of apples which was quite general over the Province resulted in the formation of very few new associations during the past year. This was specially true in the western part of the Province, where co-operation has been most successful. However, those already in existence have strengthened their membership in most cases, and as a result of the poor crop were able to sell their fruit at very good prices. The Norfolk Fruit Growers' Association, with a large membership, handled over 36,000 barrels of marketable apples, besides selling thousands of dollars worth of low grade apples to the canneries and evaporators. This Association showed a remarkable increase in membership, and with a full crop would undoubtedly handle close on to a hundred thousand barrels of apples.

The Niagara Peninsula is now well organized from Stony Creek through to the Niagara River. During the season the recently organized Ontario and Western Association handled a large quantity of fruit from their membership, which extends from Stony Creek through to Beamsville. The presence of the Hamilton, Grimsby, and Beamsville Electric Line has aided them greatly in their work.

This Association is doing for the western end of the peninsula what the St. Catharines Cold Storage Company has already done for the eastern portion. Both Associations are handling large quantities of fruit growers' supplies, and later looking after the sale of the fruit. The O. & W. is endeavoring to pack a large quantity of the fruit in small packing houses distributed along the line of the electric railway, and should be able to put out a more uniform article than where the bulk of the fruit is still packed by the individual member. In addition to these two large associations there are three other smaller ones, located at Winona, Grimsby and Jordan, and these, with a number of large dealers, furnish the fruit growers of the Niagara Peninsula with an excellent outlet for all kinds of fruit. With good markets close at hand this favored district should continue to show a big increase in the production of fruits, especially of the tender kinds, and as a result higher prices even yet for the lands throughout the section.

A revised list of Associations, with secretaries or managers, is given herewith:

CO-OPERATIVE FRUIT GROWERS' ASSOCIATION.

1. Arkona Fruit Growers' Association .....T. A. Lampman, R. F. D., Thedford
2. Brant Packing Association.....F. M. Lewis, Burford.
3. Chatham Fruit Growers' Association .....A. McGetchie, Chatham.
4. Georgian Bay Fruit Growers' Limited .....G. H. Mitchell, Thornbury.
5. Gore Fruit Growers' Association .....B. J. Palmer, New Durham.
6. Newcastle Fruit Growers' & Forwarding Assn. ..W. H. Gibson, Newcastle.
7. Norfolk Fruit Growers' Association .....Jas. E. Johnson, Simcoe.
8. Oshawa Fruit Growers' Association .....Elmer Lick, Oshawa.
9. Owen Sound Fruit Co., Limited .....Adam Brown, Owen Sound.
10. Sparta Fruit Growers' Association .....J. A. Webster, Sparta.
11. Watford Fruit Growers' Association .....D. G. Parker, Watford.
12. Grafton Fruit Growers' Association .....J. G. Wait, Wicklow.
13. Alvinston Fruit Growers' Association .....E. F. Augustine, Aughrim.
14. Burgessville Fruit Growers' & Forwarding Assn. .W. H. Kneal, Burgessville.
15. Canadian Apple Exporters, Limited .....F. B. Mallory, Frankford.
16. Cobourg Fruit Growers' Association .....S. W. Staples, Baltimore.
17. Hatchley Station Fruit Growers' Association ....W. F. Robinson, Hatchley Station.
18. Mount Nemo Fruit Growers' Association .....R. M. Spence, Nelson.
19. Orono Fruit Growers' Association .....E. J. Hamm, Orono.
20. Forest Fruit Growers' & Forwarding Co. .....D. Johnson, Forest.
21. Jordan Co-operative Association .....J. A. Wills, Jordan.
22. St. Catharines Cold Storage & Forwarding Co. ..Robt. Thompson, St. Catharines.
23. Ontario & Western Co-operative Fruit Growers' Co.C. J. McCallum, Grimsby.
24. Wyoming Fruit Growers' Association .....E. J. Borrowman, Wyoming.
25. Prince Edward Fruit Growers' Association .....Philip Greer, Wellington.
27. Georgetown Fruit Growers' Association .....W. F. Bradley, Georgetown.
27. Lambton Fruit Growers' Co-operative Assn. ....George French, Sarnia.

As requests for information on co-operative work were so frequent, it was decided to publish a special bulletin on the subject. Mr. S. E. Todd, the Representative of the Department at Petrolia, who has made a special study of co-operation for a number of years, prepared the bulletin (No. 192). It contains complete information on organization and the carrying on of co-operative buying and selling in all lines of agricultural products, but with special reference to fruits.

HORTICULTURAL EXPERIMENT STATION, JORDAN HARBOR.

VEGETABLES.

A. J. Logsdail, B.S.A., Jordan Harbor.

The work with vegetables during the past year has been almost entirely confined to the testing of a large number of varieties of the more important market garden crops, such as: Beans, beets, carrots, lettuce, peas, peppers, sweet corn and tomatoes.

Nearly eighty varieties of beans were grown during the past season. A fifty-foot row of each of the varieties was sown on the same date, and a record was kept of the most important features. The list given below includes eighteen of the most satisfactory varieties, with their respective yields (in ounces), and the season of bearing, namely, Early, Medium or Late.

Beans, 1910.

Name of Variety.	Season.	Yield.
Davie's White Kidney Wax	Early.	329 ozs.
Early Valentine	Early.	320 "
Early Mohawk	Early.	314 "
Dawson's Horticultural Wax	Early.	275 "
Henderson's Bountiful	Early.	240½ "
Michigan White Wax	Early.	216½ "
Green Pod, Dwarf	Medium.	400 "
Stringless Green Pod	Medium.	338 "
Scarlet Flagelot Wax	Medium.	270½ "
Giant Yosemite	Medium.	259 "
Early China	Medium.	233½ "
California Rust Proof	Medium.	231½ "
Refugee Wax	Late.	442 "
Burpee's White Wax	Late.	399 "
Rennie's Stringless	Late.	341 "
New California Wax	Late.	303 "
Michigan Wonder	Late.	293 "
Emerald Beauty	Late.	292 "

In order of yield, the ten most satisfactory varieties were: Refugee Wax, Green Pod Dwarf, Burpee's White Wax, Rennie's Stringless, Stringless Green Pod, Silver Bush, Davie's White Kidney Wax, Early Valentine, Early Mohawk, and Triumph of the Frames.

A similar experiment was conducted with about sixty varieties of peas. This crop was by no means satisfactory, owing to the nature of the soil in which it was grown, and the general method of growing.

In order that the best results may be obtained from a crop of garden peas, the soil should be quite rich, and a soil mulch should be maintained throughout the whole period of growth; tall growing varieties should be given support in the nature of a trellis of wire or sticks, and the rows should be further apart than those of the dwarf varieties. Many of these factors were unavoidably neglected, but it is hoped that by the system to be followed during the coming season these features will be almost, if not entirely, eliminated.

Exhibit of apples at Ontario Horticultural Exhibition, 1910.

In the list of peas given below are included twenty of the most satisfactory varieties, together with brief notes regarding the relative size of pea and pod, the season of yield, and the quantity of the crop of each of the varieties:

PEAS, 1910.

Name of variety.	Size of Pea.	Size of Pod.	Date of bearing.	Total yield.
Premium Gem	Medium.	Medium.	Very early.	138 ozs.
American Wonder	Small.	Medium.	Very early.	116½ "
Extra Early Premium Gem	Mid-Small.	Medium.	Early.	108½ "
Rennie's Best Extra Early	Small.	Small.	Early.	92 "
Alaska	Medium.	Medium.	Early.	91½ "
Early Conqueror	Medium.	Small.	Early.	90 "
Burpee's Quality	Medium.	Small.	Mid-season.	142 "
Little Marvel	Medium.	Medium.	Mid-season.	137 "
Bruce's Royal	Large.	Large.	Mid-season.	107 "
Little Gem	Medium.	Medium.	Mid-season.	102½ "
Nott's Excelsior	Medium.	Small.	Mid-season.	101½ "
Sutton's Gem	Large.	Large.	Mid-season.	96½ "
Abundance	Small.	Medium.	Late.	188 "
Yorkshire Hero	Large.	Medium.	Very late.	165 "
Lincoln	Medium	Large.	Late.	164 "
Heroine	Large.	Medium.	Very late.	162 "
Senator	Medium.	Large.	Late.	158 "
Dwarf Telephone	Large.	Large.	Very late.	158 "
Fillbasket	Large.	Large.	Late.	154 "

The ten best varieties with regard to quality, yield and season were:

For Early Season: Premium Gem and American Wonder.

For Mid-Season: Little Marvel, Bruce's Royal and Burpee's Quality.

For Late Season: Yorkshire Hero, Dwarf Telephone and Fillbasket.

Ten varieties of beets are given in order of their respective yields, with a brief note on the size, color and texture of each:

BEETS, 1910.

Name of variety.	Colour.	Size.	Texture.	Total yield.
Whiteham Fireball	White.	4 inch.	Tender.	32 lbs.
Improved Blood Turnip	Light red.	4 "	Tender.	30 "
New Intermediate	Dark red.	3 "	Fairly tender.	30 "
Philadelphia Turnip	White.	4 "	Coarse.	29 "
Rennie's Globe	Dark red.	4 "	Tender.	27 "
Albano or Market Garden	Light red.	4½ "	Tender.	26 "
Rennie's Intermediate	Dark red.	3 "	Tender.	24 "
Rawson's Arlington Favourite	" "	3½ "	Tender.	24 "
Crimson Globe	Bright red.	3 "	Tender.	24 "
Extra Early Turnip	Light red.	4 "	Coarse.	23 "

Several alterations have been planned for the coming summer's work, and with the incorporation of these modifications, it is hoped that the results obtained from the competitive trials of varieties may demonstrate more accurately the relative merits and demerits of the several varieties under experimentation.

The number of distinctive plots will be largely reduced, but the varieties deemed worthy of further trial will be grown on a more extensive scale, together with a selection of the most promising novelties of that or the preceding year.

Not only will a greater number of plants give a more accurate average of the true merits of any one variety, but they will facilitate the very necessary work of becoming intimately acquainted with the characteristics of the variety. Moreover, sufficient product can thus be obtained at one picking to enable an individual canning test to be made of each.

With regard to this last feature of the experimental work, it is interesting to note that the variety of tomato, known as Earliana, gave excellent results in the canning test, despite the fact that this tomato is considered of little use for canning purposes.

PLANT BREEDING.

A. J. Logsdail, Jordan Harbor.

The progress during the past year in the work of plant breeding and selection has largely consisted in extending the possible utility of this phase of investigation, and increasing the number of plants with which to carry on future selection.

A bed of about 3,000 seedling strawberries fruited for the first time. A careful record was made of each plant, the following data being noted, with regard to blossom: Sex—Whether pistillate or bisexual. Size—Quantity of pollen, date of first blossom, full blossom, last blossom, and whether the blossoms were numerous or otherwise. With regard to the fruit: Size, shape, color, flavor, texture (whether firm or soft), the position of the fruit (whether recumbent or semi-erect), and the dates of first fruit, main crop, and last fruit. Several other factors were noted with regard to the foliage, seeds and runners.

This work will be carried on with the same plants for another season, and similar data will be collected from the progeny of these plants; by so doing it is hoped that some valuable information may be obtained regarding the transmitability of the characters of strawberries. Several plants of definite types were selected for further breeding and improvement, and a large number of seedlings (about 12,000) were propagated from the most promising strains.

These plants are all grown in the hill system, and I will briefly explain the reason this system is followed, because commercial practice of growing the plants in a matted row is the method more generally adopted.

A number of strawberry plants raised from seed will show great variation and a general tendency to revert to more primitive types. Occasionally one plant will appear developing characteristics which are of significant commercial value and warrant retention. The hill system enables each plant to form a hill of runners very similar to itself, without intermingling with either poorer or better forms. The poorer plants are then destroyed, and those that are considered of sufficient value for further selection are retained and multiplied until a sufficient number of runners have been produced for planting in a matted row and testing beside standard varieties.

The second reason is to facilitate the work of selection. A plant growing under such conditions will develop its individual characteristics to a more marked degree than when grown in a matter row, and is thereby more easily distinguished from the surrounding plants of inferior strain.

The plant breeding work with tomatoes has been divided into two main divisions. The first comprises the cross breeding of standard varieties, with the object, firstly, of obtaining a meaty, early bearing fruit suitable for canning pur-

poses, and, secondly, an early bearing, high quality, tomato, with a skin sufficiently tough to recommend it as a fruit for long distance shipments.

The second phase of this branch of the work consists in testing selected strains of Earliana, of which we now possess five distinct types.

The Central Experiment Farm Strain has so far given the most satisfactory results, yielding a heavy crop of smooth fruit, earlier than the other types. This strain has been selected for a number of years, and is now fairly established, as evidenced by the fact that seed of our own saving from this strain the previous season proved equally as good as seed procured the same season from Ottawa.

Investigation is also being carried on with regard to the transmitability of the characteristics of this fruit. With this object in view several varieties possessing

An up-to-date peach orchard near Winona.

certain clearly distinguishable features were self-fertilized during the season of 1909, and last year, 1910, were crossed with each other. The seed of these hybrids will be grown this year, and records taken of the features of each plant.

A number of seedling peaches, apples, and grapes will be planted in orchard and grapery this spring. Seedlings of peaches and grapes, procured at later dates, are making satisfactory progress.

With regard to grapes, a number of crosses were made between varieties of the European Grape (*Vitis Vinifera*), with grapes of American origin, as Concord and Worden (*Labrusca*), and grapes of hybrid origin, Wilder and Lindley (*Labrusca x. Vinifera*), with the object of obtaining a sweeter grape, more nearly approaching the *V. Vinifera* type, yet of sufficient hardness to withstand climatic conditions, and a growth typical of the American species, and capable of withstanding the attack of mildews.

EXPERIMENTAL WORK WITH BEANS.

At the request of the bean growers of the Western Peninsula the Department undertook to conduct some special experiments with this crop on the farm of Mr. Matthew Wade, of Morpeth, in Kent County. There seems to have been a falling off in the production per acre, and the growers differed as to the causes, some believing it to be due to attacks of insect pests or fungous diseases; some to lack of vitality in the seed, while others felt that some special mineral element was becoming exhausted in the soil. Seed was imported from some of the best bean districts in the United States, but as a result of the experiments did not show any improvement over selected Ontario seed. The experiments will be continued for some time, and it is hoped that the problems presented by the growers will be solved.

In connection with the work an Ontario Bean Growers' Association has been organized, with David Wilson, Morpeth, as secretary. The aims of the Association are to advance the bean growing industry in every possible way through co-operation with this Department, and by the offering of prizes for the best fields of grain in the western part of the Province, where the bulk of the crop is now grown. In this connection the various township and county councils have given liberal prizes, while the expenses in connection with the judging have been borne by the Department of Agriculture.

The acreage devoted to this crop in Ontario, as given by the last Dominion census in 1901, shows 42,013 out of a total of 46,445 acres for the Dominion of Canada. The production in bushels was 765,818 for the Province, as compared with 856,720 for the Dominion. Of these totals the Counties of Kent and Elgin have an acreage of 33,470, and a production of 636,536 bushels, practically controlling the market. Most of the work, therefore, will be carried out in these two counties.

LAKE HURON FRUIT EXPERIMENT STATION.

A. E. Sherrington, Walkerton.

The spring of 1910 opened very early. The weather during March was as warm as June, the temperature at times being 80 deg. F. in the shade. This warm weather induced rapid growth, resulting in serious damage to foliage and blossom by the cold, wet spell which immediately followed. This cold, wet spell continued right through the blooming period, causing a total failure of the apple crop throughout this district, especially in old orchards. Golden Russets suffered the most. The frost-damaged leaves appeared to be all the more damaged by a fungus which stripped them of almost all their leaves. In the young experimental apple orchard we had quite a crop of apples. Transparent, Duchess, Wealthy, Peter, Salome, Ben Davis, and McIntosh gave the largest yields. We again undertook to test the commercial lime-sulphur and Bordeaux mixtures as fungicides. For this purpose the orchard was divided into two parts. Lime-sulphur was used at a strength of 1 to 40, with the addition of 2 pounds of arsenate of lead. The Bordeaux was used at a strength of 4 pounds copper sulphate (bluestone), 6 pounds lime and 2 pounds arsenate of lead to 40 gallons water. The first spraying took place just before the blossom buds opened, May 3rd, with Bordeaux in one part and lime-sulphur used in the other on May 6th. The next spraying was done June 3rd, just after all the blossoms had fallen. The third spraying took place from ten

days to two weeks later. The results were very satisfactory. The apples in the young orchard were clean and free from worms and a good crop. What few apples there were in the old orchard were clean and free from worms. I cannot see any difference in the results of lime-sulphur versus Bordeaux as a fungicide. The lime-sulphur is less troublesome to prepare and more easily applied. Arsenate of lead is a much more superior insecticide than Paris green, both for fruit trees and potatoes.

Fungi.

Fungous diseases were not nearly as prevalent this season as usual, excepting on the apple leaves that were damaged by frost.

Insects.

Orchard insects were conspicuous by their absence. A few codling moths were seen, but did little damage. June bugs were very scarce this season, and it is to be hoped they never appear again.

Apples.

As stated in general notes the apple crop was about a total failure here, excepting the young orchards, which did not seem to be affected by the blight, as it is called. There is not as much activity in planting here as in some districts, still quite a few good orchards are being planted, mostly from five to ten acres. The variety that is being planted is the Spy, and I should not advise the planting of many of any other variety in this district.

Pears.

Pears are not grown extensively in this district. Although the orchard has been singularly free from blight this year, and despite the fact that it has thrived more this year than heretofore, very little fruit has been harvested. Clapp's Favorite, Bartlett, Lawrence, Josephine and Bartlett Seckel are about the best varieties.

Plums.

The plum crop was good this season, of excellent quality and sold for high prices. We had very little rot, a few varieties, such as Victoria and Gueii, being the most subject to this disease. The plums were sprayed with either copper sulphate at the rate or 2 to 3 lbs. to the 40 gallons of water or Bordeaux just before buds burst; the next spraying just before the blossoms open, and the third soon after the blossoms fall. The third spraying is applied when the fruit is about half grown. Bordeaux was used at all of these sprayings. Under this method we do not have much loss from rot. All European varieties have succeeded very well here. The Japan varieties have failed, except the Burbank. Another one or two hundred trees will be planted next spring, consisting of the following varieties: Quackenbos, Bradshaw or Niagara, Shippers Pride, H. R. P. Egg, Monarch, Grand Duke, Reine Claude, and German Prune. Our system of pruning plums has been the removal of any limbs that may be crowding or crossing one another, keeping the trees moderately thin and heading back all previous seasons' growth from one-third to two-thirds. This gives us a strong, stocky tree.

Cherries.

Cherries, like the apples, were very scarce; in fact, a total failure. However, the orchard is doing fine. The Yellow Spanish, Early Richmond and Montmorency

are the best varieties. Windsor is doing better now than heretofore. The system of pruning cherries is simply to keep the trees from getting too thick. Very little pruning is necessary after the trees commence to bear.

Raspberries.

The crop of raspberries was not as heavy this season as a year ago, mostly owing to the canes being broken down by the snow and the dry weather during the fruiting season. The quality was excellent and prices good. Another acre was planted to red raspberries this last spring. The demand for raspberries has increased greatly the last year or two, and should prove a profitable crop. The varieties grown are Marlboro', the first to ripen; Herbert, next in season, and Cuthbert, the best of all. Cuthbert is still our favorite. It is a strong grower and good cropper and a first-class shipper. The Herbert is doing well. It is the heaviest yielder and the fruit is very large, but rather soft for distant markets, but the demand is still for Cuthberts. Marlboro' is doing better with us now than formerly, possibly because it is on higher land. Very few blackcaps are now grown—only about 600 plants in all. Conrath and Hilborn are two varieties and are planted in rows six feet apart, thoroughly cultivated and fertilized with barnyard manure and wood ashes.

Blackberries.

The blackberries are all discarded as unprofitable in this district.

Currants.

We have about 35 varieties of red and black currants and about 1,000 bushes in the plot. The crop of red currants was good, but blacks were rather light, although of good quality. Shallow cultivation is practiced here for all small fruit, the currants are well manured and pruned once a year. Our best varieties of reds are: Cherry Fays, Wilder, Perfection and Prince Albert. Blacks: Champions and Naples are the best. We have sixteen varieties of Dr. Saunders' hybrids, quite a number of which are very promising.

Gooseberries.

We have somewhat over 1,000 bushes of gooseberries. The crop this year was not quite as heavy as usual, but the quality was good and prices fair. About sixteen varieties are grown, but the standard commercial sorts are Downing and Pearl. The English varieties here are very susceptible to mildew. The lime and sulphur, in some cases, has helped to keep it in check, but not wholly so.

Strawberries.

We have now four acres of strawberries and about twelve varieties under test for next year. The crop was light this season owing to dry weather during the fruiting season. Brandywine, Williams and Glen Mary have been our most productive and profitable varieties.

SOUTH WESTERN FRUIT EXPERIMENT STATION.

J. L. Hilborn, Leamington.

The season of 1910 was a very favorable one in most respects for this district. The chief exception being an unusually severe hailstorm on August 10th, which did great damage in some sections, and as this station was in the midst of the affected district it got its full share.

Up to the date of this storm the season gave promise of being one of the best ever known here, for most crops. As the storm was the most severe ever witnessed by anyone whom I have heard express an opinion on it, much damage was done in the small area where its force was most severe.

In the winter of 1909 and 1910 we had a good fall of snow early in the season, which was well distributed, and kept the land well covered through the winter, as a result of which fruit bushes and trees came through the winter in excellent condition.

The month of March was unusually bright and warm, so much so that the fruit buds, particularly on the peach trees were much swollen before any one was ready for spraying.

As the San Jose scale has become quite troublesome here, all fruit growers worthy of the name spray regularly every spring for that pest. As I was not well satisfied with the Commercial brand of lime sulphur used in 1909, I resolved to do my own manufacturing in 1910, but before any spraying materials could be secured the fruit buds on the peach trees had become quite large, so much so that I feared it was too late for the control of the curl leaf. However we made a rush at it as soon as material could be secured, and as the Elberta is so readily affected by the curl, we sprayed these first, and gave them a thorough application, with the result that the curl was completely controlled on these and all other trees on the Station farm, except in a few cases where the work was not as thoroughly done as it should have been, owing to the necessity for haste on account of the buds developing so early. Results of the past season were such as to add more proof (if that was necessary) to what I have claimed each year, that, the home boiled lime sulphur wash, the commercial solution or the vitriol solution, will entirely control the curl leaf, if it is thoroughly applied and done in time, say before April 10th in ordinary seasons.

Peach trees of nearly all varieties that were old enough to bear, produced a full crop this season, but in this immediate vicinity the fruit was quite badly marked by hail, and about the time that the first good varieties were preparing to ripen, we had a severe wind and rain storm which so swayed the trees that much of the fruit was again bruised, and as the weather continued damp and warm much of this fruit rotted on the trees before it was ripe enough to harvest. This happened with New Prolific, Engol, Kalamazoo and other of our very best varieties that were never known to rot before. About the time these varieties were all off the weather became cooler and fine, and later varieties ripened up in fine shape, but the quantity was not as good as in former seasons.

At this station we have one block of peaches of some two acres planted to Golden Drop and Banner, with a few Engol and Kalamazoo. This block was planted in 1904, 15 by 18 feet apart, and has produced a full crop in each of the last three years. It has been headed back and thinned each season since planting and given good cultivation. The last two seasons much thinning of the fruit was necessary, especially of the Golden Drop, which was about one-half removed, but when harvesting the crop we decided that it would have been better had more been removed when thinning.

A view from the lower ridge east of Grimsby Park, Niagara district.

Still about 70 per cent of the Golden Drop (which is smallest of any) were large enough that three rows would fill the ordinary eleven quart basket. We secured this size, in spite of the fact that the branches of the trees meet either way in the rows, and that we had a very severe drouth through July which was not broken until August 10th. A good, thrifty growth was maintained through this severe drouth by stirring the soil about three times per week. As the straw mulch which we apply beneath the trees for winter protection, etc., covers about 30 per cent of the area, and this directly about the trees, all of the soil not covered by this mulch is easily and quickly stirred with our orchard implements.

It was very noticeable, however, that wherever a tree has failed and had been removed, those about this blank showed extra vigor and fruit was larger. As these trees had produced a heavy crop three years in succession, and well repaid their cost, we decided to practise some thinning; therefore we went over about 70 per cent of this block, after the crop was off, and removed each alternate tree in each alternate row. This was done by first cutting off the branches then by using a good team assisted a little by a man with a spade, the stumps were entirely removed, which will give the surrounding trees more root space. The alternate tree in the remaining full row as well as the 30 per cent of orchard which was left in one corner without thinning will be pruned more severely than the rest by dehorning a portion of each tree. By continuing this method for several seasons, we hope to be able to judge which is better, to remove alternate trees when too thick or thin by dehorning. So far as I can judge, from my own experience, an orchard planted at this distance and thinned out by either method, when it becomes necessary, would yield much more fruit than one planted wide enough apart that the trees will have room enough when they are fully developed.

Another block containing some two hundred trees (Banners) planted in 1907, sown to hairy vetch in 1908, which grew to a great size by late May, 1909, when it was plowed under, and this gave an immense start to the trees, and this season they produced three to five baskets each, of the largest and finest peaches I have seen of this variety, and again made a good growth. These trees are planted 16 by 18 feet apart, and some of the branches are meeting in the narrower spaces, although they have been cut back about one-third of the growth each season. This orchard was started with rather small No. 2 trees, and made only a moderate growth the first two seasons. The greater portion of the peach trees planted for variety test are growing well and some of them have borne a little, but have not fruited enough yet to report on. I have about forty trees of a new variety budded from a seedling grown in a Leamington garden. These trees are now three years, and they produced a small quantity of the finest peaches that I saw this season. This variety will be watched with great interest.

Of the thoroughly tested sorts, I would name the following as the best seven varieties: New Prolific, Engol, Kalamazoo, Elberta, Banner, Golden Drop, and Lemon. This applies to our sandy soil. Back from the lake where the soil is heavier, I would add to this list St. John, Garfield, and some others of the Crawford type.

I shall continue to mulch all peach trees with straw, or other coarse material, and several of my neighbors are now adopting that method. We have about thirty peach trees which were budded on plum roots that are growing fairly well. These are left without mulch, to test this hardiness should we get another severe winter. Peaches are again being quite largely planted in this county.

Plums.

Eighteen varieties of plums were planted in 1907 for experiment. Only two or three varieties have shown any fruit yet, and only one sort, Shiro, has shown enough to report on. This variety had considerable fruit on it last season, and this year again each tree produced about six quarts of medium-sized, nice-looking plums of fair quality; bright yellow.

The old orchard of Burbank plums on the Station Farm bore a light crop of very large, fine fruit, but as it was just beginning to ripen when the hail storm arrived, and the greater portion of the fruit was destroyed. Very few plums are grown in this county—not nearly enough to supply local demand.

Blackberries.

The varieties of blackberries reported on last season were all fruited again this season. The Mersereau was far ahead of all others this season as well as last year. Judging from these two seasons it is the blackberry of all others to plant here, being hardy, free from rust, of good size and more capable of resisting drouth than any variety yet tested here. We had about two acres of this sort in bearing this season. It is less affected by drouth than any blackberry I have ever grown.

Raspberries.

Raspberries are but little grown in this County. For the past few years growers have ceased to cultivate them on account of the difficulty of securing pickers to harvest the crop.

The few grown at the station for variety test bore a heavy crop again in 1910. They are mostly of the black varieties. Kansas did best of any again this season, followed by Hilborn, Galt, and Palmer. Columbia again produced a large crop of purple fruit of peculiar flavor, much admired by some and disliked by others.

Currants.

To my mind the production of currants has been much neglected for quite a number of years through this district, as a result of which this fruit is now much in demand, and not enough of it is produced to nearly supply local demand.

About a dozen varieties are being tested by me, most of which have borne more or less for several years. Some of the newer ones have only shown what they can do the one season. Prominent among these is the Perfection, which produced the heaviest crop of fine large red currants that I have ever seen on young bushes. If it will continue to thrive and bear like it did this season, it will eclipse all other sorts on this soil.

Chatauqua, Wilder, Fays, and Cherry all produced excellent crops of fine large fruit. LaVersailles produces a good crop of fine fruit, but the bush breaks down so badly that I would not care to grow it for market. Prince Albert gave a good yield on young bushes, but the fruit is not so large as most of the sorts named, it was latest of any this season, and should be valuable where a late sort is wanted.

Judging from experiment with red currants for the few seasons I have grown them, I consider that a plantation of the better varieties of red currants should be very profitable here, and in order to test and demonstrate it more fully, I intend planting out several hundred bushes to be tested in a commercial way, as this crop has been entirely abandoned by practically all growers in this vicinity.

White Grape gave a very heavy crop again this season of medium-sized fruit of excellent quality.

Of the black currants, Naples produced the heaviest yield this season. Victoria produced a fair crop of large fruit. Champion was rather small this season, and latest of all to ripen.

Gooseberries.

Several varieties of English gooseberries are being tested here, but the plants were in very bad shape when received from the nursery in 1907, and many of them failed to grow. Those that grew have borne well in the past two seasons. The variety called Keepsake has outgrown all others, and bears a heavy crop each year of very large, fine fruit. This variety was by far the largest crop as well as the largest fruit of any. Whitesmith came next, followed by Industry. The bushes are sprayed every spring with the lime sulphur wash, and as yet have not suffered from mildew.

Very few gooseberries have been planted for several years in this county. There is quite a demand for the fruit in all markets now, and I think of planting several hundred bushes in order to test them in a commercial way, as it would appear from results with the few bushes in experiment that it would pay to grow this fruit in a commercial way.

Vegetables.

About the usual quantity of early vegetables were started again in 1910 at this Station, but the season was rather a precarious one, and while the total results were fairly satisfactory, they were hardly up to the average of previous years, which is accounted for by the fact that the hailstorm of August 10th was very severe in this immediate vicinity.

No lettuce was grown last winter at this station, as our main greenhouse was entirely planted to carnations, which were not removed until the end of March, when the house was planted to cucumbers.

As many who are growing vegetables under glass think they would like to grow carnations, I think best to sound a note of warning, as, judging from one season's experience, I would say: "Stick to the vegetables, unless you are going into a general florist business." While I had an excellent crop of carnations, even better than I had hoped to grow, I found that they required much time and care during August and September when we were very busy harvesting peaches.

Another difficulty was that while a fruit and vegetable grower may have an excellent market established for these crops, he is compelled to seek other markets for the flowers, and I found that one growing only carnations has not the same chance to secure good prices as has the florist who has a full line of other flowers, and has more or less of an established market for such crops.

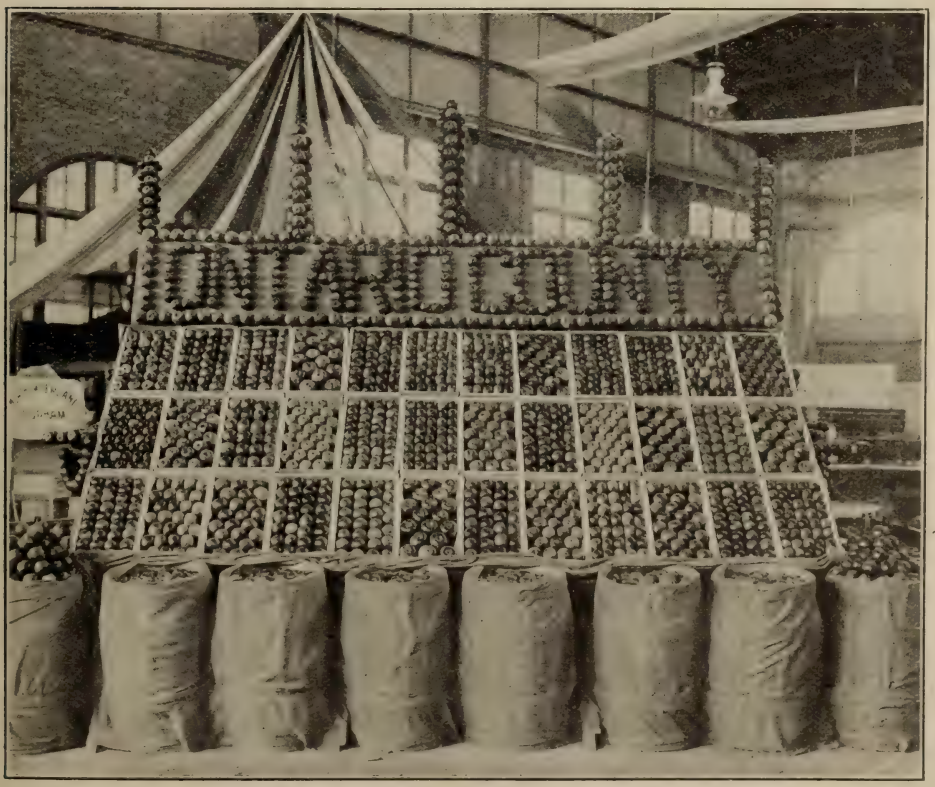
As it was found that carnation growing did not fit in well with our other crops, we decided to abandon it, and are growing lettuce again this winter.

Cucumbers.

As usual, all our space under glass, about 11,000 feet, was planted to cucumbers just as soon as it could be cleared of tomatoe, melon and pepper plants, which were grown for early fruiting in the field.

The cucumbers grown under glass are mostly set one plant in a place, about thirty inches apart in the row and trained upon a wire trellis, side branches are pinched off beyond the third leaf, except in some cases, where there is room, one branch is allowed to grow.

An attractive exhibit of boxed apples at the Ontario Horticultural Exhibition. 1910.



Well packed boxes from Ontario County, Ontario Horticultural Exhibition, 1910.

We seldom fail to secure a good crop, but to do so it is important to make the soil rich and to supply a liberal quantity of water after they begin setting fruit. We had a good crop again this season, for which we found a ready market.

As the last half of the month of May and first half of June were so cold and bad for the production of cucumber plants, and those planted in the open early in the season throughout Western Ontario were mostly lost, I made a second planting much later, and grew about one-half acre outside in a warm location. These were kept well watered during fruiting time and produced a good crop.

In order to produce a good crop of cucumbers outside, early enough to sell by the basket, it is important to have an early location well protected from the wind. I realized this a number of years ago, and erected a tight board fence eight feet high to the north and west, as there is a chestnut grove on the east, and the land has a little slope to the south. I have about an acre in this location that is well suited for producing early crops of this sort.

Water is supplied from a 180-barrel tank, which is fed from a well, pumped by windmill when there is sufficient wind at other times by a gasoline engine.

Cabbage.

We grew somewhat over three acres of early cabbage the past season. The seeds were sown in flats in the greenhouse the latter half of February, were twice transplanted while under glass, and planted in the field April 11th to 13th, as the land was in good condition, and as good cultivation given (cultivated and hoed about twice a week) an excellent crop was secured.

The varieties used were Jersey, Wakefield (Burpee's Market Gardeners' strain) and Paris Market. We have been growing these two varieties for several seasons, but are inclined to favor the former. While the heads are smaller, and hardly so early, it is a much firmer head, and the plant is more hardy. While we were able to produce a good crop very early in the season, the crop did not sell well. As the weather was rather cool in June, both here and in the south, it favored the importing of cabbages so much that all the larger markets were filled to such an extent that prices ran very low, much of it hardly realizing anything to the grower; consequently our extra early crop did not sell as well as did that coming in two or more weeks later when the market got cleared up.

Tomatoes.

About six acres of early tomatoes were grown the past season with satisfactory results. We find it important to have good plants grown from a good strain of seed, as it frequently happens that the difference in returns from these causes amounts to upwards of $100 per acre. I have been selecting a strain of Earliana for a number of years, going over the field early in the season each year and selecting only from plants that show a good type of both foliage and fruit by selecting the best fruits from the best plants every year. I now have secured a good, even form of plant and fruit, and a little earlier than any other that I have tested.

A selection of the same variety from W. T. Macoun, C.E.F., Ottawa, appears equal to it, except for earliness. Excellent results were also obtained from seed secured from W. A. Burpee, called Sunnybrook Strain.

To secure good plants we sow the seed in flats in the greenhouse about March 1st, transplant three or four times, the last planting usually being made in cool frames, where they are given a space of six by six inches. Here they are given plenty of air for a week or so before removing to the field.

As soon as they are planted out they are treated to about one teaspoonful of nitrate of soda to each plant, cultivated and hoed every few days, and thereby stimulated to grow as rapidly as possible.

Musk Melons.

The melon crop met disaster at both ends of the season in 1910. As usual, we started a lot of seeds in the greenhouse during the later part of April, which grew splendidly until after the second transplanting, and until they were nearly ready for the field. Then we got a spell of very cold, wet weather, which destroyed nearly one-half our plants, and most of these were right under glass at the time. I had never seen plants perish as those did, but all growers shared the same fate, some losing much the greater number of their plants.

As many of the early plants were lost, later sowings had to be put in; but as the season was getting advanced by this time, those plants did not get sufficiently large to remove to the field until the end of June, and as a drouth set in at this time, they did not do as well as usual. All growers agreed that it was most difficult to get a stand of hothouse-grown melon plants this season.

On the other hand, seeds planted directly in the field late in May grew splendidly. In fact I never saw such thick, heavy growth of melon plants as we secured this season from seeds planted in the field, and they set a heavy crop of fruit which grew to a good size in spite of a severe drouth all through July. We had begun to harvest a few melons from the earliest portion of the field in early August, when, on the 10th of that month a hailstorm descended with such severity that when it was over one could not find so much as one half of a melon leaf in the seven acres, which had looked so promising just before the storm.

The melons that were full grown and were about ready to ripen, continued to develop and ripened up rather rapidly, but the quality was not as good as it should have been. The later portions of the field were of no use, and the disc harrow was put on to fit the land for a fall cover crop. This hailstorm was severe only over a comparatively small territory. Where the storm was most severe great damage was done to the tobacco as well as other crops.

Our soil and climate is such that in ordinary seasons the musk melon crop is usually a satisfactory one to grow, and usually sells at satisfactory prices for good stock. It becomes more evident each season that the melons of best quality are what the market wants, and we as well as other growers are now growing many more of the better types than we did a few years ago. Such varieties as Osage, Hoodoo, Rocky Ford, Fordhook, etc., are being largely grown now, and are proving the most satisfactory to producer and consumer.

Asparagus.

Of the three acres of asparagus, all but one-half acre was in bearing this season. The plants produced a heavy crop of seed in the fall of 1909. The following spring did not seem favorable to its growth, and only a moderate crop was harvested. As the crop was generally light all over the country, the price was good, but hardly sufficient to make the crop as profitable as I had expected. However, the plantation is too young yet to produce a full crop, and as the plants were in much better condition at the end of the past growing season we look for a better crop next year.

Peppers.

About half an acre of large sweet peppers are grown each season, and usually pay fairly well. This season they were just beginning to pick well when the hail storm caught them. This completely destroyed all fruit that had attained much size, and also battered the plants to quite an extent.

As the storm thoroughly soaked the land, which was previously very dry, a good cultivation was given as soon as the land was in condition, and the plants branched out and put on a very heavy crop of fruit, and as we had no killing frost until October 29th, a goodly portion of it was marketed.

To secure best results with peppers it is necessary to start the seeds quite early in March, giving plenty of heat to start the seeds well. We usually transplant twice while under the glass, and remove to a warm location in the field as soon as danger of frost is over. If given a rich soil and good culture they seldom fail to produce a good crop.

VEGETABLES.

E. E. Adams, Leamington.

I have to report that seed selection has been made again in tomatoes, peppers, canteloupes and potatoes with some progress. Starting at this work in 1909, and making selections from the products of that year, and re-selecting again this season will, I think, give us a fair start for assisting in producing more uniformly better stock than the common quality. In potatoes I find some improvement in form already, and have hopes of considerable improvement in the future. In canteloupes, I find even after one selection that there is a decided improvement in the netting which goes to make for quality and flavor, as I find melons that are well netted are usually the finest in quality. The selection for seeds as made this year should show a decided advance for another season as the fruits were taken from individual plants of advanced type, that is, from small plants of good vigor, and were very heavy, thick-fleshed and well netted and of good quality and flavor.

Peppers as yet do not show any improvement, although individual plants are taken as types and seed from these plants carefully selected and grown for plants in the spring; all weak plants are thrown out, leaving only the stronger to go to the field. What is wanted is smoother and better shaped peppers and, if possible, more productive types.

Tomatoes are improving somewhat in shape and in productiveness. Earliana has been selected on my farm for some time, and we now have a type that is a very great advance on the earlier production. The present type is a very good sized tomato, smooth, and rough fruit almost none. This tomato has proven the best money maker on the soils in South Essex of any that are now on the market. We even find it very good for green house use, producing very good fruits and in abundance.

Other tomatoes under selection are Chalk's Jewel, Stone, Earliest of All, and Wealthy. The Wealthy has been selected for three years, and we now have a nice, smooth tomato, much superior to the first planting, with very few rough.

Considering that this work has only been commenced and that in some items an advance has been made, and with care in selection I hope to report next season a considerable improvement in all the stocks under test.

ST. LAWRENCE EXPERIMENT STATION.

HAROLD JONES, MAITLAND.

The season of 1910 has been very even in temperature and favorable for fruit trees along the valley of the St. Lawrence.

The winter passed without high winds, with a fair covering of snow; the thermometer falling to 20 below on two days, Feb. 7, 11, which only lasted a few hours in each case.

Spring opened on March 28th with ploughing commenced.

Exhibit of apples from Demonstration Orchards in charge of Fruit Branch, Ontario Horticultural Exhibition, 1910.

April followed dry and cool, which was favorable for grain seeding and cultivation of the soil, but held fruit buds dormant and protected to large extent from frost injury.

Fruit buds swelled and burst on April 22nd, when cool weather held them just at this stage until May 19th, when apple trees were in full bloom, with lowest temperature recorded during bloom of 42 degrees. Blossoms fertilized well and gave a full setting of fruit. The June drop was severe in some cases, but resulted in a crop of better quality, and relieved one of the necessity of thinning.

The fruit matured rapidly and was ready for harvesting a week earlier than normal. The trees have gone into the winter in good condition, with well ripened wood and healthy appearance.

INSECTS AND FUNGI.

Insects were fairly numerous. On April 22nd the leaf buds were swelling and a few burst open. At this date I sprayed with lime sulphur (concentrate

lime sulphur) reduced 10-1 for oyster-bark louse and green aphis, which gave good results, removing or destroying a very large percentage of bark louse, and entirely cleaning the buds of aphis.

Blister-mite is giving no trouble as yet on apple trees in this section.

May 26-28—Sprayed lime sulphur, 30-1, just after blossoms fell.

June 27-29—Sprayed lime sulphur, 30-1, for spot fungi.

Examination by actual count on July 29—Sprayed Fameuse, 80 per cent. clean. 4 per cent. Codlin Moth. 8 per cent. Spot.

Unsprayed Fameuse—20 per cent. clean, 8 per cent. Spot and Codlin Moth. 72 per cent. Spot.

Sprayed fruit grew to normal and large size with high color. Unsprayed were undersized, poor color, and there was a heavy drop before harvest.

Cultivation and Fertilizers.

A great many reports have appeared in the press during the past season about climatic conditions, insect pests, debility of trees, etc., causing the serious shrinkage in the fruit crop this year. This is no new thing, but is only becoming more noticeable with the extension of our markets and increased demand at home.

For years I have been considering this matter and watching results under varied conditions, such as I am able to obtain here at home and elsewhere.

Do we realize that we are starving our orchards? What farmer among us would think of growing wheat in a field for twenty years in succession without manure? What would be said of one who attempted, not only that, but also at the same time tried to secure a catch crop from the same land.

Yet hundreds of farmers are every year attempting just such a short-sighted policy. They try to grow apples and grain or hay on the same land.

It has been estimated by eminent chemists that the plant food carried away from an acre of bearing apple orchard in fruit sold, and leaves blown away would be worth at commercial rates $207.45 in twenty years, or over $10 worth a year.

Against this a fifteen bushel crop of wheat would remove in twenty years only $128.23 worth of plant food, or between $6 and $7 worth per year.

A bearing orchard makes annual demands upon the soil almost as heavy as a 25-bushel crop of wheat, not allowing anything for the yearly growth of wood.

Remember, too, that an orchard makes no return of roots and stubble to keep up the physical condition of the soil; nothing but a few leaves and the seeds of some waste apples.

Yet, when an orchard has borne a crop of fruit, and perhaps had a crop of hay or grain removed the same season, we wonder why it should need a rest for a year or more.

Bear in mind that a cropped orchard not only suffers a double demand on its fertility, but the sown crop is almost certain to deprive the trees of moisture, particularly in the early part of the season, when an extra supply of it is most needed.

A good orchard, well attended, is the most profitable branch of the average farm. It should be liberally fertilized and cultivated (if possible) in the early part of the season. It pays handsomely to do it. Do not starve the goose that lays the golden egg. From a careful record of sales made from the product of four acres of Fameuse planted in 1881 dated from 1894 to 1903, a period of nine years, I received an average net return of $800 per annum, after paying all expenses of picking, packing and commission of sales, except cost of barrels.

Since 1903, when the severe freezing of that winter killed 68 trees and severely injured many others, my gross returns per year have been: 1904, $298.45;

1905, $651.86; 1906, $208.70; 1907, $949.45; 1908, $964.22; 1909, $580.40; 1910, $1,048.95 (not completed); or an average gross return of $671 for the seven years. These returns have been obtained by fertilizing regularly with cultivation and cover crops.

I have some trees that have been under clean cultivation since 1896 *without manure,* and although they made good growth in wood until bearing age, they now show a tendency to short and feeble growth in the terminal wood with fruit undersized, poor color, and lack of maturity, but a good setting of fruit.

In the same soil in sod pasture, I find poor terminal growth, less than one-fourth crop, undersized but good color. The same soil in sod, trees mulched with sawdust, barnyard manure and waste corn stalks, I find a medium crop of high color, that grades well, but too many undersized.

The same soil cultivated from early spring to June 15th or 20th, with an annual application of barnyard manure during the winter with wood ashes or muriate of potash, and growing a cover crop of clover, or even weeds, gives a full crop of fine fruit that grades 80 per cent. to 90 per cent. clean, with high color, and good to large size.

My results show that for the St. Lawrence valley the most profitable procedure to follow is to use barnyard manure at the rate of one load to 12 or 15 trees annually, spread on the snow in winter with shallow plowing and cultivation in the spring, until the 1st or 15th June, allowing the growing after this date of cover crops.

The next best results are by clean cultivation to the early part of June. Then a heavy seeding of clover with muriate of potash.

Apples.

The crop of apples in the experimental orchard was uneven. The appearance of the orchard is patchy, owing to many varieties being planted that were not suited to this climate, and are now dead or dying. However, a number are making fair progress and showing good points. Alexander maintains its reputation for vigor and hardiness, but too large a percentage of the fruit rots on the tree, making it hard to handle and cutting down the yield. Arabka, a hardy, vigorous grower, coming into bearing early, not of as good quality as the Duchess, season the same.

Baxter is fairly well loaded every year, but never a heavy crop, a handsome fruit that sells well at top prices, subject to sun-scald and canker, which weakens the trees.

Blue Pearmain, a very hardy, vigorous tree, slow to come into bearing, but gives good crops of high class fruit that commands good prices in January and February, keeps in ordinary cellars into March; a desirable winter apple.

Gano gave a fair crop of high colored fruit trees showing sun-scald and canker; probably short lived like Ben Davis in this section.

Gravenstein, top grafted, 1902. The first crop harvested this year; five apples, well grown and colored.

King. Top graft, 1905; crop twelve apples, well grown and colored.

Longfield is not desirable for the St. Lawrence Valley. The trees are very hardy, but a slow grower on account of its heavy fruiting quality. The fruit is small, more like a crab apple—too small for peeling and of poor quality. Unless heavily thinned it is not worth growing. Practically unsalable in the open market. This variety has been boomed by tree agents and sold in fairly large lots, representing the variety as a late winter of first-class quality. Work like this does more to discourage the fruit industry than any other thing. The stock can be suc-

cessfully grafted to desirable varieties suitable to the district, which would largely overcome the harm already done.

Mann is another variety boomed by agents and has led to much disappointment. The tree sun-scalds and blights, and dies at an early age.

Milwaukee continues to maintain its reputation as a business tree. It comes into bearing early, and the fruit commands fair to good prices and is in demand as a cooker all through January and February. The tree is a rather slow grower and will top graft successfully on Longfield without outgrowing the stock.

Milding has now given several crops of large attractive fruit that keeps well into February; a promising variety that is well worth further trial. Tree vigorous and hardy, coming into bearing at about ten years of age. Fruit oblate, 3½ inches across the core; skin bright yellow splashed and streaked with bright red; flesh light yellow, tender, breaking, juicy, flavor, brisk subacid, good.

Parlin Beauty, another apple of bright promise, tree vigorous, healthy, hardy, and promises to be a good bearer. Fruit large, 3 in. to 3½ in., oblate, skin bright yellow, almost entirely covered with bright crimson dots partly obscure, numerous; flesh white, juicy, mild, subacid, with an aroma; core very small. A very attractive apple and well worth an extended trial.

Wolf River is a hardy, vigorous tree of spreading habit, giving a fair crop of large to very large handsome apples; keeps longer than Alexander, and does not rot on the tree to any extent. It sells well on the market; a good show apple for decorating shop windows.

With our standard varieties of world-wide reputation, such as Fameuse, McIntosh, Scarlet Pippin, the intending planter will do well to carefully consider the merits of any other varieties before planting. Our study for a long time has been to grow a late winter apple with profit. We certainly can grow a long-keeper, such as Canada Red, Golden Russett, or Bellflower; but the light crops and some years only partly matured fruit places these varieties in the black list as unprofitable.

If in conducting variety tests in the station work we can find a hardy tree for our climate bearing paying crops of late winter fruit that will keep into April, with good size, color and quality, we would then have something that would rank with our Fameuse and McIntosh as money-makers.

Cherries.

There was a medium to full crop of cherries. Montmorency produced a full crop of well-matured fruit. This is the best of all the varieties, and has given an annual crop for years past. English Morello comes second in yield, fruit of good size; tree and bud are proving quite hardy, and can be counted on to give an annual crop.

Early Richmond has not done so well with me as the two above, and the fruit is more apt to be attacked by birds.

Orel. The fruit is too small and too sour when compared with Montmorency. The trees also are showing weakness, and are dying off slowly.

Ostheim has never been a success with me. The bloom has been injured several times when Morello and Montmorency have escaped. A very shy bearer, and fruit small. I cannot recommend planting this variety.

Olivet is tender in wood and bud, and is not suitable for this climate.

Pears.

Flemish Beauty and Ritson produced fair crops of fruit.

Flemish Beauty in cultivated orchard are all dead. One tree planted in sod appears quite healthy and bears every year.

Ritson are breaking to pieces, and are almost dead; apparently not as hardy as Flemish.

The Russian varieties that are living are worthless. They bear some fruit, but it decays on tree before reaching maturity.

Plums.

Glass Seedling, thirteen years old, produced the first crop of plums in their history. The blossom bud came through the favorable winter without injury, and on three trees I secured five gallons of well-grown fruit.

Dunlop Seedling No. 53 (two trees), also gave a nice crop of six gallons. These trees are just coming to bearing age, and may prove of great value to the St. Lawrence Valley.

The Americana plums set two years next spring had a few blossoms this year, but did not set fruit to any extent.

Hammer, a variety that has borne annually for ten years or more, broke down and died this summer.

Cluny gave a scattered crop.

From present appearances the collection of Americanas planted in the springs of 1908 and 1909 will produce a group of value to this section; several of them show splendid vigor and hardiness.

Strawberries.

Plots came through in excellent condition, and the crop was all that could be desired in everything except length of season. Prices were good right through the season.

Wm. Belt and Williams were the leaders. Wm. Belt, with its fan-shaped berries and excellent quality, commands a top price. Williams for the local market can be easly harvested fully ripe and free from the green tip that is characteristic of the variety. Three W's is another successful variety, and should be given a place in every bed.

Woolverton is a handsome berry and good cropper, but its mild, almost milk-like flavor, is not popular, and is better left out of the varieties for market.

Mrs. Miller has done wonderfully well with me, giving better crops, of large, bright red berries, flattened at the tip like Three W's, than many of the so-called best.

Climax is another good berry. Plant healthy and vigorous, did very well.

Sample and Splendid have not been quite up to the mark, but have given fair crops.

Tennessee Prolific has always done well with me, and is a desirable variety to plant.

Warfield is often a disappointment. It did well this year, but a drouth at picking time will ruin the crop.

For a profitable plantation the following grouping will insure a crop almost any year: Tennessee Prolific, Miller, Three W's, Williams, Wm. Belt, Saunders.

The early varieties hardly ever produce a profitable crop for the land occupied, with the possible exception of Haverland. Tennessee Prolific and Wm. Belt are only a day or two behind, and carry their pickings well through the season.

Raspberries.

Herbert is proving perfectly hardy, and producing crops of well-grown, large-sized fruit. It is a vigorous grower, with large, healthy foliage, and produces well; a very desirable variety for this section, where we have been hunting for many years for a hardy cane.

All the varieties before tested have been tender and killed back more or less every winter, sometimes so badly as to destroy the whole crop.

Cuthbert in the past has been the most generally planted, but the uncertainty of its coming through the winter without injury has discouraged the planting. Herbert now overcomes this difficulty.

Older is the hardiest of the blackcaps, a handsome fruit and fairly prolific, but of a very sprawling habit. It makes quantities of tips and needs constant care to keep the row in line. Blackcaps have never been satisfactory, and practically none are grown here.

Currants.

Red Currants produced excellent crops of well grown fruit. Cherry holds its own against all comers, giving long bunches, well filled with large to very large berries. Bush moderately strong, but some trouble with breaking down under heavy snow.

Raby Castle is also a profitable currant, with long bunch well filled to the tip with medium to small berries. Bush strong and vigorous.

Fays is weaker in bush than Cherry and has not the vigor. Bunch short, sometimes only four or five fruits on it. Fruit large to very large, but has not been profitable.

Wilder and Prince Albert are too late in season to be desirable; foliage is too heavy and is very subject to aphis. The earlier ripening varieties hang to the bush well and give fruit of better quality all through the season.

White Grape is very prolific, but the fruit is not in demand on the market and has never been profitable.

Black Currants produced splendid crops this year. Victoria, Lee's Prolific and Champion have proved the best varieties so far.

Champion, a moderate grower, fruit large to very large, subacid, moderate yielder.

Lee's, fairly vigorous, fruit large, mild, subacid, a better yielder than Champion.

Victoria, strong grower, very vigorous, fruit large, brisk subacid and yields the largest crops of any variety on test and holds well to the bush.

Gooseberries.

Gooseberries gave a good crop of full-grown fruit. Golden Prolific is all around the best variety ever grown here; fruit large to very large; free from mildew, a strong grower and productive.

Champion, a strong, vigorous grower, very productive fruit about the same size as Downing, but easier harvested.

Downing, the old standby, produces well every year, apt to overbear and produce undersized fruit.

ALGOMA FRUIT EXPERIMENT STATION.

CHARLES YOUNG, RICHARD'S LANDING.

The winter of 1909-10 on the whole was favorable, being comparatively mild for this northern climate, March being particularly so. This month and April are the months during which we sustain the greatest damage to our young orchards by sun-scald. Bright, sunny days, followed by hard frost at night, are very trying on the vitality of young trees. The losses from sun-scald last spring were very light. May was a cold, disagreeable month, and vegetation made little progress until towards the end of the month. The bloom on most varieties was very fine, and the fruit set fairly well. June came in with dry weather, which continued all through the growing season. Perhaps this was the reason for the excessive drop which continued all through the summer, or it might be from the imperfect fertilization of the blossom. On the whole, however, early apples, with

A profitable strawberry patch.

the exception of Transparent, were a very fair crop, much better than might be expected, considering the heavy crop of the previous year. Winter fruit was not up to the average, and was what might be called very patchy, there being no uniformity about the crop—in some orchards a full crop, and in others almost nothing. The past season has caused me to somewhat modify my opinion of sod versus clean cultivation. Certainly those that were kept clean by surface cultivation had the best crop, the largest fruit, and the fewest culls. Field mice did little or no damage this year; it is only very occasionally that they are to be reckoned with as an orchard pest. Scab, notwithstanding the dry season, was more in evidence than I have ever seen it before; and I notice that where it was first seen a few years ago, it has been gradually getting worse, although some orchards are yet perfectly clear. In my own orchard, in the portion set apart principally for experimental purposes, scab has made little or no appearance yet, although most of the

trees are into bearing; while in the old orchard, planted twenty-eight years ago, it would be impossible to grow clean fruit without spraying, which has not been done on the never planted ground except for aphis. They are only about 100 yards apart, but the newer ground receives clean cultivation, while the old part is only plowed up and cultivated once in five years. Oyster-shell bark lice are still getting worse, and if not taken in hand will soon ruin many of the small orchards; but I am pleased to notice that a vigorous war has been started this year against this pest, with results depending entirely on the method and persistence of the remedy. Bark lice and sun-scald are our chief trouble in growing fruit in the north, but both are under our control if proper means are used. Just here on St. Joseph Island, where fruit growing is more of a specialty than in any other part of District No. 13, there is still much to be done, the difficulty being that there are only a few who go into fruit growing as a specialty; the others as a sort of a side line, and grow enough for themselves and a few barrels to sell. I am, however, pleased to notice that for the last few years much more attention and care, with corresponding results, have been evident in this part of Algoma. I know very little about the extreme ends. Looking at the map, and beginning at the county of Pontiac, in the Province of Quebec, in the east, going west and north to an undefined distance, there is evidently plenty of room for experimental purposes. Adaptability will take time to find out, but judging from enquiries I have received there is a growing interest at both ends, especially from the Rainy River and the Temiskaming Districts. The latter I know little about, but I can see no reason why the Rainy River country should not produce enough fruit for itself, and small bush fruit to export further west. It is true a start was made some years ago at Dryden and failed, but a most unsuitable piece of ground was chosen to begin with, and besides when any undertaking is begun with the expectation that it will turn out a failure it is quite likely to do so. Most enquirers state that they fear the extremely low temperature. "It sometimes gets 40 below zero," they say. Well, it has done that here on several occasions without any bad result so far as the apple crop is concerned, provided the wood has matured the previous fall, with plenty of snow on the ground, and an absence of wind. I recollect one winter several years ago when 42 below zero was reported, and for several days 30 degrees below, but there was a fine crop of apples the following season. But I notice what may not be so apparent in more favorable climates that there is a great difference in the individuality of the same varieties, as well as in the quality of the fruit. This has been especially noticeable to me in the Fameuse group, and I strongly advise all who want to ensure the best success to top graft with scions of proved hardiness and quality. Nor is this all that is necessary; the stock should be also hardy. This may be done by raising seedlings from the very hardiest apples, preferably from a hybrid crab. Cultivate them well the first season, and then select the strongest for root grafting. Head the trees low, say not more than two feet for upright growing varieties. I cannot say that I have always succeeded in top grafting on an old crab stock; only sometimes a perfect union is made, but the scion outgrows the stock. Never use the water sprouts for scions, as the wood is usually not fully matured, and an inclination to sprout will be evinced by the top if it does grow.

Now to sum up. Much depends upon the man. The fruit grower in the north: What is he? and What should he be? The fruit grower of the present is often a failure. Why? He knows little about his business. He intends to learn when going through his successful neighbor's orchard, but he has other things to attend to, and so puts it off until his trees are dead or may just as well be so.

Then he consoles himself by saying that he planted them well. (So he did), but he found out that his ground was not suitable, or that the nurseryman cheated him. Nothing of the sort. It was the man himself, and not the ground or the trees. The successful grower must first have a liking for his work, he must keep his eyes open to what his neighbor is doing successfully in order to succeed himself, he must understand something about the laws of nature, he will study the sciences that underlie his business, he will study his soil, he will have a knowledge of insects and fungus growths, he will know what varieties are suited to his soil, climate and market; he will be honest in his dealings. I know of such men, and they are successful. In regard to our market, this and adjoining portions of the mainland are exporting to nearby local markets many times the quantity of fruit they did a few years ago. We are always expecting to glut the market, beginning with strawberries and ending with fall apples, but somehow the appetite is keeping up with the production. For late winter apples we have nothing to compare with the Ontario-grown Spy. I am hoping that some just coming into bearing may partly at least fill the bill. Consumers are always willing to pay fifty cents a barrel more for local-grown fruit. They say the quality is better, and they ought to know.

There is a bright outlook for fruit growing through this section, and more are making a specialty of this branch of agriculture.

Apples. The apple crop this year was fairly good, except winter fruit, which was light. Charlamoff, one of the hardiest apples grown, has taken an off year. This apple has a short keeping season, but the market wants more of them.

Transparent: Not quite a full crop, and small.

Wealthy: Our old standby, good as usual, but dropped badly from the trees this year.

St. Lawrence: Good; does not bear quite enough fruit to be profitable as some others. St. Lawrence can scarcely be called a winter apple.

Peach: Profitable to grow here; hardy; quality good in its season.

Longfield: This apple has been too extensively advertised. It is hardy, fruits quite young; of fair quality; rusts badly after being sprayed with Bordeaux; fruit too small to suit the market; inclined to overbear; needs thinning.

Alexander and Wolf River may both be classed together. Inclined to overbear, then takes a few years to rest.

Duchess: Always good, the most profitable apple grown.

North Star: Follows the Duchess, and nearly as good.

Astrachan: Good, enquired after.

Liveland: Early September, hardy, good, productive.

Low: Early, productive, resembles the Duchess, bears every year, fruit rots badly, hardy.

Gipsy Girl: Quality medium, fruit large, hardy.

Red Annis: Quality medium, productive, hardy.

Brockville Beauty: Quality good, productive, hardy.

Gideon: Quality medium, productive, hardy.

Peter: Quality good, productive; resembles the Wealthy, but larger, and better color, keeps longer; very desirable.

McMahon: Quality medium, productive, hardy.

Shiawassee: Good, very productive, hardy, desirable.

Snow: Very good, medium, hardy, productive.

Louise: Good, medium hardy.

La Victoire: Good, hardy, productive.

McIntosh: Very desirable every way; is being extensively planted; fruit clean where grown here so far. This apple is more sought after than any other. Cannot begin to meet the demand.

Milwaukee: Not fully tested yet; cooking good, dessert poor, very hardy, winter.

Hibernal: Very hardy, only fit for cooking.

Winter Arabka: Quality poor, cooking fair, large, hardy.

Scott Winter: Quality fair, not productive enough, medium hardy, fruit too small, winter.

Baxter: Quality good, medium hardy, not fully tested.

Gano: Quality poor, no use here.

Black Ben: Quality poor, productive, hardy, keeps to spring.

Tolman: Quality good for those who want a sweet apple; this apple has been recommended as a stock for top grafting, but it is too tender here; not desirable for the far north.

These are some I can speak of with any certainty about. There are perhaps twenty others that have been recommended to me, which I am growing as top grafts, some of which fruited this year; but I prefer to say nothing about them yet. In past years we have depended on Wallbridge, Pewaukee, and Scott's Winter for late keeping, but none of these are satisfactory. Others not fully tried will, I think, turn out more satisfactory. Winter apples have never paid us anything like summer and fall fruit, and winter apples will have to be brought from the East for some time yet. I have tried to grow Spy, but with very poor success, and am pretty safe in saying that a Spy apple was never grown in Algoma. I have fruited Ontario, but the tree is too tender here. However, I am trying them again.

Pears. Pears have never been a success here. A few under exceptional conditions have done fairly well, but it is useless to grow them commercially. Top and trunk are both too tender down to the snow line. I had some promising trees up to the winter of 1893 and 1894, but that was too much for them. Nearly all started above the ground again, and this year had a little fruit of poor appearance. The Russians are quite hardy this year. Berrimankie had a very fine crop of large fruit and of a better quality than in previous years, but the keeping quality was no better; it begins to rot at the core before it is quite ripe; it is of no use for the market. I have several others supposed to be Russian not fruited yet, which are said to be of a better quality. Flemish Beauty and Idaho seem to be more hardy than the others I have; had the best success on rather heavy clay loam. I am trying to grow them more in bush form, with the top springing directly from the surface of the ground. A profitable market for Ontario-grown pears can be had here. It is mostly California fruit that is sold, of good appearance but inferior quality.

Cherries. Were a fair crop; not quite as good as in former years, which may be accounted for by a three-days' rain while in bloom. While the demand is limited, there has never been enough grown to meet that demand. Sweet cherries are a complete failure, and there is no use trying to grow them. Even the Dukes are too tender, and only the Morello should be grown, and then not far away from the influence of a large body of water. Further back only the old Canadian can be depended on, which in appearance and quality is but a little behind the Richmond. The trees are short lived, but have a habit of reproducing by suckers from the root. The best way to grow them is to let them have a place entirely to themselves, and thin out occasionally when they get too thick.

Burbank Plums.

Sweet Cherries in bloom, St. Catharines.

Plums. This fruit with me has been both a success and a failure. Japan plums made a splendid growth until into bearing, when they began to die one after another, perhaps owing to the season to some extent. They were all on the peach root, which is I think a mistake when planted here. Another lot on the wild plum stock, Glass Seedling and Lombard, have all done well, and fruited for several years. Glass, although not what might be called a heavy bearer, has been very satisfactory. Pond's Seedling fruited this year. We have also a large and perfectly hardy Lombard inclined to overbear, needs thinning. Native Yellow of good quality, hardy, prolific and evidently of European origin, but which evidently escaped from cultivation and became acclimatized. An excellent plum, perhaps a little sweet for cooking, but good to eat out of hand. This plum is being propagated. I would like to know just what it is. Americanas are hardy enough, but they have several faults. The top is very brittle, and you are apt to lose half the top when loaded with fruit. The skin is thick and tough. Most of them are too late in ripening, and the color is against them in the market. So far I would prefer Glass to any of them. Those I planted were on the plum stock. Plums have been so near a success that during the last three or four years I have been getting from different sources a large variety. These have nearly all come to me without any name; some came by number. Several have fruited, and so far promise better than anything I have had. They are all vigorous and healthy, with dark green foliage, large size; quality not quite as good as the best European, about equal to the Japans. It will be interesting to watch them as they come into bearing. Last spring I received from the Central Experimental Farm, Ottawa, the following: 1 Mankato, 2 Brackett, 1 Consul, 1 Fitzroy, 1 Tenny, 1 Omaha, 1 Gloria, 1 Oyama, 1 Don, 1 Swift, 1 Bixby. All are living, but made little growth, owing perhaps to the very dry summer.

Grapes. As my object principally was to find what varieties were hardy and suited to the soil and climate, perhaps I have not paid sufficient attention to this fruit. Last fall I pruned, laid down and carefully covered up the vines. Result, a fine crop of fruit, large in the bunch and individual berry, and of a much better quality than formerly. Delaware and Campbell's Early were especially fine. Other varieties colored up nicely, but were inferior to eat. With a little care and winter protection in a favorable season I would not be afraid to compete with Southern-grown grapes at the price they are on the market here. Green Mountain was especially good. Concord ripened, but was not quite up in quality, although better than usually put on the market here. There is too much immature fruit sent West, which naturally lessens the demand.

Raspberries. Cuthbert was a failure again this year. I have never had but one good crop. I notice they do best with a full northern exposure. Perhaps that helps to ripen the wood better in the fall. Brinkles Orange, which I have always recommended as the best berry for home use, but too soft to ship, I discarded last spring. A few canes were overlooked, which bore such a fine crop that I intend to try them again. Herbert, of which I received twelve plants for experiment last spring, I have never fruited. Marlboro and Louden did well as usual, not much demand for this fruit here. The wild fruit is plentiful.

Currants. Both red and black currants as usual were a fine crop, and taking the labor into consideration, equal to strawberries. The large berries take the eye on the market, but I do not say that they are more profitable to the grower. The demand for white is limited. So far there has not been enough grown to fill the demand, but they are being more extensively planted. A strong, retentive soil, plenty of manure, and frequent renewal of the bearing wood meet about all their

requirements. A moderately heavy clay soil with a full northern exposure is desirable.

GOOSEBERRIES. Were as usual a very fine crop. Eleven varieties tested for the first few years. Pearl rather out-yielded any of the others. Since then Golden Prolific and Champion have been ahead of any of the others, Red Jacket coming in third, followed by Industry and Pearl. I have grown gooseberries for over twenty years here, and only once have I seen the English berry affected with mildew, and then it was only on the leaf. I have never grown enough, the difficulty is getting pickers to handle them.

STRAWBERRIES are the crop we expect to take most money from. They are grown quite extensively here, and the market is fairly supplied with fresh fruit. I am not prepared to particularly recommend any one variety, as much depends on the soil and season, but the demand here is for a large berry, clean and fresh. The old Wilson would be thought too small, and would not sell like the Glen Mary. The early crop last season suffered somewhat from dry weather. After the rain the crop was good, but not up to some previous years. I do not cover in the fall, but find it necessary to use a fine tooth cultivator between the rows twice in the spring to loosen the surface and conserve the moisture. Formerly only one crop was taken off and the ground plowed, now I take two, and find it better. By having the land perfectly clean and keeping it clean the second crop may be as good as the first. I am trying three-quarters of an acre for 1911 for a third crop as an experiment.

Bubach was possibly the best berry this season.

RECOMMENDED FOR THE NORTH.

APPLES. *Summer*—Yellow Transparent, Charlemoff, Duchess, Peach, North Star.

Fall and Early Winter—Wealthy, McIntosh, Winter St. Lawrence, Wolf River, Baxter, Louise.

Late Winter—Walbridge, Scott Winter, Pewaukee.

CRAB—Whitney, Hyslop, Isham, Florence.

CHERRIES. If near the influence of the water, Richmond, Montmorency, English Morello, Orel 25, Ostheim.

PLUMS. *European*—Glass, Lombard, Goliath, Early Red, Trabesh, Pond Seedling. *Americana*—Cheney, Wolf, Hawkeye, Stoddard.

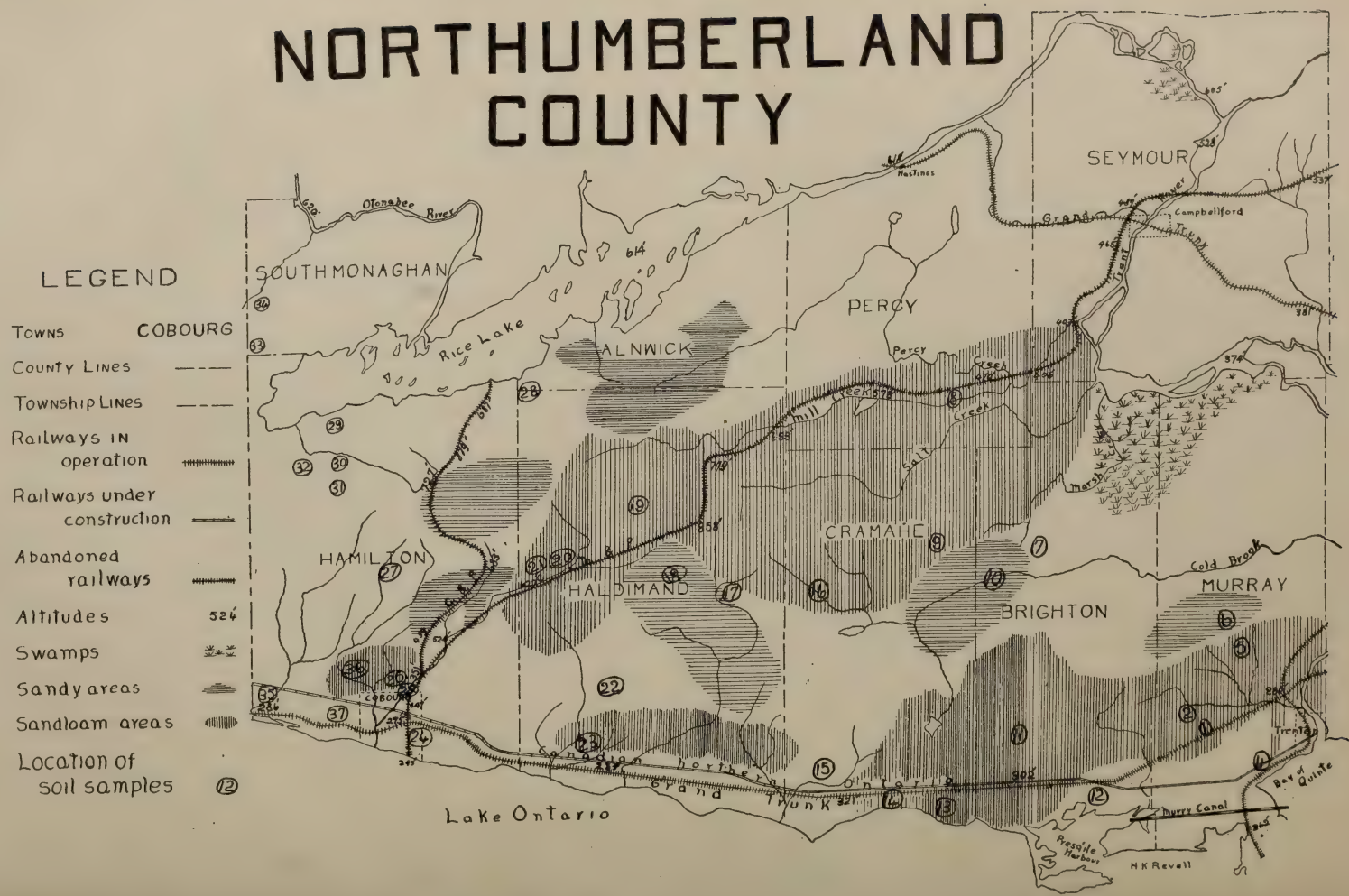
GRAPES. Moore's Arctic, Campbell Early, Winchell, Delaware.

CURRANTS. *Red*—Versailles, Red Dutch, for quality; *Black* Victoria, Saunders, Champion.

GOOSEBERRIES. Golden Prolific, Champion, Industry, Red Jacket.

RASPBERRIES. *Red*—Marlboro, Louden. *White*—Brinckles Orange for home use only.

NORTHUMBERLAND COUNTY



ORCHARD SURVEY OF NORTHUMBERLAND COUNTY—PART I.

H. K. Revell.

Purpose. This work consists of a systematic inspection of orchards. Its purpose is three-fold, viz:

1. To study the effect of the geologic and soil characters upon the orchard conditions.

2. To collect for comparison data upon the different methods of soil management.

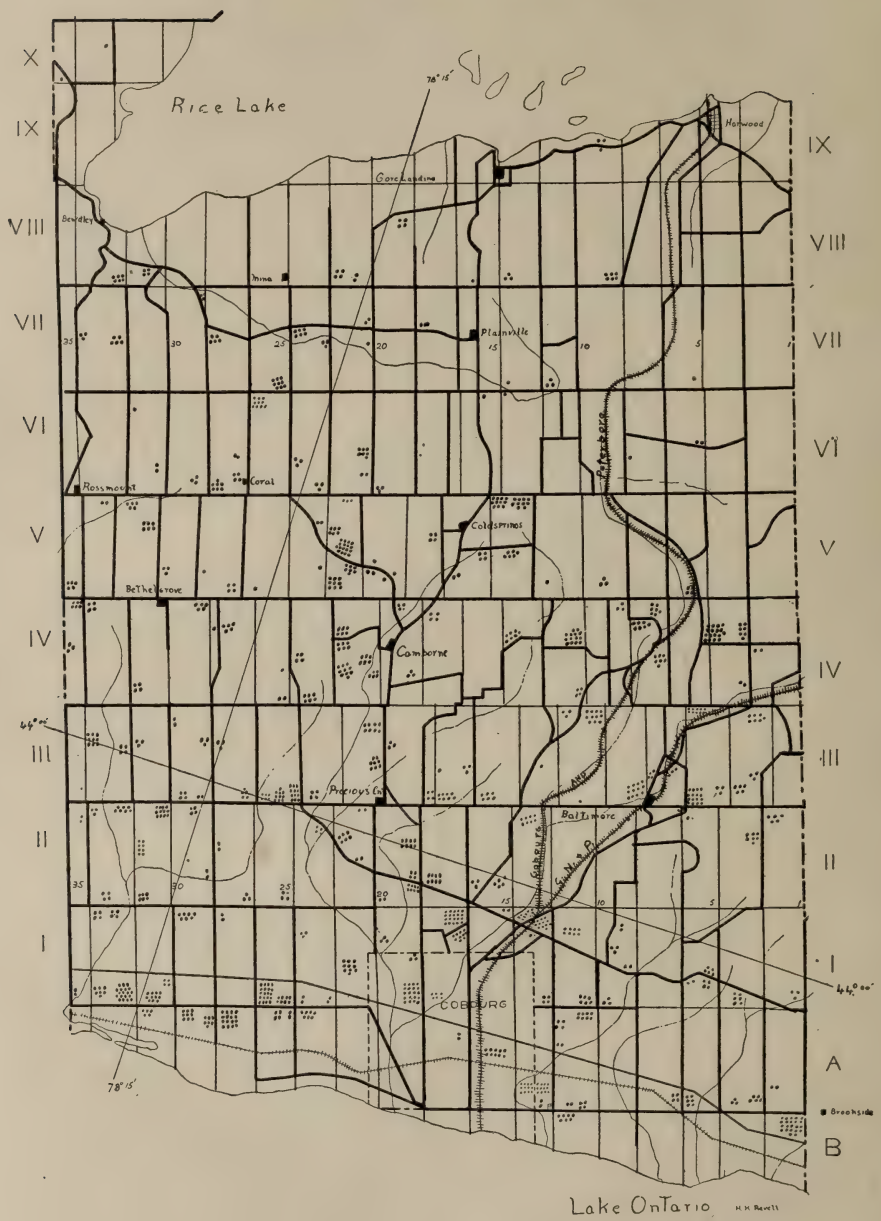
3. To try to arouse a greater interest in orcharding. This last purpose is perhaps the most important. Many men were met who seemed anxious to learn, but were too busy to leave their farms to attend the long or short courses in Horticulture which are held at the various colleges. Some of these men will keep the orchard surveyor busy for an hour or more answering pointed questions. Others there are who appear quite indifferent, but become quite enthusiastic when their attention is drawn to a few of the results of modern orcharding.

Method. In company with Mr. French I was sent to Northumberland County to carry on this work. We first made a preliminary survey of the country, to determine the relations of the townships to one another, and learn where the majority of the orchards were located. This was accomplished by a rapid drive over the territory. A systematic inspection of the orchards was then commenced by driving up and down the side and concession lines, stopping at most of the orchards. At first nearly all orchards of an acre and upwards were visited, but as the work progressed it was found necessary to miss the smaller orchards. When Hamilton Township was completed, we found that the average size of some two hundred orchards was about five and one-half acres. A complete record of every orchard could not be obtained, but sufficient information was collected to enable one to form a very fair idea of the general management of the orchards. The figures are not the results of bookkeeping, but are estimates by each owner of his yields and returns. While some are too high, others are too low, so that the averages obtained are reliable. Just here, I might say, that we are greatly indebted to the farmers, of whom nearly nine hundred were visited, for the courteous manner in which they received us and their willingness to aid us in our work.

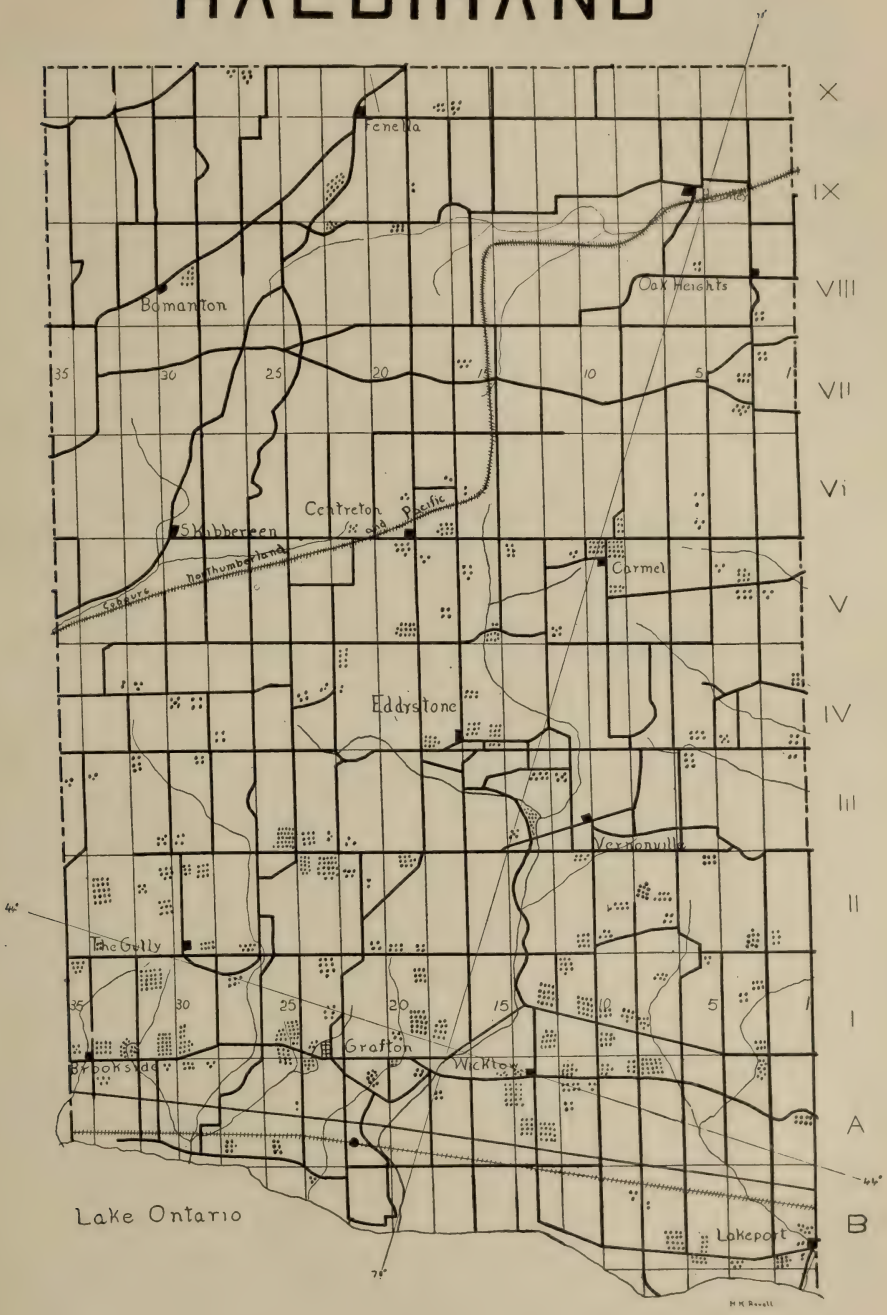
Geography. Northumberland County lies on the north shore of Lake Ontario, bounded on the west by Durham, on the north by Peterborough, and on the east by Hastings Counties. Its western and eastern boundaries are, respectively, sixty-five and one hundred and four miles east of Toronto. It has a total area of seven hundred and four square miles. There are nine townships and some sixty towns, villages and post offices. Cobourg, the county seat of the united counties of Durham and Northumberland, is the chief town, with a population of over 5,000. In Alnwick there are some five or six square miles in Indian reservations. Rice Lake, which lies between Peterborough and Northumbrland, has an area of twenty-seven square miles.

Topography. The territory travelled is very hilly and a more picturesque country one could hardly wish for. It is fascinating, indeed, to stand upon any one of the innumerable hills and study the panorama. In many places hill after hill may be seen rising one behind the other, their sides, summits and the valleys between frequently being covered with woods. Here and there on the cleared areas are dotted the farm buildings, with their orchards, some small and others quite large.

HAMILTON


Rice Lake
Harwood
Gore Landing
Bewdley
Mina
Plainville
Rossmount
Coral
Colespring
Bethesda
Camborne
Precious Corners
Baltimore
COBOURG
Brookside
Lake Ontario
78°15'
44°00'
X
IX
VIII
VII
VI
V
IV
III
II
I
A
B
H.H. Revell

HALDIMAND


Fenelka
Bomanton
Oak Heights
Skibbereen
Centreton
Grand Pacific
Northumberland
Cobourg
Carmel
Eddystone
Vernonville
The Gully
Grafton
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H K Revell

Following the lake shore is a strip of low, more or less flat, land of varying width, sometimes as much as five miles wide. North of this strip the land is of a most uneven contour. Rising rapidly from the lake shore where the elevation above the sea level is about 245 feet, some points in the country are quite high. In Hamilton township, following the line of the old Cobourg and Peterborough Railway, which ran about twenty-five or thirty years ago, an elevation of some 879 feet in the seventh concession is attained. It then descends till Rice Lake is reached, where the water stands at a level of 616 feet. A portion of this road was built on a grade of 1.6 per cent. On the line of the old proposed Cobourg, Northumberland & Pacific Railway, which was surveyed north-easterly from Cobourg through Seymour Township to the Central Ontario Railway and Canadian Pacific Railway junction in Hastings County, an altitude of 958 feet in the sixth concession of Haldimand is attained. The line then descends to the Trent River in Seymour, where the elevation is 400 feet. It again ascends to the townline of Seymour and Hastings, which has an altitude of 537 feet.

Swamps. About 7.5 per cent. of the assessed area for 1908 is classed as "Swamp, marsh or waste land." There are numerous small swampy patches, but the main swamp is in the northern part of Brighton and Murray Townships. This great swamp extends along that part of the Trent River known as Percy Beach for about six or seven miles, and southerly into Brighton for some four or five miles.

Drainage. The territory is well drained naturally, though there are many places which would undoubtedly be improved by underdrains. There are upwards of a dozen small streams and creeks, besides the Otonabee and Trent Rivers. The country has two general drainage basins; the smaller one is drained directly to Lake Ontario, the larger to Rice Lake and the Otonabee and Trent River. These are divided approximately by a line running from the western town line of Hamilton on the seventh concession, easterly through Carmel, Vernonville, south of Edville, through Hilton, and along the third line of Murray to Hastings.

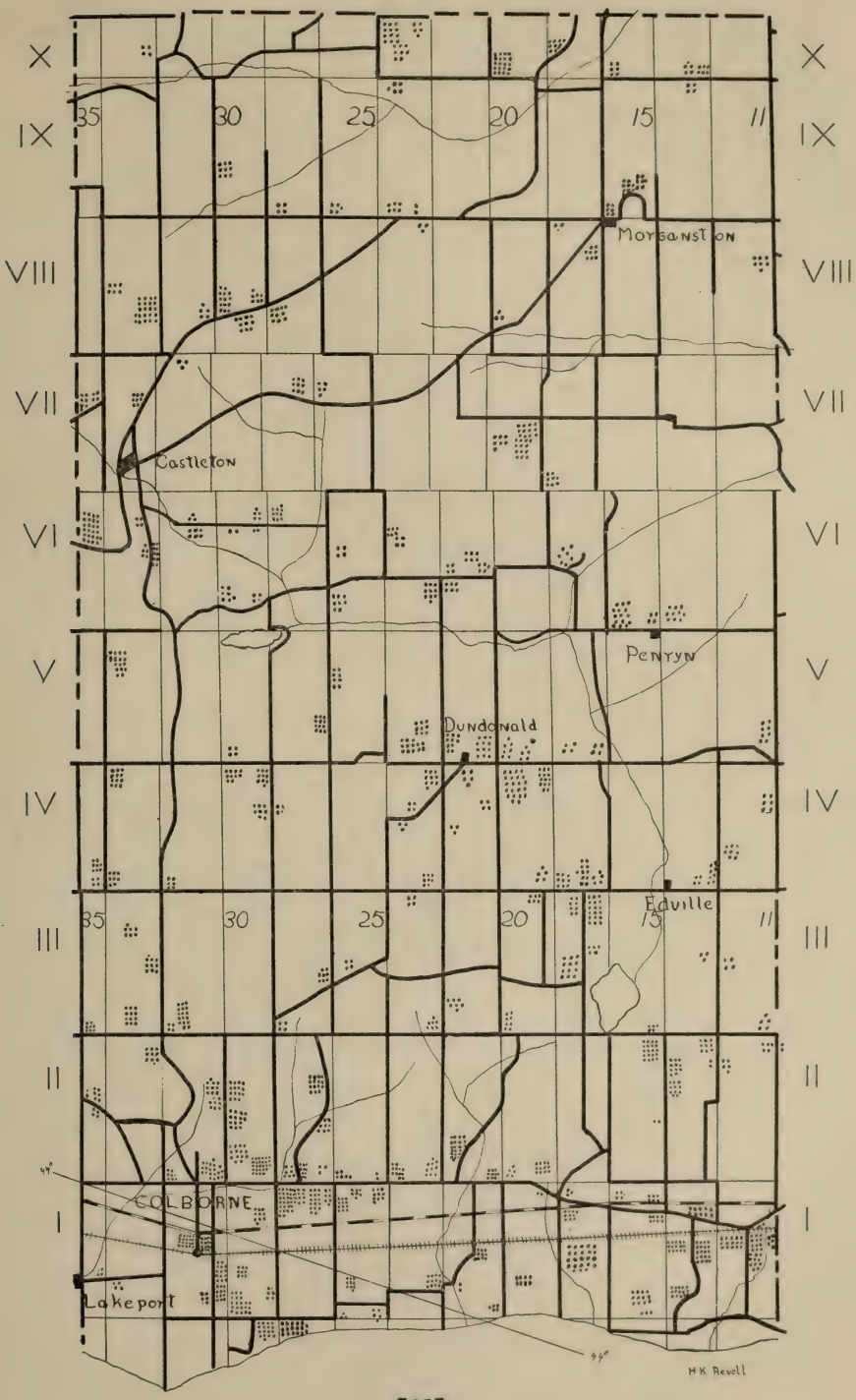
South Monaghan is bounded on three sides by water, Rice Lake to the south, the Otonabee River on the east and north. The majority of the streams run north to the river. Seymour is drained easterly and westerly to the River Trent, which runs through its centre, almost due south for nearly the entire length of the township.

Soil. The soil of Northumberland is very variable, ranging from a stiff clay to a light drift sand. A large portion of the clay lies along the shore of Lake Ontario. In South Monaghan and the other northern townships clay exists in patches. All told, about nine per cent. of the total area is clay. The larger part of the soil is of a loamy nature; about thirty-five per cent. clay loam, and about thirty per cent. sand loam. Scattered throughout the central portion of the county are numerous patches of drift sand. These are especially noticeable in Cramahe and Brighton, near Penryn. In some places the roads and from one-half to two-thirds of the height of the fences are buried in drift sand. But only a small portion of the total area is of this nature; according to the report of the Commission of Agriculture for 1881 about seven per cent. of the county is classed as sand.

In order to obtain an accurate idea of the physical properties of the soil, a number of samples were taken from the more important sections of the county.

These samples were later subjected to a physical analysis, the results being recorded in the following table:

CRAMAHE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11
Morganston
Castleton
Penryn
Dundonald
Eduville
COLBORNE
Lakeport
44°
M K Revell

TABLE 1.

No.	Kind of soil.	Percentage of organic constituents.	No.	Kind of soil.	Percentage of organic constituents.
1	Sandy loam	3.05	20	Light sandy loam	4.58
2	Sandy loam	3.85	21	Light sandy loam	4.52
3	Clay (subsoil)	6.85	22	Loam	4.72
4	Clay loam	7.60	23	Light sandy loam	4.18
5	Light sandy loam	3.36	24	Clay loam	9.62
6	Sand	1.47	25	Light sandy loam	5.73
7	Loam	6.11	26	Light sandy loam	4.27
8	Light sandy loam	2.93	27	Loam	3.77
9	Sandy loam	3.96	28	Clay loam	4.40
10	Light sandy loam	2.42	29	Loam (subsoil)	3.00
11	Sandy loam	4.14	30	Sandy loam	3.61
12	Loam	6.36	31	Sandy loam	6.74
*13	Light sandy loam	21.58	32	Clay loam	8.79
14	Sandy loam	6.47	33	Light sandy loam	6.54
15	Loam	4.25	34	Clay loam (subsoil)	6.23
16	Light sandy loam	3.05	35	Loam	5.05
17	Light sandy loam	4.09	36	Sand loam	5.75
18	Sand	5.11	37	Loam	9.94
19	Light sandy loam	3.61			

*Soil Number 13 was obtained from a swale of black muck.

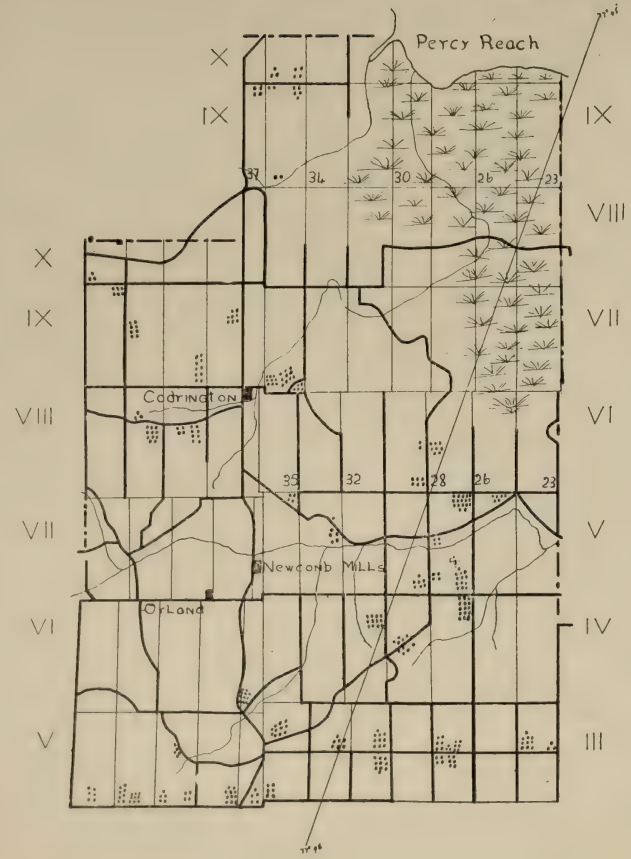
The numbers of the samples are recorded on the county map by figures within a circle. Only those sections of the county where the soil was more or less uniform in character and of a known definite area are recorded on the map. In the unshaded sections where the soil is known the areas are very patchy, and for this reason are not recorded.

There are also patches of gravel and black loam scattered throughout the territory, about nine and ten per cent. respectively. The greater part of the black loam occurs in Brighton, Murray and Percy, with some in Cramahe.

CLIMATE. Without doubt the climate of Northumberland is admirably suited to the production of a high-class apple with good keeping qualities. This is amply proved by the quantity and quality now being produced. Mr. H. B. Smith says, in his "Climate of Ontario and Some Phases of its Influence on the Growth of Agricultural Crops," with respect to apples: "This fruit cannot be produced with certainty or success northward of zone five, and even in this zone the varieties that may be cultivated are somewhat limited. In zone one, embracing the counties of Essex, Kent and the Niagara fruit districts, any variety of apple, or in fact almost any kind of fruit not particularly confined to the tropics, may be grown with at least fairly average success. In zone two, where the summer temperature is two degrees lower, and the season seven days shorter, apples are a staple crop. In zone three they are extensively produced, but perhaps the limits of zone four mark the northerly limit of the commercial cultivation of this fruit. Beyond this, in zone five, considerable areas are devoted to it, but the quality of the product is so much inferior to that grown in the true fruit districts, the risk of failure due to adverse climatic conditions so great, that apple growing can never be made a prominent feature of the agriculture of this region."

Northumberland is located in what is known as the middle Canadian Alleghanian Area, or zone number three as mentioned in Mr. Smith's thesis.

BRIGHTON


Percy Reach
Codrington
Newcomb Mills
Orland
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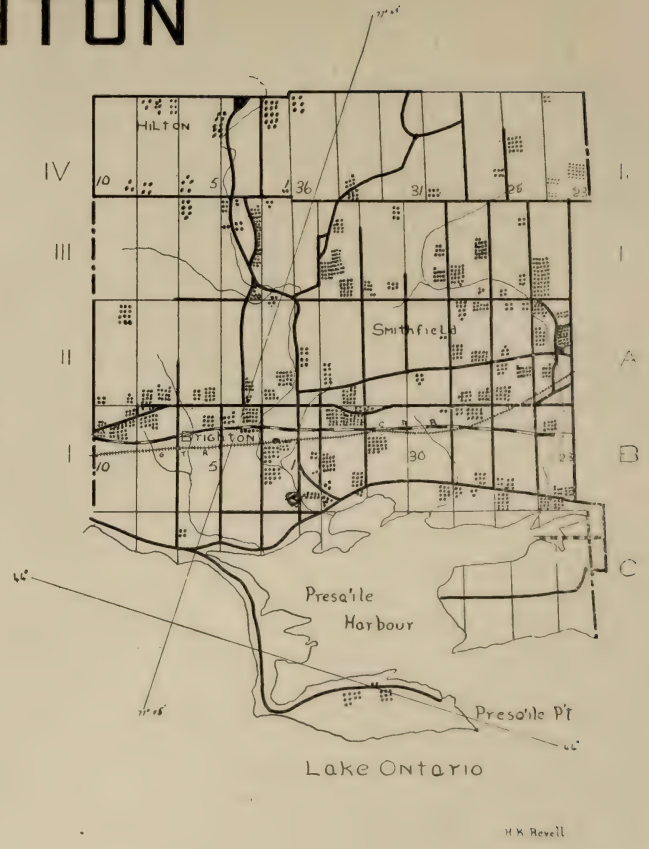
Hilton
Smithfield
Brighton
Presq'ile Harbour
Presq'ile Pt
Lake Ontario
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H.K. Revell

I propose to study the climate of this section of country by comparing its meteorological characteristics with those of other fruit sections. For this purpose I have used figures taken from the reports of the Dominion and United States Weather Bureaus, and from the theses of Messrs. H. B. Smith, of 1906, and O. C. White, 1910. Unfortunately, there have been no weather reporting stations located in Northumberland for any length of time. I have therefore used the averages of the readings from the stations located at Toronto, Port Hope, Peterborough, Deseronto and Kingston, as giving a fair idea of the weather conditions on the north shore of Lake Ontario.

Temperature is undoubtedly the most important climatic consideration in fruit growing. While the amount of precipitation may be augmented by irrigation, very little, if anything, can be done to control the temperature of a locality for any length of time. Table 3 gives the mean monthly and annual temperatures for the several districts under consideration.

The meteorological readings in Tables 1, 2 and 3 are the averages of the following stations, the figures for Ontario being taken from thesis of H. B. Smith, 1906; those for British Columbia from thesis of O. C. White, 1910, and those for United States sections from the United States Meteorological Survey.

Essex County, at Pelee Island and Windsor.

Niagara District, at Stony Creek and Welland.

Georgian Bay District, at Collingwood, Owen Sound, Meaford, Lucknow and Rocklyn.

North Shore Lake Ontario, at Toronto, Port Hope, Peterborough, Deseronto and Kingston.

Okanagan Valley, B.C., at Okanagan Mission, Vernon, and Summerland.

Southern California, at Rialto and San Bernardine.

Plants grow only between certain definite temperatures, the minimum being forty-three, Fahrenheit. Hence the number of days above this temperature is an important consideration. The total number of heat units received, the average temperature of the six hottest weeks, and the period of growth, form interesting climatal data. These figures are given in Table 2.

TABLE 2.

—	Period of growth.	Total heat units received.	Mean temp. of six hottest weeks.	No. of days of growth.
Essex County	April 10—Nov. 7 ..	13,116	71.5°F.	210.5
Niagara District	April 13—Nov. 7 ..	12,368	70.2°	204.0
Georgian Bay District	April 17—Oct. 27..	11,128	66.26°	193.0
North Shore, Lake Ontario.....	April 18—Oct. 25..	11,498	68.6°	190.2
Okanagan Valley, B.C.....	April 4—Oct. 24...	11,658	66.7°	203.0

The mean monthly and total annual rainfall of a locality demand some attention. This information, together with the distribution of the precipitation, is given in inches in Table 4.

TABLE 3.—MEAN MONTHLY AND ANNUAL TEMPERATURES.

(Fahrenheit degrees.)

—	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Essex County	23.9	24.9	32.1	44.9	57.6	67.8	75.5	71.6	64.0	52.8	39.6	29.0	48.4
Niagara District	23.3	22.8	29.9	43.8	55.3	66.0	70.7	68.7	62.0	50.0	38.6	28.9	47.6
Georgian Bay District	20.0	17.6	27.4	41.1	42.5	60.9	66.8	66.6	58.9	48.1	35.1	23.2	43.0
North Shore Lake Ontario	18.6	19.2	27.9	42.5	54.3	64.2	69.0	67.3	60.0	57.4	34.8	24.1	44.1
Okanagan Valley, B.C.	25.0	26.8	35.8	46.8	54.7	61.1	67.2	64.9	55.9	46.1	35.8	29.2	45.8

TABLE 4—MEAN MONTHLY AND ANNUAL PRECIPITATION IN INCHES.

District.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Essex County	2.49	2.75	2.47	2.48	3.33	3.23	3.27	2.78	2.06	2.02	2.62	2.29	31.32
Niagara District	3.91	3.27	3.63	2.32	2.66	2.47	3.08	1.77	3.00	2.27	3.11	2.98	34.49
Georgian Bay	4.23	2.66	2.50	1.93	2.92	2.90	3.69	3.11	3.26	3.06	3.47	4.50	38.40
North Shore, Lake Ontario	3.09	2.80	2.66	2.06	2.82	2.52	2.80	3.07	2.87	2.33	2.93	2.84	32.79
Okanagan Valley, B.C.	0.99	1.02	0.79	0.35	1.54	1.10	0.99	1.14	1.39	0.38	2.38	1.04	13.21
Southern California	6.39	5.22	2.91	1.19	0.61	0.01	0.02	0.00	1.40	2.25	0.55	1.36	21.92

Irrigation is often made necessary by an uneven distribution of the precipitation throughout the seasons. In the preceding table three western sections have been compared with Ontario. In all of these irrigation is practised, especially in the Okanagan Valley and in Southern California. In the latter case I have used the averages of precipitations from weather reporting stations in the heart of the orange section. Though apples are not grown very extensively in this section, it has been used to illustrate the uneven distribution of the total annual precipitation. These orchards are irrigated five or six times a year.

As Northumberland is located between Rice Lake and Lake Ontario, the climate must be greatly influenced by these bodies of water. This is splendidly illustrated by a comparison of the meteorological readings taken at Toronto and Agincourt. The distance between these two places is less than fifteen miles, but as Agincourt is inland its climate is more severe. This fact is verified by the following tables. The most noticeable difference is in the temperatures, Agincourt being much colder in the winter and much warmer in the summer.

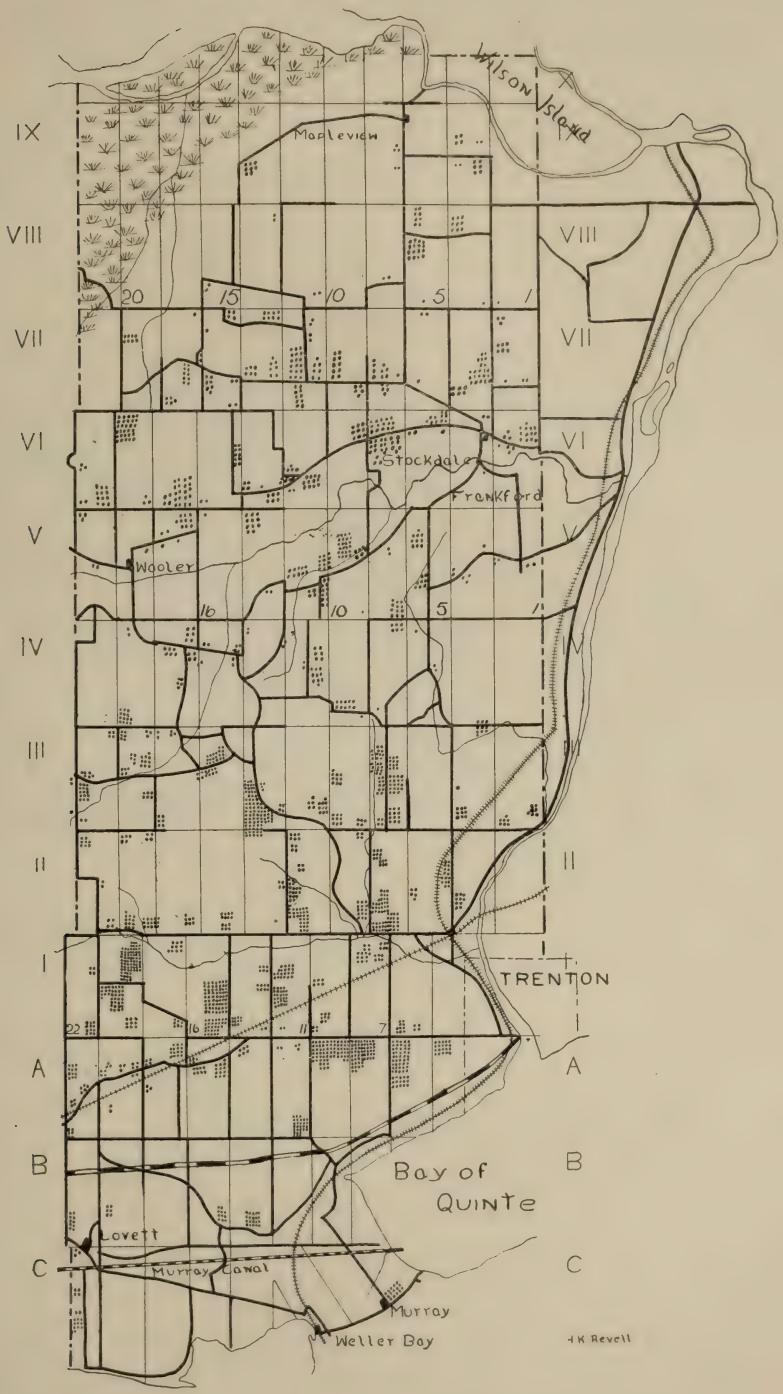
TABLE No. 5.

—	Period of growth.	Total heat unit received.	Temperature of six hottest weeks.	Length of growing season.
Toronto	April 20—Oct. 25....	10,983	67.5	187 days.
Agincourt	April 15—Oct. 28....	11,666	68.9	196 "

TABLE 6 AND 7—MEAN MONTHLY AND ANNUAL PRECIPITATION AND TEMPERATURES

MONTHS	PRECIPITATION		TEMPERATURE	
	Toronto	Agincourt	Toronto	Agincourt
	Inches	Inches	Degrees	Degrees
January	2.82	2.21	22.6	19.6
February	2.53	1.36	22.4	17.7
March.....	2.55	2.49	28.8	29.2
April.....	2.55	3.12	41.3	43.1
May.....	2.75	2.65	52.4	54.3
June	2.63	3.16	62.6	62.5
July.....	2.50	4.32	67.6	69.5
August.....	2.54	2.41	66.2	67.2
September.....	2.76	1.99	58.6	60.4
October.....	2.42	1.88	46.4	49.6
November	2.91	1.31	36.1	35.7
December.....	2.59	2.32	26.3	23.3
The year	31.08	29.22	44.3	44.3

MURRAY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Marleview
Stockdale
Frankford
Wooler
TRENTON
Bay of Quinte
Lovett
Murray Canal
Murray
Weller Bay
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H K Revell

Winter Injury. There are many forms of winter injury to fruit trees. The one most frequently seen was the sun-scald. This is nearly always found on the south and south-west sides of the trunks and main limbs. It is due to alternate freezing and thawing, causing the bark to split and fall off. Exposed trunks should be shaded on the south-west side during the season of bright sun and freezing nights of late winter. The heads of trees should be kept only moderately thinned out, in order to avoid exposal of the upper surfaces of the branches to strong sunshine. Badly affected varieties would do better if top-worked on trunks of hardy sorts. The low heading of trees is also very helpful, as this leaves much less trunk exposed to the sun.

A Northumberland Sand Dune.

Root killing is another form of winter injury. This was noticed particularly in those orchards situated on low-lying, wet lands. The remedy for this condition is better under-drainage and proper soil management in order to prevent late fall growth.

Varieties. All told, about sixty varieties of apples were mentioned, but of these not more than a dozen are being planted commercially. The following eight are those which were most frequently mentioned, their ratios of popularity being also indicated. Many of the Tolmans were set to graft to Spys, but as at time of inspection they had not been grafted, they were counted as Tolmans.

Table 8.—Most Popular Varieties and their Ratios of Popularity.

Variety	No. of times mentioned.	Ratio.
Ben Davis	841	5.35
Spy	699	4.46
Stark	489	3.11
Baldwin	411	2.61
Golden Russet	368	2.34
R. I. Greening	217	1.38
Snow	163	1.03
Tolman	157	1.00

The varieties were classed according to date of setting. The following table shows what varieties were set in the different decades. Briefly summarized, only the winter sorts were set previous to 1870. Since then a preference for fall and early winter varieties has crept in with the additional plantings. The winter apples, however, maintain their lead. Table 8 is a summary of the settings of some thirty varieties for the five periods of time. In Table 9 the figures given indicate the numbers of orchards containing the different varieties. As definite information could not be obtained in all cases, only those orchards where the date of planting was certain could be utilized. Hence, the figures are more or less relative.

TABLE 9.

Variety.	Set previous to 1870.	1870–1880	1880–1890	1890–1900	1900–1910
Alexander	1	0	1	2	6
Astrachan	0	6	6	0	1
Baldwin	6	58	42	43	73
Baxter	0	1	1	10	27
Bellflower	0	9	13	6	2
Ben Davis	5	55	63	100	191
Blenheim	0	0	3	0	4
Canada Red	1	8	4	0	4
Cooper Market	0	4	4	5	10
Colvert	3	90	8	3	2
Cranberry	1	3	1	10	54
Delaware Red	0	1	1	0	11
Duchess	0	11	3	3	6
Fallawater	0	1	0	1	5
Gano	0	2	5	11	51
Greening	4	48	40	23	18
Hubbardston	0	2	1	0	1
King	1	13	11	17	6
McIntosh	0	1	2	2	2
Mann	1	1	4	7	15
Ontario	1	2	2	4	17
Pewaukee	0	1	8	16	3
Russet	7	72	74	43	38
Salome	0	1	0	0	7
Seek	1	3	4	2	1
St. Lawrence	0	0	4	2	0
Snow	1	19	23	11	21
Spy	11	88	89	74	115
Stark	2	4	12	23	167
Tolman	3	20	15	8	20
Wagener	0	3	4	2	10
Wealthy	0	3	3	12	28
Wolf River	0	0	0	2	8

During the twenty years 1880 to 1900 there was a decline in the number of plantings of some varieties. Some of these continue decreasing, while others increase during the period from 1900 to 1910. This is significant of three points: (1) The early apples being unsuitable for export decreased, though some of these increased again with the advent of better shipping facilities and cold storage; (2) Those varieties which are unsuitable commercially have disappeared almost entirely; (3) Varieties subject to scab decreased with the increasing prevalence of that disease from 1890 to 1900, but with the introduction of spraying during the past decade have again increased. But all through these periods Stark, Ben Davis, and Spy have rapidly increased—the first over 700 per cent., the second nearly 200 per cent., and the third over 50 per cent.

NURSERY STOCK. Most of the nursery stock is secured from Ontario nursery

men, though a little comes from New York State. Of the Ontario stock, the greater part comes from the nurseries in the Niagara Peninsula, very little being grown in Northumberland itself.

The quality of the stock is very poor indeed, and almost nothing is being done by the farmers to secure first-class trees. The remark was noted on several occasions, "I know I should not have set them out." If these men knew the stock was inferior and yet accepted it, then they, and they alone, are to blame. Some have asked for legislation to prevent substitution of varieties, and of inferior for first-class stock. But the most effective legislation lies in the contract which is drawn up between the purchaser and seller. Some claim that the farmers do not known what constitutes a first-class tree, but in answer to this we might say that they are nearly always able to distinguish the poor trees in their orchards.

The majority of men seem to prefer to set trees three or more years old, believing that they are saving time. Though it has not been proved conclusively, most authorities claim that a one or two year old tree will in a short time equal in development an older tree set at the same time. If the younger trees are selected, the owner has better control over them in determining the shape and height of head. Some of the more noticeable faults of the stock were twisted and crooked trunks, crotchy heads, and lack of uniformity in shape and height of heads. These are faults which can be remedied most easily by the setting of one or two year olds, preferably strong one-year-old stock.

Slopes. In selecting a site for the orchard the question is often asked, "In what direction should the land slope?" The results of surveys in New York State support the preference of some for easterly slopes. Our results, however, rather point to the contrary. We found so many orchards which were practically level that they also have been included in the table. The yields given are the average per acre for the last three years.

Table 10.

No. of orchards.	No. of acres.	Slope.	Average yield per acre per year for three years
17	84.5	North to north-west	46.056 Bbls.
33	190.25	Level	42.936 "
112	678	South to south-east	39.676 "
22	114.25	West to south-west	37.360 "
20	193.5	East to north-east	26.633 "

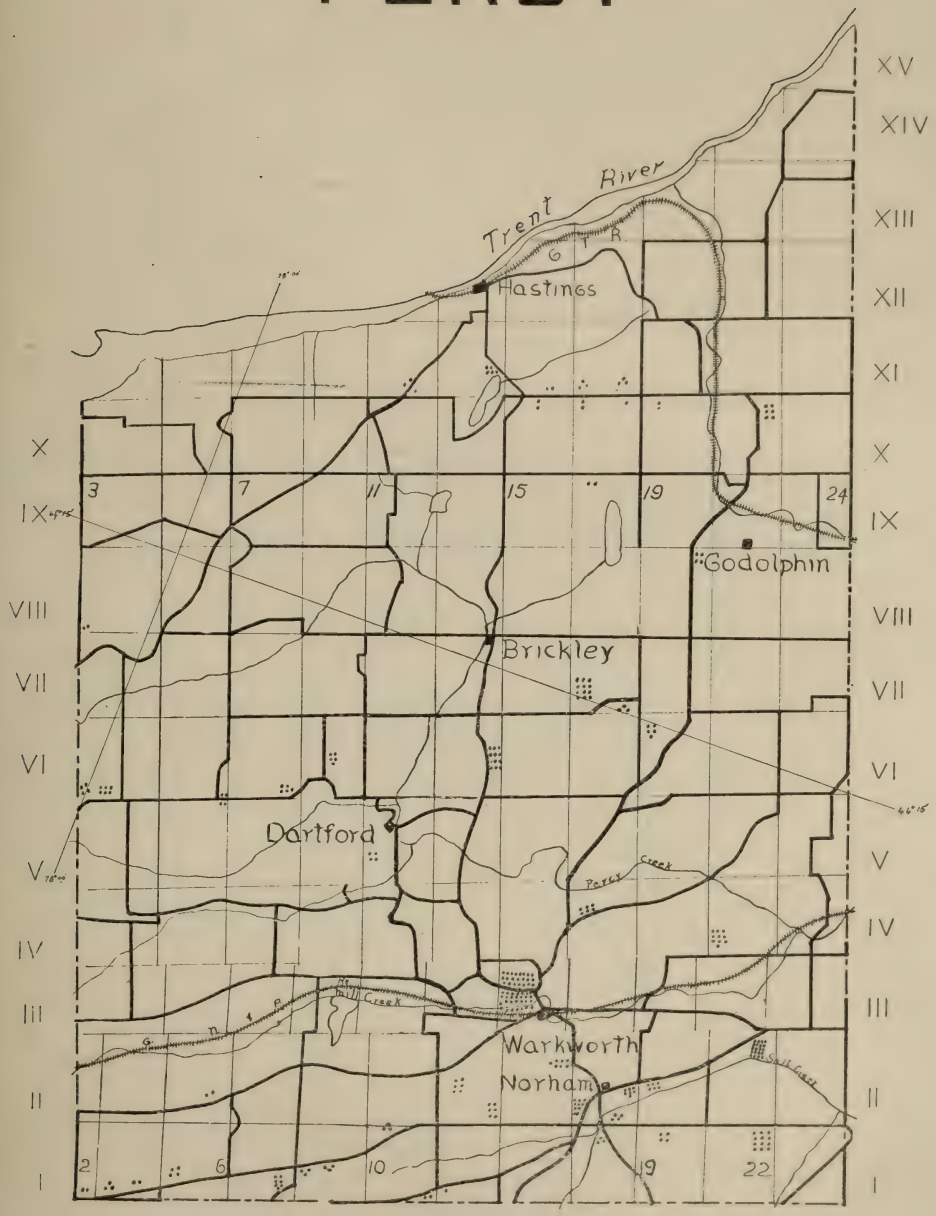
Note.—In all the tables the yields are the average for the years 1907, 1908 and 1909.

Soils. "On what soil does the apple do best?" is often asked. The answer generally given is that it will do well on any well-drained soil. The following table gives a comparison of the Northumberland soils.

Table 11 (Soils.)

No. of orchards.	No. of acres.	Soil.	Average yield per acre per year for three years.
30	173.25	Clay	48.54 Bbls.
46	201.25	Clay loam	42.82 "
85	501.50	Sand loam	36.59 "

PERCY


XV
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Trent River
G T R
Hastings
Godolphin
Brickley
Dartford
Percy Creek
Mill Creek
Warkworth
Norham
Mill Creek
3
7
11
15
19
24
2
6
10
19
22

Distance of Planting. This question has provoked a great deal of discussion. Some claim that within due limits the farther apart the trees are, the more fruit each individual will bear, and therefore the production will be so much more per acre. On the other hand, there are those who say that the increased number of trees will more than make up for the lessened yield of each individual. The following table seems to bear out the latter contention.

Table 12—(Distance).

No. of orchards.	No. of acres.	Distance.	Average yield per acre.
49	292.5	25 ft. x 25 ft., or less	45.07 Bbls.
28	147.5	31 ft. x 31 ft. to 35 ft. x 35 ft.	42.75 "
94	499.75	26 ft. x 26 ft. to 30 ft. x 30 ft.	42.453 "
5	44.00	36 ft. x 36 ft. or farther apart.	33.406 "

This table gives results in *barrels per acre,* but it must not be supposed that the results would be the same if they were figured on a basis of *dollars per acre.* Close planting gives a larger percenage of poorly colored apples, and consequently a *lower price per barrel,* and probably a *lower price per acre.* The distances recommended are 35 x 35 for large-growing winter sorts, such as Spy; 30 x 30 or 30 x 35 for Ben Davis and similar sorts, and 25 x 25 or 25 x 30 for such as Wealthy.

Orchards on Rented Land. Quite frequently we were informed by the farmers that it would not pay them to give their orchards any better care, because they themselves were "just tenants." To ascertain what effect renting the farm and orchard usually had upon the orchard yields, a comparison was made of the yields from orchards on rented land with those on land which the owners themselves were caring for. The following table does not speak very favorably for the tenant.

Table 13.—Rented vs. Owned Orchards.

—	No. of orchards	No. of acres.	Average yield per acre in barrels.		
			1907	1908	1909
Rented	13	109.00	38.20	20.01	28.33
Owned	222	1,304.75	61.90	35.46	42.05

Soil Management. Under the heading soil management we have three general subdivisions, viz.: Underdrainage, cultivation and fertilization. These we will consider in order mentioned.

Underdrainage. Very little underdrainage has been done in Northumberland. Only 8.38 per cent. of all orchards have any underdrains, and not more than two or three are completely tile drained. In spite of this, however, a very small percentage of the orchards could be classed as poorly drained.

It is well known that apples will not thrive on a wet soil. Scattered throughout the country are to be seen whole or parts of orchards on low-lying wet lands. Even the untrained eye will note the difference in the trees. Those on the well-

drained soil have a darker foliage; they are also larger and freer from disease and insect pests. In many of the old orchards situated on the side or at the foot of a hill, there will be found places with the trees missing at the lower end, while on the higher location all the trees are living and healthy. There is only one hypothesis to explain such a case as this, and that is the better drainage.

To show the difference between good and poor drainage, the clean cultivated orchards having any artificial drains have been compared with the clean cultivated orchards having no drains of any kind. A large portion of those orchards classed as artificially drained have only one or two underdrains in a low corner, the remainder of the site being well drained naturally.

TABLE 14—(DRAINAGE.)

—	No. of orchards.	No. of acres.	Average yield per acre in barrels.		
			1907	1908	1909
Artificially drained.....	13	96.5	69.98	47.15	35.91
Naturally drained.....	73	529.25	52.73	27.15	31.62

In the preceding table only clean cultivated orchards were considered.

CULTIVATION. Commonly speaking, there are three methods of cultivation in the orchard, viz.: Clean cultivation, growing of crops and sod. These methods have numerous variations in their details, but we shall only consider them in general, using for comparison the averages of the yields from orchards receiving as nearly as possible the same treatment, so far as pruning, spraying and fertilizing are concerned.

Clean cultivation is generally recommended as the best method. Briefly stated, some of its advantages are, greater freedom from such insect pests as the apple maggot or Railroad Worm and the Buffalo Tree Hopper, which are always more numerous in sod orchards; greater freedom from noxious weeds; the trees receive more benefit from the plant food stored in the soil, and the orchard has fuller control of the growth of the trees. Some claim they can grow better crops of apples in sod than in cultivated orchards. There are, of course, exceptions to all rules, but the following table shows quite plainly the results of different methods of soil management:

TABLE 15.—(SOIL MANAGEMENT).

—	No. of orchards.	No. of acres.	Average yield per acre per year in barrels.		
			1907	1908	1909
			Bbls.	Bbls.	Bbls.
Clean cultivated.....	34	180.00	56.81	42.34	50.40
Farm rotation.....	23	86.25	48.81	30.19	41.91
Sod.....	9	18.80	41.64	33.03	39.20

The orchards used in the preceding table were pruned, fertilized and not sprayed, for the reason there are too few sprayed orchards in sod to give a basis for comparison.

The clean, cultivated orchards are also better than the orchards that are cropped. Some follow a regular system of farm rotation in the orchard, while others plant only hoe crops. Some plant the hoe crops as an inducement to cultivation in the orchard. To these men the orchard is a secondary consideration, their interest lying in the farm crops. It would be better for them to dig out the orchard so that the farm crops might receive the full benefit of the sunlight, moisture and plant food. In a section of country which has a severe winter such as Northumberland, there is danger through the use of hoe crops of forcing growth too late in the season, which greatly augments the likelihood of winter injury.

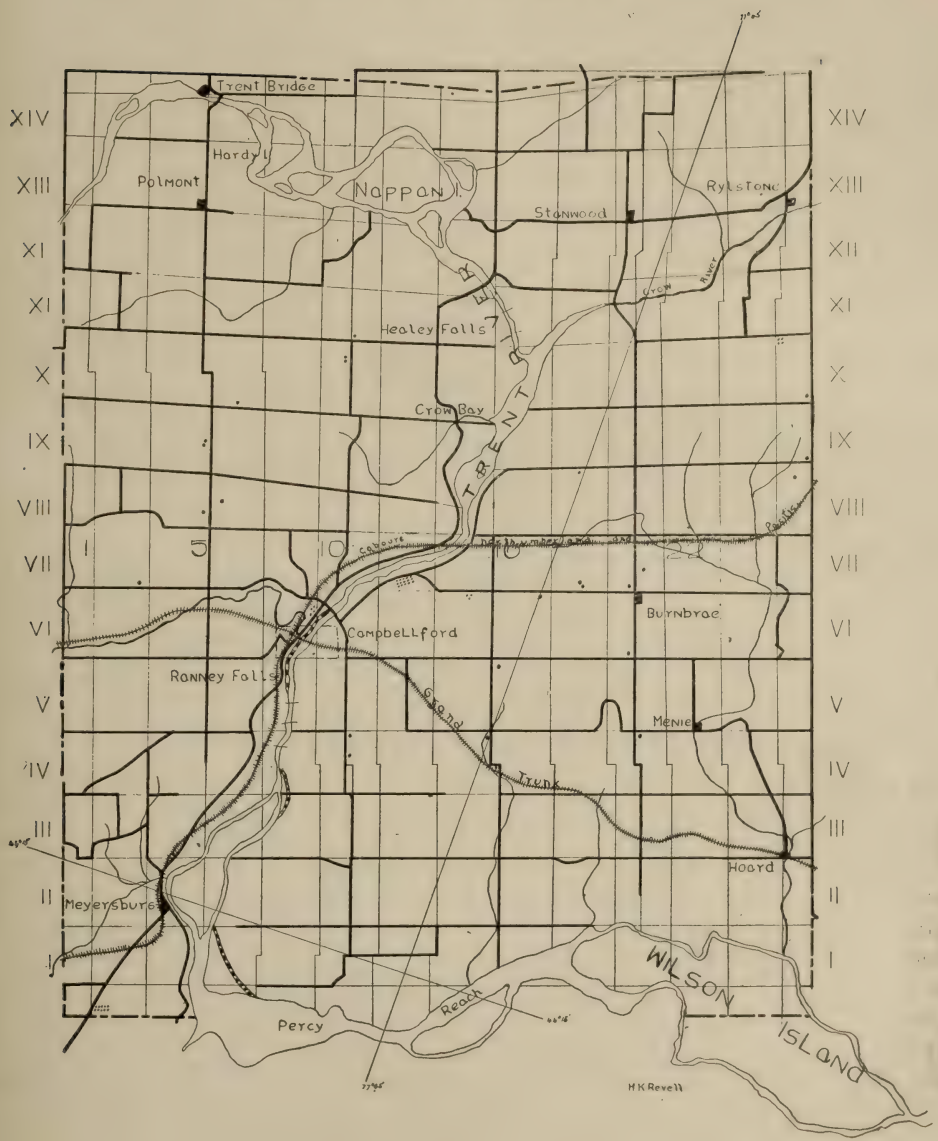
The practice of the best growers in Northumberland County is to spring plow as early as ground can be worked. Thorough clean cultivation is then given with spring tooth or other cultivator or with disc harrow every week or ten days if possible and *after every rain.* At the last cultivation, which in an ordinary season would be between June 15th and July 1st, a cover crop is sown. This is allowed to grow for the balance of the season and is turned under the *following spring.* Some of the best crops for covers are rye, 2 to 3 bushels per acre; rape 4 lbs. per acre; buckwheat, 2 to 3 pecks per acre; red clover, 12 to 16 lbs. per acre, and hairy vetch at the rate of 25 to 30 lbs. per acre.

The men who crop their orchards think they are doing well to get two crops, while the land occupied by the clean cultivated orchard only produces one crop. But the clean cultivated orchard will produce a greater quantity of better apples than the orchard that produces a crop of grain in addition. To illustrate this point, the best fifteen clean cultivated orchards which were pruned, fertilized and not sprayed were compared with the best fifteen cropped orchards, which were pruned and fertilized similarly to the clean cultivated orchards, and not sprayed. The average yield per acre in the clean cultivated orchards was 77.54 barrels per acre per year, in the cropped orchards it was 44.48 barrels per acre per year, a difference of 33 barrels in favor of the clean cultivated orchards. If these apples were sold at $1.25 per barrel, the clean cultivated orchard would produce $41.25 more than the cropped orchard. But the question may be asked, "Will not the field crop from the one orchard equal in value the extra apples from the other orchard? To ascertain this, we have used the market value of several field crops in Northumberland in 1909. When we divide the $41.25 by this price, we have the number of tons or bushels per acre that must be produced of that particular crop for the cropped orchard to equal the clean cultivated orchard in gross returns. This yield has been compared with the average yield per acre in Northumberland for the past twenty-eight years. Table 16 contains some interesting comparisons:

TABLE 16.

Crop.	Price in 1909.	Average yield per acre for past 28 years.	Yield necessary to equal value of extra apples.
	Cents.	Bus.	Bus.
Fall Wheat	103.0	22.0	40.04
Spring Wheat	101.0	13.1	40.84
Barley	56.5	24.5	73.00
Oats	39.7	32.9	103.90
Peas	91.0	18.3	45.32
Beans	145.0	16.9	28.44
Rye	67.5	15.2	61.66
Buckwheat	51.8	24.0	79.63
Corn (Husked)	47.7	63.1	86.47
Hay	1,394.0	1.14 tons.	3.02 tons.

SEYMOUR


Trent Bridge
Hardy I.
Polmont
Nappan I.
Stanwood
Ryllstone
Crow River
Healey Falls
Crow Bay
TRENT
Campbellford
Burnbrae
Ranney Falls
Menie
Hoard
Meyersburg
Percy
Reach
WILSON ISLAND
H.K. Revell
XIV
XIII
XII
XI
X
IX
VIII
VII
VI
V
IV
III
II
I

The average prices and yields used in this table were obtained from the 1909 report of the Ontario Bureau of Industries.

FERTILIZATION. So little commercial fertilizer was used that it has been disregarded in discussing fertilization, barnyard manure only being considered. The orchards were classed according to the quantity of manure applied, and in all cases they were clean cultivated, pruned and sprayed. The only conclusive evidence obtained, is in the comparison of the yields from the orchards which were poorly fertilized with those from the orchards receiving over six loads of manure per acre per year. The general conclusion reached is that the annual use of a medium quantity of manure is better than either too little or too much. The orchards receiving over ten loads of manure per acre yearly, with one exception, have not yielded so much as those receiving from six to ten loads. This is probably due to the fact, that the heavily fertilized orchards made excessive wood growth to the sacrifice of fruit production. Had these orchards received a proportionate quantity of phosphoric acid and potash in addition to the nitrogen applied, their yields would undoubtedly have been much larger.

TABLE 17.—(FERTILIZATION).

Orchards receiving per acre yearly.	No of orchards.	No. of acres.	Yield in barrels.			
			1907	1908	1809	Average.
Up to 5 loads.....	7	66.5	51.06	26.60	33.32	36.99
From 6–10 "	41	366.0	59.91	34.54	46.68	47.04
" 11–15 "	24	169.0	54.12	30.78	35.68	40.19
" 16 and up	28	209.0	58.01	38.22	32.32	42.85

PRESENT CONDITION AND EXTENT. Though there are odd orchards here and there of sour cherries, pears and plums, practically all the orchards are set to apples. From the evidence gathered it seems that the industry in Northumberland, like that in many other favored sections, is thriving. But it must not be taken for granted that such is the case over the country at large. A few months ago one of our authorities was severely censured for stating that the apple industry in Ontario had declined in the past fifteen years. Though we have no figures for Ontario to prove this statement it is the only conclusion that one can come to, when after travelling the length and breadth of this Province, the number of neglected and decrepit orchards is compared with the number which are well cared for and in a flourishing condition. In this connection a few figures from the United States Census may be interesting. These show, that though the industry may be growing by leaps and bounds in the north-western States, it has, on the whole, rapidly declined.

The average yearly yields in the United States were:

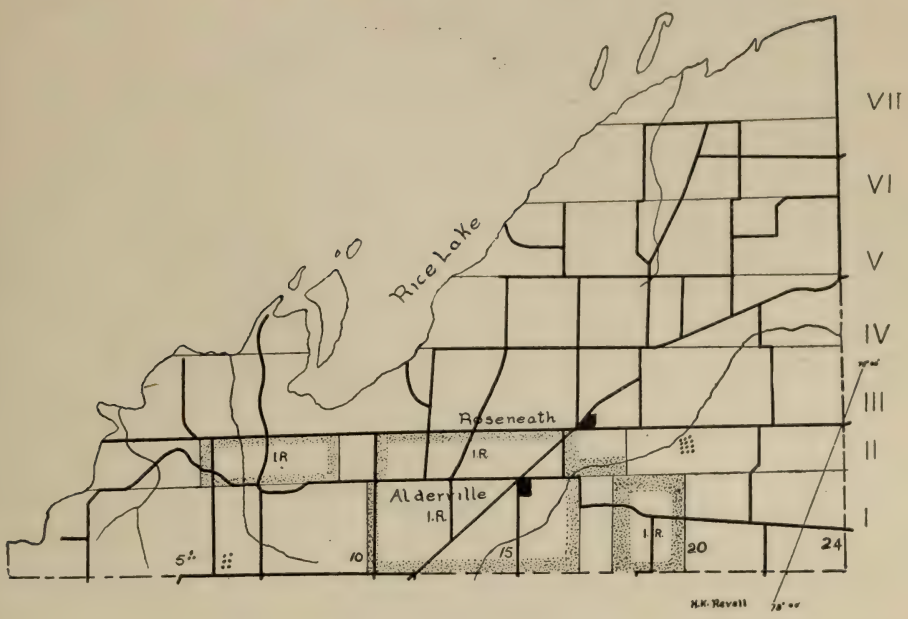
From 1895 to 1900 inclusive was 51,619,000 barrels.

From 1901 to 1905 inclusive was 44,480,200 barrels.

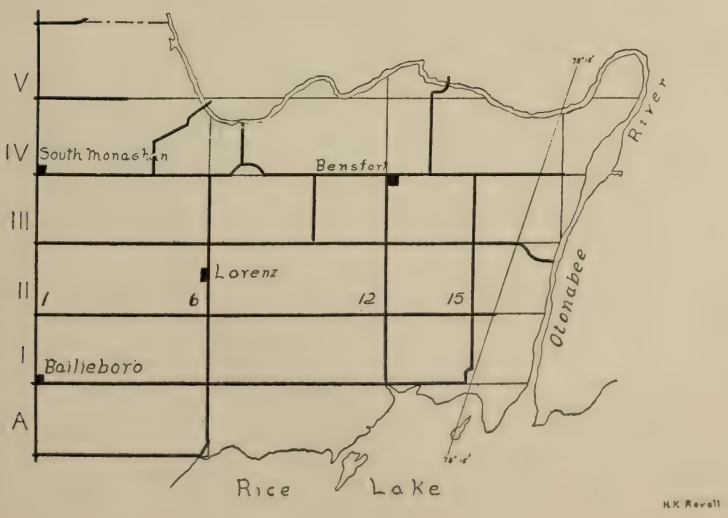
From 1906 to 1910 inclusive was 28,063,000 barrels.

In Northumberland the orchards are confined to a narrow strip along the shore of Lake Ontario, and are chiefly in the eastern end.

ALNWICK



SOUTH MONAGHAN



The following table shows the number of trees and acres of orchard which were actually visited for the different townships and for the county:

TABLE 18.

Townships.	Bearing.		Non-bearing.		Total acreage.	Total No. of trees.
	Trees.	Acres.	Trees.	Acres.		
Hamilton	27,840	575	26,768	555	1,130	54,608
Haldimand	31,796	618	29,939	611	1,229	61,735
Cramahe	47,021	955	35,246	786	1,741	82,267
Brighton	38,255	849	34,035	727	1,576	72,290
Murray	49,480	977	49,090	1,034	2,011	98,570
Seymour	1,900	35	.....	.....	36	1,900
Percy	7,805	168	5,100	109	277	12,905
Alnwick	1,095	22	.....	.....	22	1,095
Monaghan		(No orchar	ds visited	because of	lack of	time.)
Totals	205,192	4,199	180,178	3,822	8,021	385,370

ORCHARD SURVEY OF NORTHUMBERLAND COUNTY.—PART II.

P. E. FRENCH.

INSECTS AND DISEASES.

Diseases and insect pests have, in many instances, done so much damage that they afford a great source of discouragement to many fruit growers. This county is probably as well endowed with those pests attacking the apple, as most counties in the Province. The one very serious insect pest, which is not prevalent here, is the San Jose scale, and it is to be hoped that it will not get a foothold in this part of the Province. It is claimed that the scale cannot survive the cold winters in this section, but the writer found a few of the living insects on five or six trees, in a young orchard which had been out two winters. The nursery stock seemed to be the only source of infestation. The scales had not multiplied very rapidly, so that probably the cold winter had some effect on them. However, there is a possibility that this insect pest might do considerable damage, if allowed to enter, so it is advisable to take every precaution to keep it out.

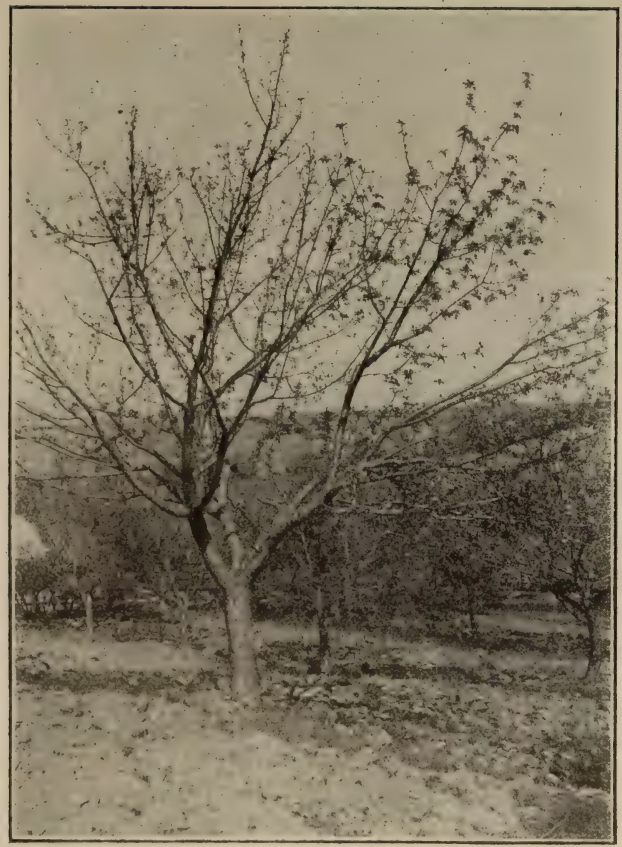
In the unsprayed orchards, the oyster-shell scale has done a large amount of damage all through the country. It is claimed by many growers that this pest is not nearly as bad now as formerly, but many orchards were found this year, containing trees with the bark simply covered with the young, live insects.

The apple canker is very destructive in all parts of the district covered by this survey. Many limbs, and in some cases, whole trees are dying. In many cases it has gained an entrance into the bark through injury caused by sun-scald. This is especially true with the high-headed trees, or those with an open habit of growth. Quite often it gains an entrance into the trunk through injury done by the single-tree.

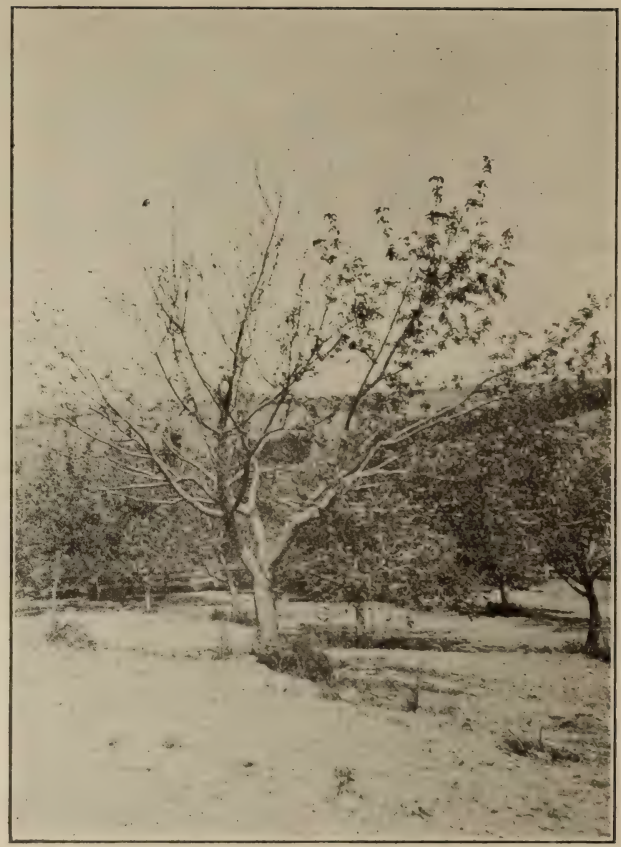
The codling worm, apple scab, and plum curculio, are doing the most damage to the fruit.

The railroad worm or apple maggot was seen in two or three orchards near Smithfield.

Blister mite was very bad this year in the unsprayed orchards.



A Cankered Apple Tree.



The same tree later in the season.

The bud moth, cigar and pistol-case bearers, were bad, especially on the young orchards.

The American tent caterpillar, apple aphis, yellow-necked and red-humped caterpillars, fall web worm, canker worm, were quite common in most sections, and doing considerabe damage.

Collar rot is quite prevalent in some sections.

SPRAYING. Spraying has been carried on regularly and systematically in very few sections of Northumberland County. A few of the more progressive fruit growers are becoming convinced that to grow fruit of high quality, they must combat the insect pests and fungous diseases. Throughout the county there is a very marked lack of intelligent knowledge of spraying and spray mixtures, and of the insect pests and fungous diseases affecting the orchard.

Only a comparatively small number of the growers in this county, who are practising spraying, are doing it with sufficient thoroughness. Too many forget that one spraying, done at the proper time, does much more good than two or three sprayings done at other times. Many are still of the opinion that it does not pay to spray, yet most of these men realize that they will soon have to do something.

Only 30 per cent. of the fruit growers of Northumberland County, sprayed in 1909. Of these 3 per cent. sprayed three times, 44 per cent. sprayed twice, and 53 per cent. sprayed once.

Bordeaux Mixture and Lime Sulphur Wash are the two principal spray mixtures used. Formerly the Bordeaux was used almost entirely, but the Lime and Sulphur has been replacing it the last two years. Most of the growers who are using the Lime and Sulphur Wash are using the commercial brands.

In spite of the poor spraying practice so general in the district, the following tables give conclusive evidence that it pays. In compiling these tables there were used, for comparison, well cultivated and fertilized orchards in every case. Very few of the sprayed orchards were sprayed more than twice, and the cost of spraying did not average more than $5 or $6 per acre.

The income given per acre is the amount realized on the tree in each case, the cost of picking, packing and packages, being deducted in those cases where the gross returns were given.

TABLE 1.—GENERAL RESULTS FROM SPRAYING.

Average per acre.	1907.		1908.		1909.		Aver. yield in bbls. for 3 years.	Aver. income per acre for 3 yrs.
	Bbls.	$ c.	Bbls.	$ c.	Bbls.	$ c.		$ c.
50 Cultivated, fertilized and sprayed.—486 acres.....	75.	92 15	43.3	58 80	47.	68 10	55.1	73.00
68 Cultivated, fertilized and not sprayed.—344 acres..	52.7	55 60	32.	37 15	38.1	42 75	40.9	45.16

TABLE 2.—THE FIFTEEN BEST SPRAYED ORCHARDS COMPARED WITH THE FIFTEEN BEST UNSPRAYED ORCHARDS.

Average per acre.	1907.		1908.		1909.		3 years aver. yield in bbls.	3 years aver. income per acre.
	Bbls.	$ c.	Bbls.	$ c.	Bbls.	$ c.		$ c.
15 Cultivated, fertilized and sprayed.—116 acres.....	111.7	150 10	65.6	94 20	82.3	131 00	86.5	125 10
15 Cultivated, fertilized and not sprayed.—63 acres....	87.4	101 55	52.6	62 70	62.	79 80	67.3	81 35

Table 1 shows that over a period of three years, the 50 sprayed orchards gave an annual average income of $27.84 per acre more than the 68 non-sprayed orchards.

In Table 2, the orchards were all well cultivated and fertilized. This table shows the value of spraying much more accurately than table No. 1, because in these sprayed orchards the spraying was fairly carefully done, while in many orchards used in table No. 1 the spraying was not done intelligently.

Table No. 2 shows that the fifteen best sprayed orchards, for which figures were obtained, over a period of three years, gave an annual average income of $43.75 per acre, more than the fifteen best unsprayed orchards.

TABLE 3.—SELLING PRICE OF SPRAYED AND UNSPRAYED FRUIT.

—	1907	1908	1909	No. of orchards.
	$ c.	$ c.	$ c.	
Sprayed	1 23	1 35	1 45	50
Not sprayed	1 05	1 16	1 12	68

This table represents the prices paid per barrel on the tree, for apples from sprayed and unsprayed orchards. It shows that the fruit from the sprayed orchards brought 23 1-3 cents more per barrel on the average than the fruit from the unsprayed orchards. Note also that the difference in the price paid for sprayed and unsprayed fruit is gradually becoming greater each year.

Every apple and pear orchard should be sprayed three times each year as follows:

(1) Shortly before, or as the leaf buds are bursting. Use lime-sulphur, either commercial or home-made, corresponding to the strength of the commercial diluted one gallon to ten gallons with water. No poison is necessary. This application kills San José Scale, Oyster-shell Scale and Blister Mite, and helps ward off cankers, and apple and pear scab.

(2) Just before the blossoms burst, use commercial lime-sulphur diluted one to thirty or thirty-five, or Bordeaux Mixture (4.4.40) and two lbs. arsenate of lead to each forty gallons. This application is to destroy all early feeding caterpillars, such as Tent Caterpillars, Case-Bearers, Canker Worms, and Bud Moths, and to help against apple and pear scab and cankers.

(3) Immediately after the blossoms fall, use the same mixtures as for No. 2, but the lime-sulphur need not be stronger than one to forty, nor the Bordeaux than (3.3.40). This application is chiefly to control Codling Moth and Apple and Pear Scab, but also helps greatly against Lesser Apple Worm and Plum Curculio.

A fourth application may be given about three weeks after the blossoms fall, with the same mixture as in No. 3, but this is seldom necessary in Northumberland County.

HEADING AND PRUNING. The method of heading and pruning practised by the fruit growers of Northumberland County is probably one of the first things which should be improved. The majority of growers prefer a very high headed tree, and in most cases all the pruning that is done to the young tree is the cutting off of the lower branches.

By getting the tree young from the nursery, say one or two years old, and pruning regularly from the time of planting, one can shape and grow the tree to his own liking. Many of the best growers now prefer a low-headed tree. The advantages of low-headed trees may be stated to be, great ease in picking, thinning, pruning and spraying, and less damage to trees and fruit from winds. The low-headed tree is also more free from sun scald. Many young trees have died because of the long trunk exposed to the sun. They become sun-scalded on the south-west side and this gives an entrance for canker.

Many growers object to low-headed trees because of greater difficulty in cultivating around them. Properly trained low-headed trees will develop ascending branches, so that the difficulty in cultivation is not what one would expect at first thought. The branches on the high-headed tree will often tend to grow downward, as there is as much light underneath as above; thus there is very little difference in the actual cost of cultivation, and there is a great deal saved in the picking, thinning, pruning and spraying of low-headed orchards.

Many of the fruit growers in this county do very little pruning until the tree is of bearing age. This generally results in having a large number of main branches. Then to get the tree fairly open the pruner cuts off nearly all the smaller branches on the lower part of the main limbs. This results in the fruit being borne on the ends of the main limbs; thus, all the weight is on the outer end, and the branches very often break. It is also more difficult to harvest the crop.

In some cases the grower, on finding that his old trees have too thick a top, has pruned all the centre out at once. This sudden opening of the centre has caused sun-scald and canker has entered with the resultant injury or death of the branches.

Much of the pruning done at present is simply the cutting out of dead wood and suckers. Undoubtedly these should be cut out regularly, but it is a great mistake to think that this is the only pruning necessary.

There are two seasons at which trees are generally pruned, in early spring when the trees are dormant, and in the summer shortly before the season of growth ends. One must become familiar with the fruiting habits of his trees before he is in a position to say which is the better time, as the spring pruning tends to make wood growth, while summer pruning tends to force the fruit buds.

A large number of the orchardists in Northumberland County prefer June pruning and do not do any in the spring. Quite often many of these men have not time to get over nearly all the orchard in June, and thus much of it is left undone. It would be much better for these growers to do their pruning early, so that it would be completed before the busy season.

Many growers claimed that they pruned "whenever the knife was sharp." The greatest trouble with this method seemed to be that the knife was not very often "sharp." It is a very good practice to cut out the small unnecessary branches at any time, but one should have a regular time to go over the whole orchard. Early spring is probably the best time to prune non-bearing trees. Older trees of a heavy bearing habit should also be pruned in early spring, while those of a very light bearing habit should be summer pruned.

THINNING. The practice of thinning apples is practically unknown among the fruit growers of Northumberland County. The writer found only two growers in the county who were practicing it, and these were doing it on only a very small scale. Many of the growers think that it does not pay to thin; others claim that

they can do all the thinning required by pruning. To a certain extent pruning is a method of thinning, but it will not take the place of thinning entirely. Experienced orchardists have found that it pays to thin and pays well. They place the cost of thinning apples at five cents per barrel.

Thinning not only increases the percentage of first-class fruit without lessening the bulk, but also encourages more regular bearing; lessens the loss from the breaking of limbs, and gives the grower an opportunity to destroy insect-infested fruit, and thus check the spread of insects early in the season. The thinned tree does not need all its stored up material for the formation of fruit, and thus it is able to form fruit buds for the next year, so that we are more apt to get annual crops.

The time is coming when fruit growers will be unable to produce strictly first-class fruit without thinning.

A low-headed well formed apple tree.

Harvesting. The manner of harvesting depends on the manner of sale. When the fruit is sold on the tree, the harvesting is done by a gang of pickers in the employ of the buyer. Nearly all the early fruit and a large quantity of late fruit is packed in the orchard. Some is picked and put in barrels as tree-run and placed in storage houses, where it is later repacked. The buyers generally require a large number of men to harvest the apple crop in this county.

In a few instances the growers are either picking and packing their own fruit, or picking and selling tree-run in barrels, the buyer doing the packing. Those who are doing this seem to be getting very good results. When growers are doing their own picking they are careful in handling the trees. In many cases where the picking has been done by the buyers gang, considerable damage has been done to the trees through rough usage of the branches.

If the grower has sufficient labor, he is usually in a better position to pick the fruit at the proper time, and can do it at less expense than the buyer. It has been

proven that where the grower is picking and packing his own fruit properly, it is more advantageous to him, and more satisfactory to the buyer.

STORING. The storing of the apple crop in this county is done mainly by the buyer, who generally has a storage warehouse near the railroad. These men usually ship as much as possible in the fall.

The keeping quality of both the early and late fruit is improved by storing in a cool warehouse for at least a few days before packing for shipment. In this way the fruit is cool to a constant temperature before the final packing. On account of this pre-cooling the fruit is not apt to shrink and become loose in the barrels on the voyage.

If there were a few cold storage plants in the county it would aid considerably in the storing of the apple crop and in putting it on the market in better condition. The only cold storage plant in the district is at Trenton.

SELLING. The methods of selling in Northumberland County are:—

(1) To the apple buyer, either by bulk or by barrel on the tree.
(2) To the buyer, packed or tree-run, in barrels.
(3) Shipping direct to wholesalers at the point of consumption.
(4) Through co-operative associations.

The first method is the one usually adopted. In the last three years about eighty per cent. of the apple growers have sold this way. This year the apple buyers started out to buy as early as July 12th, when the fruit was only one-half grown. This method of sale has many disadvantages. It is simply a gamble with the buyer having a little better chance of coming out on the right side, as he is generally better informed about the markets and prices and is usually a better judge of the amount on the trees than is the grower. Quite often it places the grower in a position where he has to take what they will give, while he should have some say in naming the price. Keen competition among the buyers often causes a flat rate to be paid. This is detrimental to the grower who is producing a good class of fruit, as he does not, in many cases, get any more per barrel than the man who is growing a poor quality of fruit. Thus there is very little encouragement to grow a good quality of fruit.

If the buyer has bought by bulk on the tree and the price in the fall is not what he had expected, there is a danger that he will put in as many of the inferior apples as possible, and thus the industry suffers. On the other hand, if the crop is sold by the barrel on the tree, the grower sometimes suffers from not having the fruit picked in time, and thus considerable is lost on the ground. The buyer usually picks those he has bought by bulk first, and sometimes, if he has very much on his hands, those bought by the barrel are neglected. Often the grower expects the buyer to take everything, so that there is generally dissatisfaction one way or the other. Sometimes the fruit goes through the hands of several buyers before reaching the consumer. This naturally takes much of the profit which should rightly belong to the grower.

This method of selling certainly has many objections, some of which have been mentioned above. However, all the trouble does not lie with the apple buyers. It is more in the system itself. Many of these men are doing a great deal for the industry, and honestly doing their best under the circumstances.

Table 4 shows that the prices received under this method of sale are very low:

TABLE 4.—DIFFERENT METHODS OF SELLING, 1909.

—	Total Bbls.	Total $.	Aver. price paid per Bbl.	Total No. orchards.
			$ c.	
Sold on tree to buyers	74,344	82,614 30	1 11	391
Sold packed, or tree run in barrels	9,081	14,151 20	1 55	35
Shipped individually	10,505	17,105 65	1 62	27
Sold through Co-operative Association	7,632	10,953 20	1 43	28

The second method of sale, *i.e.*, selling to the buyer packed or tree-run in barrels, is probably one of the best methods for the ordinary fruit grower where there is no good co-operative association. About 7 per cent. of the growers in this county sold by this method last year, and they realized on the average forty-four cents per barrel more than those who sold on the tree. If the grower will put up a good sample of fruit he generally makes more out of it, and, at the same time, the buyer is well satisfied. Many of the buyers would sooner buy this way, if the growers would pack and grade their fruit properly. The objection to this method of selling is that it is practically impossible to get a uniform pack in those places where the grower is packing his own fruit. In the case where the buyer is doing the packing this objection does not hold good.

Third Method: In looking over Table 4 we see that in 1909 this method of selling netted the most per barrel on the average. At the present time only about 7 per cent. of the growers ship independently. It is one of the best methods of sale, where the grower has a large quantity of fruit, and enough capital to tide him over a bad year. Under the present conditions it is very difficult for the small producer to make a success of it.

Fourth Method, *i.e.*, Through Co-operative Associations: The associations idea is not thoroughly established in this county, there being only about 6 per cent. of the growers who sold through co-operative associations in 1909. There are at present three of these associations in the county, viz.: The Grafton Fruit Growers' Association, Grafton, Ontario; The Cobourg Fruit Growers' Association, Cobourg, Ontario; and the Canadian Apple Exporters, Limited, Trenton, Ontario. The first two of these have only been running one year, so that it is hardly fair to compare their prices with those received by the shippers who have been in business for some time. However, the table shows that the price realized by the growers in these associations, although they have been running such a short time, is 32 cents per barrel more than the price realized by those who sold on the tree direct to the buyer. This is certainly a good start.

It is true that the men who shipped independently last year realized a higher price than those who shipped through the associations, but we must remember that those men are only a small percentage of the total number of growers, mainly men of exceptional business ability who produce and command large quantities. The small growers found that they were at the mercy of the commission men in the Old Country, and that there was little chance of success, so they have stopped shipping individually.

The advantage of co-operative associations may be summed up as follows: It turns the middleman's profits to the producer; sales can be made more directly to the consumer than can be done through the ordinary buyer. It brings the cost

of handling to the lowest possible rate. It induces better railroad, steamship, and other accommodations because the handling of several hundred cars is an item worth competing for. It gives a more even distribution of fruit, because the manager has a large amount under his control.

Supplies of various kinds used on fruit farms can often be bought in large quantities, so that the prices to the grower are only slightly in excess of the actual cost. This is an advantage particularly in such items as spray and box, or barrel material.

Associations are successful in maintaining a uniform pack, and by this means they establish a reputation for their goods. Their brand should be a guarantee for the quality. This securing of a uniform pack is one of the strongest points in favor of an association. It brings better prices. The most rigid grading should be practised, and the best grade will command the price that it deserves. This is a source of encouragement to the grower of good fruit.

Some of the causes of failure are:—

(1) A wrong start. An association should not start on too large a scale. It is impossible to get a large amount of evenly graded fruit the first year. It is much the best way to start on a small scale and gradually work up a reputation and a market for your fruit. Strict rules regarding spraying and grading should be enforced from the start. Otherwise the manager is sure to be called on to sell a large quantity of inferior fruit. This means low prices and dissatisfaction.

(2) Petty jealousies and distrust on the part of the members.

(3) Employment of Management. Men who are capable of handling large quantities of fruit at a good profit are not common, and when one is found every effort should be made to retain him. He should have a salary in proportion to the amount of business and responsibility that must be carried. The manager should be given a fair chance to work out his own ideas, and then if he fails try another.

(4) Too much supervision by the directors and unjust criticism and fault-finding on the part of the members is often the cause of failure.

There should be uniformity in the organization of different associations, so that they can work together in cases where just joint action would be desirable.

Evaporators. Northumberland County is very well supplied with evaporators. Nearly every township has one or two, and these pay from twenty-five to forty cents per cwt. for the apples. They offer an easy market for the wind-falls, etc. No orchards were observed in this survey where the total crop was disposed of to the evaporator.

Canneries. There are three canneries in the district, at Lakeport, Brighton and Trenton. They do quite a large business in tomatoes, corn and peas, and a small amount in apples and strawberries.

Yields, Prices and Profits. In the various tables given the yields and prices received from the various methods of handling orchards and selling the apples are shown. These results are now brought under one head in the following table:

TABLE 5.—YIELDS AND PRICES.

Average per acre.	1907.		1908.		1909.		Aver. yield in Bbls. for 3 years.	Aver. income per acre for 3 years.	Aver. prices per Bbl. for 3 yrs.
	Bbls.	$ c.	Bbls.	$ c.	Bbls.	$ c.		$ c.	$ c.
Cultivated, fertilized and sprayed. (Best fifteen). 116 acres.....	111.7	150 10	65.6	94 20	82.3	131 00	86.5	125 10	1 45
Cultivated, fertilized and not sprayed. (Best fifteen)—63 acres....	87.4	101 55	52.6	62 70	62.	79 80	67.3	81 35	1 20
50 Cultivated, fertilized and sprayed.—486 acres	75.	92 15	43.3	58 80	47.	68 10	55.1	73 00	1 32
68 Cultivated, fertilized and not sprayed.—344 acres.....	52.7	55 60	32.	37 15	38.1	42 75	40.9	45 16	1 10
69 Cropped.—344 acres...	46.3	47 20	25.6	31 15	35.8	39 45	35.9	39 25	1 09
9 Sod.—188.....	41.6	43 60	33.	30 60	39.2	42 28	37.9	38 82	1 02

NOTE.—The incomes per acre and prices per barrel are in every case the value on the tree. In the case of the sod and cropped orchards there was very little spraying done, so that it was not taken into account.

The figures in Table 5 show very plainly the yields and prices received by the Northumberland County fruit growers. Not only do proper methods of management give increased yields, but it it is quite evident from the figures in this table that they also materially increase the price per barrel.

TRANSPORTATION FACILITIES. Th southern part of this county is very well supplied with transportation facilities. The Grand Trunk Railway affords means of transport either east or west. The boats on Lake Ontario carry what is shipped to the United States.

The Canadian Northern Railway, which is now under construction, will probably be in working order by next year. As a result of this competition the railroads will probably be more desirous of giving good service than they are at present.

In the northern part of the county the growers have a long distance to haul the crops, and as apples are a heavy product, this takes off much of the profit. The roads are very hilly, so that it is impossible to take very much at a time.

If there was more fruit grown along Rice Lake it could easily be handled by boat to Peterboro. This is not done to any extent at present, but the writer does not see any reason why it could not be done if there was a large enough quantity grown.

MARKETS. Up to the present time the market has been mostly in Europe. Most of the apples go to Liverpool and Glasgow, and are sold through the "Receivers" there. A small amount is shipped to the West, but this is a very small portion of the total apple crop. Many of the shippers claim that the freight rates to the West eat up all the profits. During the last season a few men have shipped to the United States and report fair results.

The pears grown in this locality are consumed locally.

Cherries and raspberries are not grown to any extent. The local market takes all that are grown.

Strawberries are grown in small quantities in a few sections of the county. These are sold on the local market or sent to the cannery.

Population. It is hard to acknowledge that the "Banner Apple County of Ontario" is steadily decreasing in population. Nevertheless, this is true, as the following figures prove. The present population is only 80 per cent. of the population in 1881. This decrease is due mostly to the westward movement. In the better fruit sections of the county we find that the population is not decreasing as rapidly as it is in those sections where the people go in more for mixed farmings, and Northumberland County is not decreasing as rapidly as some of the other counties in Ontario.

The following table shows that there has been a gradual decrease in every township. The town of Cobourg decreased from 1881 to 1901, but has increased the last ten years. This is probably due to it having grown in favor as a summer resort. The increase in the case of Campbellford is due to the construction work on the Trent Canal.

Table 6.—Population of Northumberland County.

—	1881	1891	1901	1909	Increase.	Decrease.
Townships:						
Hamilton	5,155	4,313	3,623	3,495	.....	1,660
Haldimand	5,401	4,484	3,946	3,484	.....	1,917
Cramahe	3,481	2,995	2,556	2,434	.....	1,047
Brighton	3,470	3,017	2,774	2,101	.....	1,369
Murray	3,560	3,303	2,993	2,558	.....	1,002
Seymour	3,783	3,509	3,261	2,675	.....	1,108
Percy	3,768	3,388	3,216	2,690	.....	1,078
Alnwick	1,471	1,321	1,247	872	.....	599
South Monaghan	1,148	1,093	929	869	.....	279
Town:						
Cobourg	4,957	4,829	4,239	5,265	308	.....
Villages:						
Colborne	1,079	1,068	1,017	955	.....	124
Brighton	1,547	1,479	1,378	1,375	.....	172
Campbellford	1,418	2,424	2,485	2,818	1,400	.....
Hastings	885	812	815	775	.....	110
Total	41,123	38,035	34,479	32,366	1,708	10,465

Net decrease, 8,757, from 1881 to 1909.

Labor Conditions. The scarcity of labor is one of the first difficulties which confronts the fruit growers of this county. Many men of the laboring class have gone West or to the city, and the railroad construction, which is now being pushed forward, is using many of those at present in the county. The farmers themselves are somewhat to blame for the scarcity of labor. It is true that the widespread stories of the easily made money in the West, have enticed many away, but if the conditions of the laboring men on the farm were better, probably many of these men would have remained in the East. Most of the farmers expect the men to work very long hours for a wage which is much below that paid in other lines of business. Many of the farmers with one hundred acres of land are doing practically all the work themselves. They would rather neglect the work than pay more than $25 and board per month. The more progressive fruit growers, however, find that it pays them to give good wages and treat their men well. The men who are doing this seem to have very little trouble in getting men. The farmers,

as a rule, are getting a higher price for their produce than formerly, and should be able to pay a higher wage.

Land Values. Land values vary considerably in different sections of the county. The proximity to transportation facilities is probably the largest factor in deciding the value. Along the Kingston Road an ordinary farm with good buildings would sell for $60 to $100 per acre, while three or four miles back, good farms can be had for $30 to $80 per acre. Land suitable for fruit growing at such prices is very reasonable.

The following table gives values and areas of the nine townships of Northumberland County:

Table 7.

Townships.	Area in acres.		Assessment value.	
	Total.	Cleared land.	Average per acre.	Total land.
			$ c.	$
Hamilton	62,280	57,945	21 77	1,356,465
Haldimand	76,355	62,062	13 98	1,067,570
Cramahe	46,470	38,893	16 85	783,265
Brighton	48,100	36,693	17 82	857,090
Murray	48,593	35,758	16 59	806,200
Seymour	67,292	44,076	11 78	792,925
Percy	51,417	36,194	14 69	755,475
Alnwick	17,754	13,600	14 11	250,580
South Monaghan	18,088	14,438	28 23	510,675
Totals	436,349	339,659	16 45	7,180 245

Development and Possibilities. It is only within the last forty or fifty years that the fruit industry has developed in Northumberland County. About 1860 a few commercial orchards were planted, but none of these were very large. In most instances these orchards were neglected, and did not prove very profitable. For the next twenty years there was very little commercial planting done, most of the farmers simply planting an acre or two for home use. In nearly every case the trees were placed too close together, twenty or twenty-five feet square being the average. These orchards, like the former ones, were neglected. Practically no pruning was done and the farmer seemed satisfied with an occasional plowing and manuring. In the early nineties there was a boom in the apple industry, and many commercial orchards were planted. Better orchard practices were more common and the orchards were put more on a paying basis. Still there were very few that were given extra good care.

It is only within the last ten years that the industry has received its greatest boom. About one-half of the trees now growing have been planted within this period. The good prices and fair crops have made, not only the farmers, but men in other lines of business, interested in fruit growing. Young orchards are now being planted out all over the county.

The possibilities of Northumberland County as an apple-growing section can scarcely be exaggerated, if the fruit growers as a whole will wake up to the fact, that to grow fruit most successfully they must take the very best care of their orchards. Some are doing this, but the percentage is very small. One man told the writer that when he had to thin, spray and prune his orchard to get good apples he would go out of the business. The sooner such men get out of the busi-

ness, the better for the apple industry. It is the men who are thinning, pruning and spraying along with good cultivation and fertilizing that are making the most money out of the business and are upholding the reputation of the county as an apple producing section.

In some sections drainage is essential to the best development of the industry, but this applies to a small portion, mainly along the lake front and the western part. Much of the best orchard land is on high ground with a good porous subsoil.

Peach and sweet cherry culture will probably never be a paying business to any extent in this county, as the winter is rather severe for these more tender fruits.

Sour cherries are not grown in very large quantities, but what were noticed in this survey seemed to be doing very well indeed, and there is no reason why a sour cherry orchard should not be a paying proposition. There is a good market for them in Montreal and Toronto.

A crop of hay and a crop of apples.

The few strawberry beds visited were doing exceptionally well, and this industry should be encouraged.

The greatest opportunity in the fruit line in Northumberland County is undoubtedly in the apple business. The writer sees no reason why this county should not be able to grow as good apples of the hardier varieties, as any section in the Province, if the growers would improve their methods. Nature has done her part and done it well. Here we have a rich soil, good climate, fine roads good transportation facilities, unlimited markets and in the near future, Northumberland County bids fair to become one of the chief apple producing sections of Canada.

ORCHARD SURVEY OF THE EASTERN TOWNSHIPS OF THE NIAGARA DISTRICT.

F. M. Clement and V. King.

Orchard survey work was taken up first in the summer of 1909 by the Ontario Department of Agriculture and the Ontario Agricultural College, with the intention of collecting definite information with regard to the Horticultural situation in different sections of the Province. The field work in the Niagara district was started by W. D. Jackson, B.S.A., in June of that year, who worked in the townships of Barton, Saltfleet, and Grimsby. This year, 1910, the work was continued and completed by the writers in the four townships, East Clinton, South Grantham, and Niagara, and is intended to supplement the work of the previous year.

The plan employed was that of a farm-to-farm canvass with specially prepared blank forms on which were noted the owner's name and address, location and size of the farm, and the number of acres in fruit. If the grower was making a specialty of more than one kind of fruit, he was questioned on each with regard to acreage, bearing and non-bearing, the age of the trees and the distances of planting, and the soil on which it was growing, with the depth and drainage. Special attention was paid to methods of cultivation, to the cover crops and fertilizers used; pruning, thinning, spraying, with the kind of mixture used and the results obtained; insect pests and fungus diseases, and the manner of selling were also given careful attention. Also, where possible, yields and prices were obtained, and in every case the writers went over the farms and noted their condition. This plan differed from that of the previous year only in that a separate blank was used for each fruit, where formerly a general blank was used. The change was a decided improvement.

Situation. The situation of the Niagara Peninsula is ideal for tender fruits. Lake Ontario extends westward about forty-four miles farther than the farthest point eastward of Lake Erie. This point is connected with Lake Ontario by the Niagara River, which flows due north, forming a strip of land three sides of which are bordered by water. At no point is this more than thirty miles wide. The highest contour, about nine hundred feet, is reached midway between the two lakes, and the slope being gradual each way never are the variations in temperature so extreme as in most other sections in the same latitude. But the Niagara district proper is not so extensive. The Niagara escarpment or mountain extends from Hamilton to Queenston. This is an abrupt rise of from seventy-five to one hundred feet. At Hamilton it extends back in varying distances until it reaches the extreme of seven miles at Queenston. The country lying between Lake Ontario and the escarpment includes the whole of the survey and is the Niagara district proper. The whole section slopes gently to the north, which gives it a free circulation of air and consequently frost injury is less extensive than in many parts of the tender fruit districts of the Province.

Contour. Lake Ontario is two hundred and forty-six feet above sea level. The two hundred and seventy-five foot contour follows the lake in varying distances from the shore, ranging from one-half mile at Beamsville to one and one-half miles at Niagara. The three hundred and fifty foot contour, however, follows very closely the Queenston Hamilton Stone Road, and may be said to mark the bottom of the first ledge of the escarpment. The four hundred foot contour is still farther

from the shore, and marks the beginning of the abrupt rise of one hundred feet or more—the Niagara escarpment. This rise might appropriately be called the Ten Million Dollar Ridge, as it makes possible the production of the tenderer fruits. Again the rise is gradual until the highest point is reached near Fonthill, from which the waters of both Lakes Erie and Ontario are visible. But we are concerned with only the section below the escarpment. Thus the district surveyed is divided into two parts, the somewhat level though gradual sloping northward section bordering on the shore, and the somewhat rolling clay loam section of the first ledge.

Climatic Variations. The extremes of temperature vary a little even on this area. The greater the distance from the shore, the less influence the water has. A number of residents claim that the temperature varies as much as one degree for each half mile for the first mile and one-half from the shore, with a gradually diminishing variation as the distance increases. That is, on a given day in winter, especially when it is very calm, it is often times three degrees colder one mile and a half from the shore than right at the shore, with even a little lower temperature two, three, and four miles from the shore. Just the opposite is true in summer, the inland districts then being warmer. The following tends to bear out these statements. The first Yellow St. John peaches were picked this year at Queenston, seven miles from the lake, on August the twenty-second; while in Louth, two miles from the shore, the first were picked on August the twenty-sixth, four days later; while again on the shore in Niagara Township the first were not picked until September the first, or more than a week after the earliest. The orchards were all in a good state of cultivation, and the fruit in the same stage of maturity as nearly as could be judged by the writer.

Soils. We shall not here concern ourselves with geological details of the soil formation, except to state that evidence points to the fact that at one time the whole district was lake bottom and that the soil was deposited as the water receded. The surface soil and the subsoil as we find them to-day are of more interest, and we shall classify them according to what they are best fitted to produce, rather than according to their composition.

As a general rule, the soil along the shore is of a sandy and loamy nature, but varies sometimes to the greatest extremes even on a few acres. This sand extends backs from the lake shore from one to two miles and sometimes more. Along the Niagara River is another strip of sand extending from the river bank westward about one mile and a half. It must be remembered that this is only a rough outline, because often times narrow strips of clay extend to the water's edge and sand knolls crop out at various places in the heavy clays.

The first ledge and some parts along the banks of the streams are of a clay loam nature. As a rule this is easily drained and will, when sand is no longer as cheap as it is to-day, be more largely used for peach culture than it is at present. As it lies to-day, it is well suited to grapes, plums, pears and apples.

The central portions of the townships, especially farthest east, are of a clay or heavy black loam nature, with many variations. Except near streams this is difficult of drainage, because of the too gradual slope of the country. The largest areas of this soil are found in Grantham and Niagara. The subsoil is heavy and comparatively impervious to water. However, it is excellent grape soil and is giving some of the highest yields of the best quality fruit. Plums, pears, and apples do fairly well on it also.

The following table gives a fair estimate of the areas of the different soils surveyed, classified as above.

Township.	Sand soil easily or naturally drained.	Clay loam, easily drained.	Clay, black loam, etc., with heavy subsoil.
Clinton	4,160	1,600	4,480
Louth	6,800	2,880	3,360
Grantham	7,600	5,320	5,280
Niagara	8,280	2,920	7,280
Total	26,840	12,720	20,400

Thrifty nursery stock in the Niagara District.

History. The peach and grape history of the Peninsula extends back more than fifty years, but neither industry was carried on, on a large commercial basis, until between 1885 and 1890.

Before 1880 the graperies were few and very scattered, but with the introduction of the Niagara at that time a new stimulus was given to the industry. Vines of this variety sold as high as $1.25 each, and the grower was obliged to return all cuttings to the nursery, but prices were very high and single vines often yielded as much as two or three dollars' worth of fruit. In 1880 there were about four hundred acres of grapes, but in 1890 the acreage had grown to more than two

thousand acres. By 1901 the acreage had increased to 5,750, and to-day we have more than 10,000 acres under this crop, with prospects of a very steady increase for a number of years.

The peach industry began with the introduction of natural fruit planted between the rows of apple trees, along the fences, or in the door yards. The first record of commercial planting that we have is from Mr. Dennis Woolverton, of Grimsby, who sold them in Hamilton market about the year 1820. In 1856 Mr. C. E. Woolverton, of Grimsby, planted the first large commercial orchard that we have any record of, five acres of such varieties as Barnard, Crawford, Oldmixon, and Mountain Rose. Mr. Woolverton was the first also to ship by express to different Ontario markets. From 1890 to 1898 the industry boomed and fell. Many growers did not understand peach culture, which resulted in a large quantity of poor grade fruit being thrown on the market. In many cases the fruit did not pay the express charges. Then came a very severe winter in 1897-98, and many trees were killed. This forced many out of business and discouraged others who then refused to replant. But the best men stuck to it and others came back slowly.

In 1904, the first shipment was made, by frieght, to Winnipeg, and since that time, though plantings have increased largely, at no time has the market been over supplied. Several hundred cars were forwarded to the West this year. The first shipments were made to Europe in 1909 and were entirely successful. This year, 1910, several thousand cases were forwarded, and though the work is still in the experimental stage, it is expected that it is possible to develop there a large and profitable market.

Also this year cherries, strawberries, currants, gooseberries, and a few raspberries were sent to the West. In no case was the experiment discouraging, and it is expected that a large quantity of these fruits will be forwarded next year. The market is there. It is simply a case of being able to land the goods in first-class condition.

The Situation with Regard to Each Class of Fruit.

Peaches. Peach production is the leading industry of the Peninsula, and it is increasing much more rapidly than any other. The plantings in the spring of 1907 and 1908 were exceptionally heavy. The plantings of 1909 and 1910 were heavy also, but owing to the scarcity of nursery stock were somewhat lighter than the two previous years. The following table shows the trees bearing and the non-bearing by townships. All trees three years old and younger in the spring of 1910 are considered non-bearing.

Township.	Bearing.	Non-bearing.	
Clinton	37,253	66,078	
Louth	57,887	78,867	
Grantham	48,913	69,287	
Niagara	103,564	133,854	
Total	247,617	348,086	4,495 acres

From this it will be noticed that the non-bearing stock is considerably in excess of the bearing stock, which would indicate that in four years' time, or when

the young trees come into bearing, the production will be more than doubled. But before coming to such a conclusion, it might be well to take some other factors into consideration. A very large percentage, perhaps as high as twenty-five per cent. of the trees never produce a fruit that goes on the market, and there is another large percentage, perhaps as large as the above, that produces only second grade fruit. There are several reasons for this: (1) A great many are neglecting the cultivation, spraying, etc., of their trees; (2) Fungous diseases, insect pests, etc., claim many of them; (3) Little Peach and Yellows have to be reckoned with; (4) Many are planted on speculation, to sell the place, on soil too wet and heavy to produce in quantity; (5) Many trees now counted as bearing have passed their day of usefulness and will soon have to be removed.

It must be remembered, too, that our markets are expanding rapidly, and that up to date we have not kept pace with this expansion in the production of fruit of first quality. A large number of growers, some buyers and companies are supplying the high-class trade and getting good returns. But even to-day and in the last few years when prices have been good some claim that their fruit has not paid them. And both classes of producers are likely to continue. The one with good quality goods will get good returns, while the other will handle his at a loss. the market is calling for the former, but it is overstocked with the latter.

Grapes. The grape industry is making steady, gradual growth. The prices received are only fair, but they are sufficiently remunerative to induce growers to keep pace with the gradual extension of market. Following are the figures for the surveyed area. Two years and under in 1910 are considered non-bearing.

Township.	Bearing.	Non-bearing.
Clinton	147,241	22,714
Louth	255,215	54,280
Grantham	296,497	53,547
Niagara	220,606	31,012
Total	919,559	161,553

The figures do not by any means indicate excessive planting. There are a number of reasons for this, the principal of which are: (1) Peach growing offers greater remuneration; (2) Because of random distribution, the price for the past two seasons has been comparatively low. (3) The heavy cost of setting, posting, and wiring the young plantation. (4) Grapes are a staple article and there is less speculation in their production.

There are still, however, many acres of excellent soil which would give better returns in grapes than in the crop it is now producing, whether that crop be hay, grain, pasture, or in some cases peaches. Many on the sand are removing their grapes and planting peaches, so that they can use the soil for the crop for which it is best adapted. The same fact should apply to some orchards on poorly drained, shallow clay and clay loam. This will give an excellent quality of grapes in good quantity, with reasonable care and treatment, while peaches on it must be nursed to get profitable returns.

A private trade is gradually springing up which takes thousands of baskets. The grape juice or sweet wine industry drew from the general trade a large quantity this year. The wineries are taking large quantities each year.

The marketing of poor varieties, such as the Champion, has in times gone past done much to hurt the sale of first-class fruit. Campbell's Early and Moore's Early, fruits of better quality, are, however, gradually taking the place of the above, which is now scarcely planted at all. The habit of cutting the fruit before its season should be discouraged also. Poor, sour fruit is no advertisement for the good fruit that must follow.

The grapery has a place on the average farm that no other fruit can take, unless it be the winter apple. There are many fifty and one hundred acre farms that have on them no fruit at all, grown commercially, on which a grapery of eight or twelve acres would greatly increase the income. At present these farms are used entirely for grain and stock, but demonstration has proved that the soil is admirably adapted to this fruit. Grapes, with good care, produce profitably the third year, and must be considered a first-class investment on land worth from $100 to $150 per acre. They pay good interest on a much heavier investment.

Apples. For a number of years the apple industry has been gradually on the wane. This is due principally to lack of interest coupled with the ravages of the San Jose scale. Before the value of lime-sulphur was fully demonstrated, many orchards were badly weakened. Prejudice seems to have played a large part also. The early experiments, principally those with crude oil and whale oil soap, were not successful, and the feeling grew that scale on an apple tree could not be controlled by spraying. That feeling is not yet fully dispelled, especially in a few sections. Also, until quite recently, the price for apples was very low, while the good price of other fruits, peaches, berries, etc., has attracted all the interest. As a consequence, seventy-five per cent., or perhaps more, of the apple orchards to-day are not paying interest and taxes on the ground on which they stand. The small number of trees of recent planting indicates quite clearly the feeling of the growers as a whole. But still a few are quite optimistic and are planting quite heavily of the fall varieties.

Township.	Bearing.	Non-bearing.	
Clinton	12,574	20	
Louth	12,825	515	
Grantham	10,453	797	
Niagara	13,828	80	
Total	49,680	1,412	1,331 acres

Clinton stands first in quantity and quality of winter apples produced, and in 1908 and 1909 sent out a considerable quantity of box fruit. Louth and Grantham are producing some fruit of fair quality, but it is very limited compared with what is possible from the trees now of bearing age. Niagara, though it has the largest number of trees, is producing practically nothing, scarcely an orchard is receiving even fair attention. Hundreds of trees were cut down and used for fire wood or the manufacture of tool handles during the last few years.

The Jordan Harbor Experiment Station has been an incentive to some in the immediate vicinity to care for their orchards, but the enthusiasm does not seem to have become general. It must be remembered, though, that wherever an orchard of good varieties is being scientifically cared for, it is yielding good returns, demonstrating quite clearly the possibilities of the district. The trend of opinion to-day

is the planting of summer varieties, such as Duchess and Astrachan, for the Western market. The former variety in particular is doing exceptionally well where cared for, and it is very probable that a large acreage will be planted in the next few years.

The best apple orchards are close rivals of the best peach orchards, but generally have been neglected, while the peaches have been nursed.

PLUMS. All trees that have not borne a fair crop are considered non-bearing.

Township.	Bearing.	Non-bearing.	
Clinton	17,075	7,360	
Louth	12,933	2,775	
Grantham	13,797	5,031	
Niagara	21,841	4,008	577 acres

Plums are not a leading crop in any section, but they have a place and many who are giving them good care and attention are being well repaid for the trouble. Distant markets are taking an increasing quantity each year, and the tendency is to plant certain varieties for this trade.

A large number of orchards are badly neglected and contain many varieties, some of which are unsuited to the present trade. The fancy plums are coming more and more into favor. It cannot be said that plums are over-produced, especially for canning purposes, as some years small quantities are imported from New York State for this purpose.

PEARS. Pears, like plums, are, as a whole, a minor consideration, but are usually deserving of a better place. An excellent box trade is being worked up gradually near home as well is in the West. The Bartlett is the leading pear for this purpose, but owing to the ravages of the blight is not being planted extensively. The Duchess is coming slowly into increased favor. The Keiffer is being largely planted for canning purposes. Its good canning and heavy yielding properties make it quite a favorite in spite of its poor quality.

Township.	Bearing.	Non-bearing.	
Clinton	13,352	1,895	
Louth	10,540	5,793	
Grantham	11,263	4,000	
Niagara	18,825	5,478	549 acres

CHERRIES. It will be noticed that the young trees—those under four years of age—are about two-thirds the number of the bearing trees. This speaks for itself—good prices in the last few years have stimulated planting.

Township.	Bearing.	Non-bearing.
Louth	3,847	4,983
Clinton	4,406	1,941
Grantham	6,313	3,749
Niagara	6,052	3,802

Of this number, the great majority are sour varieties, only a few, 2,726 bearing and 846 non-bearing, being sweet.

It is very difficult to obtain accurate information about cherries for the reason that they are often planted either in the garden or back yard or along the fence. But sweet cherries will stand much heavier planting. Many are experiencing trouble in getting the nursery stock to start. Also, many trees after reaching the age of eight or ten years weaken and die from the top downward. No reason is assigned for this.

The heaviest plantings of sour cherries were made in the springs of 1907 and 1908. These, as a whole, are strong, healthy trees, making vigorous growth. The growers are very optimistic with regard to markets and prices, but express no little concern over the labor for the picking season.

A splendid block of 1 year sour cherries.

Raspberries and Blackberries. Clinton, 97 acres; Louth, 156 acres; Grantham, 184 acres; Niagara, 72 acres; total, 509 acres.

Raspberry culture is of considerable importance in the whole peninsula, but more particularly so in the sections East of Jordan Harbor and Port Dalhousie. They are used much for interplanting and for fillers, especially on the smaller farms where the most intensive methods are practised. Those used as fillers are not taken into account in the above figures. Plantings in the last two years have been very heavy but not excessive, as far as the market is concerned.

Black raspberries are planted only in limited acreage, there being not more than twenty-five acres in the four townships.

Blackberries are of considerable importance in Louth and Niagara, these townships having respectively forty-nine and thirty-one acres. Clinton and Grantham have but a small area not exceeding forty acres between them.

Here, as in the cherry industry, the labor problem in the picking season is the most important factor. The writer believes that the harvesting of those two fruits has almost reached its limit under present labor conditions.

Currants and Gooseberries. Currants are again slowly but surely asserting their right to a place on a fruit farm. Exceptionally high prices have led to increased plantings and the cultivation of the old plantations. They are used largely as a filler and as an intercrop.

Township.	Red.	Black.	Gooseberries.
Clinton	17,130	12,975	4,525
Louth	10,000 (estimated)	10,000	2,850
Grantham	9,095	5,747	4,297
Niagara	9,435	775	3,110
	45,660	29,497	14,782

Gooseberries, too, are gradually winning a place. Demand is increasing very rapidly, but a limited supply of nursery stock has somewhat curtailed the planting. It is at present impossible for the factories to get the required quantity. It is doubtful if the growers, as a whole, understand the requirements of the gooseberry, and as a consequence the returns are not as large as they might be.

Strawberries. Strawberries are a very important crop, especially in the vicinity of Jordan, where conditions are almost ideal for their culture, but in no other section are they considered a leading industry. They are used largely as a

Township.	1910	1911
Clinton	76	65
Louth	183	189
Grantham	98	88
Niagara	41	52
	398	394

filler or intercrop in the young orchard. The demand for early berries is increasing and the price for the first few shipments is always exceptionally high. The price for the midseason and late fruit has been comparatively low the last two years, and the acreage has somewhat fallen off, but now that it has been clearly demonstrated that shipments can be made to the West successfully, it is expected that the acreage will increase and also that better attention will be given to the quality of the fruit.

ORCHARD SURVEY OF THE WESTERN TOWNSHIPS OF THE NIAGARA DISTRICT.

W. D. Jackson, B.S.A.

This work was commenced by the writer on the first of June, 1909, under the direction of the Fruit Branch of the Ontario Department of Agriculture, Toronto, and the Horticultural Department of the Ontario Agricultural College, Guelph, the purpose of the work being to obtain more definite and accurate information regarding the present standing of the fruit industry in the Niagara fruit belt. Being provided with note book and special blank forms every phase of the work as far as possible was reported on, such as the number of trees of the different varieties of fruit, their age, distance of planting, acres, type of soil, cultivation methods, pruning, fertilization, spraying, fungous diseases and insect pests, crop yields, markets, etc. Although the report form used was quite exhaustive it was not altogether suitable for a complete report of the farms in every case. All farms of four acres and over were visited and reported on, while smaller lots were frequently visited and their condition noted. The writer in every case went over each farm reported and made note of the present condition. During the season 450 farms were reported on and over 500 were visited.

Physiography. From this standpoint the Niagara district requires but little comment at this time, the factors which make it famous for its tender fruits having been treated by writers on former occasions. However, the district includes that part of the counties of Wentworth and Lincoln lying along the south shore of Lake Ontario and north of the Niagara escarpment—the mountain. This strip of land varies from one to three miles or more in width and the area covered in the survey of 1909 includes those parts of the townships of Barton, Saltfleet and North Grimsby lying north of the mountain, or the section extending from Hamilton east about 21 miles. The section indicated is rather flat with a more or less uniform slope from the base of the mountain north to the lake. In several places a stream, gully or a more or less rolling nature of the land will make a slight deviation from the above general slope, but this does not materially affect the general contour or topography.

This general northerly slope gives good atmospheric drainage, reducing the possibility of early frosts to a minimum. The northern slope also retards early spring growth to a greater or less degree, thus reducing the danger of late spring frosts. It also reduces winter injury to a minimum, due to the fact that there is less fluctuation in temperature, and the soil upon freezing in the fall remains frozen until spring, thus eliminating in a very marked degree the damage caused by alternate freezing and thawing during the winter. The large body of water, Lake Ontario, to the north, with its cool winds in summer and warm winds in winter, tends to moderate and unify the climate. The seasonal influences of large bodies of water upon the surrounding country are too generally understood to require further comment.

The Soil. The soil of the Niagara district is of the Medina sandstone formation. This layer of rock from which the soil of the district has been built up forms the lower layer of rock of the silurian age, a geographical division in the rock crust of America. On the top of the Medina sandstone group of rocks comes a series of limestone shales known as the Clinton rock, and above this the Niagara limestone.

The soil formed from this Medina sandstone, and to some extent from other

rock formations, and also the deposits of the old lake bed, which the district is supposed to have been, is of a varying character. The soil ranges from a rather light sand to a heavy red clay, and the nature of the soils in the various sections of the district determines in a large measure the kinds of fruit grown in the particular sections.

In the vicinity of Hamilton and east through Barton township the soil is for the most part a dark loam well adapted to truck gardening, and in this section the farmers go in for truck gardening to a greater extent than they do fruit growing. A good many of them state that truck gardening is the more profitable, and what little fruit they have is to supply their customers in the fruit season. In dividing the district roughly we find from the Red Hill east to Stoney Creek the soil is of a sandy and clay loam nature, and the growers are more extensively into fruit growing, truck gardening being of little importance. General agriculture is, however, followed to a considerable extent in this section. Of the fruits grown

Working in the Demonstration Orchards.

possibly peaches and grapes are the most important, although plums and cherries are extensively grown, as are also the bush fruits. From Stoney Creek to Fruitland the soil varies from a clay loam to a heavy red clay and in this section plums, pears, grapes and apples are most extensively grown, with peaches along the water front and in the shelter of the mountain where the soil is lighter and more sandy.

From Fruitland to Winona the soil is lighter and deeper, being of a sandy or clay loam nature. On this soil peaches again predominate or at least form a greater part of the fruit grown than in the section west of it. Cherries and grapes are also prominent crops. Just in this connection it is worth noting the large number of cherry trees which have been planted in 1908 and 1909, the boom in cherries being due no doubt to the good yields and high prices of the last few years. There is another rather clayey section west of Winona, which is planted to a greater or less extent to those fruits which are more adapted to clay soils than the peach, especially pears, plums and grapes. Deep sandy soil is again encountered. Some two miles west of Grimsby and from here to the eastern boundary of North

Grimsby the soil is mostly a deep sand or sandy loam, which is especially adapted to peaches and this crop is by far the most important in this section of the district.

Summarizing, the soil of the Niagara district varies greatly, ranging from a heavy red clay to a rather light deep sand or sandy loam. The heavy clay appears between Fruitland and Grimsby and also here and there in other sections where sandy and loam soils predominate. A dark clay and sandy loam is the characteristic soil in the vicinity of Bartonville. Sandy and clay loam soils are more or less the predominating soils of the Stoney Creek, Winona and Grimsby sections. The fruits grown on these different types of soil show to some extent the adaptability of certain fruits to certain soils. Thus the type of soil may in a measure be judged by the kind of fruit grown or the kind of fruits may be determined by the type of soil.

Table 1 shows the number of trees or vines of the different kinds of fruit in the three different townships surveyed, and also the total of the three townships.

TABLE 1.

Township.	Apples.	Pears.	Peaches.	Plums.	Cherries.	Grapes.
Barton	3,145	3,806	20,256	7,675	2,502	19,552
Saltfleet	27,527	55,992	218,620	148,297	22,812	703,446
Grimsby	12,624	15,819	140,664	61,255	12,381	284,940
Total	43,296	75,617	379,540	217,227	37,695	1,007,938

Table 2 shows the number of acres of trees and vines of the different kinds of fruit, in the different townships and also the total acreage of each.

TABLE 2.

Township.	Apples.	Pears.	Peaches.	Plums.	Cherries.	Grapes.
Barton	66.1	26.30	129.25	44.50	18.05	41.50
Saltfleet	571.15	281.36	1,081.45	828.55	142.35	1,538.75
Grimsby	269.75	212.00	1,001.50	360.30	73.50	676.65
Total	907.00	519.66	2,212.20	1,233.35	233.90	2,256.90

Table 3 shows the average number of trees or vines per acre for the three townships, and is based on the results of Tables 1 and 2.

TABLE 3.

Kind of fruit trees.	Average No. trees per acre.
Apples	47.7
Pears	145.7
Peaches	171.5
Plums	176.1
Cherries	161.1
Grapes	446.6

Distance of planting of the different kinds of fruit.

In connection with the distance between the different kinds of fruit trees there is considerable variation. Tables 4 to 9 will give an idea as to distances at which the trees of the different fruits are set.

TABLE 4.—DISTANCE BETWEEN APPLE TREES.

Distance apart.	No. of orchards.	Per cent.
40 ft. x 40 ft.	14	7.142
36 " x 36 "	5	2.551
35 " x 35 "	8	4.081
32 " x 32 "	14	7.142
30 " x 30 "	124	63.265
30 " x 40 "	5	2.551
25 " x 25 "	7	3.571
20 " x 20 "	5	2.551
Other distances	14	7.142

TABLE 5.—DISTANCE BETWEEN PEAR TREES.

Distance apart.	No. of orchards.	Per cent.
20 ft. x 20 ft.	26	8.666
20 " x 16 "	9	3.000
18 " x 18 "	22	7.333
16 " x 16 "	79	26.333
15 " x 15 "	52	17.333
14 " x 16 "	12	4.000
14 " x 14 "	16	5.333
12 " x 16 "	9	3.000
12 " x 12 "	16	5.333
Other distances	59	19.666

TABLE 6.—DISTANCE BETWEEN PEACH TREES.

Distance apart.	No. of orchards.	Per cent.
20 ft. x 20 ft.	32	7.209
20 " x 18 "	40	9.302
20 " x 16 "	14	3.255
18 " x 18 "	45	10.465
18 " x 16 "	26	6.046
16 " x 16 '	80	18.604
15 " x 15 "	69	16.046
14 " x 14 "	15	3.484
12 " x 16 "	14	3.255
Other distances	.....	21.950

TABLE 7.—DISTANCE BETWEEN PLUM TREES.

Distance apart.	No. of orchards.	Per cent.
18 ft. x 20 ft.	10	2.785
18 " x 18 "	23	6.685
16 " x 20 "	14	3.902
16 " x 16 "	97	27.019
15 " x 15 "	66	18.387
15 " x 12 "	20	5.571
14 " x 14 "	21	5.849
12 " x 16 "	13	3.642
12 " x 12 "	15	4.178
Other distances	64	21.169

TABLE 8.—DISTANCE BETWEEN CHERRY TREES.

Distance apart.	No. of orchards.	Per cent.
20 ft. x 20 ft.	35	12.962
20 " x 18 "	13	4.814
18 " x 18 "	38	14.075
18 " x 16 "	17	6.285
16 " x 16 "	58	21.481
15 " x 15 "	49	18.148
14 " x 14 "	10	3.703
Other distances	52	18.518

TABLE 9.—DISTANCE BETWEEN GRAPE VINES.

Distance apart.	No. of vineyards.	Per cent.
10 ft. x 10 ft.	93	25.271
10 " x 9 "	45	12.228
10 " x 8 "	118	32.065
9 " x 9 "	27	7.337
11 " x 9 "	11	2.989
9 " x 8 "	19	5.163
8 " x 8 "	11	2.989
Other distances	44	11.995

From these tables it will be observed that the majority of the apples, 63.265 per cent., are set 30 ft. apart each way, while there is an equal percentage of them set 32 ft. x 32 ft. and 40 ft. x 40 ft., namely, 7.132 per cent.

In the case of all the other tree fruits the great majority of the orchards are planted 16 ft. apart each way. In the case of pears 26.3 per cent. of the orchards are set 16 ft. x 16 ft., while 17.3 per cent. are set 15 ft. x 15 ft. and 8.6 per cent. are set 20 ft. x 20 ft. With the peaches 18.604 per cent. of the orchards are set 16 ft. x 15 ft., 16.046 per cent. are set 15 ft. x 15 ft. and 10.465 per cent. are set 18 ft. x 18 ft. In the plums 27.019 per cent. are set 16 ft. x 16 ft., 18.287 per cent. are set 15 ft. x 15 ft. and 6.685 per cent. are set 18 ft. x 18 ft. In connection with the cherries 21.481 per cent. are set 16 ft. x 16 ft., 18.148 per cent. are set 15 ft. x 15 ft., 14.075 per cent. are set 18 ft. x 18 ft. and 12.962 per cent. are set 20 ft. x 20 ft. Of the grapes 32.065 per cent. or almost one third are set 10 ft. x 8 ft., 25.271 per cent. are set 10 ft. x 10 ft. and 12.228 per cent. are set 10 ft. x 9 ft. The tendency lately, however, seems to be to set all varieties of fruit somewhat farther apart than the majority of fruit trees have been planted previously. For instance the tendency seems to be to plant apples 40 ft. apart now while the majority of old orchards are 30 ft. apart. With the other fruits there is a growing tendency to set the trees 20 ft. x 20 ft. or 18 ft. x 18 ft. instead of 16 ft. x 16. ft. or 15 ft. x 15 ft. and with grapes the tendency to set them 10 ft. x 10 ft. instead of 8 ft. x 10 ft. This is noticeable by the fact that a good many of the young orchards being set out are planted at the greater distances.

DRAINAGE. While drainage is a very important factor in connection with the fruit industry, and no variety will stand any great amount of surplus water, still at the same time it cannot be stated that the natural drainage of the section

surveyed is bad. The natural surface drainage of the district for the most part is very good, with the exception of some small isolated areas. The accompanying Table No. 10 shows that a little less than one half (47.9 per cent.) of the farms have nothing but natural or surface drainage.

TABLE 10.—DRAINAGE.

Kind of drainage.	Farms.	Per cent.
Surface drained	215	47.9
Underdrained	124	27.69
Partly underdrained	109	24.33

A little more than one-quarter of the farms are wholly underdrained; that is, all the land set to fruit on one-quarter of the farms, while a little less than one-quarter of the farms are partly underdrained. In some places where there is a deep gravelly subsoil underdrainage is unnecessary. In one place west of Stoney Creek where posts were being set a distinct water current could be noted in the gravel subsoil, at the surface of the water table. Much of the undrained land could, however, be greatly benefited by the thorough underdrainage, although the area of land is small which is of little or no value unless underdrained.

The season of 1909 being very dry during June, July and August, land which might under ordinary circumstances need underdraining, was in very good condition. In some orchards and with some varieties of fruit damage caused by lack of drainage was to be observed, but the extent of the damage could not be determined.

FERTILIZATION. The district being devoted almost entirely to fruit growing it is difficult for the fruit grower to get sufficient quantities of farmyard manure. As a result a large number of the growers are using commercial fertilizers and other manures, with or without all the obtainable farmyard manure, as a means of keeping up the fertility of the land. Table 11 goes to show in a general way the extent to which the different fertilizers are being used. The greater portion of the growers, 60 per cent., still use nothing but farmyard manure. To be more exact it would be better to apply the term stable manure instead of farmyard manure since the greater portion of it comes from city and nearby village stables.

TABLE 11.—FERTILIZERS.

Kind of fertilizer.	No. farms.	Per cent.
Farmyard or stable manure	251	60.047
Stable manure and commercial fertilizer	84	20.095
Stable manure and cover crop	49	11.720
Stable manure and ashes	20	4.784
Other fertilizers as sewage disposal, night soil, sludge, compost, cover crop alone, etc	14	3.349

20.095 per cent. of the growers are using commercial fertilizers along with the stable manure. 11.72 per cent. are using cover crops along with the manure, this method being most extensively followed on the heavier types of soil and in connection with apples, although to some extent with other crops. Ashes are recog-

nized as a valuable manure, and are used whenever obtainable, more growers recognizing their value than can obtain them. 4.784 per cent. of the growers use ashes as part of their regular fertilizers, while only 3.349 per cent. of the farms receive nourishment from fertilizers other than those mentioned. Of these sewage disposal, sludge, night soil and compost are most common.

In no case do the growers resort to one kind of fertilizer alone, except in the case of farmyard manure, but they do use special fertilizers for special crops, and invariably you will find that stable manure forms a part of the fertilizer applied to the farm as a whole. In only three or four cases do we find the fertility being kept up entirely without the use of farmyard manure, these cases being with cover crops, the cover crops used being clover or hairy vetch. The crops most frequently used for green manuring are clover, hairy vetch, peas, rye, rape and occasionally turnips sown thick.

Ashes are valuable as a fertilizer and at the same time they are an extremely scarce commodity. In one instance (Report Form 158) a fruit grower has used with great success ashes from an old soap factory which have been laying in an exposed heap for years, also air slaked and weathered lime from a lime kiln. The value of both the ashes and lime had been seriously depleted by exposure. but the low figures for which they were obtained rendered them very profitable fertilizers to use, and gave excellent results when liberally applied. Last season the results were especially noticeable on strawberries.

The farmyard manure made in the first section represents only a small portion of the manure used. Besides all the locally made manure large amounts are hauled from the villages and from Hamilton. Farther east where it is impracticable to haul the manure from Hamilton it is shipped in by the car load, from Toronto chiefly. This trade in stable manure from Toronto is on the increase and fruit men are commencing to use more or less extensively the Toronto compost and other stable manure. This manure shipped in costs the farmer in the neighborhood of thirty dollars per car load laid down at the nearest station.

Commercial fertilizers are being quite extensively used, and as the table indicates 20.095 per cent. of the fruit men are using it in some form or other. Commercial fertilizers are used in connection with stable manure and for special crops, chiefly where quick returns from the manure are desired. As with all other commercial commodities there are always a number of fruit men ready to give free information as to the uselessness of commercial fertilizers as a result of their own or their neighbors unsuccessful experiment with them. However, in most cases where commercial fertilizers have been used intelligently good results have been obtained. Results were especially noticeable with strawberries, raspberries and other small fruits, and a number of growers had very striking results.

Phosphoric acid, potash, and nitrate are being used separately and in various combinations as complete fertilizers. Among the fertilizers most extensively used are super phosphate, muriate of potash, nitrate of soda, bone meal, dried blood, bone and flesh and several forms of complete fertilizer. Some growers mix their own complete fertilizer in whatever proportions they desire from the special fertilizers.

Tillage. Owing to the fact that the soil of the district varies from a heavy red clay to a light, deep, sandy soil with all the intermediate types, and that the fruits grown represent all the tender kinds as well as the apple, the treatment of the various types of soil differs with the soil and, to some extent, with the kind of fruit grown. Clay soil, for instance, requires quite different treatment than the

sandy soil. It is unmistakably beyond the question of sod versus cultivation in the orchards. The question is what tillage methods will give the greatest returns for the labor applied.

In a general way it may be stated that the heavier clay soils will require fall plowing in order to give the best results, while the light sandy soils give the best results when plowed in the spring. In both cases the plowing is followed by thorough summer cultivation. From the information gathered no definite rule is applicable, but Table 12 will show the extent of the methods followed in regard to plowing:

TABLE 12.—TIME OF PLOWING.

When plowed.	No. of farms.	Per cent.
Spring and Fall	285	66.743
Fall	90	21.077
Spring	44	10.304
Disc alone	8	1.850

Exactly two-thirds of the growers plow their fruit land both in the fall and spring. Twenty-one per cent. plow in the fall only, 10 per cent. plow in the spring only, and 1.85 per cent. use the disc harrow instead of the plow. This latter practice is followed only on the deep sandy land. In all cases, no matter when the land was plowed, the summer cultivation was much the same, being continuous surface cultivation throughout the season. If the grower used cover crops, cultivation usually ceased about the middle of July or first of August, and sometimes as early as the first of July. On the other hand, where clean cultivation throughout the whole season is practised surface cultivation is continued somewhat latter. Some growers follow with more or less regularity the rule, cultivate until cultivation interferes with the crop. At any rate, the general practice is to cultivate regularly and cease before the thorough maturing of the new growth is interfered with. The frequency of cultivation during the summer will depend upon the ideas of the individual fruit grower, the type of soil, the extent of the weeds, etc. The number of times the land is cultivated will vary from three or four during the season to as often as twice weekly. In the majority of cases cultivation is continued until the end of July at least, and usually ceases before the first of September. Cover crops when used are sown between the first and last of July or first of August, depending on the season.

The season of 1909 being dry, the destruction of weeds by cultivation was a comparatively easy matter, the result being that when the fruit grower found that the weeds would give no more trouble he ceased cultivation, instead of continuing when cultivation was most essential for the conservation of soil moisture. A large number, but by no means all the growers, followed this method; some going so far as to roll the land, making the surface compact, thus increasing evaporation and incurring upon themselves additional loss from drought.

A striking example of the detrimental effects from plowing extremely light sandy peach land in the fall was shown in a peach orchard at Grimsby along the lake shore. One-half of the orchard was fall plowed in 1908, and had no fruit whatever in 1909, while the other half not plowed in the fall of 1908, but in the spring of 1909 and exactly the same varieties, bore a heavy crop.

Pruning. The report form used was not adapted for reporting fully the cultural methods of the different kinds of fruit. Consequently in the case of pruning in particular the report had to be of a very general nature. In most cases, however, pruning is carried on more or less systematically and annually. A few fruit growers, however, such as those who have employment in the city and some others, neglect this important factor in the production of good fruit.

As to the time of pruning, from late winter to early spring pruning is quite universal and necessarily so. June may be, and no doubt is, the best time to prune, but it is too busy a season for most growers even to consider pruning, and if left until June would be laid over for the year.

Severity of pruning is so variable with the ideas and conceptions of the individual fruit men that it is difficult to explain just what constitutes light, medium, or severe pruning. What one man considers heavy pruning another may consider it to be just medium or *vice versa.* The fact remains that good regular pruning is necessary for the best results, and while the greater number of the fruit men prune regularly, some of them do not prune thoroughly. From the information gathered it appears that the majority of the fruit men simply thin out their trees and head in or cut back when necessary to keep the tree within bounds. There are a number of fruit farms where the trees are exceptionally well pruned.

Diseases and Insects. The codling moth, the worst enemy of the apple last season, was very numerous or scarce, depending upon the thoroughness and the extent of the spraying for its control. Those who made a study of this pest and sprayed thoroughly and at the proper time succeeded in controlling it, and in such cases the fruit was from 90 to 98 per cent. free from codling moth larvae, while in orchards where this pest was not closely watched or the spraying so thoroughly applied, as high as 80 per cent. of the fruit was affected.

The codling moth larvae, although the worst pest of the apple, may be effectively controlled if closely observed and thoroughly sprayed for.

Apple Scab. Owing to the dry season there was but little apple scab noticeable, and growers paid but little attention to its special control.

Twig Blight. This disease affected a very large number of the bearing trees last year, and was in evidence to the greatest extent on trees which were carrying a crop rather than on trees for which 1909 was the off season. (See Bulletin 176, Ontario Department of Agriculture.)

Pear Scab. Similar to the apple scab this disease was not as prevalent as in former seasons, but was quite frequently in evidence on the Flemish Beauty variety where spraying had been neglected.

Pear Blight. This is the most serious pest on the pear, works its ravages more or less regardless of seasons, and last season did a great deal of damage. (See Bul. 176, Ont. Dept. Agrl.)

Plum Curculio. Although not so bad as previous seasons, the plum curculio did considerable damage in some places to the plums and apples. On the apple the fall work of the curculio was most in evidence, in some instances disfiguring large numbers of the fruits.

Aphids. The unexpected outbreak of the aphids did considerable damage to all classes of fruit, and caused considerable alarm, but not sufficient to cause any radical steps to be taken. The aphids are seldom found in sufficient numbers to cause very serious damage, but are liable on certain favorable seasons to break out causing a good deal of damage. Last season the ravages of this pest were not

confined to the fruit trees alone, but shrubs, ornamentals and forest trees, as well as fruit trees were alike attacked. A rainy season is usually an efficient check, and as last season was dry they seemed to develop unchecked. The damage done by the aphids was most noticeable on the apple, where it caused a great deal of the fruit to be woody, small and misshapen. It is doubtful, however, if there will be another outbreak of the aphids for some time.

San José Scale. This scale insect, which is the most harmful insect we have, attacking all classes of fruit, is to be found to a greater or less extent in almost every part of the district surveyed. In most cases, however, it is being very effectively controlled. There are, however, a few cases where this pest is very bad, and is spreading almost unmolested within the orchards where it was noticed. In the vicinity of Stoney Creek the San José Scale is quite numerous, and in two or three cases practically nothing is being done to keep it in check, except the inspector's axe, which might be used a little more effectively.

Peach Leaf Curl. During last season peach leaf curl did a great deal of damage, and in connection with this disease some very convincing spraying results were to be observed. The spring of last year being wet and backward, rendered spraying at the proper time difficult. This gave the peach leaf curl a chance to develop, and it defoliated many orchards, causing a total loss of the crop.

Where growers sprayed early and got their lime and sulphur applied before the wet weather set in, they succeeded in controlling the fungus diseases. These undisputable results will, no doubt, have their influence toward more thorough spraying in the future.

Other diseases and insects, such as the Shot-hole Borer, Bud Moth, Oyster Shell Scale, Canker, Plum Rot, Peach Yellows, etc., were in evidence to a limited extent. Of these the peach yellows did the most damage, especially around Winona and Grimsby. In the vicinity of Grimsby the Yellows is spreading rapidly, and some of the fruit men fear a repetition of the outbreak of several years ago. In the case of the Yellows, as with the San José Scale, a more rigid enforcement of the law would be very beneficial.

Spraying. The spring of 1909 was very unfavorable to thorough and effective applications of the first spraying on the dormant wood. Spring opened with fine weather early, but before very much spraying was done the weather turned cold and wet, and continued for considerable time, or until it was too late to spray with lime and sulphur, or other dormant wood spray material. As a result a great many of the fruit growers did not get their first spraying done. The effect was to be observed in the enormous amount of peach leaf curl to which the Elberta variety seemed particularly susceptible.

For the later sprayings on the foliage and the fruit the season was quite favorable, being dry after May 24th, and for the most part efficient results were obtained, especially with the codling moth larvae, and in fact all leaf eating insects and fungus diseases where the spraying was done thoroughly.

Spraying Mixtures. The mixtures which may be considered as standard are lime and sulphur wash and Bordeaux mixture with a poison. Lime and sulphur wash is the mixture used almost exclusively on the dormant wood, either the commercial or the home-prepared being used. The home-prepared, self-boiled, and the commercial brands of lime and sulphur are becoming popular as mixtures for summer use. Experiments so far conducted have not proven conclusively their value, but they go to show that these preparations should and, no doubt, will become very effective preparations for summer spraying, against fungous diseases,

and with an arsenical added will make efficient insecticides as well. (For full study of lime and sulphur wash, see Bul. 177, Ontario Department of Agriculture.)

The commercial brands of lime and sulphur which have been placed upon the market within the last few years are becoming quite popular and extensively used, due to the fact that they eliminate the dirty and rather laborious task of boiling the mixture. When properly applied these give quite satisfactory results, although to be as effective as the ordinary home-boiled mixture they usually have to be applied in a somewhat stronger solution than the manufacturers recommend, which makes the material cost considerably more than the home-prepared lime and sulphur wash. Bulletin 177 deals fully with these mixtures also.

The chief brands of commercial lime and sulphur wash which are being used in Ontario are: Niagara, Vanco and Rex.

Bordeaux mixture, the standard summer spray, is too well understood to require any comment here, except to state that a number of growers are using a great excess of lime over the amount ordinarily used. The poisons lead arsenate, calcium arsenite and Paris green, are all used as insecticides, lead arsenate being the most extensively used. Other spray mixtures, such as lead arsenate alone, Gillett's lye, tobacco water, whale oil soap and lye and other emulsions are being used to a very limited extent.

Markets and Marketing. The fruits of the Niagara district go to a rather cosmopolitan market. A great deal of the fruit grown within handling distance of Hamilton is sold upon the open market. During the fruit season buyers from Toronto and other cities purchase a good deal of fruit on the Hamilton market and have it shipped out, especially to Toronto by boat. The large portion of the fruit sold on the local market is for home consumption. Other markets which consume the output of the district are the commission markets in all the large cities of the Province and also Montreal, local fruit dealers and the private customers of the individual growers.

Far too much of the annual output of the fruit finds its way to the commission market, which is not conducive to the best prices nor to the proper development of the industry. There is too great an opportunity for unfair dealings on the part of the commission merchant towards the producers who supply commission markets. It is true that there are honest, reputable men in the commission business, and at the same time there are a few growers shipping fruit on commission who have not suffered as a result of too great a trust in the commission business. There is little or nothing to commend the commission market to the fruit grower as an outlet for his fruit. It is absolutely impossible for him to tell whether he is receiving honest returns or not, and he has no means of finding out. On the other hand, the commission man has several ways in which he may outdo the fruit grower, such as reporting the fruit as arriving in bad condition. At best the system is a bad one, and the sooner the growers co-operate in the marketing of their fruit the sooner will these evils be reduced to a minimum.

The dealer having his own private customers is possibly in the most desirable position. He is absolutely sure of his market, which is what he makes it, for he knows that he has to supply a first-class article, and as long as he does this his market will develop, but if he tries to pass off inferior goods on his customers it is himself that eventually suffers.

The local dealers, as a rule, are supplying a similar trade to the grower with customers, but on a much larger scale, and they give better satisfaction to the

grower than the commission market. The local dealer often buys more than he has a market for, and in this case he turns the surplus over to the present necessary evil, the commission market.

The western market is an ever increasing market which can consume all the tender fruit which the Ontario growers can place out there. The amount of fruit placed on that market is increasing annually, and when proper transportation is obtained there will be no excuse for the common complaint that the fruit business is being overdone.

The most desirable condition and one which the growers are beginning to realize is an extensive co-operative system which would involve the whole district and absolutely control the entire output. Better markets could be obtained, better transportation facilities and shipping rates, a more staple and uniform grading which would result in uniformly better prices. Under such a system there would be less danger of a glut in the market as the output could be distributed more advantageously. The evil of the existing commission market would be overcome and also many other minor detrimental conditions which exist. To be convinced of this fact one only has to note the success of the co-operative societies already formed and the evils which the growers have to contend with in marketing their fruit where there are no united efforts.

The Season of 1909. The season of 1909, we may say, broke in rather unfavorably, the spring being very wet and backward. Nevertheless, the crops for the most part were good. After the wet spring, June, July and part of August were very dry and some crops, such as plums, were seriously interfered with. The plums dried up and dropped off in very large numbers, while the early peaches were inferior in size. The raspberry and strawberry crop was rather short as a result of the dry weather. Not only the dry summer, but also the wet spring, interfered somewhat with the peach crop, the wet season accounting partly for the enormous amount of peach leaf curl which was particularly bad on the Elbertas.

On August 16th, when the dry weather was about to break, a severe rain and hailstorm swept over Grimsby village and vicinity, doing enormous damage to peaches and grapes in particular and also to the plums. The fruit was badly bruised, and in the case of peaches the whole side of the peach was often knocked off. Several growers estimated their loss at over the thousand dollar mark.

Taking the season as a whole, crops were good throughout the entire district surveyed, except along the lake shore, from Stoney Creek west to Bartonville, a section where peaches have been a failure for a number of years.

In conclusion the writer desires to thank the growers of the district for their hospitality and the courteous and willing manner in which they gave the information desired.

ORCHARD SURVEY OF THE LAKE HURON SHORE.

S. E. Todd and T. B. Faulds.

Purpose. The purpose of this work was to make a general study of the horticultural situation in the Lake Huron district; to examine the geographical, topographical, climatic conditions; to note in the different sections the extent of the industry, management and care given, advancement or retrogression shown in such things as acreage of fruit, interest in and profits derived from fruit culture;

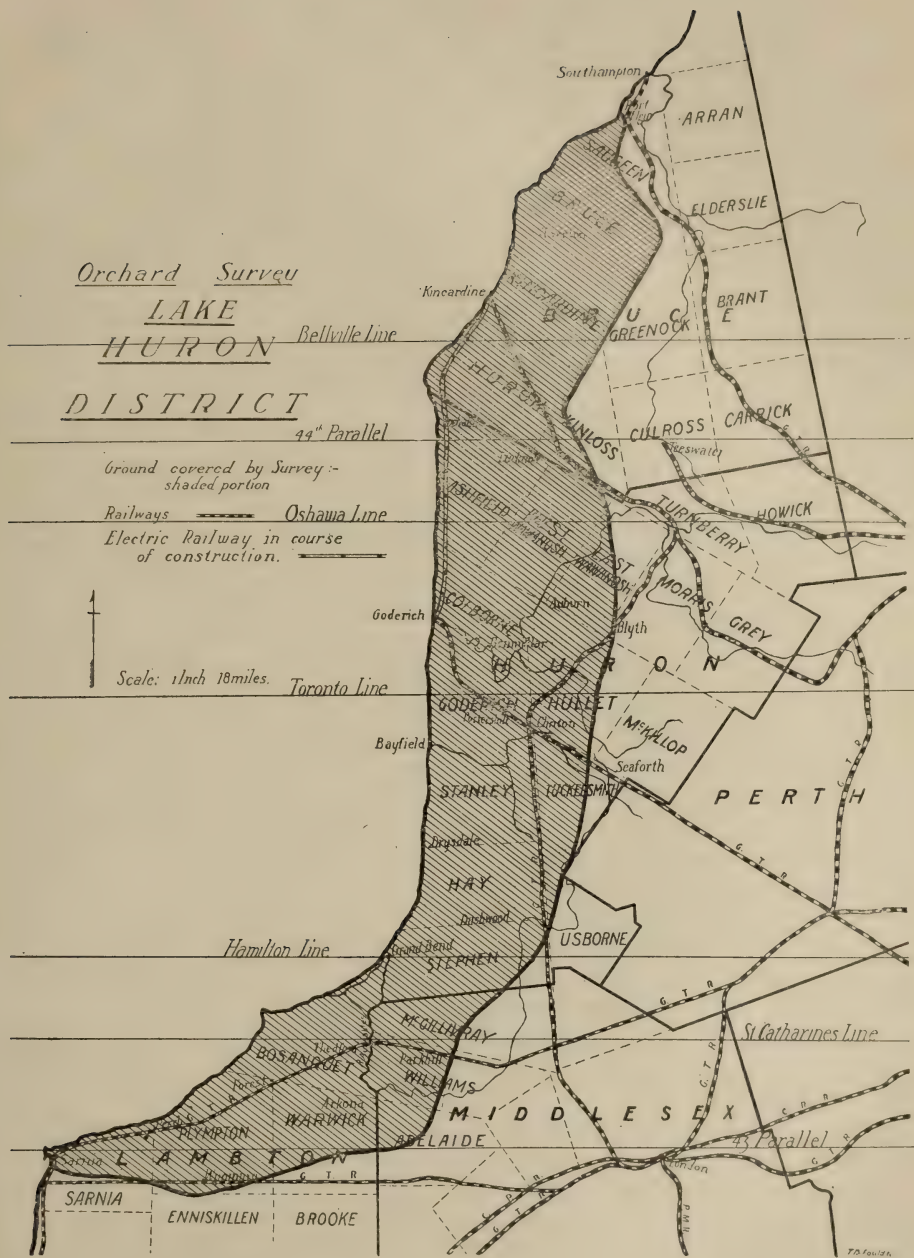
and to note the causes of such advancement or retrogression; to study, in short, the district's horticultural conditions and more immediate necessities.

METHOD. To obtain the desired information a farm-to-farm survey was planned and executed. A blank form, resembling those used for similar work in the various States of the Union which have prosecuted like studies, was used. This blank, when filled out, contained the following information: Name of owner, post office, county, location, site, township; acres in farm; varieties, number of trees, age and acreage of apples, pears, peaches, plums, cherries; acreage of bush fruits and distance of planting; type of soil, subsoil, drainage, tillage; if sod, kind and number of years so kept; method of treatment; spraying, fertilizers, pruning, with particulars of each, diseases and insects noted and present condition of orchards; yields, prices and income for three years back, also method of sale. Note was also made of any information regarding the section that could be gleaned while talking to the farmer and fruit grower. Needless to say in many cases full information on all these points could not be obtained as farmers generally are poor bookkeepers, but about fifty per cent. were able to supply fairly accurate information, so that the data gathered is fairly correct and can be relied on.

No attempt was made to make a complete census of all the orchards in the district, but a sufficient number were visited in each section to give an accurate idea of conditions and to supply trustworthy information. In all about five hundred orchards were visited. In sections where little orcharding is done only sufficient time was spent there to ascertain the reasons for this and to study the topographical, soil and drainage conditions with a view to future possibilities. The figures for 1909, shown in the various tables, were obtained by correspondence. Comparatively few returns for 1909 were received from neglected orchards, and for this reason Table III. could not be completed for that year.

GEOGRAPHICAL LOCATION. The geographical location of the district covered was what is known as the Lake Huron winter apple section, comprising those parts of the counties of Lambton, Middlesex, Huron and Bruce that border on, or approach, Lake Huron, and extending inland about fifteen to eighteen miles. The thick line on Map A indicates approximately the ground covered, but is not intended to denote the limit of the apple growing section, so far as climate is concerned. It would be a hopeless task to attempt to trace with any degree of accuracy the limit of commercial apple growing eastward from the lake. The best part of the fruit section of Bruce County lies outside the line of the survey, but owing to lack of time could not be covered.

TOPOGRAPHICAL FEATURES. This district offers some very interesting studies in topography. Beginning at that point where Lake Huron narrows to the St. Clair River and following eastward, the lake shore is low and mostly sandy till Perch, on the Chicago, Port Huron and Montreal line of the G.T.R., is reached. From there a gradually rising bluff of stiff clay is found which extends to about the site of the old village of Hillsborough—now removed—a distance of eighteen miles. Against this bluff the restless waters of old Lake Huron beat remorselessly and continually wear away the land and carry it out into the deep. At Hillsborough the bluff recedes inland gradually and the character of the land changes from clay to loam. The bluff recedes until at Mr. D. Johnson's, Forest, it is over a quarter of a mile from shore. The flat below at this point consists of a deep, rich, gravelly loam and clay with streaks of sand. Farther north, near Ravens-

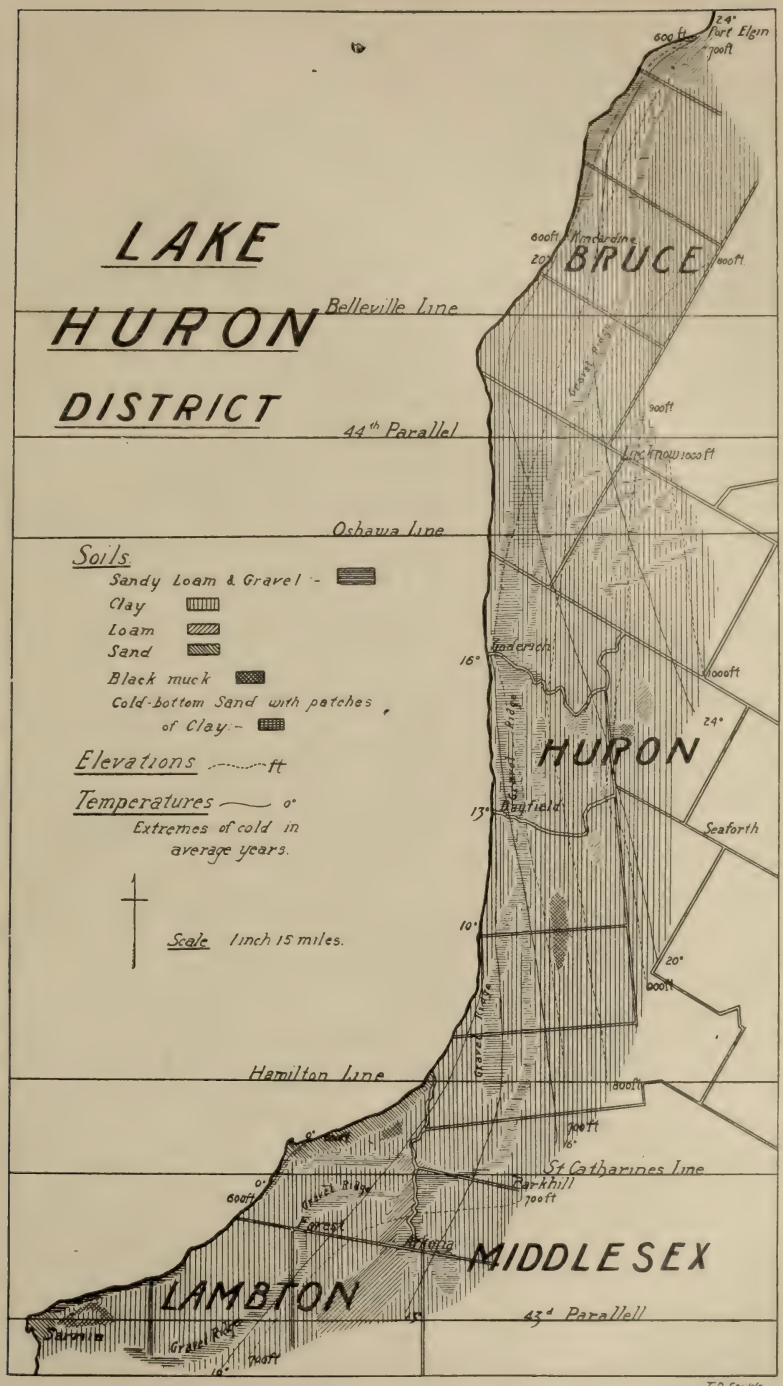

Orchard Survey
LAKE
HURON
DISTRICT
Ground covered by Survey:-
shaded portion
Railways
Electric Railway in course
of construction.
Scale: 1 inch 18 miles.
Bellville Line
44th Parallel
Oshawa Line
Toronto Line
Hamilton Line
St Catharines Line
43 Parallel
Southampton
Kincardine
Goderich
Bayfield
Seaforth
Clinton
Blyth
Auburn
Dresden
Dryadale
Richmond
Grand Bend
Thedford
Forest
Arkona
Wyoming
Brigden
Sarnia
Port Huron
ARRAN
ELDERSLIE
BRANT
GREENOCK
CARRICK
CULROSS
KINLOSS
TURNBERRY
HOWICK
MORRIS
GREY
HURON
MCKILLOP
PERTH
STANLEY
HAY
USBORNE
STEPHEN
MCGILLIVRAY
BOSANQUET
WILLIAMS
PLYMPTON
WARWICK
ADELAIDE
MIDDLESEX
LAMBTON
SARNIA
ENNISKILLEN
BROOKE
G.T.R.
C.P.R.
C.N.R.
T.D. Foulds

MAP A.

wood, the loamy bluff gives way to a strange formation indeed. Here the land becomes broken roughly into two parallel ranges of peculiar sand dunes. The peaks of many of these dunes rise to one hundred feet, and consist of drift sand which gleams brightly in the sun. This formation is about two miles wide and extends to Grand Bend, a distance of fourteen miles. At the lake shore, a short distance north of Grand Bend, the clay bluff begins again and gradually rises until at Goderich it reaches a height of about 110 feet. The character of the bluff right at Goderich is gravelly, of which further note will be made. About a mile above the town the bluff changes to clay again and extends to within a mile of Kincardine, a distance of thirty-five miles, approximately sixty feet in height. Here the bluff recedes from shore again for nearly a mile—in places two miles—and becomes broken by many gullies. Much of the land below the bluff is broken and rocky. It is sandy around Kincardine, but stiff clay is again encountered farther north. The bluff is not so steep north of Kincardine, and presently becomes a hill which extends to Port Elgin, where the land is again loamy in character.

Some miles inland is a gravel ridge which appears to be an ancient shore line extending, with only one or two breaks, continuously from a point about four miles from Sarnia, near Mandaumin, right through to Port Elgin. It would seem that the western base of this ridge is dead level for its entire length. From Mandaumin the ridge extends north-easterly, passing about a mile north of Wyoming, runs through Forest and on to Thedford. A little north of Thedford the character of the country changes suddenly. The eastern boundary of Lambton County at this point, is marked by the Aux Sables River, which flows northerly to the village of Grand Bend at the extreme north of the county. At this point and within eighty rods of the lake the river suddenly bends back and flows southerly, within a mile of the shore, down between the two great ranges of sand dunes noticed previously. The land lying within this great bend of the river is mostly low, flat and swampy, consisting of clay, black muck and sand. Beginning again near the northern boundary of Middlesex the gravel ridge runs northward, passes in the neighborhood of Dashwood, a little west of Zurich, and from there begins gradually to approach the shore until at Goderich the lake bluff itself consists of gravel and sand. This land immediately around Goderich would appear never to have been submerged. The ridge receding from the shore above Goderich, passes northward through the eastern part of Ashfield Township and crosses into Bruce County, about a mile east of Lochalsh post office. From there northward the ridge becomes less marked, but appears gradually to approach the shore till at Port Elgin it again becomes a part of the lake bluff.

It is a remarkable feature of the topography of this district that this gravel ridge is the division line between two soil types. East of this ridge the land is plainly glacial, while on the west side it is just as plainly deposition soil. Here the land is mostly flat with a gentle slope to the lake, and in a great deal of this section the drainage problem is, or has been, acute. East of the ridge the land is gently undulating, but in the north-east part of Warwick Township, and the south-east of Bosanquet in Lambton, and in the north-west corner of Middlesex, the undulations become more pronounced until they reach the dignity of hills. North of Thedford the land falls away abruptly to the river flats of the Aux Sables. The southern part of Huron County, east of the ridge, is gently undulating, the general trend being towards the lake. Farther north, however, in the central portion of the county the land becomes rolling, and in the Township of Wawanosh is very hilly. The greater part of the southern and western part of the County of Bruce


LAKE
HURON
DISTRICT
Belleville Line
44th Parallel
Oshawa Line
Hamilton Line
St Catharines Line
43d Parallell
BRUCE
HURON
MIDDLESEX
LAMBTON
Port Elgin
Kincardine
Goderich
Seaforth
Exeter
Parkhill
Forest
Arkona
Sarnia
Gravel Ridge
Soils.
Sandy Loam & Gravel
Clay
Loam
Sand
Black muck
Cold-bottom Sand with patches of Clay
Elevations ft
Temperatures 0°
Extremes of cold in average years.
Scale 1 inch 15 miles.

MAP B.

is flat, or gently rolling, but the Township of Kinloss resembles Wawanosh to the south of it.

Soil. The character of the soil in the hilly regions east of the gravel ridge is exceedingly varied, consisting of glacial clay and gravel ridges with patches of loam and sand, notably in the region around Arkona in Lambton and Middlesex. The more gently rolling and flat land is uniformly clay, or clay loam, with some patches of a lighter character. West of the ridge, with the exception of those patches below the bluff at the lake, the region of the sand dunes in Lambton around Goderich, Kincardine and Port Elgin, the soil is a clay or clay loam, for the most part overlaid with a deposition of varying depth and distance. In Lambton County and South Huron a great deal of the deposition is rich vegetable mould, while in Northern Huron a part is of the same nature and a part is of sand, which varies from a few inches to three or four feet in depth. Most of the latter land is called "Cold bottom land," because the clay subsoil holds the water, thus retarding proper drainage. That part of Bruce County west of the ridge is very like North Huron.

Drainage. East of the ancient shore line in the glacial region the drainage problem is not great. Fruit trees in this region generally do not show any lack of drainage. West of the shore line, however, the case is very different. In many sections when the settlers in the early days planted a few trees they did not thrive because of poor drainage. In undrained or poorly drained land to-day the fruit trees there are very poor, flat-topped, scraggy and affected with canker. The result is that the people of these districts have grown away from the culture of fruit and have given their thoughts entirely to other lines of agriculture. However, here and there are seen younger plantations on land that has been well drained, that are as fine as any in the whole district. In the flats west of Forest, extensive drainage work has been done, and here some of the healthiest and most remunerative orchards in the whole district are to be found. Plainly, drainage is the primary problem in fruit growing in these sections.

Climate. The great area and depth of Lake Huron has a very marked effect on this whole district. So very marked is this effect that at Goderich, right at the lake shore, is to be found a block of about 500 peach trees ten years of age and looking well indeed considering the care they have received. At St. Josephs, Huron County, the thermometer seldom falls below minus 10 degrees F., while at the same time at Zurich about four miles inland, it registers about minus 18 degrees F. At Forest when the thermometer is at minus 10 degrees, at the lake shore northwestward below the bluff a distance of about seven miles, the thermometer registers 0 degrees, and, in fact seldom falls below this point.

The district covered by the survey lies approximately between latitude 43 degrees and 44 degrees 50 minutes. The altitudes vary from 582 feet at the shore line to 1080 feet at Blyth, Huron County. The temperature varies as per lines shown on map B. A temperature lower than minus 25 degrees F., is very exceptional in any part of the district covered, and the high humidity, particularly near the shore, is a powerful preventative of winter killing. There is practically no winter injury to apples south of Clinton.

Extent and Present Condition of the Industry. Although apples have been grown in this district ever since the first settlers arrived, the industry is

still in its infancy. A few sections are waking up to the immense possibilities of the country in which they are fortunate enough to be situated. In Lambton the people are beginning to have faith in their own county, and new plantations, both of apples and peaches, are being made. The older plantations are being better cared for, with the result that they are yielding and paying handsomely. In northwest Middlesex there is a section of loam land where considerable planting of fruit has been done, but which is very poorly cared for. In Huron County the most thickly planted apple section lies between Goderich and Bayfield, but only a few of these orchards are properly cared for. The central part of the county is also slowly growing into fruit, chiefly apples. That part of the County of Bruce included in this survey has only a few commercial orchards. The acre orchard, the usual size there, is generally poorly kept and very little new planting is being done.

At one time quite extensive peach plantations existed in Lambton, but when the "peach curl" became serious nothing was done to protect the trees which resulted in almost completely destroying not only all plantations there, but also the faith of the people in the business. If the apple trees of the County had died from the attack of scab, as did the peach trees of curl, it is quite probable that the apple industry would likewise have disappeared. About ten or twelve years ago, however, a few daring people planted again, and, with the aid of spraying, succeeded in overcoming the "curl". These orchards are scattered over quite an area and denote fairly well what may be done in peach growing. The great freeze of 1904 did not seriously injure these plantations, and they are now bearing heavily. The result has been a revival of peach growing, and during the last two or three years thousands of trees have been planted. There is quite a large area of "peach soil" in this county within the temperature limits of minus 10 degrees F. At St. Joseph, in Huron County, a small experimental peach orchard has been planted, and is now two years old and doing well. At Goderich, as already mentioned, there is a ten year old peach orchard now growing and bearing fairly well. What the possibilities of the future are can only be determined by further experiment. A glance at the accompanying map will show that practically all of Lambton County is south of the St. Catharines line and has a very similar situation to the Niagara peach belt in relation to the lake. Here and there are found peach trees twenty-five years old still hale and hearty in spite of peach curl and bad pruning methods.

Sour cherries are grown in various sections of the district covered, particularly in Colborne township, Huron County, and in parts of Lambton. The sour cherry prefers a sharp well drained soil.

Sweet cherries are growing well in Colborne township, where the industry is increasing in importance. There are sweet cherries found here of considerable age and very thrifty appearance. The soil they grow best on there is a gritty glacial clay loam.

The acreage of fruit set compared with the acreage available and suitable for planting is very small. In Lambton, the area set in fruit is increasing and the industry is attracting considerable attention. Orchards are receiving better care and the resulting increase in profits is attracting attention, and stimulating effort toward better cultural methods. Spraying is becoming general in this county, but much of it is poorly done. There is much need of improvement in spraying, cultivation and fertilizing.

In north-west Middlesex there is a fine section of country with a considerable

acreage of apples, but little cultivation is done, and the apple industry is at a standstill or going backwards. The causes seem to be poor selling methods and the general indisposition of the people to fight insects and fungus diseases. Scab and codling moth are very bad, but very little spraying is done.

In south Huron very few commercial orchards are to be found, and those few are generally neglected. The people have given more attention to extensive grain and stock-farming, than to intensive fruit, dairy and poultry farming. However, even in this district the activity of the central part of the County is being felt, and a few young plantations of commercial size have been planted within the last five or six years.

The great bulk of commercial orchards in Huron are found in the townships of Goderich and Colborne. A fair scattering is to be found in Stanley, north-west Tuckersmith, Hullett, Wawanosh, Ashfield, and Morris. In all these townships the acreage is increasing, quite a number of apple orchards being found, from one to six years old.

The old orchards in this county are quite generally neglected and some contain many poor varieties. There is a general impression that an orchard forty years old is not worth taking care of. In contradiction of this impression some of the most remunerative orchards seen in the county are old, but are receiving proper care and management. It is very unfortunate that this impression has got so firm a hold in the minds of the people, as, where the varieties are good, there is no investment of money or time that will give such good results as that necessary to prune, spray, cultivate and fertilize these same old orchards. From results seen in Lambton County these old orchards will return 100 per cent. on the time and capital invested in them, but improved methods of culture and management must be adopted.

The younger orchards are receiving somewhat better care, but even these are generally poorly managed. Spraying is anything but common and many orchards are cropped with grain while quite a percentage of orchards under twelve years old are in sod. However, there is an increasing interest in the industry, many orchardists reporting spraying this year for the first time. The outlook is hopeful and improving. In Goderich and Colborne Townships, interest is rapidly increasing, the difficulty which retards more thorough and intelligent orchard management being a lack of a proper selling system. With the adoption of co-operative selling methods, a great and immediate improvement in orcharding will undoubtedly take place.

In that part of Bruce County covered by this survey the small orchards receive little care and are infested by insects and scab to a degree that makes better methods of management absolutely necessary if profits are ever to be realized from these orchards. The old orchards also have quite a large percentage of poor varieties. Very few young plantations are being made and the people generally do not recognize how much nature has favored them.

Nursery Stock. Nursery stock is secured from various sources, both Canadian and United States. Some of the stock is grown in Huron and Bruce Counties. Generally the apple stock is fairly good. The peach stock, however, is poor. Big, overgrown, one and two year old trees are quite generally used which are headed very high. Some of the more experienced growers are finding how disastrous to success this class of stock is and are now buying trees three to four feet high, rather than five to six feet as previously. These are being headed about 16 inches from the ground with the result that fine young trees are being

produced. Care should be exercised by prospective planters in securing suitable nursery stock, as the class of peach stock which has generally been planted in this section is considered worthless by experienced growers.

Soil and Management. Of the orchards recorded about 70 per cent. were in sod and pastured. Of the remaining 30 per cent. about 12 per cent. were given clean cultivation and the remaining 18 per cent were cropped with grain, roots or hay. A study of the tables appended shows that cultivated orchards, given the same treatment as sod orchards, yielded in 1907, 12.5 barrels; in 1908, 13.5 barrels and in 1909, 13 barrels per acre in excess of orchards kept in sod. In the following tables neglected orchards were not reckoned.

Table 1.

—	1907.		1908.		1909.		No. of	
	Bbls. per acre.	$ per acre.	Bbls. per acre.	$ per acre.	Bbls. per acre.	$ per acre.	Acres.	Orchards.
Cultivated, sprayed, fertilized.....	50	124	32	57	51	76	147	29
Sod, sprayed, fertilized, pastured....	37.5	54	18.5	21.5	38	54	238	36
Cultivated, cropped, fertilized.....	21	29	6	6	16	16	64	11

These figures speak for themselves and need little comment. True, many good orchardists practise sod culture with fair results, and yet not only from the facts presented here, but also from observation during the summer, it is safe to say that it pays well to practise clean cultivation.

Of those orchards receiving clean cultivation only a small per cent. are sowed to cover crop. The popular practice is to plow in spring, cultivate more or less thoroughly during the spring and summer until the middle of July or first of August and then let lie. If a cover crop of clover were sown when cultivation ceased a large amount of nitrogen and humus would be available to turn under in the spring, which would materially aid in solving the fertilizer problem in the orchard.

The cropped orchards were not sprayed and therefore scarcely give a fair basis for comparison, but the average shows plainly that it does not pay to crop a bearing orchard.

Insects and Disease. Of all the various elements that have entered into the conditions which of late years have discouraged orcharding in this district, insects perhaps are the most serious. Orchards that years ago gave abundant crops, have of late years become unproductive and unprofitable in a way that has been somewhat of a mystery to the farmer and orchardist. Without a close examination the causes of this falling off in productiveness cannot be seen. The old unsprayed sod orchards of the district have become infested with bud moth, apple bucculatrix, cigar and pistol case bearers, to a degree that precludes all possibility of fruitfulness. To the attacks of these insects have been added those of tent caterpillar, fall web worm and green apple aphis, the latter having this year in many cases almost ruined the crop. Against these minute creatures the farmer or orchardist who has not studied modern orcharding is utterly helpless. But by intelligent

application of the information given in the many bulletins on the subject not only can these insects be overcome but orchards that were thought to be past all usefulness can be made to yield handsome profits.

The better known enemies, scab and codling moth, are very destructive in all this district. These pests are especially bad in the southern part of the district and particular care should be given in Lambton and Middlesex to fighting these enemies. On the other hand, while oyster shell bark louse is found in the whole district, it is much worse in the northern sections where in many cases whole orchards are seriously affected by it.

Apple canker is also becoming quite serious in some sections. It is not sufficiently bad, however, to give cause for alarm. In a short time, if neglected, its attacks may spread until it has become as serious as it is in the east. In the northern part of this territory where canker occurs it is found almost invariably in trees affected by sunscald. Now is the time to deal with this disease before it becomes serious.

Sunscald is found almost entirely in trees having an open habit of growth or where they are headed very high and pruned out severely in the centre. Sunscald can be entirely overcome in this district by proper and reasonable methods of heading and pruning.

Spraying. Spraying intelligently done, will certainly control all the orchard insects in the district. The many failures reported where spraying has been tried for a year or two and dropped, tell nothing of the value of spraying, but speak eloquently of the need of intelligent knowledge of spraying and thorough application of spraying mixtures as well as a knowledge of the insects and fungi the orchardists are attempting to combat.

Only a comparatively small number of those people who are practising spraying are doing the work just at the proper time, or doing it with sufficient thoroughness. There is a proper time to spray, and one spraying done just at the right time does much more good than two or three sprayings done at other times. Doing the work at the right time is a splendid form of labour saving. In spite of the poor spraying practice so general in the district, the following tables give conclusive evidence that it pays to spray, even in a way far from being perfect. In compiling these tables it was found necessary to use sod orchards for comparison. An interesting fact may be noted here. The man who takes the trouble to practise clean cultivation in nearly all cases believes in and practises spraying. For this reason, a sufficient number of orchards subjected to clean cultivation and not sprayed could not be found to compare with those receiving clean cultivation and sprayed. The tables are a comparison, then, of orchards kept in sod, pastured, fertilized and sprayed against similar orchards not sprayed. Neglected orchards were not included in these computations.

Table 2.

Average per acre.	1907		1908		1909		Total No. of	
	Bbls.	$	Bbls.	$	Bbls.	$	Acres	Orchards.
Sod sprayed	38	51	18	22	40	54	252	38
Sod unsprayed	32½	35	16	11	50	44	448	119

The comparatively large number of orchards unsprayed indicates how much this method of increasing the profits from orchards is neglected, and the table shows plainly how much can be gained by spraying. Where spraying is thoroughly done at the right time the value of the crop can be very much increased in an ordinary year.

FERTILIZING. The man who has become sufficiently advanced in orcharding to cultivate his orchard, generally fertilizes as well as sprays, but even he does not sufficiently recognize the value of some form of potash and phosphate manures. For this purpose unleached wood ashes are perhaps the best and cheapest form of potash and phosphate fertilizers available. Several men report using commercial fertilizers with excellent results. A more thorough knowledge of the requirements of orchards in order to get the highest degree of fruitfulness as well as a more complete knowledge of fertilizers generally is very much needed by orchardists. Barnyard manure, while being a good general manure, is too rich in nitrogen in proportion to the percentage of potash and phosphates, to give the best results obtainable in orcharding. This is especially true where clover is used as a cover crop, as it, too, is rich in nitrogen.

In cultivated orchards the growing of cover crops should be more generally practised as an easy way of securing a large amount of nitrogen annually. Then, by a judicious use of phosphate and potash fertilizers, along with barnyard manure a high degree of fruitfulness may be obtained.

Even in sod orchards fertilizing is more generally practised than is spraying. Barnyard manure is almost exclusively used. Many orchardists who practise pasturing calves. sheep or hogs in their orchards expect the droppings from these animals to be sufficient fertilizer. They forget that they are taking two crops off the land, *i.e.* one of calves, sheep or hogs, and the other of apples. It has been found that fields subjected to pasture for many years gradually become exhausted, although possibly richer at the surface. The grass in its effort to produce pasture for the animals, robs the orchard of much fertility. Surely then an orchard subjected to pasture requires regular applications of fertilizer.

The appended tables were computed from a list of unsprayed orchards. As in previous tables badly neglected orchards were not reckoned.

TABLE 3.

Average per acre.	1907		1908		Total No. of	
	Bbls.	$	Bbls.	$	Acres	Orchards.
Sod fertilized	34	35	12	12	192	39
Sod unfertilized	25	28	18	8	193	46

In 1908 the number of barrels yielded by unfertilized orchards is in excess of the fertilized orchards, but even then the number of dollars received was greater in the fertilized orchards as in very many cases orchards unfertilized and unsprayed are forced to market their product to the evaporator. Sufficiently accurate figures on this point were not obtainable to report for this year (1909).

HEADING AND PRUNING. In heading an orchard two main objects should be kept in view: 1. Health of the trees. 2. Ease in handling, *i.e.*, cultivating, pruning, spraying, harvesting. Generally speaking only one feature has been kept in view in

heading orchards, and that is, ease in cultivating. Trees have been pruned up and up with the object of being able to drive a team under them, leaving long bare trunks which in the more tender or "straggly" growing varieties have become sunscalded, cankered and finally killed outright. In many cases this extreme high heading has defeated the very object for which it was intended, as so much light was admitted below the lower limbs that the under limbs began to grow downwards towards the light. When to this method of heading is added a system of pruning that cuts all the centre out of the tree and forces all the fruit to be borne on the tips of the branches, a condition occurs the very reverse of what the orchardist aimed at, namely, ease in cultivating. The tips of the branches are all pulled down toward the ground in such a way as to make it impossible to cultivate.

The common practice of pruning all the middle out of a tree has resulted in two very bad conditions. It has forced the trees to bear their fruit at the tips of limbs, that is at the weakest place. The result has been a breaking down of many trees; in others unnecessary dropping of the branches has been caused. Trees pruned very open in the centre are subject to sunscald with the resultant injury or death of the tree.

Peach trees depend very much for their fruitfulness on a proper system of heading back, and this should be studied by the peach growers of the district as very few are pruning their trees in a proper manner.

Thinning. A very few orchardists are thinning their fruit on the tree. This year (1909) owing to the bunching of the fruit on the trees as a result chiefly of apple-aphis injury, the need was especially great. Many orchards would easily have yielded double the amount of money to their owners if a little time had been spent in thinning. A most remarkable difference could be seen in the orchards of those men who thinned this year as compared with the unthinned orchards. Thinned orchards this year sold at $1.75 per barrel on the tree, as compared with $1.00 for unthinned. Then, when the fact that a thinned orchard yields double the number of barrels of saleable apples, the great gain can easily be reckoned. The cost of thinning, as computed by experienced men is 5c. per barrel. Another important advantage gained by thinning is in securing annual crops. By removing a part of the crop this year, the tree in place of expending all its energies in the attempt to mature its fruit, can expend a part of its energies in forming fruit buds for next year. This argument alone is a convincing proof of the usefulness of thinning.

Harvesting. The manner of harvesting varies directly with the manner of sale. Where orchards are sold outright to the buyer the packing gang very often picks the fruit. In other cases the fruit is picked and piled on the ground from where it is again handled by the packers. The method of piling on the ground is very objectionable as rain or frost may seriously injure the crop before it is packed. When the picking is done by the packing gang in many cases considerable breaking of the trees occurs owing to rough handling.

Selling. There are four systems of selling the apple crop. 1, To the apple buyer; 2, shipping direct to the wholesalers at the point of consumption; 3, to evaporators; 4, through co-operative associations.

The first method is the one usually adoped. In some cases the apples are sold by the orchard on the trees, or are bought by the barrel either on the tree or picked. In either case the buyer usually does the packing.

There are many objections to selling to apple buyers. In many cases the apples pass through four or five handlers before they reach the consumer. This reduces the price of the apple to the producer to such an extent as to discourage the orchard industry generally. Another objection is that the seller is placed in the position of taking what he is offered by the buyer, whereas he should be in a position to place a fair price on his product, and get it. Still another objection is that competition, which is often keen among buyers, causes a flat rate to be paid for all kinds of apples. This discourages those inclined to do so from adopting more modern methods of culture and management.

A word in defence of the apple buyer should be said right here. Many of these men are honestly trying to do their best under the circumstances, and the trouble really lies in the system itself rather than with the individual buyer.

In spite of the discouragements due to bad selling systems, quite a number of men are adopting modern orchard practice and have tried shipping direct to the point of consumption. A fair number of these report reasonable success. Where the grower is alone in his section this is probably the best method of sale. One of the chief objections to it is that unless the sales are made f.o.b. the commission man very often reaps nearly all the profits. A modification of this system is reported as working very well. The grower picks, packs, and stores his apples; then he places a price on them, and sometimes sells to a local apple buyer with fairly good results.

The third method of sale, *i.e.*, to the evaporators, has become quite common in those sections where orchards are generally neglected. This is perhaps the best possible method of selling the poor class of apples produced in such orchards. In some cases the owner of the evaporator ships a certain percentage of these apples and cures the rest. The trouble with this method is that it offers absolutely no encouragement to better methods of production. A flat price is paid for the whole crop, good and bad. The apples are shaken from the trees, and here again poor orchard practice is encouraged. As a means of marketing culls the apple evaporator certainly has a place.

The fourth method, by co-operative associations, is the one that undoubtedly gives best results in marketing all kinds of fruit.

In that part of Lambton County included in this survey there are two of these associations, working under the name of the Forest Fruit Growers' Association and the Arkona Fruit Growers' Association, respectively. A very marked difference is evident in the interest in, methods of management of, and profits received from, orchards whose owners are members of these societies as compared with many others. In those sections where the associations are strong, orcharding is rapidly increasing, and everyone, bankers, tradesmen of the towns, as well as farmers generally, are awakening to the value of fruit-growing as a great wealth-producing factor in the county. A computation has been made of the yields and sales per acre from the better class of orchards sold to buyers as compared with orchards sold through associations. The remarkable difference in the yields shows how much co-operative sales stimulate increased production.

TABLE 4.

Average per acre.	1907.		1908.		1909.		Total No. of	
	Bbls.	$	Bbls.	$	Bbls.	$	Acres.	Orchards.
Sold through Associations.....	53	81	20	42	51	80	103	22
Sold to buyers	26	32	15	13	35	35	972	123

The advantages of co-operative sale are: A large quantity of fruit is placed on the market of a uniform quality and under one brand; an absolute guarantee of quality can be given, which gives the buyer confidence in the goods; sales can be made more directly to the consumer than can be done through the ordinary buyer; in many cases sales are made f.o.b. at the shipping station, thus throwing the risk of transportation on the buyer at the consumer's end; better transportation rates can be secured by acting in concert; good orchard practice is encouraged; even distribution is secured, as the manager has a large quantity of fruit directly under his control, and, by conferring with other co-operative managers, can regulate the flow of fruit into any one market. The seller is also placed in the desirable position of being able to fix a price for his fruit. A combination of all these advantages insures larger net returns to the growers, with the resulting rise in value of property occupied in orcharding.

Evaporators.—Judging by the number in the district, the evaporator business must be a very profitable one. An evaporator is found in nearly every town and village in the whole district. These offer an easy but not very profitable market for the apple crop. In some sections a great many people market their whole crop to the evaporator. The price paid runs in the neighborhood of twenty-five cents per hundred pounds.

Canneries.—There are no canneries in the whole district. The small acreage of canning crops have not been sufficient to induce the establishment of a factory. Of late years, however, the amount of canning crops grown in the district around Arkona in Lambton doubtlessly offer as good investment for capital in this enterprise as does any other section of Ontario. The nearest cannery is eighteen miles east of Arkona, at Strathroy. There is no reason why certain sections of this district should not grow canning crops equal to the best in Ontario.

Yields, Prices and Profits.—In the various tables given the yields and prices received from various methods of handling orchards and selling the apples are shown. These results are now brought under one head in the following table:

Table 5.

——	1907.		1908.		1909.		Average yield in bbls. for 3 years.	Average prices per acre for 3 years.	Average prices per bbl. for 3 years.	Total No. of	
										Acres.	Orchard.
	Bbls.	$	Bbls.	$	Bbls.	$		$ c.	$ c.		
Cultivated, sprayed and fertilized ...	50	124	32	57	51	76	44.5	85 66	1 93	147	29
Sod, fertilized, sprayed, pastured	37.5	54	18.5	21.5	38	54	31.3	43 00	1 38	238	36
Cultivated, grain crop	21	29	6	6	16	16	14.3	13 66	0 95	64	11
*Sod, sprayed, fertilized	38	51	18	22	40	54	32	42 33	1 32	252	38
Sod, unsprayed and fertilized	32	35	16	11	50	44	32.66	30 00	0 92	448	119
*Sod, fertilized, unsprayed	34	35	12	12	.....	....	23	23 33	1 01	192	39
†Sod, unfertilized, unsprayed	25	28	18	8	.....	....	21.5	18 00	0 84	193	46
Sold through associations	53	81	20	42	51	80	41.3	67 66	1 64	103	22
Sold to buyers	26	32	15	13	35	35	25.3	26 66	1 06	972	123

* Different groups of orchards from the ones above. Compare the two.
† Results for two years.

The consistency of the above figures is remarkable. In working out the tables it was necessary in order to have a fair comparison to use different groups of orchards handled in the same manner. The close resemblance of these figures proves their truth in an undoubted manner. Take for instance the two groups of sod orchards, both sprayed and fertilized, and note the close relation existing between these figures throughout. Likewise in sod orchards unsprayed but fertilized the relation existing between the two groups is very remarkable, although there is a great difference in the acreage and number of orchards.

This table brings out very clearly the effect on the price received per barrel through different methods of orchard management. These, arranged in order of price, give the following:

Cultivated, sprayed and fertilized	$1.90	per bbl.
Sod, fertilized, sprayed and pastured	1.40-1.30	" "
Sod, fertilized, unsprayed	1.00- .93	" "
Cultivated, cropped, unsprayed, fertilized	.93	" "
Sod, unfertilized, unsprayed	.88	" "

Not only do proper methods of management give increased yields, but it is evident from the above figures that they materially increase the price per barrel.

Transportation.—A glance at the map will show that much of the best situated fruit land of this district is very poorly supplied with railways. Apples, being a bulky product, cost heavily for transportation, and where the distance from a railway is great the cost of hauling eats up the profits from the orchard. There is also a serious lack of really good harbors on the lake shore, thus making good land transportation absolutely necessary to rapid development in orcharding. That section of country from Port Elgin to Sarnia should offer excellent opportunity for an electric power line. As this district develops into fruit, population must increase, with a resultant increase in railroad traffic. An electric power line is now being built from Kincardine to Goderich. The greatest acreage of orchards in a block in the County of Huron lies south of Goderich, and it must be only a question of time until this section is supplied with good transportation facilities. A few months ago a Goderich paper published a proposed plan of an electric line for the county. These proposals should receive the careful consideration of every landowner and fruit grower in the district, as there is no doubt that the low price of land and the lack of advancement in orcharding is largely due to poor transportation facilities. Competing lines of railroad in this district would also make the railroads now in existence there a little more desirous of giving good service than they are at present. One large shipper made the following statement: "Cars of apples to be forwarded by boat, loaded at Tara, within twenty-five miles by rail of Owen Sound, were sent to Sarnia, and allowed to lie three weeks at the docks before being loaded on the boat." Many similar complaints have been made, and it would seem imperative that some steps should be taken to induce the railroad companies to give more prompt and direct service. It is surprising, with the large amount of fruit grown, the numbers of cattle, swine, horses, etc., raised, and the large and increasing popularity of many places on the shore line as summer resorts, that this district is so inadequately supplied with railways.

Markets.—The district is favorably situated to reach the western and northern markets, as well as those of Europe and the Old World. The co-operative associations and a few private individuals have shipped successfully for some years to Britain and the West. Peaches and tender fruits are usually shipped to

such towns as Sarnia, London, Stratford, Chatham, Guelph, Toronto, and Sault Ste. Marie, and find there a fairly good market. There are, of course, unlimited opportunities in the distant markets.

POPULATION.—The movement westward has greatly affected this whole district. This is especially noticeable in those townships where little fruit has been planted. There the farms have increased in size so much that scarcely one-half of the houses are occupied. In some sections not more than forty per cent. of the population that existed twenty years ago is to be found to-day. On the other hand, in the sections where much fruit is planted, the increase in the size of farms is not nearly so noticeable, empty houses are fewer, and population generally is much more dense. It would seem that the movement westward began to take place about the same time that European markets became available for Canadian fruit, with the result that those sections which already had considerable fruit began to plant more and thus created conditions which vied in attractiveness with the inducements of the West. The following table shows population from 1880 to 1909. Note the continuous decrease in every case:

TABLE 6.

Dates.	Lambton.			Huron.						Bruce.		
	Plympton.	Bosanquet.	Warwick.	Hay.	Stanley.	Colborne.	Hullet.	W. Wawanosh.	E. Wawanosh.	Huron.	Bruce.	
1880.....	4,197	2,896	3,700	3,375	2,373	1,875	3,378	1,894	2,329	5,175	4,236	
1885.....	4,000	2,717	*	3,422	.....	.....	.....	1,902	2,110	.....	.....	
1890.....	3,668	2,498	.....	3,440	.....	2,083	.....	.....	1,932	3,612	3,371	
1895.....	3,636	2,435	.....	4,045	.....	1,791	.....	1,844	1,856	3,645	3,084	
1900.....	3,242	2,448	2,329	3,452	2,152	1,530	2,898	1,831	1,933	3,308	3,492	
1905.....	3,252	2,606	.....	3,295	.....	1,679	.....	.....	1,755	3,039	2,719	
1909.....	3,134	2,466	2,662	3,167	1,788	1,450	2,475	1,795	1,619	2,907	2,357	Total.
Decrease in 29 years..	1,063	230	1,038	208	585	425	903	99	710	2,268	1,879	9,408

* For the years left blank, information could not be obtained.

LAND VALUES.—The value of land varies greatly with the proximity to transportation facilities. Good, drained farm land, including good buildings, can be readily bought for from $40 to $70 per acre. Land set in fruit varies greatly with the condition of the industry. In Goderich Township, Huron County, a farm of 120 acres, with fair buildings, and having forty acres of seventeen-year-old apple trees in good condition, was sold in 1908 for $9,500. This was considered an exorbitant price by the people of the township. In this district fruit-growing as a distinct line of agriculture is just beginning to attract attention. In Lambton County, at the same time, where orcharding is commanding general attention, land set in bearing orchard has been assessed as high as $130 per acre. The difference in price has been chiefly brought about by the adoption of scientific orchard practice and modern co-operative methods of sale of fruit.

The following table gives values, areas of townships and acreage of orchards, etc., from eleven townships in the district, as nearly as they could be supplied by them.

TABLE 8,

County.	Township.	Area in Acres.			Assessment Value.	
		Total.	Tilled Land.	Orchard.	Farm Land per acre.	Total in Township.
					$ c.	$
Lambton ...	Plympton.....	75,015	56,075	2,846	27 00	2,405,607
" ...	Bosanquet	71,000	.....	.....	30 00	2,168,366
" ...	Warwick	70,000	56,554	.....	32 00	.....
Huron	Hay	52,487	43,457	376	35 00	2,345,420
"	Stanley.....	43,347	37,834	.....	.....	1,525,305
"	Colborne.....	34,133	30,952	.....	35 00	1,379,750
"	Hullet.....	53,468	45,869	530	37 00	1,980,000
"	West Wawanosh.....	42,000	20,585	.....	35 00	1,303,956
"	East Wawanosh.....	41,732	30,323	.....	39 00	1,636,375
Bruce	Huron	58,104	54,096	550	30 00	2,590,972
"	Bruce	67,183	51,741	399	21 00	1,839,862

NOTE.—Figures of orchard acreage could not be obtained for several townships.

POSSIBILITIES.—The future of this district lies entirely in the hands of its people. Nature has done her part and done it well. In geographical situations and topographical features everything is favorable for fruit growing. In some sections drainage is essential to good results, but with proper management these sections can produce fruit of very superior quality. Apples can be grown successfully without fear of winter injury in almost any part of the district included in this survey. The finest commercial varieties—Baldwin, Spy, King, Greening, Gravenstein, etc.—flourish and grow to perfection in all this district. Northern apples excel all others in quality, and there are orchards in this section whose amount of production it would be hard to beat. Winter injury is practically unknown in the whole district, except in a few small sections and even here it is simply a matter of proper management.

It would seem from observation of peach orchards growing at the present time in Lambton County that there is a considerable section there quite capable of producing the finest peaches of almost any variety grown in Ontario peach districts, and comparing favorably in fruitfulness with the Niagara district. The clay loams, which are the predominating soils, are very well suited for plums and pears, and these, particularly the former, do very well wherever planted on such soils. Grapes are also grown with great success, though on a very small scale.

In the opinion of the writers the future horticultural possibilities of this section can scarcely be exaggerated. The essentials for the horticultural success of a district, apart from the right kind of men, are good natural conditions, good markets, sufficient labor, and a proper selling system. The latter is being admirably supplied by co-operation. It is the experience of many growers that labor can easily be got if enough is paid for it, and also that labor, almost at any cost, properly directed in orcharding, pays for itself over and over again. With the increase of fruit-growing, too, labor will become more plentiful, because it goes where it is wanted.

Markets are practically unlimited and improved transportation is a matter of time. There only remains natural conditions, and these, as has been pointed out, are very favorable. Much has still to be done, but the future is undoubtedly great.

ORCHARD SURVEY OF PRINCE EDWARD COUNTY.

By W. H. Robertson.

Purpose. This survey was similar to that conducted in other counties of the Province of Ontario and in various States of the Union. The object was to obtain definite information regarding the present horticultural situation in Prince Edward County, as shown by the acres in bearing and non-bearing orchard, care and management received, prices obtained, as well as other facts of interest from a horticultural standpoint.

Method. Being supplied with notebook and blanks similar to those used on other surveys, a farm-to-farm canvass was made. The blanks when filled out would convey the following information regarding each orchard, viz.—The name and post office address of the owner, together with the number of the lot and concession where the farm was situated, as well as the name of the county and township; the number of acres in the farm, acres in fruit, kind of fruit, number of bearing and non-bearing trees and acres of each; the site of the orchard, as well as the aspect, planting plan, distance apart of the trees and varieties grown; whether or not other crops were grown in the orchard, and if so the nature of the crop; nature of the soil, depth and kind of subsoil; regarding tillage, the kind and frequency was noted, whether or not cover crops were grown, and if so for how many years. If in sod the kind was noted, number of years this method had been followed and the manner in which it was treated; fertilizers, kind, quantity used and frequency of application; pruning, times, method followed, frequency and severity as well as the thinning of the fruit if this practice is followed. Diseases were noted, as well as the various insect pests, and also the present condition of the orchard visited. The manner of selling was obtained, as well as the yields and prices for the three previous years, together with the income per acre and the manner in which the apples were packed, viz.; boxes or barrels.

As the farmers on the whole are not very careful book-keepers, it was impossible in many cases to obtain satisfactory information, especially in the cases of yields and prices obtained.

Geographical Situation. Prince Edward County is situated on the Northern shore of Lake Ontario and about one hundred miles east of Toronto. The county is almost surrounded by water, being connected with the mainland at the western extremity by a narrow strip of land. Through this strip of land, however, runs the Murray Canal, which makes Prince Edward County practically an inland. The county is divided into seven townships, namely; Ameliasburg, Sophiasburg, Hallowell, North and South Marysburg, and Athol. It was in the township of Hallowell that the orchard survey was carried on this summer. This township has an area of 43,707⅞ acres of assessable property, and is situated in what might be said to be the very centre of the county when compared with the other townships. It is bounded on the North by the township of Hillier and Sophiasburg, on the South by the townships of Athol and North and South Marysburg. On the East by the township of Sophiasburg, North Marysburg and also the Bay of Quinte, and on the West by the township of Hillier and Lake Ontario.

Topographical Features. Enclosed within this township is a body of water known as West Lake, and covering an area of at least four thousand acres,

and at no point in the township is there a place situated over five miles from the waters of either Lake Ontario or West Lake. The contour of the county on the whole is varied. East of the town of Picton and extending along the east side of Picton Bay and for about one mile south of the town is a high plateau-like formation. The soil here is of a clay-limestone-gravel formation. For the most part it is very shallow, probably not averaging over four feet in depth and very little fruit is grown here. The remainder of the township is, for the most part, a gently rolling country. The soil is varied.. North of the town of Picton it is of a clay loam formation, with here and there streaks of clay-limestone-gravel. West of the town and extending to the village of Bloomfield the soil is a sandy loam, with patches of what is known as black loam or "Black Land" situated in the hollows and lower portions. South of Picton and extending west along what is known as the "Ridge Road," the soil near the town is very light and sandy, gradually changing until it reaches the character of a light sandy loam. South of West Lake the soil near the shore is of a light sandy nature, and changing to sandy loam and finally clay loam as we recede from the shore. North of West Lake and including the first concession the soil is for the most part clay loam. North of the first concession the soil is principally of the clay-limestone-gravel formation. The soils for the most part are of sufficient depth to insure good orchard growth, with the exception of the clay-limestone-gravel. Where this is found the soil is for the most part too shallow to insure sufficient growth and very little tree planting has been done.

Drainage. The county, as before mentioned, is of a gently rolling nature and the drainage on the whole is fair. The orchards in most cases are situated on the highest parts of the farm and as a rule the trees do not show a lack of drainage. When drainage is used, the system employed principally is the open ditch. Up to the present time, there has been no tile drainage done in the orchards and very little on the farms in general. Much of the land could, however, be greatly improved by tile drainage and a few are beginning to see the advantage to be derived and are laying tile. Needless to say, they are in the minority. The advantages to be derived from the tile drainage are numerous, chief of which are the facts that it allows an earlier seeding in the spring, and also allows heat, and air to enter the ground, both of which are necessary for seed germination.

Climate. Surrounded as it is by so much water, it naturally follows that there is little tendency towards extremes of either heat or cold. Regarding correct data on this question of temperatures, none could be secured. In the township of Hallowell, however, the winter temperature rarely falls below minus 10 degrees to minus 15 degrees, although it has been known to fall as low as minus 30 degrees. This is rare, however, and the low temperature would probably be between 0 degrees and minus 5 degrees. These temperatures are by no means prohibitive of fruit growing, and it was only during the winter of 1903 and 1904 that fruit trees in this section suffered at all from the extreme cold. The summer temperatures on the whole are not extreme, and there is usually sufficient fall of rain to prevent trees suffering from the drouth. Especially is this noticeable in orchards that have been cultivated.

Extent and Present Condition of the Industry. Having an area as it does of 43,707⅞ acres; 36,826 acres of which is cleared and for the most part suitable for cultivation, the acreage in fruits is not very large. At the present

time, there are 1,562 acres in apples. Of the amount, 941 acres are bearing, while the remainder comprising 621 acres is non-bearing. The trees bearing at the present time number 51,623; those non-bearing number 27,075. From these figures it may be seen that the average number of trees per acre of bearing orchard is 54.8, while for the non-bearing orchard it is 43.5 trees per acre.

TABLE 1.

No. of acres suitable for cultivation	36,826 acres	100 %
No. of acres devoted to apples	1,562 acres	4.2%
No. of acres of bearing apples	941 acres	60.2%
No. of acres of non-bearing apples	621 acres	39.7%
No. of bearing apple trees in the township	.....	51,623 trees
No. of non-bearing trees in the township	.....	27,075 trees
Average No. of bearing trees per acre	.....	54.8 trees
Average No. of non-bearing trees per acre	.....	43.5 trees

Apples are the principal fruit grown, there being practically no commercial planting of pears and plums. Cherries are not grown to any extent. There are, however, a few commercial orchards that are doing fine. Sour cherries are the principal kinds grown and the Montmorency and Early Richmond comprise the largest plantings. The principal cherry orchards are planted on a clay-limestone-gravel, and on this soil they do remarkably well, as it is hard and gritty and seems to be particularly suited to their growth.

For apples, the clay-limestone-gravel does not seem to be so well suited. This is due, no doubt, to the fact that it is difficult to secure sufficient depth of soil to insure a satisfactory growth. Where it can be secured, however, of sufficient depth, the trees do well. The part of the county where the principal apple orchards are found is in the vicinity of Picton and in close proximity to the county road, between Picton and Wellington. A great deal of the remainder of the county is suited to fruit growing. In most cases, however, fruit growing is a secondary proposition only receiving attention, if at all, after all other crops have been attended to.

From the following table, some idea may be obtained of the comparative yield of the orchard with other farm crops.

TABLE 2.

Crop.	Fair yield in bus.	Price.	Value.
		$ c.	$ c.
Fall Wheat	30	98	29 40
Barley	34	53	18 02
Oats	45	40	18 00
Peas	20	2 00	40 00
Beans	20	2 00	40 00
Potatoes	150	50	75 00
Tomatoes	300	25	75 00
Apples	200	40	80 00

It was impossible to obtain accurate information on the number of trees of each variety, and in the case of the older bearing orchards the age of the trees. The varieties in the older orchards are very badly mixed and many worthless kinds are found. More attention was paid, no doubt, at the time of planting to securing a variety of fruit for home consumption rather than for commercial pur-

poses. The older orchards are for the most part small and do not receive the attention that they should. The young orchards on the whole receive better attention than the old orchards. The trees are set farther apart and in many cases interplanted with such canning factory crops as corn and tomatoes, thus increasing cultivation in the orchard. Very little attention is given to the spraying or the pruning of the young orchard for the first year or two at least. This results in a bad head being formed and much harm being done through the attacks of such insects as the Oyster Shell Scale and the Case-Bearer. The varieties in the non-bearing orchards are numerous. The Ben Davis, Stark, and Spy are without doubt the leading varieties, while among the others planted are the McIntosh Red, Cranberry Pippin, Pewaukee, and Wealthy. These are a few of the more important. There are others too numerous to mention, as the grower has not yet learned that it will pay him better to set out two or three standard commercial varieties instead of an orchard containing a number of varieties.

At the present time, the interest of the farmers is being awakened in fruit growing. In many cases the older orchards are being scraped and spraying is being done, although not always in the most satisfactory manner. Pruning, when attempted, is in the majority of cases by no means thorough, and the general indications are that in the future more attention will be given to the production of first class fruit.

From the following table some idea of the distance between trees may be obtained.

TABLE 3.

Distance between Trees.	Number of Acres.	Percentage.
Under 25 x 25 ft.	99	6.338
25 x 25 to 29 x 29 ft.	172	11.011
30 x 30 to 35 x 35 ft.	1,092	69.916
36 x 36 to 40 x 40 ft.	136	8.706
Other distances	63	4.037

From the above table we may see that 69.916 per cent. of the trees are set at a distance varying from thirty feet by thirty feet to thirty-five by thirty-five feet.

The plan usually adopted for planting is the square, very few orchards being planted on any other plan. In the very old orchards in several cases, little attention has been paid to planting and the trees are more or less irregular.

NURSERY STOCK. At present, the stock for planting is principally Canadian grown, although a small quantity is obtained from the United States. More attention should be paid by the growers to the obtaining of first-class stock. Much of that which is planted at the present time is very high-headed and in many cases the trees when obtained from the nursery are bruised and broken.

SOIL MANAGEMENT. The methods of soil management differ greatly. The two principal methods are (1) Sod culture, (2) Cultivation. In the sod culture, the usual plan is to allow the orchard to remain in sod, pastured by horses, cattle or hogs. As a rule, the man who pastures his orchard is neglectful, and the orchard is not kept in first-class shape.

When cultivation is followed, the orchard is either fall or spring plowed, and kept cultivated through the summer and in some cases planted to a cover crop.

In the young non-bearing orchards the usual plan is to plant a hoed crop of some kind, such as tomatoes or corn, and keep these cultivated through the summer. The principal cover crop grown is buckwheat. In some cases rye and clovers are used. Clover as a cover crop should be more extensively used, as it not only aids in adding humus to the soil but also from the fact that it collects large quantities of nitrogen from the air, which is made available to the tree when the clover is turned under.

Insects and Diseases. The insects and diseases that attack the fruit and foliage of the orchard trees are numerous. It is probably in a large measure due to these pests that more interest is not taken in the production of fruit, and it is the reason why more fruit of a first-class quality is not produced. With the present knowledge, however, of sprays and the best method of application, there is little excuse for the production of poor fruit. The insects and diseases that are troublesome are numerous but there are many methods of combatting them. To give them any more than a passing notice in this publication would be impossible. Nevertheless, it might be advisable to mention a few of the most serious ones which have been encountered in this survey.

Insects.

Oyster Shell Scale. This is without doubt one of the most serious insect pests that can be found to-day in Prince Edward County, and I feel quite safe in stating that ninety-nine per cent. of the orchards visited are infested with this insect. The remedy is simple, being the thorough application of lime and sulphur spray before the leaves open in the spring.

Blister Mite. Another serious insect pest and one which is not as well known to the grower as the Oyster Shell Scale, is the Blister Mite. These insects are very small, too small to be seen with the naked eye. They raise on the leaf small blisters which eventually turn brown, and in this way destroy the function of the leaf. The remedy for this insect is similar to that for the Oyster Shell Scale, namely, a thorough application of lime and sulphur spray before the leaves open.

Railroad Worm. This insect attacks the fruit during the month of August, and is one of the most difficult to control. The adult lays its eggs under the skin of the apple. The larvæ when hatched bore through the fruit in all directions. The principal remedy, and one which has given great success, is to destroy all infected fruit. This may be done by picking up all the fallen fruit and feeding it to the hogs or by burying it deeply in the ground.

There are also other insects which are numerous and doing a great deal of damage. The most harmful ones are: Codling Moth, the Apple Tree Tent Caterpillar, the Case-Bearers, and the Tussock Moth.

Diseases.

The diseases encountered on this survey which affect the fruit and trees are not numerous. Nevertheless, they are of such a nature that more attention should be given to their treatment than is done at the present time.

Black Rot Canker. This disease is found principally in the old orchards, although the young orchards are by no means free. At the present time fully

ninety per cent. of the orchards visited are troubled to a greater or less degree with this disease. The principal remedy is to cut all infected spots in the tree. Then disinfect thoroughly by washing with corrosive sublimate solution. When thoroughly disinfected, paint with a mixture of white lead and oil. This treatment not only cleans out the wound and allows it to heal, but also prevents further infection.

Other diseases which were quite prevalent were the Leaf Spot and Apple Scab. Both of these can be overcome by thorough spraying with lime and sulphur.

Collar Rot. Collar Rot was noticed in a number of the orchards. The first appearance of the trouble is the rotting or decaying of the bark around the base of the trunk, which results in the death of the tree. The cause of this trouble is not definitely known. Treatment similar to that for Black Rot Canker would no doubt prove beneficial.

Spraying. Spraying is an orchard practice which is receiving more attention at the present time than formerly. This is no doubt due to the fact that the fruit grower is troubled with more insects and diseases than was the case in previous years, and he is beginning to see that if he intends to make his orchard pay he will have to spray. The character of the spray used is varied. The old spray known as Bordeaux Mixture is used much less than formerly, its place being taken by the lime and sulphur washes, which are proving very satisfactory. In some cases preparations of Gillett's lye have been used. This is not satisfactory, as the amount required renders it too expensive for commercial work.

Although more spraying is being done than formerly, there is still room for improvement in the manner of spraying. To be satisfactory and profitable, it must be done thoroughly. The lack of thoroughness is one of the points of spraying that is in need of emphasis, and until the grower learns to spray, and spray thoroughly, he cannot expect his crop to bring him satisfactory returns.

At the present time the form of spraying machinery most generally used is the barrel pump. Another kind of outfit used, although not to any great extent, is a two-barrel tank. The power in this case is supplied by the revolution of the wheels. No sprayers were seen during the survey where the power was supplied by means of a gasoline engine.

With regard to the kind of spraying outfit which would prove the most satisfactory it is difficult to say. The man with a smaller number of acres of fruit will not require as large an outfit as the man with a large orchard. Whatever kind of spraying outfit is used, it should be of sufficient power to generate and maintain at least one hundred pounds pressure, this amount of pressure being necessary to give a satisfactory spray.

Table 4.—Results of Spraying, Cultivating, Fertilizing.

Treatment.	1908.		1909.		Total Number of	
	Barrels.	Value.	Barrels.	Value.	Acres.	Orchards.
Sprayed, cultivated, fertilized	31	$39 68	32	$46 28	58	9
Not sprayed, cultivated, fertilized	15	20 28	17	15 81	53	11

TABLE 4.—SPRAYING IN 1910.

How Sprayed.	Number of Orchards.	Number of Acres.	Per cent.
Sprayed once 1910	15	145	30
Sprayed twice 1910	25	314	50
Sprayed three times 1910	10	121	20
Total 1910	50	580	22.527
Seldom or never sprayed	172	982	77.675

TABLE 5.—KINDS OF SPRAY USED FOR SUMMER SPRAYING IN 1910.

How Sprayed.	Number of Orchards.	Number of Acres.	Per cent.
Lime and sulphur	25	254	50
Lime and sulphur and arsenate of lead	13	201	26
Bordeaux mixture and Paris green	1	25	2
Paris green only	1	3	2
Bordeaux only	3	31	6
Lime and sulphur and arsenite of lime	1	25	2
Other mixtures	6	41	12

FERTILIZATION. The subject of fertilization is one of the most important problems that the orchardist has to deal with. That the trees are taking food out of the ground from the time they are set until the tree dies is an assured fact. For this reason, therefore, there should always be sufficient fertilizer in the soil to insure a healthy growth. Just how much plant food is taken up by apple trees as compared with various field crops may be seen from the following table taken from Bulletin No. 68 of the Illinois Experiment Station.

TABLE 6.—FERTILIZING CONSTITUENTS USED BY APPLES AND FARM CROPS.

Produce.		Pounds.		
Kind.	Amount.	Nitrogen.	Phosphorus.	Potassium.
Oats.... Grain	75 bus.	45	7	9
Oats.... Straw	2 tons	24	4	40
	Total crop...	69	11	49
Oats.... Grain	40 bus.	46	6	11
Oats.... Straw	2 tons	19	4	34
	Total crop...	65	10	45
Timothy	2 tons	48	6	47
Potatoes	300 bus.	63	13	90
Apples	600 bus.	47	2	57
Leaves	4 tons	59	7	47
Wood growth	.....	6	2	5
	Total.....	112	11	109

From this table it may be seen that fertilization is as necessary for production in the orchard as in any other part of the farm.

Barnyard manure is the principal fertilizer used. Even the men who do not spray or work their orchards apply barnyard manure to a greater or less extent. Commercial fertilizers are seldom or never used, and the general opinion is that they are of little use. This idea no doubt will predominate until the grower has been taught and shown the way to supplement his applications of barnyard manure with commercial fertilizer. Barnyard manure makes a very good fertilizer. Its chief constituent, however, is Nitrogen; the other two elements which are in many cases very essential are, to a large extent, lacking, namely, Potash and Phosphoric Acid. These two constituents may be supplied by means of wood ashes and commercial fertilizers. Unleached wood ashes form a valuable fertilizer if they can be secured at reasonable cost and in good condition. With regard to commercial fertilizers their value lies in the fact that through them can be supplied at once any constituent in which the soil is lacking, and also that they are readily available to the plant. The commercial fertilizers may be divided into three classes, viz.: (1) The Nitrogen-supplying fertilizers, such as Nitrate of Soda, Blood, and Guano; (2) the Potash-supplying fertilizers, such as Kainit, Muriate of Potash, Sulphate of Potash; (3) the Phosphoric-supplying fertilizer, such as Basic Slag, Tankage. Fish, etc.

Under the head of fertilizers should come cover crops. Not only do they serve the purpose of winter protection, but they also tend to improve the physical and chemical condition of the soil. The cover crops principally used in this district are Buckwheat and Clover. The buckwheat is usually sown about the middle of July. It grows until early in the fall, forming a thick covering, and remains on the ground all winter, being plowed under in the spring. Clover is usually sown in the spring along with some grain crop. The following year a crop of clover is removed from the ground, and the second crop is plowed under. This is rather a questionable means of securing fertility, as the grain crop removes a large quantity of plant food from the ground. By plowing under the first crop of clover a greater amount of humus would be obtained, as well as a large amount of nitrogen.

Cover crops may be divided into three classes, viz.: (1) Those sown for their nitrogen-supplying qualities, as clovers and vetches; (2) those sown for their potash-supplying qualities, such as turnips and rape; (3) those sown for their humus alone, such as buckwheat, rye, and other crops.

Heading and Pruning. The trees in the orchards visited are for the most part headed very high, the principal object being to secure a tree which will not interfere with cultivation. This has been accomplished in many cases without regard for securing a tree that may be easily sprayed, pruned or picked, which would be the case were they headed lower.

With regard to pruning, the main idea should be to open up the tree in such a manner as to let in sunlight, so as to insure a good coloring of the fruit, a minimum amount of disease, and a maximum amount of value from spraying. It also takes a less amount of spray to cover a tree that has been well pruned than one resembling a brush heap. Thus it appears that good pruning and thorough spraying must necessarily go hand in hand. There are two systems of pruning to be followed, viz.: Open centre and central leader. In the majority of cases in this district little or no attention has been paid to any system. When followed up, the main idea seems to be to get rid of dead wood and suckers and to trim the branches

in such a manner that the bearing wood is all on the outside. This leaves the main limbs long and bare, the weight of the fruit being all on the ends of the limbs, making propping necessary; if not done, the result is the breaking of the limbs. When pruning is done, in many cases not enough attention is paid to the manner in which the cuts are made. Growers often think that once the limb is removed the operation is finished, and no more attention is given to the wound.

Pruning is usually done in the early spring, because at this time the grower usually has more time to devote to this work than later in the season. A few of the growers, however, attempt June pruning, which is no doubt a good time if opportunity offers.

Thinning. Thinning of the fruit in the early stages in order to increase size and quality has been attempted. Most of the growers think that it is a waste of time. In one case, however, where thinning was done, the results obtained were excellent, and they would have been much more satisfactory had the operation been a little more severe. Not only does thinning tend to increase the size of the fruit, but it also tends to the production of an average crop each year. There is thus no overloading of the trees and permanent injury caused by breakages.

Harvesting. The manner of harvesting depends largely on the method of selling. If the orchard is sold directly to the buyer, it is his men who do the picking. As soon as the apples are picked, they are carried to the grading table. Here they are sorted into the various grades and packed into barrels ready for shipment. (At the present time, none of the growers have learned the art of box packing, so that no shipments are made in boxes, either by the growers or buyers.) All packing is done in the orchard, and from the orchard they are drawn to the station and shipped. Few or no barrels are placed in storage in the township.

Methods of Selling. The principal ways in which apples are sold are: (1) Co-operatively; (2) On commission; (3) To the buyer; (4) Canning factory and evaporators.

Up to the present time there have been no apples sold by a co-operative society. The first co-operative association, namely, "The Prince Edward Fruit Growers' Association," was formed during the spring of 1910. Their object was to purchase the various supplies for their members but not to sell their fruit. They intend, however, in the near future to control the selling of the fruit also. A word with regard to the value of co-operation would not be out of place. Not only does it enable the fruit growers to purchase their supplies at a reduced cost because of the fact that these are bought in bulk, but it also enables them in packing their fruit to put large quantities of a uniform quality on the market. Better prices are thus obtained and better rates are often secured from the railways by the company than could be secured by the individual.

Few of the growers ship their apples on commission. When this is done, it is usually to Ottawa, Montreal or England that they are sent. The prices obtained are as a rule very satisfactory, but so few of the growers have followed this method that it is difficult to say whether satisfactory results would follow if it were largely practised. Results will, of course, in any event depend entirely upon the grade of fruit packed, as well as upon the honesty of the commission man, as the grower is largely at his mercy once the fruit has been shipped.

Selling the fruit to the apple buyer is the method most largely practised. There are, however, different methods. The buyer may visit the orchard during

the summer and offer him so much per barrel on the tree for firsts and seconds, or it may be that the buyer buys at so much per barrel orchard run. Again, the buyer may give the grower so much for the orchard. In some cases the growers pick and pack their own fruit, and then sell to the buyer whenever he wishes. This last method is, I would say, the most desirable. The grade of apples should be superior, while the grower would also be more careful in picking not to injure his trees. A number of the growers also sell their fruit to the factories and evaporators. This includes the culls and a poorer class of fruit generally than that which is packed and sold by the barrel. The quantities which the factories will take for canning purposes is limited. The evaporators, however, will probably take a fair amount, but as to the exact quantity I am unable to say. The factories also buy a large quantity of the strawberry crop. As these two crops, however, are not grown in exceedingly large quantities, they were not considered to any extent in this respect.

TABLE NO. 9.—HOW THE FRUIT IS SOLD.

Total.	On commission.		To buyer.		Factory and evaporator.	
193 growers...	10	5.18%	165	85.4%	18	9.3%

TABLE NO. 10.—RETURNS FROM DIFFERENT METHODS OF SELLING.

	1908.		1909.		Total No. of	
	Bbls.	Price per bbl.	Bbls.	Price per bbl.	Acres.	Orchards.
		$ c.		$ c.		
Canning factory and evaporator	.....	.....	657	99	75	11
On commission.	391	2 55	335	2 53	23	4
To buyers on the tree.....	5,027	1 23	5,754	1 13	255	39

TRANSPORTATION. Surrounded as it is by water, transportation by this means plays an important part. Through the summer and early fall months part of the shipments of fruit goes by this route to such markets as Toronto, Kingston, Gananoque, and Montreal. This is especially the case in the shipping of small fruits, such as raspberries, strawberries, cherries. The only railroad in the county is the Central Ontario Railway. This line forms the connecting link between Picton and Trenton Junction on the main line of the Grand Trunk Railway. Situated on this line also are the towns of Wellington and Bloomfield. No point in the township is over six miles from the railway, so that we may say transportation facilities are, on the whole, fair.

POPULATION. The following table shows the total population of Prince Edward County and the decrease in population which the county has undergone the last thirty years. The exodus of the people of Ontario in general to the West, and also to the large cities and towns, as well as to the United States, has in all

probability had to do with the depletion of the population of the county. The increase in population of the villages of Bloomfield and Wellington is no doubt due to the fact that many of the farmers are leaving the home farm and retiring to the city. The establishment of canning factories at these points would also have the effect of bringing more people into the villages.

PRINCE EDWARD COUNTY.

Dates.	Townships.										
	Ameliasburg.	Athol.	Hallowell.	Hillier.	Marysburg N.	Marysburg S.	Pictontown.	Sophiasburg.	Wellington Village.	Village of Bloomfield.	Total.
1881	3,451	1,573	3,704	2,192	1,700	2,205	2,975	2,546	598	.....	21,044
1891	3,079	1,284	3,380	1,890	1,430	1,643	3,287	2,341	555	.....	18,889
1901	2,585	1,187	3,445	1,647	1,213	1,342	3,698	2,095	652	.....	17,864
1905	2,430	997	2,892	1,342	1,097	1,142	3,722	1,632	668	.....	15,922
1906	2,429	1,101	2,979	1,281	1,042	1,102	3,834	1,657	681	.....	16,106
1907	2,493	1,059	2,352	1,326	976	1,063	3,780	1,649	760	592	16,050
1908	2,517	943	2,485	1,446	1,010	1,140	3,732	1,598	769	645	16,285
1910	2,389	996	2,418	1,451	1,010	1,028	3,532	1,903	845	647	16,221
Decrease	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,823

LAND VALUES. Land values vary in this township as well as in any other part of the country. They depend greatly upon the proximity of the land to a town or village, which is really the shipping point. At the present time the value of land along the main road between Picton and Wellington is in the neighborhood of one hundred dollars per acre. Passing out into the country from points along this road, the land may be obtained at different prices, all depending upon the distance from town, nature of the land, and the condition of the buildings. On the whole, the price of land is not exorbitant throughout the township.

POSSIBILITIES. Prince Edward County, like many other counties, is just awakening to the fact that it is capable of producing fruit of a first-class quality. The apple is the principal fruit grown, and when the orchards are looked after the results obtained are excellent. Pears and plums are grown in such small quantities that they were not considered. Cherries are grown in small quantities, but with considerable success. Two orchards visited during the survey were doing fine, having made an excellent growth and looking well. Smaller fruit, such as strawberries and raspberries, are grown in small quantities, and their sale is largely to the canning factory.

From the previous statement with regard to topography and transportation it may be seen that the county is well situated with regard to markets, and that the means of transportation both by water and land are on the whole fair, and will improve as time and necessity demand it. On the whole, the outlook for fruit growing in Prince Edward County is very favorable, and this important industry will without doubt increase in extent as the people awaken to the possibilities at hand.

CANNING CROPS OF HALLOWELL TOWNSHIP IN PRINCE EDWARD COUNTY.

By J. E. Smith.

Introductory. Prince Edward County has long enjoyed an enviable reputation for the production of canning crops on a commercial scale. Though with the smallest area of any of the counties, yet to-day it provides the raw material for fifteen out of the fifty-seven canning factories in this Province, with a corresponding percentage of the total annual pack. That part of Prince Edward comprising Hallowell Township contributes approximately seventy-five per cent. of the total output for the county, and it is the purpose of this article to give as clearly as possible an insight into the conditions of the industry as I have found them in that township.

The field work for this report was carried out largely by W. H. Robertson, who in March last was appointed by the Fruit Division of the Ontario Department of Agriculture to make a farm to farm survey of the entire township. During his investigation Mr. Robertson visited each of the 274 farms producing factory crops. My connection with the Prince Edward branch of the Department of Agriculture at Picton, and the experimental work carried on by that office, kept me continually in close touch with the practical field work of the grower, so that the figures and estimates given are as accurate as was possible for us to obtain. In some instances, however, the growers for various reasons were unable to supply us with figures regarding acreage, yields, varieties, etc., for more than the past year.

Of the canning crops grown for factory purposes, beans, peas, corn and tomatoes are by far the most important, and of these the three last named form the main crop. This investigation will be confined, therefore, chiefly to these three, and particularly to the last two, as the area devoted to the production of the corn and tomato crops greatly exceeds the total acreage in the other two.

History. Both the corn and the tomato are natives of America. The order "Solanaceæ," or Nightshade Family, to which the tomato belongs, contains over twelve hundred species, among which are three of our most wholesome and important vegetables— the Irish potato, the tomato, and the egg-plant. This family also includes the red-pepper, and the narcotics, bitter-sweet, belladonna and the tobacco plant. The tomato was originally thought to be poisonous, but in 1781 we find it being grown for culinary use in Virginia. In the twenty years following, it gradually came into favor, and in 1812 we find it quoted on the New Orleans market. As a canned article of trade, tomatoes were first introduced at Easton, Pa., in 1848, by Harrison W. Crosby, Steward of the Lafayette College. The original cost per can was about five times that of the present.

The canning of corn and tomatoes in Ontario on a commercial basis dates back some thirty years. In 1881 Messrs. Wellington Boulter and Gilbert Barker erected and started into operation canning factories at Picton and Bloomfield, in Prince Edward County. To these two men, then, belongs the honor of pioneering an industry which to-day has assumed a remarkable magnitude. Regarding the recent growth of the tomato industry alone in Ontario, the total number of bushels paid for by the canneries has increased from 132,000 in 1891 to 1,400,000 in 1908; the cases packed, from 83,000 to 880,000; the cans, from 1,992,000 to 21,124,000; the value of the pack, from $190,000 to $1,672,000, and the price paid to the growers, from $26,400 to $386,600. The total output of the factories

of Hallowell Township in all canned vegetables during 1910 was about 500,000 cases, valued at $1,250,000.

The following is a list of the canning factories in Hallowell Township:

Consolidated (Dominion Canners, Limited).

Bloomfield Packing Co., Bloomfield.
Farmer's Canning Co., Bloomfield.
Old Homestead Canning Co., Picton.
Lakeside Canning Co., Wellington.
Boulter & Sons, W., Picton.
Miller & Co., A. C., Picton.
Wellington Packing Co., Wellington.

Independent.

Saylor Co., A. B., Bloomfield.
Orser & Sons, J. B., Chisholm.
Hyatt & Sons, J. W., West Lake.
Morden & Sons, A. A., Wellington.

Soils of the Township. In regard to the soils of the township. a few words will not be amiss. As in most other districts of a rolling nature, we find here also a wide range in the character of the soils, variations being found all the way from heavy or gravelly clays to light sand. with clay or sandy loams as the predominating ones. As for subsoils, clays or gravelly clays are the prevailing types.

Apart from its splendid harbor and beautiful location, Picton, the county town, possesses the advantage of being the centre of the canning industry. To the east of the town, along the south shore of the bay, the land rises sharply until, a half-mile back, an elevation of 150 feet is reached. This northwesterly slope of land, extending along the bay to the eastern limit of the township, is of a gravelly clay nature, with a heavy clay subsoil—rather cold for the production of canning crops unless well underdrained. Along the summit of this elevation the Trenton limestone outcrops, and from this line to the eastern limit, the soil, for the most part clay or clay-gravel and with little slope, is seldom found with sufficient depth to withstand a dry season. This elevation extends also away to the south of the town until, near the township line of Athol and Hallowell, it turns slowly to the east into South Marysburg. The land lying to the east and above this ridge is invariably a heavy clay, with little depth to the rock, similar to that above the ridge just east of Picton. Below this ridge the soil has much greater depth and is more suited to growing crops of any kind.

Directly to the south-west of Picton and extending as far as Athol Township, the country is quite rolling, almost regular ridges varying from one-half to a mile apart, reaching in a north-east and south-westerly direction. These ridges are invariably of a sandy nature while the land between, always heavier, is for the most part clay or 'black' clay-loam with a heavy clay subsoil. That part of the township lying directly south of West Lake is peculiar in its formation. A light sandy soil is found for some distance back from the lake, with a sandy loam farther south and this again gradually blending into a deep clay before the township line is reached.

North and west of Picton the soil is mostly loamy clay with a deep impervious clay subsoil. This extends both north and north-west to the limits of the township. The slightly rolling nature of this region affords fair natural drainage, though in many of the flat reaches, artificial drainage is greatly needed. Between Picton and the town of Bloomfield, and within a four-mile radius of the latter place, is to be found probably the finest agricultural section in the county. Excellent drainage is afforded by the undulating nature of the district, while the soil —a rich clay loam with a gravelly subsoil, can scarcely be excelled in the production of the various canning crops. The land extending beyond this radius to the north of the township is also of excellent quality, though slightly heavier and hence a colder soil.

Along the north shore of West Lake a gravelly sand ridge extends to the town of Wellington. North of this ridge, to the township line, the land is a prevailing gravelly lime stone clay loam, with here and there a heavier gravelly clay. The subsoil is invariably clay or gravelly clay except in a few instances nearer the lake where a marl subsoil was found. Only a portion of this district concerns itself in the production of canning crops, the remainder being engaged in orcharding and mixed farming.

Climate. Being practically an island, Prince Edward County enjoys a climate less rigorous and fickle than that of its neighbors to the north. The winters are tempered by the proximity of Lake Ontario and extremes of summer heat are infrequent. There is also that protection from late spring and early fall frosts, which only the proximity of a large body of water affords. During June, July, August and September, there are from 100 to 120 days reasonably free from frost, in which time a crop may be grown and matured. During this season the day temperature will average from 72 degrees to 90 degrees Fahr., with 15 degrees to 20 degrees lower at night. If to this length of season, a week of May be added, the season is amply long, if proper attention has been given to the crop.

The following figures compiled from the Report of the Bureau of Industries give approximately the average monthly range for the past 28 years, and the monthly temperature for 1909.

—	Highest.	Lowest.	Average per month.	Average for past 28 years, 1882-1909.		
				Highest.	Lowest.	Average.
January	56.8°	—6.2°	24.3°	43.3°	—7.1°	21.0°
February	46.0	—3.1	25.1	44.6	11.2	19.2
March	44.8	6.1	28.6	53.4	—3.0	26.6
April	65.5	11.1	37.9	72.6	15.1	40.1
May	80.1	29.1	49.5	80.0	28.4	51.2
June	87.9	38.0	62.0	85.5	37.5	60.9
July	85.4	42.2	64.8	87.2	43.4	66.5
August	86.9	40.1	67.2	86.1	41.8	64.5
September	90.5	36.1	58.7	84.8	34.2	59.3
October	77.3	24.1	45.5	74.3	24.8	47.7
November	68.3	5.1	40.4	60.9	13.9	36.8
December	47.8	.9	25.5	49.3	—0.1	26.7

Average temperature for June, July, Aug. and Sept., 1909, 63.1 degrees Fahr.
Average Temperature for year 1909, 44.1 degrees.
" " " past 28 years, 43.4 degrees.
Total Precipitation for the year 1909, 36.21 inches.
Average annual Rainfall, 26.87 inches.

Increase in Acreage of Vegetable Crops. The production of canning crop within the township has shown a marked increase in the last few years. Unfortunately we were unable to secure, for various reasons, accurate figures of the acreage and yield for more than the past two seasons. In 1909, the total area devoted to the production of canning crops, other than berries, was 2,461 acres. Last year, this was increased to 3,324 acres, or 34 per cent. more than the previous year.

In the following tables will be found the number of growers, total acreage and average per grower for the years 1909 and 1910.

Acreage in Peas.

Year.	Number of Growers.	Total Acreage.	Average Acreage per Grower.
1909	155	540½	3.48
1910	207	743¾	3.5
Increase	52	203¼	.02

Acreage in Corn.

1909	192	1,390¾	7.3
1910	236	1,855¾	7.86
Increase	44	465	.56

Acreage in Tomatoes.

1909	188	530	2.82
1910	219	699	3.19
Increase	31	169	.37

Total Canning Crops.

Year.	No. of growers.	Total acreage.	Average acreage per grower.
1909	248	2,461	9.97
1910	273	3,324	12.18
Increase	25	86	2.21

Only 25 acres of beans were grown for the factories in 1910.

The Growing of Tomatoes for the Canning Factories.

Varieties. There are a great number of varieties of the different canning crops grown within the township, but only certain varieties have given general satisfaction to both grower and canner. Of the tomatoes there are 15 varieties, of which the Worden, Baltimore, Chalk's Jewel, Bonnie Best and I.X.L. are the favorites.

While scarcely as early as many of the others, the Worden commends itself in being a vigorous grower, a heavy yielder, and specially suitable for canning. The later pickings are much smoother and more uniform than the early ones. This variety is of local origin, though its exact source is not definitely known. It is the most popular variety in the whole county. The Baltimore is also one of the old favorities, late growing but a good cropper. Chalk's Jewel is earlier than the Worden, but is inclined to run off in size. The Bonnie Best is an early variety lately introduced into the township. Like Chalk's Jewel it is a good cropper, fairly smooth, scarcely so luxuriant or late growing and has also a slight tendency to run small in the late pickings. Special seed selection with this variety promises much improvement to one that is already a good canner. The I.X.L. is our earliest variety of canning tomato. A trifle more delicate than other varieties, but it is a heavy yielder on rich soils and ranks first with the canner. It carries a low percentage of seed and thus a high percentage of flesh. The fruit is large and fairly smooth, but the variety tends to run down unless careful seed selection is practised. The Earliana, with its large round fruit, makes a good early shipper, but only a few selected strains are of much value to the canner, the others being too soft and juicy, and not ripening well on the stem end in the late pickings.

The other varieties of tomatoes grown for the factory are: Perfection, Successs, Early Baltimore, Stone (very late), Matchless, Favorite, King of Early, Mammoth, Naturalist and Livingstone, none of which can be specially commended to the grower.

Best Soils for Canning-crop Production. Large yields of canning crops can be and have been obtained from soils of varying composition—from the deep "black" clay, muck soils, clay loams, sandy loams and even in the light sandy soils provided the other conditions, such as drainage, tilth and fertility, are favorable. But a maximum crop can never, and a full crop very seldom, be produced on any soil, no matter what its composition, if it is poorly drained, sodden or sour, in a poor state of tilth or too leachy to hold sufficient moisture or available plant food. By the above statement, I do not mean to say that these crops can be produced as cheaply on one soil as on another. This could not be so as the cost of keeping some soils in good physical condition is much greater than with others. A clay soil requires much more cultivation and care than a lighter one, tends to "puddle" more readily in wet weather and to bake when dry. For these reasons, our choice of a soil for the production of tomatoes at the lowest cost per bushel and for maximum yields, should be a rich deep sandy or light clay loam with a well-drained clay subsoil. In saying this I do not wish to discourage the man on the heavy clay or muck soil farm, who, although he will find his cost of production somewhat higher, can raise maximum yields from either of these soils by an adequate system of cultivation and crop rotation. In the case of corn and peas the types of soil best suited for the production of maximum or full crops at the lowest cost are almost identical with those for tomatoes.

Exposure and Location. In sections where there is danger of the plants being affected by early fall frosts before they have ripened their entire crop, exposure of the fields is usually of importance in determining the marketable yield. A gentle inclination to the south with a protection of higher land or timber on the side from which frost or high winds are likely to come is the best. It is frequently found that fields enclosed on all sides either by higher land or timber so as to form a dead air space, are much more readily affected by frosts than more exposed locations where there is a free air circulation. Our investigation gave us 51 per cent. of the vegetable crop of the township on practically level ground; 18 per cent. on undulating land; 17 per cent. with a southern exposure; 8 per cent. with a slope to the north; 4½ per cent. with a western exposure, while only 2 per cent. had an eastern aspect. Turning to our figures of the yields, we find that the first three exposures gave a slightly heavier average yield each than any of those obtained from the soils with other exposures. Much of this increase in yield is no doubt due to earlier maturing of the crops on these exposures.

While exposure is in most cases a factor in determining the total yield per acre, and thus the cost of production, the location as regards distance from factory and the character of the roads between fields and factory are of equal, if not greater, importance in determining the cost of and profit on the crop. The nature of these factory crops is such that they must be marketed within a day or two of the time they are in prime condition, regardless of the condition of roads or weather. These conditions and the fact that one frequently has to wait for an hour or so for his team to unload, make it very important in securing a site, to have it within easy marketing distance of the factory. In Hallowell Township the average distance of the grower from the factory is 1½ miles, and the cost of hauling tomatoes for this distance is estimated at 1½ cts. per bushel and ½ cent per bushel for every extra mile beyond this. Thus the distance from the factory must be carefully considered in estimating the profit or loss in the growing of canning crops.

Drainage. For the production of a maximum yield of corn or tomatoes, the water-table must be sufficiently low to allow of the greatest root development. Tomatoes, corn, and peas will resist drouth much better than supersaturation. A water-soaked soil is invariably a cold one. As before stated the land best adapted to these crops is rather light. Such soils usually give better natural drainage and proper air-circulation through the surface layer. In fields of a rolling nature we find an excellent yield on the slopes, while the plants in the lower places are small, stunted and unthrifty. Moreover, a percentage of the yield from these vines is lost through rotting of the fruit. The cause of these conditions is the lack of drainage and air-circulation in the soil. The excess of water causes "puddling" in wet weather and "baking" of the top layer in dry weather, both of which check root development, which results in the production of a dwarfed plant. The nature of the subsoil also directly influences the condition of the surface layer and where under-drainage is not practised, by its open and impervious nature and distance from the surface, the subsoil will determine the drainage accorded the top soil. Our investigation showed that where the soil was well drained, either naturally or by tile or open ditch, it gave a warm seed bed earlier in spring, secured a higher average yield, a crop freer from diseased fruit and shortened considerably the time from planting to harvesting. Whether secured by selecting a site where natural drainage is afforded, by tile or open ditching, efficient drainage is always essential if maximum yields are to be obtained.

Rotation of Crops. The choice of the tomato ground depends to a considerable extent upon the rotation of crops in vogue. While good yields have been produced after various crops, yet the consensus of opinion throughout the township favors clover sod, and this is well substantiated by the experience of the best growers in other parts of the province. The best crops seen this summer were produced on clover sod. Occasionally we find a grower who, by thorough cultivation and heavy fertilizing, produces tomatoes successfully year after year on the same piece of ground. These are invariably exceptions, where rotation is impossible either for lack of land or other reasons. The practice, from our experience of the past summer, is not to be commended, nor is it advisable to grow tomatoes on ground that was in potatoes the previous year. Both these crops are heavy consumers of potash and considerably reduce the available amount of that element in the soil. The most successful tomato grower in Hallowell township practised a three-year rotation as follows: Cereal, clover hay, tomatoes. He seeded to clover with his grain crop, took one cutting of hay the following year and when the second growth had obtained a height of 6 to 8 inches, he gave it a light coat of manure and then plowed it under. In the spring he prepares this ground by thorough cultivation, thus securing an excellent seed bed in a soil rich in those elements required by the tomato. Such a rotation, together with good cultivation and the selection of good seed, has given this grower an average yield in the past five years of a little over 500 bushels per acre. There is no doubt but that clover sod leaves the land in better condition for tomatoes than any of the other commonly grown farm crops. Failing clover sod, however, the next best is the second crop after clover and of the other preceding crops, peas, beans, corn or wheat are to be preferred in the order named. While a large percentage of the growers raise their tomatoes on ground that was previously in some kind of sod, it is to be regretted that a large percentage practise no particular rotation, the tomato crop having been found succeeding every kind of crop grown in the township.

Source of Seed. A rough estimate places the total amount of tomato seed used annually in Ontario at from twelve to sixteen hundred pounds. Thus the market for seed here is very limited and accounts largely for the fact that much of this is imported. The cost of this seed varies from $1.00 to $10.00 a pound, the average price being about $3.00. J. Bolgiano & Son. of Baltimore; Livingstone Seed Co. of Columbus, Ohio; The Burpee Co.; Wm. Henry Maule Co.; Henry A. Dreer and W. P. Stokes Companies of Philadelphia are some of the firms from whom the bulk of this seed is secured. The majority of the factories have, until recently, retained control of the seed, supplying the farmer at slightly above cost price. In the past few years, however, the grower has been permitted to do his own seed selection or secure it from any source he may see fit. The reason given by the factorymen for retaining control of the seed supplied is that the grower was unable to do as good work in selection as the professional seed grower, and also that the amount of seed used by each is so small that it is cheaper to buy well-selected seed than produce it.

The advisability of the grower selecting his own seed is perhaps questionable. Yet, notwithstanding the attitude factory men take toward this question, I am convinced that more of the seed used in this township should be grown here. Good seed is the foundation of a good crop and every grower would profit by selecting his own seed to suit his own particular locality. Two young plants, grown from the same seed under similar conditions, put out in different soils, may

show a striking difference in crop. Hence I contend that each grower should raise and select his own seed and that a standard of straight seed selection by each is highly desirable and would materially increase the yield and profit. The small amount of seed selection carried on in the township leaves much room for improvment. The indifferent manner in which many growers select for seed a few "good looking" specimens from the crates or from their neighbors' fields, without giving any thought of the type of plant from which they may have been produced, is discouraging. Some of the better growers are, however, taking much care in their seed selection, and in the few years in which they have done so, have obtained considerable improvement in yield, size, smoothness and uniformity. A decided gain has also been made in early maturity, an important factor in escaping early fall frosts.

The following outline for a scheme of improvement by seed selection should prove applicable to the case of the ordinary grower. From the standpoint of soil, climate and market requirements, ascertain by observation and small test plots the type of plant best suitable to your requirements. Keep this type clearly and constantly before you. Otherwise you cannot hope for that success which should come from careful plant and seed selection. Let us presume that you have a field of tomatoes, the seed of which is true to variety. Go through your field and stake out, say half a dozen plants, which in every respect approach nearest to the ideal in your mind. For it must be remembered that the character of the seed thus secured is determined largely by the plant and not by the individual fruit. Thus the selection of an almost perfect tomato from a vine varying in size and perfection is not advisable. In selecting these plants, then, observe carefully the following points:

1. Select from healthy and productive vines. By so doing you will in a few years greatly increase the productiveness of the variety.
2. Select the earliest fruit.
3. Select large fruit.
4. Select the smoothest and best shaped specimens. With reference to shape, the best is considered to be a tomato nearly flat at the stem end, very smooth, moderately full at the blossom and in general nearly oval.
5. Do not pick the fruit until very ripe. The fruit should remain on the vines five or six days after all the green has disappeared.

Having secured satisfactory specimens, thoroughly ripened, the next step is to extract and save the seed. Cut the tomato in two crosswise. Slip out the seed into a pail or small tub and cover an inch or two with water. Let this stand in the sun until the pulp is broken down by fermentation. This will take only a day or two. Then wash thoroughly until all the pulp is carried away and nothing remains but the clean seed. Drain the seed and take as much moisture from them as possible by pressing in a linen towel. They can then be spread on a paper and dried in a sheltered sunny spot or other warm place. It is well to stir occasionally during drying and when thoroughly dried, label the seed from each plant and store in a dry, cool place free from mice, until they are to be used.

The following spring some of the healthiest plants from each package of seed should be set out on well prepared ground, entirely separate from the main crop and keeping plainly marked the block of vines derived from each of the plants originally selected. As these plants mature, select those from that block which most closely resemble the desired type and show the least variation. Such a course of selection should not be difficult to carry out and if judiciously and care-

fully done should, in from three to five years, result in strains greatly superior to the original, and better adapted to one's own soil conditions than any which it might be possible to purchase. The seed from the discarded plants of each year's selection may be used for the main crop, as it will be preferable to that selected from the field crop.

Many of the growers, however, do not take the trouble to handle the tomato seed at all, but secure their plants from greenhouse-men who make a business of starting the plants ready for the field. Others again select their own seed and arrange with the green houses to have their plants started. Still others purchase or select their own seed and grow their own plants.

Prices and Quantities per Acre. Tomato plants purchased from a professional grower will cost on an average about $3 per thousand. The prices paid in Hallowell Township during the past season varied from $2.50 to $7.00, depending upon the size, variety and method of growing. The cost of the seed also varies greatly and while 25 to 30 cts. per ounce is the usual price, even as high as 60 cts. is not exceptional. As good seed is the foundation for a good crop, it is well to select your own or purchase from reliable sources.

The amount of seed or number of plants required per acre will depend upon the planting distance. One and one-half ounces of good seed should produce an abundance of good plants for each acre. The following table gives the number of plants required per acre for the different distances of setting, but in purchasing it is well to have a few extras to provide for losses from various causes.

Number of Plants Required per Acre According to the Distance of Planting.

Distance.	No. of plants required.
4 ft. x 5 ft	2,100
4½ " x 4½ "	2,350
4 " x 4 "	2,600
3 " x 5 "	2,900
4 " x 3½ "	3,000
4 " x 3 "	3,450
3½ " x 3½ "	3,500
3 " x 3 "	4,600

Starting Tomato Plants. In the starting of the young plants lies one of the great causes of ill-success or failure in tomato growing. When the plants are grown by professional growers, they are often held back or suddenly forced to meet the demands of the trade and frequently through rush of business or lack of space, are improperly hardened off. This results in tender plants. Even in many cases where the farmer grows his own plants, through failure to realize the importance of starting a crop with the best of plants, he frequently fails to give them the care they should receive. It is an essential of profitable production that good, hardy plants be procured for setting. A stunted tomato, like a stunted pig, is a poor proposition on which to expend time and labor. Tomatoes will stand a lot of abuse but I am satisfied that abused or stunted plants will never give the results that thrifty ones do. Neither do we desire the tall, spindly kind with light-colored foliage. When ready for the final planting, the plants should be 7 to 9 inches

high, foliage a deep green, a stem the size of a lead pencil and a well developed root system.

THE HOTBED. Where only a few plants are required for the farm garden, they may be started in a shallow box or tray filled with rich black soil and placed on a slope in a south window. It is actually cheaper to buy than to raise them in such small numbers. Below, however, will be found a description of the hotbeds, cold frames, and other apparatus necessary for growing the plants on a much larger scale. The equipment described will be found most suitable for the farmer who grows from one to five acres for the factory and while general directions are given for the handling of the young plants, yet these of course must be modified to suit the conditions and requirements of the individual.

In locating hotbeds, choose a warm sunny spot, dry and well drained, with as good a protection as possible from the north and north-west winds. A southerly slope is desirable. The land selected should be about 30 yards long and 10 to 12 feet wide and running east and west.

A hotbed of sufficient size to carry three 3 x 6 foot sash, that is, 9 x 6 ft., will enclose space enough in which to start the plants for a five acre field. In the middle of the strip of land selected, remove the soil to a depth of one foot for a space of two feet larger each way than the size of the frames, that is 11 x 8 ft. Now build up this space squarely with manure to a height of two feet. Fresh horse manure from grain fed horses, without too much litter, will be found the best. Uniformity of composition and in heating must be secured if uniformity in growth is to be expected. This may be accomplished by shaking out and evenly spreading each forkful of manure and repeatedly and evenly tramping it down as the bed is being built up. The frame can now be placed on the bed of manure. It should be 10 inches high in front and 16 inches high at the back. If the back be made of two boards, let one of them be narrow and placed at the bottom so that the crack between them can be covered by banking up with manure or earth. Set the frame on the bed, first placing four short pieces of board under the corners to insure even setting of the manure. Now complete the hotbed by placing on a top layer, six inches deep, of light rich, friable soil. A soil composed of about three parts of garden loam, two parts well rotted stable manure and one part of an equal mixture of sand and leaf mould is desirable.

THE COLD FRAMES. The young plants started in the hotbeds are to be pricked out into these. They may be of the same dimensions as the hotbed frames and for convenience should be placed on either side of the hotbed and extending either way for a distance of 36 feet, giving space enough to hold, pricked out to four inches apart, all the plants which can be started in the central hotbed. The soil underneath the cold frames for a depth of eight inches should be removed and a five inch layer of well rotted stable manure placed in, and this overlaid with four inches of the soil described above. Although thin cloth curtains often replace sash as a covering for these cold frames, yet the sash gives a little better results. The cloth covering is of course much the cheaper.

DIRECTIONS FOR GROWING THE PLANTS. We now have a hotbed located centrally in the middle of the cold frames, and containing some 54 square feet, upon which we are to start plants enough to set five acres. First, thoroughly level off the soil upon which the seed is to be sown. About the first week in April sow the seed in drills one-half inch deep and 3 inches apart, seven or eight seeds to the

inch. Now scatter over the surface an equal mixture of leaf-mould and sand and press firmly and evenly over the seeds. This covering will not bake or crust, and the tender shoots of the germinating seeds can readily break through. If the soil is dry, sprinkle lightly with tepid water and replace sash, partially shading the same. We now have some 36 rows 70 inches long and sown eight seeds to the inch, or a total sowing of over 20,000 seeds, which should give us enough good plants for our purpose. It will take from three to six days for the plants to break the soil, and the temperature during this period should be from 75 degrees to 85 degrees Fahr. in the day time and from 55 degrees to 65 degrees at night. When the plants have practically all broken through, remove the covering from the sash and reduce the temperature to from 70 degrees to 80 degrees F. The temperature can be regulated by propping open the sash. After about ten days, reduce the temperature to from 65 degrees to 70 degrees F., and give more air. Dull, cloudy weather, too high a temperature, crowding of the plants and insufficient ventilation causes damping off. Great care must be taken not to over supply the young plants with water as this also causes damping off. Endeavor to keep them growing thriftily with as little watering as possible. Some authorities favor two transplantings, others only one. The system here recommended is a combination of the two. As soon as the central bud is well started, prick out the plants to the cold frames, setting them two inches apart. Remove the plants as carefully as possible, preserving the root system intact, and set them a little deeper than they were in the hotbed, pressing the soil tightly around them so that they cannot be easily pulled out. To prevent excessive wilting shade the young plants for the next few days. Don't apply any more water than necessary and be sure that it is tepid. As soon as all the plants are well established in their new positions, admit as much light as possible, being careful that the temperature does not fall below 45 degrees F., and that the plants are not subjected to cold winds. As soon as the plants begin to crowd one another, transplant every other plant, setting them four inches apart; this will leave the whole lot four inches apart, half of them transplanted twice and the other half only once. When set in the field, those transplanted twice, will probably bear the first ripened fruits and those transplanted once will follow shortly. Be careful not to overwater the plants or expose them to unfavorable winds. Maintain a uniform temperature throughout the day of from 60 degrees to 75 degrees F. Observe these precautions and by the time it is safe to set in the open field, you should have good, hardy, stocky plants, which, with subsequent favorable attention and conditions, will produce a heavy crop.

A very convenient article to have when transplanting is a spotting board. This may be about 5 feet 10 inches long, 1 foot wide, with round tapering fingers, about one inch thick at the base and 2½ inches long. These should be fastened into the board, the distance apart the plants are to be set. It should also have narrow projections carrying a single peg nailed to the top of the board at each end, so that when these pegs are placed in the end holes of the last row, the first row of pegs in the spotting board will be the right distance from the last row of holes or plants. By standing on the spotting board while setting plants in the last set of holes, the holes for another set are formed. The cost of the frames and sash recommended need not exceed seventy-five dollars, and might be considerably less if waste lumber were utilized. This could be turned to advantage in many ways when not occupied by the young tomato plants.

Time of Planting. The time of planting or sowing canning crops is determined largely by the locality and season. The time thus varies greatly. Sowing

or planting is scarcely ever advisable until the land is sufficiently dried and warmed to insure early germination or no severe check to the young plants. For the past few years, the "setting out" of the tomato crop has been done during the last two weeks of May and the first week of June. In 1910 almost the entire crop was planted between May 23 and June 3. The condition of the soil is of special importance when it comes to setting out. The worst condition is when the ground is wet or muddy and particularly so on clay fields. Wet soil, cold, dry air and strong wind, are the conditions which we should aim to avoid, while a moist soil, and a still, warm day are to be desired. There is as a rule a certain definite time in every season when the plants can be removed to the field with the least shock or 'set back.'

Distance of Planting. The best distance for setting out tomato plants varies greatly with the soil, the variety, methods of cultivation and other conditions. Plants set as close in rich clay as would give best results in a warm sandy loam, or those of a luxuriant growing sort set as close as for dwarf varieties, would yield little but leaves and every inferior fruit. This probably explains the many differences of opinion as to the proper distance for planting. The following distances were found in practice in the township in 1910. We also give the number of growers using each distance.

Distance.	Number of Growers.
4 ft. x 5 ft.	3
4 " x 4 "	132
3 ft. 10 in. x 3 ft. 10 in.	5
3 " 9 " x 3 " 9 "	38
3 " 8 " x 3 " 8 "	15
3 " 6 " x 3 " 6 "	21
3 ft. x 3 ft.	5

From the above table and from close observation, we must infer that, to secure the best results, most varieties, under average conditions, should be placed in squares at least four feet apart. A few of the best growers contend that even a greater distance than this will tend to produce a heavier yield of superior quality. Free air-circulation and plenty of sunlight are essential for the fullest development of the plants and the production of a maximum yield.

Methods of Planting. The first essential of successful transplanting is to have well-grown healthy plants; the second is that they be in good condition for planting out. This latter can be secured through proper "hardening," and by giving them a few days before setting out a scant supply of water, fullest possible exposure to air and sun and a thorough wetting a few hours before they are to be set. The plants will then be ready for the field.

The day before the plants are to be set out, the field is marked out with a corn marker into squares of the desired size. A still better plan is to set the plants in the fresh cross rows that can be marked out just ahead of the setters.

By means of a flattened shovel or spade, the plants may be divided into blocks, placed on a low flat waggon and removed to the field before the roots have scarcely been disturbed. The plants in the blocks are then cut apart, placed, and the soil pressed about each. If the soil is very dry, water is usually applied—about two

quarts to each plant. The spade system is the one invariably in use in the township, though a trowel or "dibble" occasionally takes the place of the spade. The furrow system is not popular.

In setting the plants, it must be borne in mind that, while sunshine on the leaves of the plant rarely does any injury, it is very injurious to the roots, and their exposure to the sun should be avoided in every possible way. It is wise to handle the plants in the shade of the body and see to it that the blocks of plants are sheltered while waiting to be planted. Such care usually distinguishes the grower whose plants usually do well from the one who has a great deal of re-setting to do.

The Use of Barnyard Manure and Commercial Fertilizers. The experience and opinions of many successful growers vary greatly as to the amount and kind of fertilizer necessary for the production of the most profitable yields on different soils. These differences of opinion are due to the fact that the nature and amount of fertilizing elements to be applied to the soil is dependent upon such a number of local conditions, that no one individual can recommend a certain practice and guarantee success to all who follow it. The more growers one interviews, the greater diversity of practices and differences of opinion are encountered. In general, the application of barnyard manure is not heavy, from eight to fifteen tons being the usual run per acre. The average application for the township on the canning crop ground was thirteen tons per acre for 1910. This is applied to the land either during the winter or early spring and worked in during the spring plowing or cultivation. A few apply the manure to sod in the fall and plow it under immediately. This is an excellent practice. Thorough cultivation of this in the spring secures an excellent rich seed bed, and particularly so if the sod was a clover one. The use of commercial fertilizers, while not at all general, is resorted to by a number of very successful growers. It is invariably used as a supplement to the barnyard manure at the rate of 200 to 500 pounds to an acre. It is usually applied broadcast or worked in about the plants at the time of setting. One grower used as much as 700 lbs. to the acre in the latter way, and claimed for it excellent results. The 2-8-10 Bradely mixture is one commonly used. With some, the liberal application of wood ashes has been found to give better results in increasing the yield than any other special fertilizer.

As previously stated, no set system of fertilizing is applicable to all conditions. The grower will do well to experiment to determine what his soil requires for his particular crops and then supply that need. The requirements of his soil can be ascertained by setting aside five plots, each one rod by four rods. To these he can apply nitrate of soda, muriate of potash, phosphate and ordinary stable manure, alone and in combination. He should also have a check plot to which no fertilizer is applied. The yields of the crops from the different plots will suggest the fertilizer mixture he can use to his best advantage. The grower should also be acquainted with the types of soils to which various forms of fertilizers are most suited. For example, phosphoric acid, from its acidic nature, should be applied to limestone soils in the form of superphosphate, but to sour, swampy soils in the form of basic slag or ground bone.

The grower can also determine from these experiments the actual value of the fertilizers to his soil. This can never be done by theory alone. The action of the various elements in the fertilizers will go far in deciding the amount to use. Thus, an excess of nitrogen will cause the plants to run to vine, throw soft, watery fruit, and to decrease the yield. The use of a large proportion of phosphate tends

to produce soft fruit with a less distinctly acid flavor; of potash, to smaller growth of vine, firm and acidic fruit.

If called upon to make a general recommendation of the quantity and kind of manure for a tomato crop, without any knowledge of the soil or its previous condition, I would say 12-14 tons of good stable manure worked into the soil as late as possible in the fall or in the early spring and 300-400 pounds of commercial fertilizer of such composition as to furnish 2 per cent. nitrogen, 6 per cent. phosphoric acid and 8 per cent. potash. This commercial fertilizer should be sown and harrowed into the soil just before the time of setting. Most growers who use the commercial fertilizer, apply part of all by putting a handful closely about each plant at setting and working it in with a hoe. If it is not desired to use a commercial fertilizer, the amount of stable manure should be increased. We can never afford to get away from a liberal use of the good old stand-by, farmyard manure. Apart from its actual fertilizing value, it has a physical action on every soil—light or heavy—which we usually greatly underestimate. Its application to light soils checks leaching and excessive evaporation. With heavy clay, on the other hand, the soil rendered more friable, less inclined to puddle and bake. The labor of cultivation is thus decreased.

As a parting word on the use of fertilizers on all canning crops, I must say that our experience has proved that in the majority of cases, where the soil is reasonably rich, expenditures in either money or labor for putting the soil in the best possible state of tilth for the crop and keeping it so by thorough cultivation, will give larger returns than those for fertilizers (and particularly commercial fertilizers) in excess of that which the land should receive in the regular rotation for ordinary farm crops.

Cultivation. To no small degree, the success of the tomato crop depends upon good cultivation and proper handling of the soil. A large percentage of the tomato growers of Hallowell township realize this and have the reputation of being intensive cultivators. The object of this intensive summer cultivation is to prevent the soil moisture evaporating into the air. The nearer the condition of the surface soil to road dust, the better will be the results secured. The fine particles of soil act as a mulch on checking surface evaporation.

Most growers aim to give their tomatoes the first cultivation the first or second day after setting, and then once a week each way until the plants block the rows. One can scarcely cultivate too frequently during the first month. The first cultivation should be 3 to 5 inches deep and fairly close to the plants. The depth and width of cultivation must be gradually decreased as the plants develop their root systems. One hoeing, and from seven to ten cultivations are advisable during the season. One very successful grower advocates cultivating until damage is apparently being done to the plants either by the horse or the cultivator.

Harvest Time and Method. Harvesting of the tomato crop lasts from the middle of August to about October 15, depending much upon the particular season. The first pickings, very light, are gathered in baskets and afterwards placed in bushel crates. Later pickings, when ripe tomatoes are numerous, are gathered right into the crates. Roadways are made through the field for the waggons and the crates are placed thereon to be hauled to the factory. The number of crates hauled at a time depends largely on the proximity of the factory and the area under crop. Quite frequently the last pickings are so late that considerable damage is done by the first fall frosts.

YIELDS. The multiplicity of conditions which influence the yield of canning crops frequently results in crops raised at a loss to one grower and again furnish a handsome profit to another. Many of these conditions are under the direct control of the grower. With some tomato growers the cause of failure can be traced to poor cultivation; with others, to lack of fertility of the soil, poor drainage or careless handling of the plants or fruit. One grower, of whom I know, has an average yield for the past five years of only 165 bushels per acre. Another in the same district, on similiar kind of soil, has an average for the same time of 508 per acre. Individual yields of from 600 to 800 bushels per acre under field conditions are not exceptional. From these figures it must seem that the success of the tomato crop rests almost entirely in the hands of the individual grower. The maximum yield per acre in the township in 1909 was 825 bushels; the minimum 150 bushels. The average of the township for the same season was 285 bushels to the acre.

PRICES AND COST OF PRODUCTION. The prices for the various vegetable crops grown for canning purposes have been almost constant for the past few years. Tomatoes have regularly brought 25 cts. per bushel for three years in succession. This price is for the goods delivered at the factory in good condition. A large proportion of the canning crops are grown under contract by which the farmer agrees to deliver the entire yield fit for canning, which may be produced on the given area, at the constant price per bushel or ton. The canner is to judge what fruit is fit for canning, and this annually results in much dissatisfaction. It would seem to the grower that at times the quantity of acceptable fruit paid for was determined quite as much by the abundance or scarcity of the crop as by the weight hauled to the factory.

The cost of the output from a well equipped factory is divided about as follows:

Fruit	30%
Handling, preparing, processing	18%
Cans, labels, etc.	43%
Labelling, selling, and other incidentals	0.1%

Of all the foods used for human consumption, least is probably known of the cost of production of those produced on the ordinary farm. Canning crops are no exception to this fact. Few farmers there are who know at all accurately what it costs them to produce an acre of tomatoes. Fewer still are there, either among producers or writers who can agree as to the cost of production of such a crop. This is accounted for by the varied conditions of the business and individual circumstances. And yet it must seem one of the first essentials of profitable production that we have some definite knowledge of the cost of producing any particular crop on which we depend for a profit. It is only in recent years, and even yet to a slight extent, that the farmer has begun to keep any reliable track of the cost of production of his various farm products. In the following table, secured through some of the best growers, will be found an estimated cost of producing a crop of tomatoes in Hallowell township. A number of these growers have kept very interesting records, which show that they study the different phases of crop production and have a keen grasp of the business. These estimates are made on a five acre basis—land that was previously in clean clover sod. The allowance for labor is as follows: Man, $1.50; man and team, $3.00; man and three-horse team, $3.50; man and horse, $2.00.

(5 acres).

Rent of land, 5 acres at $5.00	$25 00
Manure, 12 loads per acre at 75 cts. a load	45 00
Applying same	20 00
Ploughing, (2 1-5 acres per day), man and team	6 00
Cultivating, 3 times, man and 3-horse team	5 25
Harrowing and rolling	2 00
Marking (4 ft. x 4 ft.)	1 50
Plants, 13,000 laid down in field at $3.50 M.	45 50
Setting plants, $3.50 per acre	17 50
Cultivating, 5 times each way	20 00
Hoeing	1 50
Depreciation of equipment	3 00
Incidentals (resetting, insecticides)	4 00
Total cost of 5 acres	$196 25
Average cost per acre	39 25

PROFIT ACCORDING TO YIELD.

Yield per acre	200 bushels.	300 bushels.	400 bushels.	500 bushels.	600 bushels.
	$ c.	$ c.	$ c.	$ c.	$ c.
Initial cost per acre	39 25	39 25	39 25	39 25	39 25
Picking (3 cents per bushel)	6 00	9 00	12 00	15 00	18 00
Cost of hauling	4 00	6 00	8 00	10 00	12 00
Total cost per acre	49 25	54 25	59 25	64 25	69 25
Amount received at 25 cents per bushel	50 00	75 00	100 00	125 00	150 00
Profit per acre	0 75	20 75	40 75	60 75	80 75

Many growers will contend that the estimates on cost of labor, marketing, etc., are either too low or too high. The estimates given are not expected to fit into all particular conditions that may be found in different sections, but an average of the whole. Value of land, soil conditions, location, labor, and distance from factory, all combine in rendering the cost of producing this crop very variable. Thus it is impossible to quote estimates fitting all conditions in the township. In this case the most of the manure has been charged to the tomato crop alone. This of course should not be, but the low estimate on cost of labor tends to balance conditions.

FUNGUS DISEASES AND INSECTS AFFECTING TOMATOES. The health of the canning crop is entirely dependent upon the conditions under which it is grown. The character and physical condition of the soil, the supply of moisture and plant food, humidity and sunlight, are all factors in influencing the health of the plants and their power to resist infection from fungus diseases. The effect of every dry or very damp seasons is noted in the prevalence during such seasons of the various wilts or insect pests. Nevertheless, the grower, by his methods of cultivation and a judicious use of insecticides and fungicides, can be very effective in controlling the ravages of both these troublesome pests.

Hallowell Township has been fortunate in its freedom from the devastation of various insects and fungi, which are frequently prevalent with these crops. With but few exceptions, the poor, unthrifty fields or low yields met with during the past season were due to causes other than the above. But do not think we are by any means entirely free from their ravages. In several localities the yields

were considerably decreased, and in a few instances the loss of almost the entire crop resulted. Fortunately, it is only in the past few years that damage to any extent has been done, and the growers are now alive to the problems of combatting much further mischief.

Fungus Diseases.

Tomato Blight (*Bacillus solancearum*). This is a bacterial disease which turns the stems and leaves brown and black, and eventually spreads to the fruit. It runs a quite rapid course throughout the plant and spreads quickly from one plant to another, the stem and lower leaves being first affected. It is by far the worst tomato disease in the township and one that has increased rapidly during the past two years. Last summer fields severely attacked by this disease were found in the neighborhood of Wellington, Chisholm and West Lake. In a few cases the disease incurred the loss of a large percentage of crop. Its attacks are worst where the plants are in any way sheltered or the ground moist. The prevalence of this blight in the township has caused much anxiety to the growers.

Remedies. Thorough cultivation, including vigorous, healthy plants, together with frequent changes of the tomato ground, would probably eliminate much trouble from this disease. Spraying with Bordeaux mixture (4-4-40) is effective. The times of spraying are as follows:

1st Spraying.—While the young plants are still in the seed bed, a few days before transplanting.

2nd Spraying.—A week after the plants are set in the field.

3rd and 4th Sprayings.—Spray at intervals of two weeks. If done at all, the work should be thorough, every leaf and stem being covered with a fine spray.

Leaf Spot (*Septoria lycopersica*). This is also commonly called blight. It is a destructive disease, producing small grayish-brown angular spots, which bear the fruiting bodies for the spread of the disease. The lower leaves are first attacked and the disease spreads upwards, at times defoliating the young plants. The fruit is seldom affected. The disease frequently does not appear until the plants are well advanced and loaded with fruit, when it may spread quite rapidly, but too late in the season to do much real damage. The few leaves of which it may then rid the plant aid in ripening the fruit earlier. This disease is quite widespread in the township, but nowhere were its effects very severe.

Treatment. Spray with Bordeaux a week after transplanting, and repeat at intervals of ten days or two weeks. Rake up and burn the diseased tops after the crop has been harvested.

Black Rot (*Macrosporium tomato*). This fungus attacks the stems, leaves and fruit. It is by the destruction of the fruit, however, that it causes the most serious loss. It occurs on the green fruit at various stages of development. The spores of this disease most frequently lodge at the blossom end of the young tomato, and in developing cause a brown sunken spot to appear. These spots increase in size, and sometimes the whole fruit is involved. It is most prevalent in dry weather and on light soils where moisture is lacking.

Treatment. Spray early with Bordeaux, and repeat at intervals of ten days or two weeks. Destroy diseased fruit and burn the refuse from the field in the fall. A short rotation and intense cultivation will also help in its control.

Ripe Rot. This disease occurs in ripe or nearly ripe fruit, causing a rapid softening and decay. Damp, rainy weather favors the spread of it, and it is more

common with varieties that produce a heavy, close vine. It is found chiefly on the crown fruits and those touching the ground. No great loss has been suffered from either this or the previous rot. Spraying as for "black rot" is the treatment. It is always advisable to collect and destroy all infected fruit during the first picking.

Insect Pests.

Cutworms (various species). These are the larvæ or "grub-stage" of dull-colored, night-flying moths, and of all the insect pests they are to be most feared by the grower of canning crops, especially corn and tomatoes, and particularly the latter. Every grower is familiar with their habits of cutting off or partly destroying the tender stalks of the young plants just below the ground surface. This, in the case of tomatoes, means resetting of the plants. The damage is always done at night. A great deal of trouble and loss has been caused in the township by their ravages, and some years as high as fifty per cent. of the plants have had to be reset. During the past two years, however, the growers have awakened to the necessity of combatting their attacks, and have thus reduced the loss to a small percentage. The remedy is a poisoned bait, and of such the "poisoned bran" is the most effective. It is made in the following manner: Place 25 lbs. bran in a soap box or other vessel and gently moisten with half a pail of water, thoroughly diffusing the moisture throughout the bran. Then add the same amount of water, in which 3 lbs. of sugar has been dissolved. Syrup may be used in place of sugar if so desired. The bran, if the right amount of water has been added, should crumble easily between the fingers. Now take ½ lb. of Paris green and dust a part of it over the bran, and mix thoroughly. Repeat until the whole half-pound has been added and mixed.

The bait should be applied in the evening of the same day that the plants are set out, sprinkling just a small amount of the mash around each plant. If the field has been free of vegetation for a few weeks, the worms will greedily devour the poisoned bait during the night. Subsequent applications of the bait should be made at the grower's judgment. Fifty pounds of bran and one pound of Paris green are sufficient for an acre, and can be applied in two hours. Clean farming and good cultivation is helpful, by destroying many of the eggs and preventing the deposition of others.

White Grubs (*Lachnosterna*). These are the larvæ of May beetles or "June bugs," which breed for the most part in old pastures. The larvæ hatch in the ground, where they live for three years. When an old pasture is broken up, they live for a time on the grass and roots, and then attack whatever plant may be grown.

Remedy. Late deep plowing is effective. Pigs and poultry devour them greedily.

Tomato Worm (*Protoparce celens*). This is a large green worm, attaining very nearly four inches when fully grown, and correspondingly thick. They are very voracious feeders, and soon strip the foliage from a plant. They are seldom met with in numbers large enough to do serious damage. They have caused no serious loss to the tomato crop of the township. Hand-picking will keep them in check.

Potato Beetle (*Leptinotarsa decemlineata*). This beetle is so familiar to everyone that a description of it is unnecessary. Only seldom does it feed upon

the tomato, and then just when other suitable foliage is scarce. Arsenate with Bordeaux is the remedy, applied early in June.

Potato Flea-Beetle (*Epitrix cucumeris*). This is a tiny black beetle, about one-twentieth of an inch long. Quite frequently we found growers complaining of the damage of this insect, which eats small holes all over the surface of the leaves and causes much injury to the young plants in this way. Moreover, these wounds provide a suitable entrance to the leaves of the spores of the tomato blight. Bordeaux mixture is a satisfactory remedy for both the insect and the blight.

The Growing of Corn for the Canning Factories.

Varieties, Soils and Cultivation. The following ten varieties of sweet corn are grown in the township for factory use: Early Evergreen, Crosby, Stowell's, Old Colony, Late Evergreen, Hickox, Pearce's Evergreen, Crosby's Improved, Improved Evergreen, and Pearce's Improved Evergreen. Most of these strains, and particularly the first five, have been greatly improved by judicious seed selection and by special breeding practised by a few of the best growers. One is fairly safe in selecting any of these five, all of which give good yields and general satisfaction to both the grower and canner.

The soil best suited for the production of a maximum yield of corn at the lowest cost is identical with that for the tomato crop. Warm loam soils which afford good drainage and sufficient available plant food invariably give the best results. Corn never yields well on heavy, poorly drained soil.

Too much care cannot be given to the preparation of the ground for the corn crop. It requires a slightly higher temperature for germination than our other grains, and thus the necessity for much care in preparing the seed bed. Clover sod, plowed under the previous fall and thoroughly disked in the spring, can always be depended upon as the starting point for a good crop.

Most growers endeavor to have their corn in the ground by June 1. During the past season over seventy-five per cent. of the corn crop was sown between May 24 and June 2.

The corn is also planted in squares and the distances are almost identical with those for tomatoes, most growers using the same marker for each. Squares of 3 ft. 9 in. and 4 ft. to the sides are the most popular distances, although a great number of the growers plant in squares 3 ft. 6 in. in size.

The canning corn is sown entirely with hand-planters and covered with the foot, the squares having been previously blocked out with the marker.

The canning factories still retain control of the seed corn, most of which is also imported. Lately a considerable amount of this has been grown within the township, but still reaches the growers through the factory management. While most of the seed corn furnished to the contract growers is usually the best, it is always advisable for each farmer to test the vitality of the seed he is about to sow. This can readily be done by spreading a hundred kernels between wet linen cloths placed in the top of a box filled level with wet sawdust. Fasten the lid down tightly on the layer of corn, and place the box where it will keep warm. The corn should be moistened by sprinkling once a day. In a few days all the good grains will have sprouted. From these he can determine the percentage of good seed, and thus be guided in the amount to sow to the hill. The usual cost is $2.50 a bushel. Most of it, however, is purchased by the pound at from five to ten cents.

The average price is seven cents. Seven to eight pounds are required to plant an acre, the exact amount depending upon the distance of planting and the number of grains to each hill.

As previously stated, most growers prepare the ground for corn in a similar manner to that for tomatoes. The average amount of manure applied per acre is about eight tons. This low average results from many growers using no more than for the ordinary farm crop. Those who do make a practice of specially dressing their corn field apply about fifteen tons either in the fall or early spring. As a rule, this is applied to sod and turned under as soon as possible. Only a few growers use commercial fertilizers. The amounts used vary from 150 to 300 pounds to the acre. It is sown broadcast and harrowed in just before the marking is done.

The cultivation of the corn commences as soon as the plants show above the ground and continues once a week until the height of the crop renders horse cultivation harmful. Soils at all inclined to be heavy require more cultivation to keep them in good tilth than lighter ones. All soils should be cultivated after a rain to break up any crust that may have formed, and thus retain for the plants the moisture that has fallen. It is well to be careful, however, not to disturb the soil when too wet. One hoeing during a season is usually sufficient.

Harvesting, Yields, Prices. The harvesting of the corn lasts for four or five weeks from the first of September. The ears are stripped by hand from the standing corn, and thrown into waggons for hauling to the factory.

An average load will weight about one and one-half tons. The price per ton is for the ears before husking.

The cornstalks (stover) are used by the growers for silage, or fed as dried corn during the fall or winter. At one of the factories the husks and waste cobs are cut up and stored as silage. This is sold as fodder during the winter. The price of this silage varies according to the supply of cattle feed in the locality, but is usually from $4.00 to $5.00 a ton.

Corn yielded an average of 3 tons of ears per acre in 1909. The maximum yield was 5 tons; the minimum, 1 ton.

For some years past the price per ton of the ear corn delivered at the factory has been $7.00. It is nearly all grown under contract.

Cost of Production. The following table from a prominent grower gives an estimate of the cost of production of factory corn. The scale of wages is the same as for the tomato estimate, and the calculation is made on a five-acre field that was previously in clover sod.

Cost of Production of Canning Corn.

(5 acres as a basis).

Rent of land (5 acres at $5.00 per acre)	$25 00
Manure (8 loads to the acre at 50 cts.)	20 00
Applying same	9 00
Plowing	6 00
Cultivating (3 times)	5 25
Harrowing and Rolling	2 00
Marking	1 50
Planting	1 50
Seed	3 00
Cultivating (8 times)	18 00

Picking and delivery to factory, 15 tons at 1.50 per ton	22 50
Total cost	$113 75
Cutting down stalks	5 00
Filling silo (60 tons silage)	20 00
Total cost	$138 75
Average cost per acre	$27 75

Or if corn is not silaged:

Stooking	$5 50
Hauling and storing dry stalks in barn	15 00
	$20 50

This amounts to virtually the same as putting it into the silo.

COST OF GROWING SILO CORN FROM FIELD TO SILO.

(5 acres as a basis and a yield of 20 tons per acre).

Rent of Land	$25 00
Manure	20 00
Applying same	9 00
Plowing	6 00
Cultivating	5 25
Harrowing and rolling	2 00
Planting 3 ft. 6 in. by 3 ft. 6 in.	1 50
Seed	2 50
Cultivating (8 times)	18 00
Cutting	5 00
Filling silo:	
(a) 4 teams and 10 men 1 day	21 00
(b) Engine and blower (2 men attending)	12 00
Total cost	$127 25
Cost per acre	25 45

COMPARISON PER ACRE.

Sweet Corn:	
3 tons ears at $7	$ 21 00
12 tons silage stalks at $2	24 00
Total value	$45 00
Cost of growing, picking and filling	23 25
Balance per acre	21 75
Silage Corn:	
20 tons Silage at $3	$60 00
Cost of growing and putting into silo	21 25
Balance per acre	$38 75

Comparison as to above valuation:

Sweet Corn:	
3 tons ears to factory at $7	$21 00
12 tons stalk to silo at $2	24 00
15 tons of total value	$45 00
Value per ton	3 00
Silage Corn:	
20 tons Silage worth	$60 00
Value per ton	3 00

In reference to these tables it is interesting to note the comparative values of the crop produced for the factory and that grown for silage. The removal of the ears from sweet corn decreases its value as silage by about one dollar per ton.

Fungus Diseases and Insect Pests of the Corn Crop.

Corn Smut (*Ustilago zeæ*). This is an exceedingly common disease, familiar to every grower of corn. On stalks, leaves, tassels and ears appear peculiar growths, usually spoken of as "smut boils." These are white and shiny in the early stage, but later turn dark, with a powdery filling of black spores, which reproduce the disease. The ear is the part most commonly affected. Very little of this disease was found on the corn crop of last season, though in different seasons past it has caused some loss.

Treatment. Remove and burn all the smut growths as soon as they appear; practise rotation of crops. Seed treatment is not effective.

Rust (*Puccinia sorgi*). This disease is seldom serious. The attacked leaves show elongated reddish or blackish pustules on both surfaces. Very little was met with during the past season.

White Grubs (*Lachnosterna*). These larvæ frequently attack the roots and stems of the young plants, and thus prove very destructive. This is particularly so when corn is planted on old pasture land broken up a year or two before. The first or second crops usually suffer most. Clover is least affected by them.

Treatment. Late and deep fall plowing will break up the winter quarters, exposing them to frost and various animals that prey upon them. Pigs and poultry will greedily devour them.

Cutworms. These pests also feed upon the young blades of corn as soon as it is up. The damage is similar to that done on the tomato. The "poisoned bran" is the remedy.

Wireworms. These are the larvæ of click beetles, and have a hard, glassy skin. They breed in old pastures and feed upon the roots of any plants that may be convenient to them. Corn planted on land in pasture the year previous usually suffers severely when they are present.

Remedy. A short rotation of crops and clean cultivation, especially along the fences.

The Growing of Canning Peas.

Eighteen varieties of canning peas were sent to the factories of the township during the season of 1910. Many of these varieties are doubtful value to the farmer, being too low in yield to pay well for their production. The following varieties are the most popular with the growers: French Canner, Hassford's Market Garden, Advancer, Admiral, Alaska and Eclipse.

Peas require a warm, well-drained soil if the best returns are to be secured. Careful preparation of the seed bed is just as essential to the success of this crop as with either tomatoes or corn.

Last season the pea crop of the township was sown between April 1 and May 1. This wide range in the seeding time was due to the variable weather conditions. They are sown either broadcast or with the grain-drill, usually the latter. The amount sown per acre is from three to four bushels, and the usual cost of the seed is $2.50 per bushel.

The canneries still retain control of the seed and provide it to the growers according to the amount under contract.

Few growers apply manure of any kind to the ground on which the pea crop is to be raised. The peas are usually sown on land that was previously in hay or pasture.

Packing Apples in the Orchard.

Harvesting Time and Method. The entire pea crop is harvested during the month of July. Several methods of harvesting are in vogue. The greater percentage of the crop is harvested with the scythe like field peas. The factory men prefer this method. Others first cut them with the mower and use the horse-rake in collecting into bundles. Others again use a special rake for this purpose, which does not require the use of the mower. The vines—not allowed to dry—are hauled direct to the factory, where the green peas are threshed out by machinery.

The grower is paid by the ton for the shelled peas. The price last year was $35 for No. 1 and $30 for No. 2. Practically the entire yield is graded into the latter class. The grower receives back the green straw from his threshing. Various uses are made of this. Some growers pile it to rot for manure. Others feed it green or cure it for winter roughage. Still others unload it where the cattle may pick it over at will. Much of it has to be hauled from the factories as waste. Analysis of this material shows it to have a feeding value higher than any of the straw used on the farm.

The following is an estimate of the cost of production of canning peas. Five acres are taken as a basis, with an average yield of 1½ tons per acre:

Cost of Production of Canning Peas.

Rent of Land, 5 acres	$25 00
Plowing	6 00
Fertilizers and Cultivation	30 00
Seed, 3 bus. at $2.50	37 00
Sowing and harrowing once after crop is up	5 00
Harvesting (by hand)	15 00
Marketing, $4 per acre	20 00
Total cost of 5 acres	$138 00
Cost per acre	27 60
Returns per acre 1 1-2 tons at $30.00	45 00
Profit per acre	$17 40

Insects and Diseases.

Aphids. Commonly called "plant lice." These are minute, pear-shaped, soft-bodied insects that may be found on almost every kind of plant. They feed by sucking the juices of their host. The young are born in great numbers during the warm season, and thus they increase rapidly, especially in damp, warm weather. These insects did much damage to the pea crop of 1910. In many cases the crop was a partial or total failure from their ravages. Cutting and destroying the patches of peas where the first outbreak is noted is partly effective in keeping them under control. Spraying is impracticable. Fortunately, severe attacks of aphids occur seldom more than once every six or seven years.

Pea Blight (*Ascochyta pisi*). This disease attacks stem, leaves and vine, originating with infected seed. The stems of attacked plants show discolored areas of dead tissue, extending completely around them and destroying the shoot. The leaves show round or oval discolored spots where attacked.

Treatment. Select seed free from the disease. Bordeaux is effective but impracticable for field conditions.

Loading Fruit at the Station.

Green Beans for the Canning Factory.

The growing of beans in the township for canning green is still in its infancy. Of the few varieties grown, the Golden Wax, Yellow Refugee and Green Refugee have thus far produced the largest yield per acre.

Beans require a soil warm and dry for the production of maximum yields at lowest cost. They will, however, thrive on quite heavy soils if the drainage and cultivation are good. The soil should have the same preparation as for the tomato crop. Liberal applications of farmyard manure invariably give profitable returns.

The growers secure the seed either through the factory or from whatever source they see fit. The beans are sown at the rate of one bushel per acre, and good seed for one acre costs $2. Most growers endeavor to have their beans in the ground by June 1. They are planted in rows three feet apart, and sown to have the plants come up about eighteen to twenty inches apart in these rows. The hand-planter is used for the planting, and several kernels dropped at each spot.

The cultivation of the beans commences as soon as they appear above the ground. One cultivation should be given each week until the crop is harvested.

The beans are harvested from the vines by hand as they reach the proper size. The harvest continues during the last half of August and up till the first week in September.

Cost of Production of Beans.

5 acres—Yield 2½ tons per acre.

Rent of Land, $5.00 per acre	$25 00
Manure and applying same	15 00
Plowing	6 00
Cultivation	7 00
Seed	10 00
Planting	1 50
Cultivating and hoeing	8 00
Harvesting and marketing	100 00
Total cost	$182 50
Cost per acre	36 50
Value per acre, 2½ tons at $30.00	75 00
Profit per acre	$38 50

Diseases of Beans.

Anthracnose or Pod Spot (*Colletotrichum lindemuthianum*). This is the commonest and worst disease to which beans are liable. It attacks stems, leaves, pods, and seeds, beginning with the first leaves of the seedling plant. The "spots" of this disease are most conspicuous on the pods, and from these the fungus enters the seed, where it remains unactive until the seed is sown. The disease was found quite prevalent in several parts of the township, and considerable was noticed in the crates at the factories.

Treatment. Since the disease winters in the seed, the most important point is to secure, if possible, clean seed. This can be done fairly accurately by selecting seed from pods showing no trace of the disease. Care should be taken not to work among the plants when they are wet. This spreads the disease.

Rust (*Uromyces appendiculatis*). This appears as small, round, rusty brown spots on the leaves and even on the leaf-stalks and pods. Later these spots become darker in color. The disease is not often serious.

Treatment. Burn the remains of diseased plants. Select resistant varieties. Spray with 5-5-50 Bordeaux when the plants are small. Select clean seed.

Value of Canning Crops as Compared with Farm Crops.

The following table gives a comparison of the value per acre of canning crops with those of the ordinary grains, roots, etc.

Crop.	Fair field in bushels.	Price.	Value.
		$ c.	$ c.
Fall wheat	30	88	26 40
Barley	34	55	18 70
Oats	50	35	17 50
Field Peas	20	85	17 00
Field Beans	20	1 75	35 00
Potatoes	150	65	97 50
Turnips	350	10	35 00
Tomatoes	400	25	100 00
Sweet Corn	3 tons ears	7 00	45 00
"	12 tons silage	2 00	.....
Canning Peas	1½ tons	30 00	45 00
" Beans	2½ tons	30 00	75 00

A comparison of profits cannot be made, as the cost of production of each of the farm crops is not definitely known.

Prospects for Development of the Canning Industry.

Hallowell Township is far from the limit of its productive capacity; in fact, it is only beginning to produce commercially. Both acreage and yield will see a rapid increase in the coming few years. Growers are taking a greater interest in the selection of good seed, varieties, etc., in order that the yield per acre may be increased, and thus the cost of production reduced. Better methods of cultivation and rotation are rapidly gaining a hold on the growers. Not a few are realizing the advantage of underdraining for the growth of these crops. Much attention has recently been paid to the ravages of insect and fungus pests, so that the loss from this course has been greatly decreased.

One of the great weaknesses among the growers is their lack of organization. A co-operative association is needed for educational propaganda. A strong organization would give greater influence with the factory managements, in whose hands the growers are at present quite plastic. Until some such organization work is undertaken, the splendid returns that are possible from this business will not be realized.

The total output of the Province of Ontario during 1909 was approximately 75,000,000 cans, or about 10 cans to each head of the population in the Dominion. This would seem to indicate room for an extension of the business. This extension will depend to a great extent upon the quality of the goods placed upon the market. So far the market has never "glutted" and thereby injured. The formation of the canning factory combine will in all probability prevent such an occurrence, by controlling the supply to meet market requirements. A few independent factories that have been putting up a "special brand" have found this a profitable business, and we may look for a much greater development along this line in the near future.

From their value as a staple food, the demand for canned vegetables and corn must ever keep pace with the rapidly increasing population of the Dominion.