

ANNUAL REPORT

OF THE

POMOLOGICAL AND FRUIT
GROWING SOCIETY

OF THE

PROVINCE OF QUEBEC.

1897.

PRINTED BY

BROUSSEAU & PAGEAU, Printers to Her Most Excellent Majesty the Queen.
QUEBEC, 1898.

HON. SIR HEN

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J. C. CHAPAIS

R. BRODIE

DR. GRIGNON . . .

W. W. DUNLOP

District No. 1—1

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LIST OF OFFICERS FOR 1897.

HONORARY PRESIDENT

HON. SIR HENRY JOLY DE LOTBINIERE.....Quebec

HONORARY VICE-PRESIDENT

HON. SIDNEY FISHER, Minister of Agriculture.....Knowlton

HONORARY 2nd VICE-PRESIDENT

J. C. CHAPAISSt. Denis

PRESIDENT

R. BRODIESt. Henri

VICE-PRESIDENT

DR. GRIGNONSt. Adele

SECRETARY

W. W. DUNLOPOutremont

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District No. 1—DR. WOODSt. Johns
 “ “ 2 J. M. FISKAbbotsford
 “ “ 3 JAMES H. CARTERMassawippi
 “ “ 4 E. A. BARNARDQuebec
 “ “ 5 AUG. DUPUISVillage des Aulnais
 “ “ 6 W. TREMBLAYChicoutimi
 “ “ 7 J. C. CHAPAISSt. Denis
 “ “ 8 W. F. HALCROHudson
 “ “ 9 R. W. SHEPHERDComo

LIST OF MEMBERS, 1897.

Arpin, C.....	St. Johns.
Blanchard, J.....	Abbotsford.
Bachelor, J.....	Rougemont.
Brodie, R.....	St. Henri.
Buzzell, G. W.....	Abbotsford.
Beaudoin, G.....	Bonfield.
Ball, J R.....	Knowlton.
Boswell, Miss.....	Quebec.
Bourque, Curé.....	St. Alexandre.
Chapais, J. C.....	St. Denis.
Craig, W., Jr.....	Abbotsford.
Craik, John.....	Rockburn.
Carter, J. H.....	Massawippi.
Cooke, G. E.....	Outremont.
Castel, E.....	St. Hyacinthe.
Dupuis, Auguste.....	Village des Aulnaies.
Davies, G. E.....	Stanbridge East.
Dunlop, W. W.....	Outremont.
Duggan, W. J. E.....	Quebec.
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Dupuis, P.....	Abbotsford.
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Duggan, Mrs. G. H.....	Dorval.
Edwards, G. B.....	Covey Hill.
FitzGibbon, Robert.....	Montreal.
Fisher, Hon. S.....	Knowlton.
French, Rev. A.....	Montreal.
Frenette, C. E.....	St. Jean Port-Joli.
Fisk, J. M.....	Abbotsford.
Fisk, C.....	Abbotsford.
Fraser, John.....	Coaticook.
Goodchild, A. A.....	Montreal.
Gareau, J. J.....	St. Roch l'Achigan.
Grignon, Dr.....	St. Adele.
Gibb, J. J.....	Como.
Gilmore, Granville.....	Cote St. Paul.
Gagnon, F.....	St. Denis.

Halero, W
Hodgson, E
Hitchcock,
Herrick, J.
Hardy, E...
Hutcheson,

Jack, N. E.
Johnson, A
Joyal, N....
Kegan, B. H
Lefebvre, J.
LaRocque, I
Lebel, A....
Leclerc, C. F
Labrecque, J
Leblous, Moi

Macaulay, T.
Moreau, Dr.
Macdonald, A
Middleton, J
Morris, W;...
Marshall, W
Morris, Mrs.
McGibbon, D.

Newman, C. F

O'Cain, J....

Price, Herbert
Pelletier, Dr.
Paradis, C...
Parkes, T. J...
Pattison, W. M
Park, James...

Robinson, R.
Rugg, W. U...
Rowell, W. Q.
Ramsay, W. M
Roach, G. E...

Shepherd, R. W
Stevens, Rev. A
Stuart, G. G...
Sicotte, E.....
Smith, Malcolm
Savard, M.....
St. Pierre, G. H
Simpson, Mrs. G

Halero, W. F.	Hudson.
Hodgson, E. A.	Hudson.
Hitchcock, G. P.	Massawippi.
Herrick, J. E. R.	Abbotsford.
Hardy, E.	St. Anne de la Perade.
Hutcheson, J. H.	Montreal.
Jack, N. E.	Chateauguay Basin.
Johnson, Asa.	Cowansville.
Joyal, N.	St. Michel de Yamaska.
Kegan, B. H.	Massawippi
Lefebvre, J. H.	Howack.
LaRocque, Dr. G.	Quebec.
Lebel, A.	St. Denis.
Leclerc, C. F.	St. Jean Port-Joli.
Labrecque, J.	Bonfield.
Leblous, Moise	St. Paul de Chester.
Macaulay, T. R.	Montreal.
Moreau, Dr. H.	St. Johns.
Macdonald, Alex.	St. Johns.
Middleton, John	Point Fortune.
Morris, W.	Sherbrooke.
Marshall, W.	Abbotsford.
Morris, Mrs. A. H.	Dorval.
McGibbon, D. D.	Brownsburg.
Newman, C. P.	Lachine Locks.
O'Cain, J.	St. Johns.
Price, Herbert M.	Quebec.
Pelletier, Dr. J. P.	Matane.
Paradis, C.	St. Denis.
Parkes, T. J.	Montreal.
Pattison, W. M.	Clarenceville.
Park, James	Hudson.
Robinson, R.	St. Amedee.
Rugg, W. U.	Compton.
Rowell, W. Q.	Ayers Flats.
Ramsay, W. M.	Montreal.
Roach, G. E.	Abbotsford.
Shepherd, R. W.	Como.
Stevens, Rev. Albert	East Hatley.
Stuart, G. G.	Quebec.
Sicotte, E.	Boucherville.
Smith, Malcolm	Lachute.
Savard, M.	Les Eceureuils.
St. Pierre, G. H.	Coaticook.
Simpson, Mrs. G. H.	Montreal.

Tremblay, W.....	Chicoutimi.
Tomkins, E. F.....	Chicoutimi.
Van Vleit, G. M.....	Lacolle.
Van Vleit, W. B.....	Lacolle.
Wotherspon, Ivan.....	Montreal.
Wright, A.....	Fort Covington, N.Y.
Wood, Dr.....	St. Johns.
Westover, D.....	Freleighsburg.
Wintle, Gilbert.....	Como.
Wilkinson, G. H.....	St. Johns.
Wood, Hon. Thos.....	Dunham.
Wyman, W. H.....	St. Johns.

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 Small Fruits—
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FINANCIAL STATEMENT

OF THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF THE
PROVINCE OF QUEBEC, FOR THE YEARS 1896-97.

1896

RECEIPTS.

Cash on hand 31st December, 1895	\$ 409.35	
Members' Subscriptions	103.00	
Government Grant	500.00	
		\$1012.35

EXPENDITURE.

Directors' Expenses, Etc., Attending Meetings	\$148.56	
Reporting Meetings	90.00	
Reports, 1894	\$48.80	
Reports, 1895	68.00	
		116.80
Stationery and Printing	27.35	
Postage, Express and Telegrams	32.25	
Plants, Etc., for Distribution	30.60	
Secretary	100.00	
Balance cash on hand	466.79	
		\$1012.35

1897

RECEIPTS.

Cash on hand December 31st, 1896	\$466.79	
Members' Subscriptions	93.00	
Government Grant	500.00	
		\$1059.79

EXPENDITURE.

Directors' Expenses Attending Meetings	\$187.72	
Reporting Meetings	100.00	
Reports	20.00	
Printing and Stationery	40.45	
Postage, Express, Etc.	30.85	
Plants for Distribution	32.07	
Prizes for Seedling Apples	15.00	
Secretary	100.00	
Balance Cash on Hand	533.70	
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THE POMOLOGICAL AND FRUIT-GROWING SOCIETY

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The Fourth Annual Meeting of the Pomological and Fruit-Growing Society of the Province of Quebec was held in the Temperance Hall, at Howick, on the 27th January, 1897.

The opening session was held at eight P.M. The President, J. C. Chapais Esq., occupied the chair.

Quite a number of prominent fruit-growers came out from the city. Among them were the Hon. Sydney Fisher, Minister of Agriculture; R. W. Shepherd, of Como; J. C. Chapais, of St. Denis, President of the Society; E. A. Barnard, Secretary of the Council of Agriculture; Dr. Grigaon, Ste. Adèle; C. Newman, Lachine; Robert Brodie, St. Henri; W. W. Dunlop, Outremont; W. F. Halero, Hudson; J. M. Fisk, Abbotsford; Dr. Wood, St. Johns; Gilbert Wintle, Como; Professors Craig and Shutt, of the Ottawa Experimental Farm.

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THE PRESIDENT'S ADDRESS.

The President (Mr. Chapais) addressed the meeting as follows:

Ladies and Gentlemen:

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It is with much pleasure that the Provincial Fruit-Growers' Association of the Province of Quebec finds itself in Howick to-day to hold its fourth winter meeting. When our Society was organized, the idea that governed its organization was to make this a peculiarly provincial society—one whose work would penetrate every section of the Province—and it is to carry out that idea that every year we select a new place of meeting, so as to reach in time every district which takes any interest in the cultivation of fruits. We have visited a good many places in the Province now, and in each locality we have found the people considerably interested in this branch of culture, and I am happy to see by the large gathering present to-night that the people of this section are just as much interested in promoting the object of our Society as those of the other sections we have already visited, and I have no doubt that the industry of fruit growing will become a source of profit for our Province. Last summer, in order to see a part of the country pretty distant from the Western part of our Province, we held our convention in St. Jean Port Joli, L'Islet County, fifty-nine miles below the City of Quebec. We were in hopes that the Directors of our Society from

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the West would have been able to visit us there in that part of our Province, to which I myself belong, and we expected to show a fine exhibit of fruit to them. But unfortunately, for one reason or another none of our Directors from the Western part of the Province had found it possible to attend the convention, and we were sorry for it, because Professor Craig, of the Experimental Farm at Ottawa and Mr. Dunlop, our Secretary—two good men in their line—were rather surprised to see such a good exhibit of fruit in that district. We had forty varieties of apples, fifteen varieties of plums, seven of cherries, and were able even to show at that meeting on the 27th of September, owing to the difference of climate between there and the West, a variety of gooseberry, the Downing; 2 varieties of currants, Lee's prolific and Versailles; 1 variety of White Raspberries; 1 of strawberries, the White Alpine—all picked from the bush the day before. The judges were rather surprised to see these small fruits so late in the season. If I mention this, it is simply to show what the prospects are for fruit-growing in our district. We can come on the market with certain varieties after the season is over in the West, and thus make the market last longer for certain varieties which are always looked for, such as good summer apples and these small fruits which are all marketed in the West in June, July and August. These we have in August and September in our district. I shall be able to show you to-morrow, in a paper which I have prepared on cherry culture, that we can have cherries in our district from the 1st of July to the 1st of September. Even on the 27th of September last year, we could show at St. Roch des Aulnaies cherries growing on the tree of very good quality. In our Province there are many districts quite different one from the other as regards climate, and it is the duty of our Society to find out the wants and requirements of all these districts. I know, for instance, the Chicoutimi and Lake St. John district, where it was thought, a few years ago, that no fruit could grow. Last fall at St. Jean Port-Joli we have seen some specimens of apples grown there, which show that some work is done in that direction, and it should be our endeavour to find out what kinds of fruit will suit that locality, especially what kinds of plums and cherries, the cultivation of which has so far been a failure in that section. Then we have the northern parts of the Province. We must find out what fruits will grow there; and I am sure, if we work hard on these lines we shall succeed in enabling the farmers in every part of our Province to grow some fruits, if not from a commercial point of view, at any rate for family use. We have to work on new ground, and new ground is always good ground to work in, because it is not exhausted. We have to follow out in that line what was done before. We propose to follow the example set by the Province of Ontario. Some of the best work done in that Province was done by means of what they called their Fruit Experimental Stations. That system has been working there only three years, and the Assistant Commissioner of Agriculture of Ontario says it is the best piece of work ever done by the Fruit-Growers' Associations of that Province. These stations are established in various parts of the Province, and are now eight in number. The Society chooses a farmer in one district who knows something about fruit-culture, and who has a good orchard, and gives him something like \$100 or \$150 a year and gives him some trees of various kinds. In one station apples are grown, in another plums, in another cherries, in another small fruit; they try all the varieties known in the

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Province, and they have derived from that system, began three years ago, very good results. I have read a paper on that subject before the convention of St. Jean d'Iberville last winter. It was printed in both languages and we wanted to put it before the Legislative Assembly of Quebec. Unfortunately, however, we were too late, but I propose to keep agitating in the matter, and I am glad to see here to-night the Hon. Mr. Fisher, who understands very well this question of fruit experimental stations, and who, I am sure, will give us all the help he can in that direction.

I am sure I express the feeling of every member of our Society, when I say that we consider ourselves highly honoured in having Mr. Fisher, our Vice-President, raised to the important position he now occupies. We are all very proud of that (applause), and I take the liberty of congratulating him, or rather of congratulating ourselves, on his having been called to so high a position, in which I am sure he will do all he can to help us in our work, which he understands so well and sympathizes with so fully. (Applause.)

Hon. Mr. Fisher (Minister of Agriculture):—Mr. President, Ladies and Gentlemen.—I wish to thank you, Mr. President, for the very flattering reference which you have made to myself, and you, Ladies and Gentlemen, for the kind manner in which you have endorsed the friendly congratulations made to me by our President on my elevation to the position I now occupy. I have had the pleasure of visiting Howick on former occasions, and am very glad indeed to see that to-night the people of this neighborhood have turned out in such numbers to welcome the Provincial Fruit-Growers' Association. I know of old, from experience, the hospitality of the people of Howick, and I am satisfied that no better place could be chosen for our winter meeting. I was unable to attend the meeting at St. Jean Port Joli, a deprivation which I felt very keenly, because not only would I have been glad to make the acquaintance of the people in that far-off part of the Province, but because I had known of the great efforts which have been made there in fruit culture, and the success which has attended these efforts—a success which most of us, in the western part of our Province, thought to be impossible. We cannot, however, refuse to believe in that success after the evidence we had of it in the shape of the fruit sent from that part of the country for exhibition here, where they could be seen by everybody. I regret especially that no director of our Association from this western portion attended that meeting. We have been fortunate, when we held meetings of our Association in this part of the Province, to have present at these meetings directors from those far-off districts, and I think it is but right that directors from the western sections should try and attend meetings in these distant districts, and bring back reports of the work that is being done there. The Provincial Fruit-Growers' Association is a comparatively young body. It has not got, by any means, the age or prestige of the Dairymen's Association, which has done so much good for the dairy interests of this Province; but I am satisfied that just as that Association has done great things for the dairymen, so this Society can and will do great things for the fruit-growing interests of this Province. We have abundant capacity for the raising of fruit of the finest quality. We cannot, perhaps, raise quite such enormous quantities as the Province of Nova Scotia or Ontario, and there are some of the finer and more delicate fruits to

which our climate is not favorable, but we have the finest apples in the world, apples famous for their rich, delicate quality. I believe that also below the City of Quebec, there are plums raised which are equal in quality to any raised elsewhere. They are not so large and fine looking, but in the matter of quality, in deliciousness, they surpass any other fruit in the world.

We have ample facilities also for raising small fruits of every kind, and though we cannot market them quite as early as people west and south of us can, still we have them of the finest possible quality and for just as long a season. What we should strive for is to obtain quality. I think quality far more important than quantity. If the quality of our productions is kept up, our reputation will be made, and our products will be in demand in the best markets in the world. (Applause). And while we may not be able to produce quite such a large variety of fine looking fruit as California and British Columbia and some of the more favoured southern countries, still, I am glad to know the quality of our fruit far exceeds theirs, and it is that we should aim at keeping as high as possible. At present the raising of fruit for export is receiving a great deal of attention. In this Province we have not yet turned our attention in this direction to any great extent, except in the neighborhood of Montreal. The export of fruit is a thing we must look forward to, and there is also a large market at home, in our own Province, which is not sufficiently supplied by our own people. It is certainly a matter for regret that this Province should have to send so much money out of it every year in order to pay for fruit that is eaten by our people. That is not right. When we can produce the fruit ourselves, there is no reason why we should not do so and keep this money which we spend on imported fruit circulating in our own midst, and use for other purposes what we have to send abroad. This question of producing fruit for export is rapidly engrossing the attention of fruit-growers in other parts of the country, and it may be of interest, perhaps, to this Association if I should say a word or two regarding what they look forward to. Last fall it was my good fortune to go down to Nova Scotia, and there I came into contact with the fruit-growers of the far-famed Annapolis Valley—a portion of the country, comparatively speaking, of small area, but rich and productive, and which grows and exports an enormous quantity of good apples. Of course the crop this year was quite abnormal, never equalled in the past, and not likely to be in the near future. From that little piece of country, the Annapolis Valley, not larger than the Counties of Chateauguay and Huntingdon, not less than 400,000 barrels of apples were exported last season. It is true that a good many of these did not bring any return in England, but that was because, unfortunately, they were not sent forward properly packed and with proper care, and the prices got were consequently comparatively small. Yet despite the fact that they sent out that enormous quantity of apples this year from the Annapolis Valley, not one-quarter of the land there available for apple culture is in orchard, so that they could easily multiply that export four or five times, provided the crop per acre were as great as it was this year. In the Province of Ontario, the Fruit-Growers' Association have been turning their attention to the export trade. Last year, 1895, they sent experimental shipments to Australia. The experiment was not successful; the whole thing was practically lost, but that was due to the fact that the shipping arrangements were not good. This last fall, however, they

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sent another shipment, which was much more carefully managed, though not by any means perfectly managed, and the result was a portion of the fruit gave satisfactory return. No doubt, in the near future, when the arrangements are still better, when the chain of communication between Ontario—if we choose to undertake it—to Australia is more perfect, our people will be able to send certain kinds of fruit with profit to that far-off colony of our Empire. In the same way, I am satisfied that in the near future, if we can improve the arrangements between this and the Mother Country, we will find a better market in the Old Country for all the fruit we can export. There is an almost unlimited market in the Old Country, in this sense, that the fruits are here to-day cheap enough to be eaten by everybody, but are only eaten over there by the comparatively well-to-do. There are many people on the other side who would consume fruit in enormous quantities if they could get it a little cheaper, and if we could send it. If communication between this country and England was so perfected that we could send our fruit forward at less expense, and place it more cheaply and easier on the English market, the demand for it would be practically unlimited. I am glad to know that the fruit-growers of Nova Scotia and Ontario are prepared this season to send forward fruit experimentally to the Old Country, to see whether a market may not be opened there for a much larger quantity than we have hitherto sent, and also a market for other fruits than we have been in the habit of sending. In this Province, we have a difficult problem to deal with. We have part of the Province where fruits of a more delicate nature have not heretofore been grown. Railways are penetrating to all parts of the Province, and the result is that in these sections where fruit cannot be raised, it is imported from elsewhere easily and cheaply; but fruit which comes a long distance, I care not how good it was at the start or how carefully packed, is never like that which we can pick out of our own garden. We can pick that fruit just in the condition we want it and get it in the freshest condition on our tables, and therefore it is of the utmost consequence to everybody who has a country home and a little plot of land to try and raise his own fruit. In this the work of this Association will be of inestimable help. We have our reports, which contain not only the reports of this meeting, but also the reports and experiments of all the leading fruit-growers of the Province. We have the reports of the Experimental Farm at Ottawa, of the experiments there in a climate pretty similar to that of a large proportion of this Province, and, therefore, of great help to us. Under these circumstances, by joining the Society so as to get the reports, by sending to the Experimental Farm for its bulletins, you will be able to find out pretty nearly all you can about fruit-growing, without having to make the trials and experiments yourself.

But, while these things which you find in books and reports are accurate and carefully prepared, at the same time, they have to be applied to your own particular circumstance and conditions with sound common sense, or, otherwise you may fail, and then throw the whole thing up in disgust. Do not do that. Talk to your neighbours and others, who have a little experience, and find out whether the application of these things which you find in books and reports apply to your particular circumstances; if you have not made a little mistake. I wish to impress on you that, in applying these things to your own conditions, you must use your own common sense and judgment. Hard and fast rules

cannot be laid down for any work in agriculture or horticulture. The principles which underly these matters, the general methods which must be followed, can be laid down, but the application of these principles and methods to the work on a particular piece of land must be more or less varied according to the conditions and circumstances and the facilities which are present. To-night we have a long programme, and I do not intend to detain you at any great length. I hope to be with you during the whole of the meeting, and we shall, no doubt, have a number of opportunities of taking up other things and discussing other matters before the Convention closes. I wish to say, before closing, that I regret that, as an official of the Association, of which I have been for a number of years a Director, and of which I have had the honour of being this year Vice-President, I will have to bring my connection with it to a close. The onerous duties I have assumed as Minister of Agriculture for the Dominion will not allow me to do justice to the work I would be called on to do as an official of this Association. I regret this extremely. I would be glad, indeed, to go on doing what I could, as an official of the Society, as I have done in the past. I hope, however, to continue a member of it, and I assure you that, if in any way, in my official capacity, I may be able to promote the work the Fruit Association is doing, I shall be only too glad to do the utmost in my power. (Applause.)

Our President has spoken about a matter to which he has drawn my special attention, that of experimental fruit stations worked by individuals over the Province. This is a matter about which I have thought a good deal lately, because my attention had also been drawn to it by the work done in the Province of Ontario. The work done there has been done by the means of the Local Government, which established such stations as Mr. Chapis has described; and up to a certain point, I understand they have been doing excellent work. They have not yet gone into some spheres in which too, perhaps work ought to be done, but they hope to extend the sphere of their work, and in that respect our Province might well follow their example. We have the same necessity for experimenting in different parts of our Province, perhaps even greater necessity, and I hope that in this work the Province of Quebec will emulate her sister Province. If in addition I may be able to make any arrangement which will facilitate such work, which will perhaps increase the efficiency and scope of the work done at the Experimental Farm at Ottawa and its branches, you may be sure I shall not neglect do so. (Applause.) With these few remarks, which I have made entirely on the spur of the moment, I shall conclude.

I have been speaking for the last month, pretty nearly every day or two, at agricultural meetings, and am glad to say I have had the opportunity of meeting a very large number of people interested in this industry in various parts of the country. I feel it my duty as it has always been my pleasure, to go about and discuss with the people the details and methods of their business, find out their views and ideas, and especially to study what can be done by the Government of our country to aid what I consider our most important industry, the industry of farming. It was in this view that I attended this large number of meetings since the session closed. I have now pretty nearly got to the end of the work, and must the next month sit quietly at Ottawa to prepare for the work of the session. I am especially gratified that the last meeting I attend is

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one in my own native Province for the promotion of a work with which I am so intimately connected and in the midst of people with whom I think I can fairly claim to be on the most friendly and neighborly terms. (Applause.)

Mr. President—We shall all feel sorry to see the name of our worthy Vice-President disappear from the list of our Directors, but as he assures us he will continue to take great interest in our work and give us all the help he can, we must thank him, not only for what he has done in his capacity as Director and Vice-President of our Society, but also for the assurance he has given us of his continued interest in our success in the future. Let me now introduce to you our distinguished horticulturist, Mr. Craig.

LESSONS FROM THE YEAR.

Prof. Craig—We have all been congratulating ourselves on the fact that in the Dominion Cabinet, one of our members fills the important position, for which he is so eminently qualified, of Minister of Agriculture. We certainly deserve to be congratulated as well as the hon. gentlemen in question, but I must say that in one respect I feel somewhat disappointed. I felt extremely proud to find my name on the programme following that of our Hon. Minister of Agriculture and vice-president of this Society, but in the course of his address he has so completely covered the ground that I intended to take up and has done it so well that I feel the disadvantage of following a practical Minister of Agriculture, and heartily wish myself in some other place, feeling extremely diffident about presenting to your consideration matter which has already been so lucidly expounded. Mr. Craig then illustrated the point that he wished to make by telling a humorous anecdote, and proceeding, said:—

The Hon. Mr. Fisher has pointed out a fact, which is strongly borne in mind at the present time, viz., that there has been an over production of apples during the past season, but the question arises whether there has been an actual over production of the kind of the varieties of fruits we ought to grow. Growers experienced great difficulty in marketing their fruits, owing to the fact that a great many varieties ripened at the same time and we had no facilities for holding them without loss; the markets were consequently glutted. I wish to say that I believe we shall have to change our system of horticulture in the Province of Quebec in the near future. As the Minister of Agriculture has pointed out, we shall have to look for foreign markets and grow for these markets suitable varieties. Cold storage shipping facilities no doubt will enable us to reach these markets even if we continue to grow the kinds of fruit we are now cultivating, but it is evident we must cultivate in the future more winter apples than we have been doing in the past. The first lesson then which should be impressed upon us very strongly by the experience of the past season is to increase the amount of our winter apples. Later on I shall touch on the methods by which that change may be brought about. Some people believe that we can profitably turn our summer apples into cash by making them into cider. I think Mr. Dunlop will tell you to-morrow, and Mr. Newman will bear me out, that summer apples are not the kinds best fitted to make the first quality cider. Again, it is said that we can evaporate them and put them on the market in dried form the following year. Here, I believe, we shall also be disappointed.

This year I had the opportunity of carrying out some experiments with the view of finding out which were the apples best suited for evaporating purposes, that is, the varieties which would give us the largest amount of evaporated products per bushel of apples and would make evaporated products of the best quality. With one of G. H. Grimm Manufacturing Co.'s portable evaporators I tested forty-five varieties. Invariably, in the case of the autumn and summer varieties, when the requisite amount of water was thrown off, the residue—the dried apple—was so small that it would not allow us to compete with the firmer winter varieties now used for that purpose in the State of New York. This simply emphasizes and bears out what I said a minute ago, that summer apples, while they have their features of usefulness, cannot be relied upon to make the best cider, and certainly are not suited for making of good quality and in economical quantity an evaporated product. For instance, the ordinary winter apple will give you 5 to 7 pounds of evaporated product per bushel, whereas in the case of summer apples, many of them run as low as three pounds per bushel when dried to the same extent as the others. This shows a great discrepancy between the two, and taking into account the quality and the fact that we can use the commonest winter apples for evaporating, it places the unpleasant fact before us that our summer varieties are unsuited for this purpose.

SUMMER VARIETIES.

To enumerate one or two varieties I have noticed that have done particularly well in a great many parts of the Province, I do not know of any apple for the home market which is better than the Yellow Transparent. I may not be borne out by commercial growers, but, from my experience at Ottawa and in marketing them at Ottawa in ten-pound baskets, I do not know of any variety that will give you more money in the early part of the season. The Montreal market, I think, would give you good returns also, but the apple must be handled with exceeding great care, as it is tender in the skin and flesh. It must not be allowed to hang on the tree too long, and it should not be marketed in large packages. Another variety I think a good deal of is called Van Deman; it is a variety closely resembling the Red Astrachan, but ripens rather earlier, and is somewhat finer in texture. The fruit is just as beautiful as the Red Astrachan.

Mr. Shepherd—What is the quality?

Prof. Craig—Rather better than Red Astrachan.

WINTER VARIETIES.

Of winter varieties, it seems to me we could very well increase the number of trees in our orchards of such kinds as Scott's Winter, Golden Russets, and Lawvers or Delaware Red Winter. The Lawver is one of the best keeping apples we have. At the meeting to which Mr. Chapais referred—and I quite corroborate his statements of the exhibit at St. Jean Port Joli—I exhibited specimens of Lawver grown the previous year, and kept in an ordinary cellar.

RENEW BY TOP GRAFTING.

Now that we have this large number of varieties, which I have referred to, what shall we do with them? It seems to me the practical solution of this

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question is not to destroy them and wait, during the time necessary, to grow new trees of different varieties with which to secure returns, but to utilize the stocks we have by placing upon them tops of other kinds. In other words, by top-grafting. Any of those which are tender, or show by sun-scalding lack of adaptability to our conditions, should be rejected. I would root these out entirely, but it would pay to top-graft a large percentage of the vigorous summer varieties now growing in many of the orchards throughout the country.

RUSSIAN APPLES.

Turning to the Russian apples, all have had the fever more or less, and I know of no place where a larger amount of information on this question of the value of Russian apples may be obtained than in the vicinity of Abbotsford. Mr. J. M. Fisk has done a great deal of good work in selecting from a large list those of value. Those who have Russian apples which are perfectly hardy—and most of them are—bearing summer fruit, will find them, in many cases, excellent stocks for top-grafting.

Mr. Barnard—Winter varieties?

Prof. Craig—I should advise using the winter varieties. I know the point that you have in mind, viz., that if you place winter varieties on a summer stock, you may change the season of the grafted fruit. That is true to a certain extent, but not to such an extent as to seriously affect the value of the work.

Mr. Newman—What varieties do you refer to?

Prof. Craig—I would top-graft, using the three varieties I have named.

Mr. Shepherd—Have you thoroughly decided on the value of the Lawver, because I have had some experience with it, and do not find it hardy.

Prof. Craig—As the Hon. Mr. Fisher has said, I think that any tree that will stand the climate we have at Ottawa—which I consider much more trying than the Island of Montreal or along the banks of the St. Lawrence on either side—will stand the severe portions of the Province of Quebec. Our climate at Ottawa is often dry, always cold in winter, and the sandy soil in which the orchard is planted is not as favourable as it might be; therefore such varieties which succeed with us, I feel justified in recommending to other portions of the country where the thermometer does not fall as low. We have six trees of Lawver in the orchard, none have winter killed, and they have borne for three years, good annual crops.

Mr. Newman—Do you include the Wealthy?

Prof. Craig—I have not mentioned it as a summer apple. I think it possesses a decided element of value for export purposes, and therefore would not include it among the varieties to be top-grafted.

RASPBERRIES.

Regarding small fruits, I wish to touch upon one or two lessons brought home to me by experiment in connection with growing small fruits on the

Experimental Farm. Speaking of raspberries, I know of no better variety for general culture than the Cuthbert, and I say this after having tested pretty carefully at least 75 or 80 kinds. With Cuthbert I would grow the Heebner and Marlboro. The Heebner is a variety as yet not grown to any extent outside of our Experimental Farm. We have tested it for six years and year after year it has given us large crops, being but very little winter killed.

TRAINING AND CULTIVATING.

The experiments we have been carrying on touching the methods of cultivation I have not said anything about in the past, but after having secured the same results three years in succession, I think I am justified in stating these results now. We grow most of the varieties in two parallel rows, 150 feet in length, for purposes of comparison. These are varieties which are comparatively well known and may be considered commercial. I have treated two rows of each kind differently. One row has had the young wood cut back when it attained the height of 15 to 18 inches, and has also had the bearing wood taken out as soon as the fruit was harvested. The other row was not summer pruned, the old wood being taken out after picking the fruit. Then half of the canes of each row was bent over and protected from the frost. Now, the row which was not summer pruned has given the largest product year after year. That is not orthodox teaching in connection with raspberry growing, but it is exactly what has happened in our experiments. These plants which were cut back did not give us as satisfactory results as these which were allowed to grow the full height and were pruned the following spring.

Mr. Shepherd—Without nipping the ends as they grew?

Prof. Craig—Yes, without nipping the ends; we cut them back the next spring to the extent that they had been injured by the frost.

STRAWBERRIES.

Then with regard to strawberries, we have tested a large number of strawberries. This year we had fruits of 120 varieties. There are just two to which I would call your special attention. The name of the first is the William Belt. While not giving the largest number of boxes per row, it gave us the largest proportion of large, fine, firm berries. It is a strong grower. I think it is a variety we should test. We shall probably hear more about this from Mr. Farmer, the strawberry specialist from New York.

Hon. Mr. Fisher—What is the quality?

Prof. Craig—I should not call it the best from an amateur's standpoint, but it is good from a commercial standpoint. The next variety is one called Scarlet Ball. This is a handsome berry, borne on long stems, strong enough to keep it up well out of the sand and dust.

ROOT KILLING OF FRUIT TREES.

I would pass on to another lesson which was strongly impressed upon us last year, and that is the danger of fruit trees being destroyed by frost killing the roots. This disastrous result has occurred in our orchard to a considerable

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extent, and was most severe on those portions which were unprotected by any vegetation whatever. Such injury suggests to us a practice which, I think, should receive our earnest attention, that of growing in our Province of Quebec orchards some sort of a crop upon the surface of the orchard ground, in order to prevent the frost from injuring the roots of the trees. Of a great many of the trees, when taken up and examined this spring, it was found that for a distance of two feet or more below the surface of the ground the roots were entirely killed. We should understand, in this connection, that the roots of trees will occasionally be injured by a frost which will not injure the tops, and it was so in this case. The cherry trees, for instance, which were killed, blossomed in the spring at the normal time, and carried the process so far as to attempt to get fruit and develop leaves, but after the food supply stored up in the branches and twigs was exhausted, the whole tree gradually withered. The action of the frost on vegetable tissue is very interesting, and when a tree dies from a severe cold, it may die from practically the same result as that which follows a period of severe drought. A severe cold withdraws the moisture from the cell contents. If this action is kept up long enough, the vital part of the protoplasm dies, as in the case of protracted drought.

Mr. Fisk—Was there any difference in the roots of those which have suffered?

Prof. Craig—The apple trees were propagated mostly on French crab stock but I could see very little difference, whether root grafted or budded.

Mr. Shepherd—Were these trees mulched?

Prof. Craig—No; they were on clean cultivated ground.

SHIPPING FRUIT.

To come back to our first proposition, it seems to me we shall have to endeavor first to grow suitable fruit for the market. It must be grown in the best manner in order to produce the finest quality. Then it must be placed on the market in the most attractive manner. We should grow less fruit of better quality, and place it on the markets in smaller packages. Mr. Fisher referred to the Nova Scotia Fruit-Growers' Association. I had the pleasure of attending the annual meeting last week, and while there I learnt a great deal more than I could possibly draw your attention to at this time. One matter that is occupying their attention just now is the formation of a Fruit Exportation Company, so that the fruit-growers of the Valley may combine in order to place on the European market their fruit as cheaply as possible, in the best condition and of a uniform grade, under a provincial superintendent, so as to avoid the profits of the middle man on the other side. They purpose having an agent over there who shall govern the distribution of fruit to a certain extent, so that if the market is glutted at one point, he will order a change of shipment to another market less filled up, in order that the fruit-growers may reap larger profits. In many cases, when Liverpool and London are glutted, the markets in the central parts of England have a comparatively small supply. In Nova Scotia, while they grew Northern Spy and Golden Russet to

a considerable extent, yet such apples as Gravenstein do not keep very long. At this time their heaviest shipping season is past, and these apples which are now in cold storage are the only ones in good condition, so that while they have some advantages in the distance of the haul, yet with regard to their staple varieties they are not much better off than we are.

THINNING TO INCREASE SIZE.

The necessity of thinning the fruit is a work we shall have to recognize in the future. The benefits have been brought to my notice in many places this year. In September I was in Ontario in one of the best plum-growing sections, and saw an orchard of four hundred trees, each tree of which yielded ten baskets of Lombard plums, or four thousand baskets in all, which sold at twenty-five cents, making a gross return of \$1,000 for these 400 trees. I saw another orchard, not five miles away, that carried probably as large a number of baskets, but I am sure that they would not realize more than fifty per cent. of the gross return of the first. The high prices scored by the first lot may be attributed to the fact that they were thinned, and the second was not. The Lombard is one of these trees which will practically kill itself by overbearing if it is not thinned. The fruit will, under these conditions, become small, and be very poorly coloured, so that the smaller price for the larger number of baskets will not equal in gross return that secured from the smaller quantity of better quality obtained by thinning. At the farm, I have tried this experiment on some varieties of American plums. These are very prolific sorts; if allowed to bear to their full extent, will in a few years destroy themselves. In the case of the Weaver plum, two trees which were not thinned for three years died at the end of that period, and two other trees which were thinned each year, are in good health and give fair returns each year. It is, therefore, not only possible by thinning to increase the quality of the fruit but to keep your trees in health. The varieties, methods of cultivation, the manner of packing and the kind of package, are points that we, as fruit-growers, should consider with great care at the present juncture. We should not only take an interest in our own work, but should study the demands of the market abroad. Speaking of "taking an interest," reminds me of an incident told to me by Mr. J. H. Hale, of whom many of you have heard as one of the largest peach-growers in the United States. A Hebrew couple had a little boy named Jacob, and one day when Isaac, the father, came in, Rachel told him that little Jacob was very sick. Isaac asked what was the matter. Rachel said, "I do not know, but he does not eat and he does not take any *interest* in anything." "He does not take any *interest*," replied the father, "that boy is not sick, he is dead." Any fruit-grower who does not take sufficient interest in his work to come to our annual meeting in order to discuss and study these questions with his fellow-workers, is dead to his own best interests.

Mr. Brodie—Have you ever tried canning apples?

Prof. Craig—The canning industry of apples has not proceeded to such an extent as the canning of other fruits, owing to the fact that we have not an extensive market for this class of canned fruits in America. There is, I believe, a considerable market in Germany and, to some extent, in England. In British

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Columbia, the industry is prosecuted to some extent, also in Picton County, Ont.; but the proprietor of one of the factories told me that the market for canned apples was rather limited.

Mr. Brodie—About the Yellow Transparent, I am sorry I cannot corroborate what Prof. Craig has said as regards the value of that apple in the Montreal markets. The colour does not take, and it comes into competition with the California fruit.

Prof. Shutt then delivered the following address on

PLANT CONSTITUENTS.

These fundamental materials are divided into two large groups as will be noticed by the accompanying chart, the organic elements and the inorganic or mineral elements. The organic elements are also classified as the air derived, and the inorganic elements as the soil derived elements.

PLANT CONSTITUENTS:

The Organic Elements	{ Carbon } { Oxygen } { Hydrogen } { Nitrogen }	Carbonic Acid	Water	{ Starch } { Sugar } { Fibre } { Oil }	A	AIR-DERIVED	
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The Inorganic Elements	{ Calcium } { Magnesium } { Potassium } { Sodium } { Iron } { Manganese }	Ph'sphor's	Silicon	Sulphur	Chlorine	B	ELEMENTS
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The Inorganic Elements	{ Calcium } { Magnesium } { Potassium } { Sodium } { Iron } { Manganese }	Ph'sphor's	Silicon	Sulphur	Chlorine	L	SOIL-DERIVED
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The Inorganic Elements	{ Calcium } { Magnesium } { Potassium } { Sodium } { Iron } { Manganese }	Ph'sphor's	Silicon	Sulphur	Chlorine	N	ELEMENTS
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The organic elements, carbon, etc., are not to be found as such in the materials of the plant, but are there combined with one another, forming well-known compounds. These have been formed from the food the plants have absorbed, just as the bone, flesh and blood of which we are made up has been derived from the food we have eaten. They are not absolutely, but they are essentially the same as the food. The food has been converted by the life functions of digestion and assimilation into muscles, bone and so forth. Remember this, then, that just as we are constituted of the food we eat, so are plants made up of the elements of food they take in. These elements are built up, by the life functions of the plants into various substances. What are these substances? These organic elements, combined in various proportions, become protein or albuminoids, of starch, sugar, fibre and oil. The Albuminoids are so called because of their chemical resemblance to the white of an egg, a substance

which is known as albumen. One of their essential constituents is nitrogen. Albuminoids differ from starch, etc., in the possession of nitrogen, which these latter substances do not contain.

Just as nitrogen is essential for the animal so it is, curiously enough, for the plant, and just as it is the most expensive element which we have to purchase, when buying foods for our cattle—because it is these concentrated foods which are sold at high prices that contain the largest amount of nitrogen, and which really in a large measure gives them their value—so it is that these forms of plant food or fertilizers, which contain large quantities of nitrogen, which cost the most.

By observing the brackets on the above chart you will notice that nitrogen is placed among the air-derived elements and also among the soil-derived elements.

What do I mean by that? I mean that under ordinary circumstances that is, with most of our farm crops, nitrogen is a soil-derived element, but that under certain circumstances, as with the clovers, it may be an air-derived element. This is a very important fact, and one which we should thoroughly understand. The air which we breathe consists mainly of oxygen and nitrogen—practically four-fifths nitrogen and one-fifth oxygen. It also consists of small quantities of carbonic acid gas. The latter is given off from our lungs, and exists in the atmosphere at the rate of four parts per ten thousand. This apparently small quantity of carbonic acid gas furnishes a large portion of the food of plants. But I wish specially to refer to the part that atmospheric nitrogen plays in agriculture. There is only one class of plants, as far as present known, which is able to appropriate or assimilate or build up into their tissues this atmospheric nitrogen. Although there is a very large quantity of atmospheric nitrogen, yet for the majority of our farm crops it is absolutely useless. For cereals and roots and grass we have to give from ten to fourteen cents a pound for nitrogen when we purchase commercial fertilizers. The nitrogen of the atmosphere is quite valueless for the classes of plants I have just mentioned. But it is different with the pod-bearing plants or the legumes. These comprise clover, peas, beans, vetches, etc.

I should like to indicate how it is that these plants are able to assimilate this atmospheric nitrogen. It has been said by some one who was able to take the birdseye view of the progress of the world, that electricity and clover culture are revolutionizing the world. That expression really gives voice to a truth. I believe that this discovery, which is quite a recent one, is revolutionizing our agriculture. Its application is certainly lessening the cost of production of our other farm crops. By the aid of certain bacteria or germs that exist in the nodules or the roots of clover, peas, etc., this atmospheric nitrogen is appropriated and assimilated. In turning under such a crop we enrich the soil with nitrogen for the use of future crops.

We are speaking to-night more particularly upon the resource of plant food for orchards. Apple trees must take their nitrogen from the soil. They cannot absorb it from the atmosphere. It must be furnished in some available

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form. Further, the result of vast experience, extending over a many years of careful work in Europe and America, has brought to light that, although plants require all the elements which are noted on this chart—some seventeen in all—yet most of them are in such abundance in the soil, and are required by plants in such small quantities, that is not necessary for us to replace them in order that our crops may continue to give lucrative yields. But with regard to certain of these elements, the soil becomes exhausted by continued cropping. It is important to know what these elements are; they are nitrogen, phosphoric acid and potash.

If we continue cropping a field, without replacing any fertilizing material, we are every year taking away from it certain amounts of nitrogen, potash and phosphoric acid. In other words, we are reducing its fertility. We must replace these elements if we expect in the future to take such crops as we obtained from the soil when it was in its virgin condition.

Let us ask ourselves more particularly as to the apple. If we want to know the fertilizer required for apple trees we must avail ourselves of the assistance that chemistry affords. Two years ago, at the Experimental Farm laboratories we analyzed four varieties of apples, and at the same time made an examination to determine the constituents contained in the leaves. Let me give you the results. We find that apples contain about 87 per cent. of water. Now the water, of course, of which they are composed was drawn up through the roots from the soil. That water was necessarily fallen rain. As we have no control over the rainfall we need not, at this juncture, consider water as a food, although it is a very essential factor in the production of fruit. I could show you that while we may not be able to add to the initial amount of water in the soil, yet by a proper treatment of the soil we could preserve a very large portion of it for the use of crops. But I must not allow myself to digress. We have something like 13 per cent. made up of organic constituents—starch, sugar, fibre, oil and albuminoids. These are, with the exception of the nitrogen of the latter, air-derived elements. Over 99 per cent. of the apple tree, therefore, derives, its substance from the atmosphere. We have seen that the water has come through the roots. How do they absorb these materials from the atmosphere? Simply through their leaves. A plant takes in food through its roots and through its leaves. The very small amount of carbonic acid that I mentioned a moment ago existing in the atmosphere furnishes it. It is taken into the tissue of the leaves through small mouths, usually on the under side of the leaf, and then in the presence of the sunlight by the action of the green colouring matter (which make the leaves green), this carbonic acid is built up together with water into these organic substances, starch, sugar, fibre, oil and so on. That travels down the stem, and a large part of it finally finds its way into the apple. That is how that 13 per cent. is made up. Now you see how essential the leaves are to the fruit, because the leaves practically are acting as stomachs for the digestion of the food which finally is converted into fruit.

I have not accounted for the whole of the material in the fruit. There is something like 3-10 of one per cent. which is made up of these inorganic elements which are absorbed from the soil by the roots of the tree, and we have

to see that the soil contains these materials, principally potash and phosphorus, in available forms. You must remember that although more than 99 per cent. of the material of the apple is a clear gain to us from the atmosphere, nevertheless the tree cannot appropriate that 99 per cent. if we do not supply it with the 3-10 of one per cent. of these materials which it takes from the soil.

After making an analysis of the apples and of the leaves, I calculated the quantities of these three essential constituents,—nitrogen, potash and phosphoric acid—which were taken from the soil per acre by crop of apples. The calculation was made on this basis: that in an orchard twenty-five years old of 40 trees to the acre, the yearly crop might be put down at 160 barrels, or four barrels to the tree. Of nitrogen, we found there were about, in round numbers, 9 pounds in the 160 barrels, five pounds of phosphoric acid and 33 pounds of potash. That is very little compared with what some of our crops take out per acre. Of course, these amounts are in addition to those contained in the wood and leaves of the trees. I cannot, therefore, speak of our fruit crops as exhaustive crops; nevertheless it is essential they should have these elements in available forms. You ask me is it necessary to furnish them in equal proportions or should one be in excess of the other. Well, chemistry shows that the apple uses these elements in these proportions:

9 of nitrogen.
5 of phosphoric acid.
33 of potash.

Our fertilizers for orchards do not as a rule contain sufficient potash. In the past many of us have been applying, season after season, superphosphate, when in all probability potash was most needed. I am convinced that there are many erroneous opinions, widely spread, held regarding the nature of commercial fertilizers. These are due to ignorance on this matter. Unfortunately the term "Phosphate" has been applied to commercial fertilizers in general. It should be restricted to these fertilizers which contain phosphoric acid in a soluble form, and that only; it should not be used in speaking of these materials which contain nitrogen and potash. The mistake many have made has been supplementing farm manure with superphosphate, and this in orchards that require, as I have indicated, potash and nitrogen.

We analyze the leaves and find that these elements do not exist in the leaves in the same proportion that they do in the apple. The leaves require more nitrogen than the fruit, but nevertheless they require a very large amount of potash. There is also a considerable amount of potash stored in the wood—the trunk and branches. This leads us to the conclusion that our orchard fertilizers should, in the first place, be rich in potash, and secondly should contain nitrogen in addition to phosphoric acid, unless we supply the nitrogen by turning under occasionally a crop of clover.

Now, I shall devote a very few minutes before closing to pointing out how I think these elements may be most advantageously and most profitably supplied. Upon this chart which hangs on the wall, I have depicted the composition

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of all the fertilizing materials in the market. From them are compounded the various commercial fertilizers of the manufacturers. Let me briefly take up the matter of the fertilizers, which you may buy. You should always purchase fertilizers upon an analysis. If you want to apply it to an orchard, you do not want to get one which is very rich in nitrogen and very poor in potash. That would not be profitable or economical treatment of orchard soil. What we want to do if we are going to buy a brand of fertilizers, or to make a mixture containing these three essential elements, is to see that there is from two to three per cent. of nitrogen and from three to five per cent. of phosphoric acid and from 10 to 12 per cent. of potash. The mistake of many of our manufacturers has been that they have been keeping down the percentage of potash and giving more phosphoric acid than it is economical to use. If you have a knowledge of these principles of fertilizer mixing it might be far cheaper for you to buy the materials and mix them yourselves. Before doing this some little knowledge is necessary as to the nature of the materials to be employed, otherwise we may lose one or other of their constituents. That knowledge you can always obtain by writing to the Experimental Farm, and there is no reason why an intelligent orchardist should not prepare his own commercial fertilizers and effect a saving of at least 25 per cent. Let me ask your attention to the forms of potash available. There is, first of all, wood ashes. They should contain about $5\frac{1}{2}$ per cent. of potash. They will contain in addition, about 2 per cent. of phosphoric acid. Further, I would point out that the potash in wood ashes is in a form particularly adapted to the wants of the tree. It is soluble, and I am convinced from the experience of others, and extensive reading on the question, that the form in which potash exists in wood ashes is the best form for the fruit trees. I am not aware whether wood ashes are obtainable in this district or not, but they were quoted to me in last summer, F. O. B. at Kingston, at \$4.30 a ton. At any such price they are certainly the cheapest form of potash.

If wood ashes are dear and scarce, it will become necessary to inquire whether there are not other forms, and cheaper, of potash on the market. There is imported from Germany Kainit, Muriate and Sulphate of Potash. Kainit contains about 12 per cent. of potash. Muriate of Potash is much richer; good grades contain nearly 50 per cent. potash. It is contended by the sellers that they can furnish potash in this form much cheaper than we can purchase it in wood ashes. That may be true in the United States, but when you can purchase wood ashes for the price I have mentioned, I would certainly advise you to take the wood ashes. Wood ashes contain all the inorganic elements of the wood from which they are produced, and besides the potash and phosphoric acid, lime, magnesia and other elements valuable to crops are present.

You may ask about what quantity you should apply. I think 30 to 60 bushels per acre every second or third year, according to the condition or fertility of your soil. Some soils contain ten times as much available plant food as other soils, so that it is not possible to give one formula which would be economical for all soils.

Hon. Mr. Fisher—Per acre ?

Mr. Shutt—Forty bushels every second or third year would give you all the potash your crops could use. Forty bushels of good wood ashes would give from 100 to 120 pounds of potash. We have to feed the tree not only for the fruit but for the leaves and wood. The presence of available potash in the soil has been shown to be conducive to the maturing of the wood, and also to a choice flavour in the fruit.

Hon. Mr. Fisher—That would be a bushel per tree?

Mr. Shutt—Practically so. Of course, we must understand that owing to the disposition of the roots in the soils, it is not possible for us to utilize all the plant food which is in the soil. There must necessarily be a very large amount of what we might call unoccupied land. It is only where the root fibres penetrate that they abstract the food. More must be put in the soil than can be immediately taken out, but this additional amount or margin is not lost. Just as in a bank account, we must always have a margin, so it should be with our soils. We do not, however, want too much unused soil capital, or there will be a tendency for a part of it to become wasted through leaching.

Ques.—What can be used in the place of wood ashes?

If we cannot get wood ashes at reasonable rates, we can purchase Kainit or Muriate of Potash. The first of these contains about 12 per cent. actual potash, the latter about 50 per cent. potash. Muriate of Potash is usually applied at the rate of 100—200 lbs per acre—Kainit, at the rate of 300—700 lbs per acre.

With regard to phosphoric acid, if you apply wood ashes, I doubt very much whether it is necessary to apply much phosphoric acid as such for orchards. It may be well, however, to supplement with ground bone every second or third year. That will give you phosphoric acid in an excellent form, and also a certain amount of nitrogen. If you do not use ground bone, you can obtain superphosphates, which contain usually 10 to 15 per cent. of soluble phosphoric acid; 100 to 150 pounds of such material would be sufficient per acre to supply all the phosphoric acid for the tree.

How can we most economically furnish our trees with the necessary nitrogen? We could buy nitrate of soda, and the nitrogen would then cost us about 14 cents a pound, or we could purchase sulphate of ammonia, which is a little cheaper, or organic manures, such as dried blood, fish guano, could be used. But I am convinced that the most economical method will be to employ the legumes to gather the free nitrogen of the atmosphere.

By the growth of clover we may add to the soil a large amount of nitrogen. Our experiments at the Experimental Farm, both in the field and the laboratory have shown that by this means there may be a distinctive gain of more than 100 pounds per acre of nitrogen. From 12 pounds of clover seed we can obtain foliage and roots containing 100 pounds of nitrogen. This, purchased in the form of commercial fertilizers, would cost between \$10 and \$15. If clover seed is worth 20 cents a pound, ten pounds would be worth \$2, so that we should have a gain of eight or ten dollars in fertilizing material per acre. The following table gives

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the interesting result obtained with the growth of clover at the Experimental Farm during the past year. They will be referred to by Mr. Craig when he addresses you to-morrow on the subject of cover crops for the orchard.

In the growth of clover there is not only a storing up of the nitrogen from the atmosphere, but there is also an appropriation of carbonic acid, which may be said to be the foundation of the vegetable matter. This vegetable matter, when it decomposes in the soil, gives rise to humus, a most useful constituent of soils. Further, the roots of the clover have attacked the mineral matter of the soil, dissolving and absorbing it. This mineral matter is transmitted throughout the whole material of the clover plant. It is, therefore, in a certain sense digested. When we turn under the clover crop this mineral matter is returned to the soil in a form useful to succeeding crops. It will do good service in the nourishment of our fruit trees. Something like 800 pounds of mineral matter per acre are in this way worked over by a clover crop. This is a very important function of clover. The vegetable matter of the clover is particularly of value in conserving the soil moisture. We have seen to what a large extent water enters into the composition, not only of the fruit, but of the leaves and the wood of the apple tree. Anything which in seasons of drought will conserve the soil moisture for the use of our crops is of great importance—hence the value of building of our soils in organic matter.

Mr. Newman—Is there any gain of nitrogen if the clover is cut and taken away?

Mr. Shutt—That which you take away is of course, lost to the soil—unless the resulting manure is carefully returned. But the roots are rich in nitrogen and they are necessarily left in the soil. An acre will contain more than 3 tons of such roots. The assimilation of nitrogen by the clover comes about in this way: The clovers are no more in themselves able to assimilate atmospheric nitrogen than any other kind of farm plant. The absorption or assimilation is done through the agency of certain microscopic plants which exist in the soil and are commonly known as germs or microbes. These are able to appropriate the free nitrogen of the air which exists in the small interstices between two particles of soil. These microbes attach themselves to the roots of the clover plant and there they form nodules or tubercules. If you could examine these, you would find, with a microscope of great power, the nodules full of these microscopic plants. These microbes in some way are able to appropriate, as I have said, the free nitrogen which exists between the particles of the soil. This nitrogen is then transmitted to the main tissues of the clover plant, where it is converted into the organic substances of which I have spoken. When a soil contains a large amount of combined nitrogen, there is but little disposition on the part of the clover plants to assimilate free nitrogen. It would appear that it is only in soils poor in nitrogen (nitrogen-hungry, as it is called) that this disposition to assimilate free nitrogen is well developed. The clover, in its early stages of growth, cannot make use of the atmospheric nitrogen because it has not these tubercules. It consequently must then draw on the nitrogen compounds in the soil for the necessary supply for its growth, so that the nitrogen contained in the young

plant is not a distinct gain from the atmosphere. The largest amount of gain probably exists when the plant is in flower. That is the best period at which to turn it under as a green manure.

Mr. Barnard—Supposing the soil is poor in potash, how much nitrogen would be extracted from the air ?

Mr. Shutt—The growth of legumes would not then be luxuriant. Although they are able to forage for themselves with regard to nitrogen, they require, comparatively speaking, large quantities of potash. They will also respond to applications of phosphoric acid and lime. Therefore, if we want a good growth of clover, we must furnish our soils with potash, phosphoric acid and lime.

With regard to the economy of either turning the clover down or feeding it off: If you have animals to feed it to, by all means feed it in every case, because in the manure which results you can return to the soil 70 per cent. of these plant food constituents. But if you have not got the animals, ploughing under the green crop of clover will still be a cheap source of nitrogen.

With regard to barn yard manure, the analysis of which has been placed at the bottom of the chart so that you may be able to compare it with the commercial fertilizers: Why is it that barn yard manure does not offer a balanced ration for the food of our fruit trees? Because it does not contain a sufficiency of potash for the nitrogen it possesses. It contains as much nitrogen as potash, and we should have two to four times as much potash as nitrogen. Consequently if you are going to furnish all the potash necessary for your fruit trees in the form of barn yard manure, you will have to add four times as much nitrogen as the trees need. This may do injury to your trees, because the action of excess of nitrogen in the soil prompts undue development of leaf and woody parts, and keeps the wood from maturing in the autumn.

Mr. Brodie—What action has land plaster and gypsum on plants to make them grow ?

Mr. Shutt—Land plaster is a compound of lime and sulphuric acid, or oil of vitriol. Lime is an essential constituent of all plants, but more particularly of clover, peas, beans and all these crops known as the legumes. Consequently, the first valuable property of gypsum is in the furnishing of lime. Further, we find that plants require a certain amount of sulphur, and undoubtedly gypsum acts beneficially in furnishing this element. The action of lime and land plaster within the soil is to liberate a certain amount of potash. Land plaster, although in itself not a direct supplier of potash, thus indirectly is the means of furnishing a certain amount of this valuable element which the plants can use.

Mr. Brodie—It is used mostly on the leaf, especially when the dew is on the plants.

Mr. Shutt—The food of plants is taken in by their roots and their leaves—that by their leaves must be in the form of gas; that by the roots must be in solution. Gypsum cannot therefore be absorbed through the leaves. It readily becomes soluble in the soil water and the acid exudation of the rootlets, and thus becomes serviceable to plants.

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Mr. Barnard—The fact that plaster of Paris has not a good effect in very dry weather may be explained by the fact that it requires a great deal of water to make it useful, and if applied when the plant is covered with dew, the action of the plaster will be quickly seen. In two or three days, when there is sufficient moisture, the clover field will change in appearance entirely.

Mr. Shutt—It is quite true that the presence of water in the soil is absolutely essential for the utilization of any kind of fertilizing material which plants have to appropriate through their roots.

Mr. Fisk—In the ripening of the apple, is there a greater draft on the potash than at other stages?

Mr. Shutt—There is a disposition on the part of plant to store up in their seeds large quantities, comparatively speaking, of phosphoric acid, more particularly, and to some extent of potash. There is a migration as the season advances and the fruit matures, of these constituents to the seed, so that relatively a larger amount of these materials are contained in the seed than in many other parts. It is in the spring, however, when the greatest draft is made on the soil elements of fertility.

The meeting then adjourned.

HOWICK, 28th January, 1897.

The Society met at 10 a.m.

THE USEFULNESS OF BIRDS IN HORTICULTURE.

Mr. N. E. Jack, Chateauguay Basin, read the following paper:

There is not anything in nature more delightful to a lover of birds than their morning song, from the first sleepy chirp at early dawn to the full orchestra at sunrise. And while they give us this music without any ticket of admission, we give scarcely a thought to their great value in other respects, for it is to these feathered friends we are greatly indebted for ridding us of many insect pests while searching for their food.

Nor is it only the *morning* bird, for there are others that come abroad only during the night, or twilight, and satisfy their hunger. Swarms of insects are most active after dewfall, and the hour about sunset is the foraging time for the swallow, while later on the whip-poor-will and owl direct their attention to the larger beetles and moths.

The woodcock seldom ventures abroad in the daytime, but feeds on worms in the fields, though he has been observed scratching among the leaves for insects in the daylight when in the dense woods. The advent of the English sparrow has been a great drawback to the domestication of our native birds, as many condemn *all* birds on account of this quarrelsome raider, for though they

may eat a few insects, they give more useful small birds no peace and drive them from our orchards and gardens. Many people encourage them in winter and give them attention that if devoted to some of the native insect-eating birds would be of use to the orchardist. At Hillside we build *nests* for the native birds, the holes in the boxes being large enough to admit a wren or a swallow, but too small to admit its persecutor. An old kettle, minus the spout, makes an excellent nest, or boxes four inches square and about nine inches long, with an inch and a quarter auger hole at one end, are safe houses for small birds. It is estimated that a healthy swallow will eat from two to six thousand insects in a day, so we can imagine what good a nest-full of these hungry fellows can do. I read in a well known agricultural paper of a man who kills off the birds when they become a *pest*, and I wondered when that time came. Because they eat a few cherries or strawberries shall we take their lives when we know their value? The blackbirds eat the peas, yet I have seen them follow me at the plough, picking up grubs and worms and taking them to their nests. Then, if you ask a farmer what the crows do for him, he will tell you that they pull his corn, and he does not seem to realize that they will eat grasshoppers and other insects. I have seen crows go through a hay-field, clearing it of grasshoppers at every flight, yet they are shot and poisoned and trapped as if they were robbers. Investigation shows that they follow the plough to eat the white and grey grubs that are so destructive on new land, and a request for information by the State Department at Washington resulted in information from all parts of the country as to their usefulness in eating cut worms and locusts, while in winter they feed on the field mice that destroy our trees. When some people advocate a flock of turkeys to rid us of the "hopper" they do not seem to remember that they are likely to destroy the grass, while the crows alight for their dinner without doing harm to any other crop than the animal food we are anxious to spare. The little yellow birds that build nests on low bushes feed their young on the larva of insects near at hand, while the robin, who is scolded for his passion for cherries, is equally fond of beetles and worms, and the summer morning without his sweet notes would be like a garden without flowers—devoid of charm. No one can estimate the loss it would be to the orchardist if birds were to disappear for one year and insect life to dominate. Think how the industrious Woodpecker drums on the branches of the apple trees, the rapid strokes revealing that insects are below the bark, and even to the heart of the wood it will reach and toil for food, and I defy you to count the grubs that it swallows. What a large family the Robin rears on worms. I have watched them many times flying from their special maple tree to where the ground has been freshly spaded, returning with a wriggling victim to its nest. The Snowbird deserves protection, and is of value to the farmer, for I have watched these winter beauties running over the snow, pulling weeds apart so as to reach the seeds, and by feeding on them all winter save the farmer much work in summer that he would have to do if the seeds were left to germinate. In the orchard we consider the Bluebird and Swallow the most valuable, and encourage them to make their home in the boxes I have mentioned, placed in the crotch of a tree, where they may live and raise families in safety while endeavoring to exterminate the moths and millers that destroy our fruit. We all denounce the American cuckoo, as it destroys the

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eggs of other birds and lays its own in their nests. It is the tramp among birds, too lazy to work for itself and determined to have no domestic cares, and yet in its food it devours what other birds would not touch unless famished, that is, the canker worm, on which it makes a square meal at any and all times. The Chickadees have been more plentiful in our orchard the past season than for many years, and even during winter can be seen in sunny sheltered nooks, catching spiders and numberless eggs and larva lurking in the tree bark and decayed wood; while, when chopping trees in the woods they will perch upon my hand if holding a chip infested with grubs. When the Robin takes his dessert off the cherries and there are none left for preserves I think of the grey grubs he has picked up as his first course, and when I hear my friends say "How do you keep the foliage of your roses so clear of insects?" I know that the small birds deserve a share of praise. So every law has its complications, and every time I hear a gun fired or see a bird trapped (unless it be an English sparrow) I know that it has left us to fight its share in the battle against pests that every orchardist must wage.

Many intelligent people do not know that birds differ from each other, as Scotchmen differ from Japanese, and even more do not know a bluebird from a Blue Jay or a Catbird from a Cow Bunting. They are all birds to them; and what their uses in nature are does not seem to many people worth a single thought; nor do they notice the fact that these feathered friends return to the orchard and garden each spring to the same old nests, and with the season's work begin foraging for their food.

We should be glad to acknowledge them as friends and say, "One of the best things that was done was the creation of birds."

Hon Mr. Fisher—We ought to be very grateful to Mr. Jack for bringing out some new points which a great many have overlooked. There is a great number of birds which are a great pleasure to us, and I must say that, although I have lived in the country some years and watched these birds, I do not know half as much about them as I ought. Is there any book which gives a description of birds by which ignorant people like myself can recognize them? I see birds and know their notes, but do not know their names, and when I ask other people they do not know either. I know that Mr. Jack and his family have studied these birds for years, and perhaps he might give us a hint where to get the best information.

Mr. Jack—The book I have studied is the ordinary natural history. Woods' is the one I took up. I have got a book from my brother in Boston lately treating on nothing but the common crow.

Mr. Dunlop (Secretary)—Just recently there has been issued a little work by a gentleman in Montreal, Mr. Ernest Wintle, entitled "The Birds of Montreal." It also takes in the birds of adjacent localities. Those who want to know about the local birds will find it a useful work.

Mr. Chapais—Le Moyne's book is a very nice book on the birds of the Province of Quebec, and there is a book in French by the ornithologist of Laval University, Mr. Dien.

Mr. Dunlop—There is also a work by Abbe Provencher.

Mr. Chapais—Yes; but Dien's work is the best by far. It is entitled "Les Oiseaux de la Province de Quebec."

Mr. Brodie—What birds will destroy the English sparrow? I notice some sparrow-hawks round my place, and they sometimes make a meal of a sparrow.

Mr. Jack—The common Canadian or American shrike will destroy the English sparrow. He will destroy anything he comes across.

Mr. Chapais—Everybody thinks the sparrow is a nuisance.

Prof. Craig—It makes very good pie.

Hon. Mr. Fisher—Is the Catbird a useful bird or the reverse?

Mr. Jack—I think it is a useful bird; it minds its own business pretty much. It is an insect eater. I notice it nests a great deal in the plums, and any bird that nests in the plums we had better try and keep. One of our worst enemies is the curculio, and he will likely eat that.

Mr. Dunlop—The Catbird is as fond of strawberries and cherries as the Robin.

Prof. Craig—Has Mr. Jack any practical means of preventing Robins destroying the cherries? While they like insect life, yet when the cherries are in season they like these just a little better.

Mr. Jack—You could draw a netting over the trees. I would recommend growing cherries that the Robins do not seem to care for, which are a Russian dark red.

Mr. Brodie—The best plan is to grow enough cherries both for the Robins and ourselves.

Prof. Craig—That is a very good plan; but I have found in my experience that the Robins are exceedingly careful to eat only the best. They have an inquiring turn of mind and, will sample a cherry sufficiently to destroy its salability without completely eating them. I have tried covering the trees with netting, and I think it is practicable, even if you grow cherries on a large scale, but you must indeed grow them on a large scale if you would have cherries with covering the trees. Two years ago we had nearly an acre in good bearing, and the loss from Robins and Blue Jays at that time was very considerable indeed, and it pointed to the fact that some good method would have to be devised unless everybody in the vicinity went into cherry growing.

Mr. Jack—They consider the Government farm as a Government institution and like to help themselves.

Prof. Craig—There is a bird netting manufactured in England which can be bought at a very low price and is sufficiently strong to protect the trees for three or four years. If we grow the Morello varieties, these close round-topped kinds, they can be covered very completely with a comparatively small amount of netting.

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Mr. Chapais—What is the price?

Prof. Craig—I think it could be laid down here for about four cents a yard.

Mr. Edwards—Do you not think the Woodpecker destroys the apple trees? It works to get at the borers.

Mr. Fisk—There is a species called the sap-bird.

Mr. Edwards—They nibble right around the tree as if they intended to kill it. They do not miss a quarter of an inch and they run clear round. I have heard it said that they do this to draw the worms, but it affects the tree so much it lets worms in.

Wm. Craig (Abbotsford)—We have lost a number of trees planted by the late Mr. Gibb through the work of the sap-suckers. They dig holes in the bark and the sap oozes out, which attracts insects. They seem to suck the sap and eat the insects too, although it is quite a serious thing for our ornamental trees, such as white birch and mountain ash. We have tried shooting them and using various remedies, but without much satisfaction.

Mr. Edwards—They are a small bird, black and white.

Mr. Craig (Abbotsford)—Yes; different from the ordinary woodpecker. The tree dies eventually as a result of their continuous attacks.

Mr. Dunlop—With regard to woodpeckers, as a rule they are beneficial to the orchard. There are two varieties commonly called sap-suckers, the Yellow-bellied and the Red-headed. They are fond of the mountain ash and white birch. They form a complete girdle of punctures round the trees and suck the sap. They do this to cause the sap to ooze out and attract the insects, which they eat. The Yellow-bellied and Red-headed are the two varieties only which are injurious.

Mr. R. Brodie read the following paper:

A FEW NOTES ON LAST YEAR'S APPLE CROP.

This has indeed been a year of plenty for the farming population of Canada and the United States. We farmers have been feeding the world too cheaply, and have had to pay too much for labor in proportion to the revenue we get off our farms, and especially may this be said of the apple grower this past season.

It has been a great year for the cooper, the railway and steamship companies, commission men and apple pickers, but very little was left for the apple grower. From the 1st of September to the end of the year the British market has been glutted with Canadian apples. The total receipts of apples in Great Britain for the first half of the season ending 1st of January were 2,200,000 bbls., against 279,036 bbls. for the whole crop of 1895. Liverpool alone taking over 9,000 bbls. daily from 1st September to 31st December, the largest month being October, when Liverpool received over 12,000 bbls. daily. No wonder

our apples were slaughtered with such shipments. But invariably our Canadian apples brought from 50c to 75c more per bbl. than the American apples shipped from Boston. In most of the apple catalogue sales from England one-half the shipments have been marked either slack or wet. There is something radically wrong in reports like these; either most of the fruitgrowers and packers do not understand their business or the apple receivers are mostly thieves and robbers. In my experience a shipment of choice Fameuse sent to Liverpool netted me twice as much as the same grade of apples shipped to Glasgow at the same time. The Liverpool man said it was a treat to handle such nice apples, while the Glasgow man said they were all slack and spotted. Private shipments made to Scotland at the same time arrived in good condition and gave good satisfaction. The old Fameuse has come to the front this season, and when grown to perfection it is the most profitable apple we can grow. For the British market the Fameuse need to be shipped immediately after they are packed, and shipped not later than the first week in October. After that date they get too soft, unless kept and shipped in cold storage.

The buyers from our local markets, Quebec, Three Rivers, Sorel and other country towns, would buy Fameuse before any other variety. In spite of the great glut of apples in the States, there were several car loads of Fameuse shipped there, and it is the best Christmas dessert apple they can get. Among the few winter apples we can grow in the Province of Quebec that have realized the highest price in the Liverpool market for the month of December were the Golden Russet and the Canada Red. Well colored, large apples like the Kings bring the best prices.

If shippers this past season had sent *only* their best and kept their second grade of apples at home it would have paid every one better in the long run.

I saw barrels of apples on the Montreal wharf marked "Choice Canadian Apples." One of the barrels burst open accidentally quite near me, and they proved to be poor specimens of R. Greening, and pretty badly spotted. If it could be made practicable to have the fruit inspected before shipping it would be the best thing for trade in general and all concerned. A great deal has been said at fruit growers' conventions throughout the country about the dishonest commission men in our cities. Our duty is to begin with ourselves, and be honest farmers; then we can easily find out who the honest commission men are. Living near the city, I have occasion more than most fruit growers to see what the farmer sends in and what the commission men do with the fruit. One day while in one of the large stores a lady came in with a sample of wild apple she had found in the middle of a barrel of Spys. The merchant gave the lady back 50c for her loss and docked the shipper 50c per barrel on the few barrels he had sent in, saying: "That is the only satisfaction I have. If I 'go for' him I shall lose his custom, for he ships me fine berries in the berry season." I could mention many instances similar to this, but do not wish to take up too much of your valuable time.

Our Governments have been doing good work in furthering the dairy interest throughout the country, instructing the people in the manufacture of dairy

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products until Canadian cheese has taken first rank in the English markets and our Canadian butter is coming well to the front. Our Government might go a little further in their good work, and instruct the farmer in the care of their orchards, the proper use of chemicals to destroy insects and fungi in our fruit trees, and also in packing and the best packages. No doubt the farmers in fruit sections who combine dairying and fruit growing make the most money. I believe it would be a good thing when building cold storage houses at the butter and cheese factories to add, with a little more expense, a cold storage room for apples as well. What we need to make apple exportation a success for the Province of Quebec is cold storage steamships, cheap transportation (not like our steamship companies, who raise the rates to 12 cents per barrel as soon as apples come in plentifully, and our railway companies, who put on their winter rates for freight before the close of navigation), and we need representation in the British markets to look after our interests.

Mr. R. W. Shepherd read the following paper :

LA FAMEUSE AND THE APPLE CROP OF 1896.

The apple crop of 1896 will long be remembered as that of the greatest on record throughout the apple growing regions of the North American continent.

We are not able to estimate the quantity of bushels, but that the crop was phenomenal goes without saying. The exportation to Europe was the largest ever known—725,016 barrels shipped from the port of Montreal alone. Moreover, a very large proportion of the crop was never marketed, but allowed to go to waste or was fed to live stock, so that it is impossible to form any estimate of the great apple crop of 1896, but we know it was too immense, too unwieldly and too bountiful to be handled profitably by the growers.

There is such a thing as having "too much of a good thing," but it is improbable that such a favorable condition of things or circumstances which produced this crop, will ever obtain for a very long time throughout the apple growing districts of America. But it is in a year of plenty, like the last, that we discover many things which otherwise may not come under our observation.

First. That the growers of the Province of Quebec are particularly fortunate in being situated within easy access of the great sea port of Montreal. We are more favorably situated in respect to shipping than are our brothers in Ontario, who have hitherto been the greatest shippers of apples—not excepting our friends in Nova Scotia—from the Dominion. Last season was the first on record that Quebec growers attempted, to any extent at least, to ship their apples to Britain instead of disposing of them at the commercial centres of the province, etc. I say we are particularly fortunate in being so near the shipping port. That Duchess, picked and packed, rather on the green side, were profitably disposed of in Liverpool and Glasgow—even without cold storage—is entirely owing to the fact that we are able to dispense with the long land carriage. The Quebec grower within a radius of fifty miles from Montreal was able to pack his apples and put them on the steamship the following day, and

in ten days the fruit was received by the consignee in one of the above mentioned ports. Duchess realized nett per barrel at Liverpool \$1.25 and at Glasgow \$1.30 per barrel. Wealthy realized \$1.75 per barrel at Glasgow, but not quite so much at Liverpool. These prices are nett, after paying ocean freight and all charges from the port of Montreal, and are from fifty to sixty cents per barrel more than the same fruit realized at the Montreal fruit exchange. The quality of the Fameuse was excellent last season where any attempt was made to spray the trees. Perhaps more Fameuse were exported and sold in Great Britain last season than ever before. Sold under the name of "Fameuse," too, they brought better and higher prices than the western "Snow." When Fameuse were picked and barrelled early and shipped immediately, they arrived in fair condition, and netted good prices in London during the greatest glut ever known in that market. London seems to be the best market for No. 1 Fameuse if packed with care, either in barrels or cases. Of course I prefer the case package for my special trade, as the fruit arrives on the other side in much better condition. No little credit is due our High Commissioner, Sir Donald A. Smith, for booming "La Fameuse," as he calls that fruit. Interviewed by a reporter of the London Daily Telegraph, we read:

"The High Commissioner proudly declared that Canada has the most excellent climate and can grow the best apples and wheat in the world. The finest apple in existence is the celebrated 'La Fameuse,' which is grown on the Island of Montreal, in the St. Lawrence. It is unequalled in delicacy and sweetness of bouquet, and it is beautiful as it is delightful to the taste. Unfortunately, it is a very tender fruit and will hardly bear transport to England. Recently, however, some have been sent to this country packed in separate compartments in boxes, much as eggs are packed, and those persons who have been able to obtain them are loud in their praises."

Just as the Newtown Pippin commands fancy prices even in such years of plenty as last (prices reaching 25s to 28s per barrel), for no other reason than because the Newtown Pippin is a *fashionable* apple with the *fashionable* people of London, so it is possible, if "La Fameuse" (which, in the opinion of those who know both apples well, equals, if it does not surpass, in its season the former), is put on the London market in its best condition, will command equally good prices when it becomes a "fashionable" apple. I believe there is a large trade to be worked up by exporting our Quebec Fameuse to London, and that in time, as the taste for it increases in that metropolis of the world, so will the demand and the prices increase. Never has "La Fameuse" been exported in sufficiently good condition, in large quantity, to encourage the demand for it in England; but the past season, I believe, is only the beginning of a large trade. A few years ago it was supposed that the day of the Fameuse was over; that it would not pay to continue to plant out orchards of that variety, and owners of old orchards were disposed to cut down their trees, but since the advent of the spray pump a new lease of life has been given to the old trees, and no one now need to fear to plant out new orchards.

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palates of England's Royal princes and the aristocracy are tickled and are crying out for more "La Fameuse," there is no cause for the Quebec grower to despair, but rather to be elated and pleased with the future prospects. So much am I impressed with this view of the circumstance and of our admirable situation for profitably shipping our best fruit to England advantageously that last fall I planted out one large orchard, and next spring it is my intention to plant another—mostly Fameuse and McIntosh Red, with a few winter varieties, Scott's Winter, Canada Red, etc.

One object lesson we have learned by the enormous crop of 1896 is that, of all our Quebec varieties, "La Fameuse" has obtained better prices and was more readily sold than any of our other varieties, both in our home markets and in England. It is the best known and the best appreciated of all our apples. Let us grow what the market demands. I think rather too much time has hitherto been expended in trials with foreign varieties, both Russian and American, but none of them, I feel justified in stating, can compare with Fameuse and McIntosh Red—royal fruits, which are natives of our country, and which attain their greatest perfection in the apple growing districts of the Province of Quebec.

Since California fruit has reached our markets to compete with our summer and fall apples, it does not seem necessary to set out large orchards of trees bearing apples only to compete at low prices with this foreign fruit. A few years ago our Red Astrachans, Yellow Transparent, Strawberry, Peach and Duchess apples were the most profitable apples to grow in this province; but that has all been changed since our markets have been glutted with Californian fruit. Whether we shall be able to ship these varieties in cold storage advantageously I am not prepared to say.

Let me say a word about the necessity of more careful handling of our best apples, both in picking and packing. The system practiced in some districts of the picker ascending the ladder with a bag slung across his shoulders in which to gather the apples he picks, is one *not* to be recommended. I believe the first bruise the apple receives at the time of picking, almost imperceptible at the time, is the worst, and from that moment the fruit rapidly begins to decay. There is no receptacle better adapted to gather apples in than the ordinary round peck basket, lined inside with canvas to prevent bruising. Apples of "La Fameuse" type should be handled like eggs. *It pays to do it.* Where it is practicable also, I think it better to pack the barrels or boxes in the orchard. Head up the barrels then or the next day. I have no faith in the cry that apples must be allowed to sweat. I never saw any necessity whatever for that idea. The less handling you give the fruit the better. It is a mistake to keep our delicate apples in unheaded barrels (standing on end, of course) in a barn or shed, exposed to all the variable changes of the atmosphere, sometimes for weeks before packing them in barrels ready for market. The fruit mellow and ripens much more quickly, and when we begin to pack up the fruit for market we find that the bottom half of the barrel contains many bruised specimens caused entirely by this mode of handling the fruit. The best apples should always go into new barrels. On no account should No. 1 fruit be put into old flour barrels. It is a great error and short sighted policy.

Times are changing, and the public are becoming more enlightened on every subject. The demand is for the attractive—the beautiful. For example, compare the illustrated periodicals of to-day with those of five and twenty years ago, the palatial railway trains and steamers with those of a quarter of a century ago, and we have the same idea carried out in almost every trade, viz., attractiveness. The rough and ready old system of shaking the trees, packing bad, good and best apples in second hand barrels indiscriminately will not suit the present day.

The plan I have always adopted is to make my profits *out of the best quality*, selling seconds for what they will bring, without my brand or mark on the barrels.

Careful selection always, I think, pays well for the trouble. If we Canadians wish to compete in the English market—a market open to the whole world—where goods are sold on their merits, we must be very careful to export only the very best. At present, owing to our northern climate giving the fruit a higher color, Canadian apples command better prices than American apples, but if we wish to retain that supremacy we must pay the greatest attention to handling, packing and selection of our fruit.

When I mentioned at the Kingston meeting in December that I had shipped all my Duchess to Liverpool and Glasgow and sold them there, the members of the Ontario Society were very much astonished.

They had never before heard of Duchess having been sold profitably in Liverpool and Glasgow.

Hon. Mr. Fisher—You shipped them in cases?

Mr. Shepherd—No, in barrels. The Duchess realized net in Liverpool \$1.25. They were shipped from fifty miles beyond Montreal, and were ten days arriving. That is, starting from Montreal, I realized \$1.25 after paying all expenses, commission and everything. In order to test the thing well I sent a small consignment of ten or twelve barrels of each shipment to the Montreal Fruit Exchange, and I realized 60 to 80 cents a barrel more on the other side than if sold in Montreal. The quality of Fameuse was excellent last season.

No doubt there were more apples exported from the Province of Quebec last year than ever before. I never thought of selling my Duchess as a crop on the other side at all before last year. I have exported Duchess in cases about the latter part of August two years ago. I shipped probably forty or fifty cases, which turned out pretty well, but never thought of shipping in barrels until I began to look about to see what I could do with the crop. I ordered my men to pick them before they were ripe and pack them in barrels. I shipped seventy-five or eighty barrels, and they netted in Liverpool \$1.25.

Mr. Chapais—Can you explain, Mr. Brodie, the wide difference between the prices you had at Glasgow and at Liverpool for the same fruit?

Mr. Brodie—The Liverpool boats go much quicker than the Glasgow. I could not account for the fact that the private shipments on the steamer gave

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good satisfaction while those sent on consignment did not. I shipped fifty barrels on private orders to Glasgow and all arrived in good condition and gave satisfaction, while those sent on consignment did not bring nearly as much. I blame the commission man.

Mr. Jack—What system is best in the way of branding the barrels? We found years ago that these old barrels were bought up and inferior apples put in the following year with our name on the barrels. My father has gone into the market and seen a barrel of apples branded with our name that were really rubbish.

Mr. Shepherd—The system I adopt is the stencil brand. I stencil the head of the barrel and also have the same label as I put on my apple cases. I am not labelling my apple cases now. I find that the labels do not remain on the boxes until they get over, so I stencil the name of the orchard on the box the same as I do the heads of the barrels. The system we started three years ago was to get paper the size of the barrel heads to fit just inside the barrels and print on it the full name of the apple and address, and, of course, when the package was finished quite likely the label was destroyed.

Mr. Brodie—That is very good for local markets, as the empty barrels are apt to be bought up by other dealers and sold over again. It protects you from other people using your brand.

Hon. Mr. Fisher—Some mention was made by Mr. Brodie with regard to cold storage. There has been a good deal of discussion with regard to fruit shipments. I would like to get some idea from those who have thought over the matter and perhaps tested it. Both in Ontario and Nova Scotia fruit-growers desire to try shipments in cold storage, but so far as I could gather there has been no real experience with it, and there is some difference of opinion as to the necessity or even advantage of cold storage for transshipment of our apple crops. Shippers like Mr. Brodie and Mr. Shepherd could probably give some information that would be of value.

Mr. Brodie—Unfortunately, ships coming to Montreal do not carry these chemical refrigerators. They had ice cones between decks filled up with ice. That was very suitable for butter and cheese, but there was not sufficient ice carried in these cones to take them the whole way across, and the few apples I shipped in one of the steamers arrived in worse condition than those sent by ordinary shipment. What we need in these chemical refrigerators is dry air and even temperature the whole way across. Until we have some vessels that carry chemical refrigerators I do not think we can ever make a success of the system of carrying ice.

Mr. Shepherd—Would cold storage be an advantage?

Mr. Brodie—Certainly; proper cold storage; but we have not had it so far. I sent over fifty boxes of St. Lawrence in cold storage and I sent a few to Liverpool. The St. Lawrence is not a popular apple at all on the other side. The people there like a firm, hard apple, that meets the stroke of their teeth, and

the St. Lawrence is apt to be a little soft. I only realized about 96 cents a barrel for the few St. Lawrence I sent there, while I was getting \$1.25 in Quebec.

Hon. Mr. Fisher—Was that due to defective cold storage?

Mr. Brodie—Yes; I sent apples in as nice, good condition as those sent by the steamer with the ice. The captain told me there was not sufficient ice in the cone to take them the whole way across.

Mr. Shepherd—I think cold storage might be used very advantageously for our early fruit. With reference to St. Lawrence, I believe if we were able to ship St. Lawrence in cold storage they would sell exceedingly well. The trouble is that they ripen on the voyage, and eight or ten days ripens them so that they are over-ripe when they get over. I have shipped St. Lawrence in cases for several years in a small way, filling private orders, and in almost every case, although they were picked on the green side, arrived in over ripe condition. We could not pick them when absolutely unripe, because they would have no flavor. These were private orders. I had reports from those to whom they were sent. One of them was Mr. Johnston, who resided many years in Montreal. He said they arrived comparatively in very fine condition, they were too soft, and because they had not been allowed to get ripe enough they had not the same flavor as they have over here. I believe if we could pick them just as they acquire their flavor and put them in cold storage to arrest the ripening process they would arrive in good condition. We can always find a market for St. Lawrence on this side. It is very profitable in Montreal. In September and October Montrealers want St. Lawrence. I have made a practice other years of shipping baskets of St. Lawrence to Ottawa, and people will buy the St. Lawrence when they will not buy anything else. If we are going to have Californian fruit we must look out for other markets for our early fruit. We shall have to export, and the only way they can be exported is in cold storage.

Prof. Craig—What kind of California fruit?

Mr. Shepherd—Peaches, pears and plums, which are sold so cheap that they take the place of our fruit. There is no sale now for our Duchess, Yellow Transparent and Red Astrachan.

Mr. Fisk—I would like to ask these gentlemen who have had some experience in shipping last season why they do not deem it advisable to introduce another package besides the barrel. During the past season the returns of sales on commission on the other side show that there has been a very large percentage of slacks. Can there not be an improvement made in the packing? While on its passage over the barrel gets a little slack and the fruit must be tossed from side to side, and when it arrives it is almost worthless.

Mr. Newman—I made a small shipment of Duchess, 25 boxes in all, on the Ertolia. It had cold storage on the cylinder principle, small cylinders all round and air-tight chambers (filled with ice and salt). The Ertolia had to stay at Quebec a couple of days, in a very hot sun, and when the apples reached

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London they were in bad condition and sold at about a shilling a box. The shipments sent five days sooner without cold storage did better. My opinion is that this cylinder system is not at all fitted for the shipment of fruit. As soon as the ice melts the chamber is found to reach the same temperature as other parts of the boat.

There is a great deal said about bad packing, especially by the English commission men, and I think these "slacks" and "wets" are caused very much by the temperature of the chamber. Judging from the way my fruit carried I should say the temperature of that chamber was about seventy degrees, and to take the trouble to raise good fruit and pack it and then have it exposed to a temperature of seventy degrees for twelve days is waste of time. If we had cold storage the Fameuse could be shipped at any season. If we have to ship Fameuse in October, and there is no market here, we are entirely at the mercy of the trade on the other side at that time.

Hon. Mr. Fisher.—With regard to cold storage and what Mr. Newman has just said, the cold storage we supplied this summer was specially arranged with a view to the butter trade. In the fall I was anxious that some efforts should be made to test cold storage with fruit, and I asked Mr. Brodie and one or two others to try it. These chambers used this summer were air-tight; ice was put in the cylinder and the chamber was kept below forty all through the voyage. That may not have been the case in every instance, but that was the intention. The chambers were cooled before things were put into them and the ordinary supply of ice was put in, and I think the temperature was ordinarily maintained. The butter arrived on the other side satisfactorily at a temperature of about forty. I know that the chambers were practically air-tight. I should like to know from the shippers whether it is necessary, even in cold chambers, to have ventilation. Shippers have pledged me that next year they would send me a car load of fruit every week from the Grimsby district to go forward in cold storage, commencing as soon as their fruit is in condition and lasting until the cold weather. I would like to know whether something of the same kind cannot be tried here, and thus make a practical test of the feasibility of shipping fruit from Montreal in cold storage. The arrangements on board the vessels will be as perfect as possible. There will be four or five vessels leaving Montreal every week equipped with cold storage. I would be glad if the fruit-growers would undertake that a sufficient quantity of fruit should go forward next season every week to make a fair test of the system and a fair test of the markets on the other side. A casual shipment of twenty or thirty or fifty boxes is no test. What is needed is a regular supply throughout the season of Canadian fruit. The capacity of the cold storage supply this coming season cannot possibly be sufficient to carry such a large crop as we had this year. That would be a physical impossibility unless we spent a far greater amount of money than we deem justifiable. I have been urged very strongly to have a man who thoroughly understands our Canadian productions over in England during next season to watch what is done with our product when it is sent over. I am not prepared to speak positively about it at present, but would like to have some expression of opinion from you as to what would be the value of that work and

whether it is desirable, and what kind of man would be needed. The whole thing is entirely in the clouds at present. I make no promise or assurance, but still the proposal has been made, and I want to find out all I can before coming to a conclusion.

Mr. Shepherd—Do you mean a Government man?

Hon. Mr. Fisher—Yes, a representative of the Canadian Government in England to look after Canadian shipments on the English markets. I should like to know what you think of such a proposition and the best way to carry it out.

Mr. Shepherd—We are very much indebted to the Hon. Minister of Agriculture (Hon. Mr. Fisher) for the great interest he takes in this subject. I think that the interest he shows in it will result in great benefit to this province. He has asked whether we consider that the Government should have a representative on the other side to look after Canadian products. In so far as fruit is concerned, I think it would be an excellent idea. I think the whole trouble in shipping to commission men is this, that we have no one to represent us on the other side. I know in my own experiences I have shipped splendid fruit in boxes which were sacrificed at 40 or 50 cents less than they cost. The excuse was that there was a glut in the market. If we had a representative on the other side, when there was a glut in Liverpool why could he not send a number of barrels and boxes to some inland towns to be disposed of advantageously? The trouble is these commission men do not consider us at all. We have no representative on the other side, and I think that is one of the first things we must arrange for.

Mr. Newman—My opinion is that cold storage does not need ventilation. I have tested it in Montreal in the Montreal Cold Storage Company's place, where there is no ventilation to speak of. I have kept fruit there this winter and the result was quite satisfactory.

Hon. Mr. Fisher—How does it keep when it comes out?

Mr. Newman—Quite well enough to sell within ten days or so.

Hon. Mr. Fisher—Was it ripe when it was put in?

Mr. Newman—Not to say ripe to eat. I put in six barrels of Duchess for a test on the 22nd of August this year, and at the same time I made a shipment to England. I took my Duchess out of storage on the 10th of January and found their appearance rather improved, and they sold very rapidly.

Hon. Mr. Fisher—Were they as good when you took them out of the cold storage as when they were put in?

Mr. Newman—I think their appearance was improved and they were riper.

Mr. Ness—With regard to having an agent on the other side, I heartily agree with the Honorable Minister of Agriculture in the view he took. My

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experience in that line was more in the cattle business. I notice that the cattlemen felt it to their interest to have a man at every sale who will take the cattle to another town when he finds a glut in any particular market. I think it would be well for the fruit-shippers to have some one to look after their interests on the other side.

Prof. Craig—This seems to be an occasion on which great minds think alike. Our friends in Nova Scotia have been thinking of carrying into effect something along the same lines, and have concluded that it is necessary for their interest to have an agent representing them among the commission men on the other side.

As a part of the fruit exportation scheme which I mentioned last night, they intend to have an agent on the other side all the time to see about the proper distribution of fruit throughout the United Kingdom.

There are one or two points in connection with the matter under discussion to which I would refer. Mr. Shepherd has taken strong grounds with regard to the method of packing fruit. I do not think I can altogether agree with him.

I do not think we can pack our apples in barrels *in the orchard*, head them tightly at once, and get them right off to the market and then have them arrive in the best condition. It seems to me as if it were absolutely necessary to allow for a brief period of sweating after packing the fruit. If the apple is enclosed in a comparatively tight package such as a barrel there is always a certain amount of condensation. Water being withdrawn, the apple shrinks, occupies less space, and this accounts, to my mind, for a certain percentage of what are called on the other side "slacks." I think the best system to follow is to pack our apples in barrels, then place them in the packing house, allowing them to stand for a few days. After the shrinking process has taken place you may complete the packing, head and ship, and are more likely to have them arrive in prime condition than if shipping directly from the orchard. I offer this as an opinion.

Mr. Jack's method of branding is excellent. The system in Nova Scotia is to make two grades of apples. The first grade is branded Extra No. 1, with the initials of the shipper on each end of the barrel; a round piece of heavy paper is placed with the name of the shipper in full printed on it. This meets the eye of the consumer as soon as the barrel is opened. The next grade is simply No. 1, and the other grades, if shipped, are not branded. With these the buyer takes his chances.

As to refrigeration, Mr. Fisher, soon after coming into office, asked me to try some experiments in shipping fruits in different kinds of packages with and without such refrigeration as was offered by the boats then going from Montreal. My experience has been quite in line with that given by Mr. Newman. I think we can explain our failure in shipping fruit on the ground that the refrigeration supplied was intended mainly to carry butter in good condition. Now, the butter was taken from the cold storage warehouse rooms in a frozen condition,

and thus furnished its own refrigeration to a certain extent. On the contrary, when the fruit was put in it was quite warm in most cases, so that the refrigerator plant in cooling this to the temperature of the chamber may have largely exhausted the supply of ice. The consequence was that a good deal of it arrived in a worse condition than if it were carried in the ordinary freight rooms. I think with Mr. Newman, that if we have sufficient refrigeration we do not need ventilation. But with a temperature of 40 to 50 degrees, we must have ventilation. If the temperature of the chamber is sufficiently low so that absolutely no chemical change takes place in the composition of the fruit and the process of decay and maturing is completely arrested, then we do not need ventilation.

Question—Where there is ice alone used, would you recommend ventilation?

Prof. Craig—I would. Mr. Shepherd has emphasized the fact that the best grades of Fameuse have brought us good prices this year in the British market, and I think he made an excellent point in favor of the cultivation of this variety. The name of the Province could not be associated with a more worthy fruit. But there is another point to be remembered. We can all remember that four or five years ago, many of us were shaking our heads and wondering what we would do with our large Fameuse orchards. Many of us seemed to think that we had altogether too many Fameuse, and McIntosh Red was recommended. That is an apple practically of the same class as the Fameuse and in growing it we must give it the same care in order to obtain good fruit.

We ought not to plant McIntosh Red or Fameuse without making up our minds to give both apples the very best cultivation; not only that, but to supplement the cultivation with persevering spraying.

Mr. Shepherd—That is understood.

Prof. Craig—Yes, better understood than practiced I fear. I would like to emphasize it so that no one would forget it for a single instant. It is the absolute root of success in this case. This year the apples have been very good over the Province as a whole, but we may expect that the same conditions which prevailed two or three years ago, and which were the cause of our having so many poor apples, will return from time to time periodically. We should be prepared to meet and overcome these difficulties.

Mr. Brodie—The best results that I had in shipping were when my apples were put into cold storage in the city for some days before placed on board of the steamer. The boxes were packed in large cases that had been used for carrying meats. There was enough of cold air in these boxes to keep the apples cool the whole way across.

There was one matter overlooked about the slackness of the apples. There has been such a run on barrels that they had to use up quite a good deal of green wood in making them. The wood became seasoned, the heads got a little slack and the apples go slack inside.

Mr. Shepherd—What is your opinion about sweating?

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Mr. Brodie—When an apple starts to sweat it seems to ripen. They should be kept in a temperature which would prevent their sweating. If put in barrels and kept in a cool place, they will not sweat.

Mr. Halero—I must agree with Mr. Shepherd with regard to packing apples in barrels. I have had a little experience with tender fruit such as the Fameuse. My method is to put them in the barrels from the trees and ship them as soon as possible. With regard to cold storage, I do not agree with Mr. Newman. I think we want air for the apples. If a chamber could be made so that a cool draught of air would circulate where the barrels are, it would be better than keeping them in a air-tight compartment. I think that moisture is injurious to apples shipped in cold storage. I perfectly agree with the Hon. Minister of Agriculture that an agent should be on the other side to receive the apples and see that they are properly disposed of. It would be well if there were cold storage there in the event of the market being glutted, so that the apples could be stored up until the market was more propitious.

Mr. Brodie—In the month of November there was a slight boom for one week and then the apples were rushed in and the market got to a low ebb from which it never recovered until ten days ago.

Hon. Mr. Fisher—This year's experience is not likely to occur again very quickly. We had an enormous crop and fruit sent forward without the slightest preparation for such an emergency. People seemed to think that all they had to do was to put their fruit into barrels and ship them. When we find that over three times as many apples were sent from Montreal than usual, we can understand that the strain on the transportation and Commission business in England was a little too severe, and we could not expect such a strain to occur without very considerable loss.

I think that Prof. Craig has struck the right solution of the difficulty with regard to cold storage this summer. No doubt when the chambers are kept cool by ice, this necessitates that the fruit should be cooled down to a low temperature before it is put in. If you put warm fruit into a chamber at a temperature of 36 or 40 degrees, you would hardly get the warm fruit down to that temperature until the vessel arrived at the other side, and the process of ripening and decay would in the meantime be going on. As Prof. Craig says, if you have no ventilation, you must absolutely arrest the process of ripening, which is the beginning of the process of decay going on in the fruit. That process is one in which heat and perhaps some volatile gases are given forth from the fruit. If that be the case, ventilation would be necessary, otherwise there would be condensation on the surface of the fruit of any moisture in the chamber, and that would help the process of decay. In the cold storage chamber in Montreal, the atmosphere is absolutely dry, and if warm fruit be put in there will be a current of air, although there is no ventilation.

Mr. Newman—If it has pipes?

Hon. Mr. Fisher—There is condensation on the pipes of any moisture in the air. In the other, the moisture and any gases, which may be given off by any

of the products in the chamber, are arrested by the brine pipes among which the cold air is forced before it goes into the chamber and by which it is purified, so that the conditions are very different from these in the ice chambers on the steamers. As far as sending an agent is concerned, I do not want it to be supposed that this gentlemen will be able to act as a consignee to handle your fruit. All that could be done would be to have an agent in England who would keep track on the market, who would keep the people informed of the condition of things, and would watch, as well as one man possibly could, the arrival and disposal of the shipments. You send your apples to half a dozen different markets in England, and one man cannot look after all these markets. He can only keep a general eye, go about here and there and send reports, and shippers would have to consign their shipments the same as before. I want to remove any impression that this agent would handle the fruit.

Prof. Craig—I understand that Mr. Edwards, of Covey Hill, exported fruit last year. We should like to hear his experience.

Mr. Edwards—My experience was something like that of the rest of you—rather a failure.

Mr. Shepherd—Did you allow your apples to sweat before you shipped them?

Mr. Brodie—Always in a glutted market there are plenty of sweats and slacks. When apples are scarce we never hear of them.

Mr. Edwards—I sent 177 barrels to London and they were a failure. I sent another lot to Glasgow and they did better than at Montreal. The last I sent was 100 barrels of Fameuse to a friend to be delivered in Scotland. They were Fameuse, and he was very well satisfied, and they paid me very well. Those I sent to London were sent to Jews, and I am afraid they were sharpers. I would like to ask something about the packing. Mr. Fisher speaks about a different package from the barrel. I have been thinking of trying a box that would hold a barrel full. I was thinking of laying the apples in rows on pasteboard with bran or fine sawdust between the layers instead of ordinary package.

Mr. Shepherd—Just as good.

Mr. Edwards—If there were any sweating the bran would take up the moisture, or use a fine sawdust.

Mr. Brodie—What we use mostly in the boxes is wood fibre.

Mr. Shepherd—For packing round the apples?

Mr. Brodie—Before putting down the lid. When the wood fibre presses down on the apples it keeps the apple firm.

Mr. Edwards—What about bran?

Mr. Brodie—I would not recommend bran. I wrap the apples in tissue paper. Do you think a box would be better than a barrel?

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Mr. Shepherd—Do you intend sending another consignment?

Mr. Edwards—I am going to deal with Scotchmen. I am afraid of the Jews.

Mr. Shepherd—The commission men do not want boxes. There is not enough of slack, and wets and other things in the boxes, and not so much chance for them to make any reduction. The commission men take great advantage of the shipper, and they prefer the barrel because they make more out of it.

Hon. Mr. Fisher—Do you find you make more money out of the boxes?

Mr. Shepherd—I do not now ship to commission men, but make my arrangements with special agents. I do not recommend shipping in boxes to commission men. Mr. Woolverton told me at the Kingston meeting that they did not get as good prices as they expected out of the boxes. Mr. Hart, of Montreal, shipped in 1895 some 10,000 boxes and he did not find it profitable.

Mr. John Craik, of Franklin—Mr. Fulton bought a lot of Duchess from me and put them up himself. He gave me \$1.50, and I packed them. He told me he did very well, and I judged he did because the next year he paid \$2.00, but he did not do so well on them.

Mr. Edwards—The same lot he told me he netted \$4.00 a barrel and the other lot hardly paid expenses, and he could not understand the difference.

Mr. Newman—As soon as a barrel is put on deck these men will shake it, and if it rattles it is put down slack, and if it is a little wet it is put down slightly wet.

Mr. —As regards prices varying so much, I have seen apples selling on the Montreal market at \$4.00 one day and the next day you could hardly get \$2.00, and no doubt there are the same fluctuations in the old country markets. The same experience holds good in potatoes and other things.

Prof. Craig—About that question of boxes, it seems to me that it resolves itself somewhat in this way: that we cannot get the Liverpool or London commission man to move out of the general routine way in doing business. He has been accustomed to handle apples in barrel packages and is averse to the introduction any other kind of packages. During the season I have shipped a number of small consignments to Liverpool and London; the reports I have had from both places are that the commission men do not want the box package. They did not give any particular reason, but only said that the box did not seem to be the sort of package to suit the market. I believe there is a great future for small box packages for high class fruit if we pass the commission men and sell direct to retail dealers.

Mr. Shepherd—Last year was an extraordinary year. London was glutted with fruit to such an extent that it took three or four weeks to remove the fruit off the docks to the commission houses. Some consignments of my boxes of Fameuse going to the Army and Navy stores were three weeks on the docks before the stores could get them. There the system is different from what it is

in other ports. The London Dock Company takes charge of the ship, and the owners of the ship have nothing to do with discharging the cargo. The company unload and distribute the cargo.

Mr. Newman—When in London, I tried to impress Mr. Whitely, fruit buyer of London, with the advantage of buying direct from the growers. He said that the distance and the arranging of prices was so difficult, that the system was not satisfactory. He preferred to take the advantage of the market. Of course the crops vary. The quality of the apple might not be as good one year as the other and they preferred to do the business through the commission men.

Hon. Mr. Fisher—This year there has been an agent in Montreal buying dairy products on behalf of the wholesale co-operative stores. Their headquarters are in Manchester, and they sell to the retail co-operative stores in England. This institution has had an agent in Canada this past season buying dairy products from the people here and shipping direct to the co-operative stores in England. I should think that a fruit trade might be done in the same way. These people buy everything under the sun and ship direct to these stores, which distribute to the retail co-operative stores all over the country.

Prof. Craig—I would suggest that a committee be formed to consider and report on the proposition which Hon. Mr. Fisher has so kindly brought before the Society.

The meeting then adjourned until the afternoon.

AFTERNOON SESSION.

ELECTION OF OFFICERS.

The Society met at 2 P.M.

Mr. Shepherd submitted the report of the Nominating Committee for the election of officers for the year 1897. The Committee reported as follows :

Honorary President : Sir Henri Joly de Lotbiniere, Controller of Inland Revenue.

Honorary Vice-President : The Hon. Sidney Fisher, Minister of Agriculture.

Honorary 2nd Vice-President : J. C. Chapais, St. Denis.

President : Robert Brodie, Esq., St. Henri.

Vice-President : Dr. Grignon, St. Adele.

Directors No. 1 District : Dr. Wood, St. Johns.

do. No. 2 do. J. M. Fisk, Esq., Abbotsford.

do. No. 3 do. J. H. Carter, Massawippi.

do. No. 4 do. E. A. Barnard, Quebec.

do. No. 5 do. A. Dupuis, L'Islet.

do.	No. 6	do.	William Tremblay, Chicoutimi.
do.	No. 7	do.	J. C. Chapais, St. Denis,
do.	No. 8	do.	W. F. Halero, Hudson.
do.	No. 9	do.	R. W. Shepherd, Como.

The President, Mr. Brodie, then took the Chair, which the retiring President, Mr. Chapais, vacated.

The President briefly expressed his thanks for the honor they had conferred on him and assured them that in every way possible he would endeavour to promote the interests of the Society.

AMENDMENT TO THE CONSTITUTION.

Mr. Shepherd—Before we proceed to Mr. Chapais's paper on Cherry Culture, which is the next item on the programme, I have a resolution to submit with reference to a change in the constitution.

Mr. Dunlop (the Secretary)—At the last annual meeting there was a committee appointed to study the constitution and report on certain amendments deemed advisable. They recommend that Clause 2 and 4 be altered to read as follows :

II. Its objects shall be the advancement of fruit culture, forestry and horticulture generally, by holding meetings for the discussion of all questions relating to such subjects, by collecting, arranging and disseminating useful information and by such other means as may from time to time be deemed advisable.

IV. The officers of the Association shall be composed of a President, Vice-President, Secretary-Treasurer and nine Directors, the said Directors being appointed to represent nine fruit districts into which the Province shall be divided.

The original Clause "No 2" simply confined the objects of the Society to the holding of meetings for the purpose discussing fruit matters only, and we propose to include Forestry and Horticulture generally.

Clause 4 originally read that each Director must be a resident of the district he represents. It has been found very difficult to make that apply always, and the rule has been changed with the view of making it apply as far as may be thought necessary.

Mr. Shepherd—Is it your pleasure that these amendments shall be made to your constitution ?

Motion agreed so.

Mr. J. C. Chapais read the following paper on

CHERRY CULTURE IN EASTERN QUEBEC.

I do not fear to assert that it is in Eastern Quebec, from Quebec city down the St. Lawrence River, that the best cherries of our province are found. In making that assertion, I find myself in contradiction with the opinion of M. G. Moore, who says, in the first edition of his essay on "*Fruit Culture in the Province of Quebec*," that he doubts if that culture can be undertaken here with any certitude of success. Nowhere else, neither in Ontario nor in United States, have I seen as fine cherries, nor eaten as good cherries as the fine and good French cherry (*cerise de France*) imported into our province by the first French immigrants who settled it. And, what is more, take, no matter which of the varieties of cherries in the Morellas class of Western Quebec, Ontario or United States, plant them somewhere below Quebec, and immediately you see such an amelioration in its quality and often such a great change in its appearance and flavour, that you are in doubt if truly it is the variety you thought you had planted at first. This is due especially to the climate. Cherries mature generally their fruit in the west in June, when, almost always, drought prevails. In the east cherries ripen from the beginning of July to the end of August, according to varieties, and then, even during that period of hot weather, we always have the coolness and abundant dews of our nights which help the cherry to take its full development and get all its quality.

SOIL REQUIRED FOR CHERRY CULTURE.

The typical soil for cherries is a good light sandy loam. If the soil is too sandy and very dry the tree grows well, but the fruit is small. If the soil is too clayey and damp, the tree suffers from gum (*cerasin*) and lives poorly. At all events, the ground where it is planted should be perfectly drained.

OBSERVATIONS ON PLANTING AND PRUNING.

The cherry tree, on account the severity of the climate, at times must be trained low. The branches should not start higher than three feet from the base of the trunk. The tree thus trained is protected against strong winds, and moreover, offers a great facility for the gathering of its fruit. Avoid pruning the cherry tree with the knife or the saw. Do it only when some of the branches of the tree are broken. Its pruning properly, so called, consists in shortening by a few inches, in the spring, the young shoots of the previous year. All pruning more severe than that will be the cause of an exudation of gum (*cerasin*) from every wound made. We plant cherry trees at a distance of ten or fifteen feet apart.

CULTIVATION OF THE TREE.

It is a good plan to till the soil around the young tree for a space of six feet during the three first years after planting. Later on, there is no more advantage in doing it. But care must be taken to put a good mould of manure on a space of six feet around the tree every two years.

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DISEASES OF THE CHERRY.

Gum or Cerasin.—Gum, of which I have spoken above, when coming out ought to be cut away to the green wood. An application of grafting wax on the wound is recommended, but I have found it is much better to burn the wound with a hot iron. It may also be rubbed with sorrel leaves.

Black Knot.—Besides gum, the only disease of the cherry tree in our district, is the Black Knot (*Flororightia*). It is so well known that it would be useless to describe it. I will, nevertheless, repeat here what has so often been written on the means of fighting the Black Knot. To cut it out and throw it in the fire, this last part of the operation followed strictly, is the only way to get rid of it. It has been recommended to paint it with coal oil or turpentine; but I have found that this remedy is worse than the disease, in the sense that it often kills the whole branch. I think I have read that Mr. John Craig, the skilful horticulturist of the Ottawa Central Experimental Farm, has obtained good results from the application of Bordeaux mixture against Black Knot. If a knot shows itself on the trunk of the tree, take it away with a joiner's chisel, provided you cut away to the green and soured wood. Then burn the wound with a hot iron.

CHERRY GRAFTING.

Before going further, I must say that, from the two stocks in which cherry is grafted, the Mahaleb or St. Lucie (*Cerasus Mahaleb*) the Mazzard (*Cerasus Avium*), the Mahaleb is by far the best for us. It admits of planting in a soil which would be too clayey for the Mazzard. Budding is the best method to follow. Root grafting does not succeed and cleft grafting, which consists in inserting the seed in the split stock causes often the tree to exude gum at the junction of the scion with the stock.

NOMENCLATURE AND DESCRIPTION OF THE VARIETIES.

After these few remarks on cherry culture, let us see what varieties succeed well in the Eastern part of the Province of Quebec. I would be quite ready to say that, with the French cherry (*cerise de France*), no other variety is needed. Yet, in the special point of view of the prolongation of the season of that fruit, which is rather short with the French cherry, it is better to have some other varieties. I give here a few notes as to those which I grow in my own orchard, at St. Denis of Kamouraska. They are all of the Morella class.

BESSARABIAN.—A cherry imported from the Russia, where it is said to have been introduced from Central Asia. Fruit over the average in size, born in pairs on the branch, of a dark and bright red colour, flattened on the side and top; stalk long, thin, inserted in a deep cavity. Flesh firm, deep red, and with astringency when fully ripe. Pit small and round. Ripens in the first week of August. Tree of rapid growth, a little spreading, with leaves of average, or a little over average, size, oval and coarsely serrated. Quite hardy.

FRENCH CHERRY (*cerise de France*).—A cherry imported from France by the first immigrants who have settled the Province of Quebec. Its description

corresponds closely with that given of the common cherry, called *cerise franche*, or *commune*, by Mr. Charles Baltet in his classic work: *Traité de la culture fruitière commerciale et bourgeoise*. When it is grown alongside of the cherry called early Richmond and the one called Kentish, it is impossible to find any difference between the three. It is pre-eminently the cherry of our section. I give here its description:—Fruit of medium size, often born in clusters of from three to six on the branches, round bright and deep red. Stalk long, thin, with pit clinging often to it when the fruit is pulled. Flesh very juicy, rich and acid, very sweet when fully ripe; pit rather large; ripens at the beginning of July; tree very prolific, hardy and spreading. It is a variety which you could always rely upon, of which the fruit clings to the tree till after the fifteenth of August, if you have enough patience to leave it there, and which is excellent for cooking in many various ways.

The French cherry is propagated from pit or shoots. No good results are obtained with it from grafting. On the contrary, grafted trees of that variety grow with less vigor than those on their own roots. The reason is that trees of that variety have a system of abundant, spreading rootlets which make them grow very fast, and which are not found on the Mazzard or the Mahaleb stocks. In fact, trees from pits or shoots three years old bear fruit.

LUTOVKA.—A Russian variety. Fine fruit, very large, almost globular; of a deep red colour. Clings strongly to the stalk which is long; flesh red, acid; ripens from the first to the tenth of August. Very hardy tree; a thrifty grower, having the new shoots of the year slender and dangling. The fine appearance of that fruit ought to make it one of the best for sale on the market, as is the Montmorency.

MONTMORENCY.—A cherry of French origin. Very large fruit, with hard, thin and bright red skin; of globular form, a little flattened, with a deep centre stalk an inch or one and a half inches long, inserted in a cavity; flesh white, tender, juicy, not quite enough sweet as long as it is not quite ripe; pit of medium size; ripens at the end of July; tree of vigorous growth, spreading; but with a tendency to send upright shoots. It is the finest of cherries as to the appearance for the market, and the one which sells the best.

OSTHEIM.—Comes from Russia, but is said to be of German origin. Fruit a little larger than that of the French cherry, of a deep red color, brownish black when fully ripe, of obtuse heart shape, with a hardly distinct suture; stalk of two inches or more long; flesh tender, deeply coloured, juicy, somewhat acid, of good quality; it is rather large; ripens from the 15th to 25th of July; tree prolific, round topped, rather dwarf, very hardy.

VLADIMIR.—Originally comes from Russia, where it is the most widely cultivated variety. Fruit medium to small, in clusters, from two to four cherries on the branch. Of an almost black colour when fully mature; stalk of medium length; flesh firm, acid; pit round and rather large; ripens by about the 25th of July. Tree medium in size, with leaves oval and sometimes irregularly serrated.

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CLASSIFICATION OF CHERRIES ACCORDING TO THEIR MATURITY.

With these six varieties of Morellas we get a succession of cherries during six weeks. They come in the following order:—French cherry (*cerise de France*, *Richmond or Kentish*), beginning of July. Ostheim, from the 15th to the 25th of July; Vladimir, about the 25th of July; Montmorency, end of July; Bessarabian, beginning of August; Lutovka, from the 1st to the 10th of August.

Mr. Pattison, Clarenceville—Referring to the experiments of Prof. Craig with Bordeaux mixture, I must confirm his experience. I was not able to raise cherries for some years on account of having to prune off so much of the black knot. Some four years of spraying my apple trees, I gave the cherries a dose of the same mixture, and I found year after year the advantage of doing so, that this last year I had a very good crop of cherries and the black knot disappeared to a very large extent. Of course the black knot must be cut off and burnt; but I think we are in a new direction towards the cultivation of the cherry, which is a very valuable fruit, as shown by the taste which the robins and other birds have for them. I am glad that experiments have been made in the way of spraying them by others, so that we may be able to compare results. While spraying your apple trees, you may as well spray the cherry trees, and you will save the cherry in the future. The only varieties I have are the Early Richmond, which I find the best cherry; the Gov. Wood which is a valuable cherry, and grows to perfection in the south; but it is very susceptible to the black knot.

The President (Mr. Brodie)—I am sure you are glad to hear of a cure to prevent black knot. I can corroborate what Mr. Pattison has said. It is quite easy to spray the cherry as well as the apple tree.

Prof. Craig—I am sorry I was not able to carry out completely the experiment of spraying I began three years ago to prevent black knot on cherries and plums. In our locality at Ottawa the black knot—I suppose it is because we are so near the seat of Government—like other parasitic enemies, does not flourish to any extent. There were a few trees on which we had been carefully cultivating the black knot for the purpose of seeing if we could kill it off in due time by our preventive methods; but the disease defeated our objects by disappearing so promptly when I began to spray them that I was not quite sure I had sufficient data to warrant me in saying that the result was entirely due to the spraying or some other fortuitous circumstance.

Mr. Chapais—They did not require the care of a doctor to die?

Prof. Craig—They died, whether the doctor was fully responsible or not. In our orchard, which is sprayed regularly every year with Bordeaux Mixture, I have not a dozen cases of black knot, and I know of two other orchards in that vicinity where black knot is quite injurious to the plums and cherries. The late Professor Lodeman, of New-York, a personal friend of mine, instituted some experiments in his State about the same time that I was working at Ottawa, and he wrote me sometime ago that the results of his experiments were in a line with mine. While I do not think it is an absolute preventive, yet I think,

as Mr. Pattison has pointed out, that as we must spray for other enemies we might as well give this disease the benefit of the doubt, and spray it as well. If we spray at the time we notice the knots are covered with this green velvety growth, we would certainly destroy a large number of the spores that are so effectual in spreading the disease. There is one point I forgot, and it is a point emphasized by our President, viz., the necessity of, as far as possible, getting cherries in the Province of Quebec on their own roots. In nearly all cases they do best when on their own roots. One point which makes these Russian cherries and also the French cherries of Eastern Quebec of superior value is that they come from northeast Europe, where they have been grown from seed and sprouts for many generations. In this way the hardiest and best have been perpetuated.

Mr. Fisk—Do you find that the Russian cherries are more hardy than the Early Richmond?

Prof. Craig—Some; not all, as far as the winter killing is concerned.

Mr. Shepherd—Are they as productive?

Prof. Craig—Four or five varieties have been very productive with me. The productiveness has depended in a measure on the stock upon which they are propagated. Those on Mahaleb, which is usually used in budding the cherry, have been very productive indeed. The Russians as a class have been much more productive than the Early Richmond. The buds of the latter are frequently killed if the wood itself is not injured.

Mr. Fisk—My experience has been very much the same as Mr. Craig's. I find that the Russians are hardier, but so far as flavour is concerned, I find they are more acid. They make very fine preserves and are good for canning purposes.

The President (Mr. Brodie)—The only Russian cherry I have tried that surpasses our own varieties is the Griotte D'Ostheim. We have a cherry grown only on the Island of Montreal, called the Newman Black, a cherry which was originally on the old farm of Mr. C. P. Newman's grandfather. It is the best we have, but a shy bearer.

Mr. Chapais—As I do not see any paper on plum culture on our programme, I would ask Prof. Craig to answer a few questions on behalf of Mr. Aug. Dupuis, Village des Aulnaies, Que. What are the varieties of plums which have been planted in the Government orchards at Ottawa? What has been the success of these plums?

Prof. Craig—I shall send Mr. Dupuis a copy of the annual report, as I do not think I could give him the list from memory. We have about 100 varieties in the orchard at present. In a general way the varieties which succeed best belong to the *Americana* type. Our situation is more severe than that of the Island of Montreal or L'Islet County, where the Blue plum does very well. I do not think the American varieties should be planted where they come into competition with the blue plum, because they are not equal in quality for

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canning or for dessert purposes. Still they have their sphere of usefulness, and we shall secure varieties by seedling production, of great value for the northern portions of the Province.

Mr. Shepherd—Seedling varieties from what ?

Prof. Craig—From the American plums.

Mr. Shepherd—Will you improve the American plums ?

Prof. Craig—When we look back and see the marvellous strides made in the last ten years in improving the American plums and other native fruits, I cannot doubt that equal care will give us further improvement in the next ten years. We have tried the plums that Mr. Dupuis grows, and they did not thrive with us. Our Quebec plums, while not of a vigorous habit, are doing better than any New York or West European plums. I speak of the Damson and Reine Claude de Montmorency. These Quebec varieties should be propagated by some of our nurserymen. I have tried to secure the true Reine Claude de Montmorency, for instance, and have not been able to purchase more than a few sprouts.

Mr. Newman—The black knot has killed the plums in our place.

The President (Mr. Brodie)—Was there not black knot where the trees were not cultivated ? Does not cultivation tend to prevent black knot ?

Prof. Craig—General experience shows that this is the case with all diseases, blight of pears excepted.

Mr. J. M. Fisk read the following paper :

THE SUGAR MAPLE.

(The Saccharinum Wang.)

By J. M. FISK, Abbotsford.

The selection of the Maple as emblematic of Canada was most appropriate ; and I question if there is another variety among our forest trees that combines more points of beauty and usefulness than this noble tree of our Canadian forest.

Although it is confined more particularly to the southeastern borders of the Dominion and the North Eastern States, it thrives in most parts of this province, and succeeds best on limestone land, where it is often found in great abundance, occupying the soil almost exclusive to other timber ; and it is under these conditions that man utilizes one of those gifts so often given through nature by an all-wise Creator to provide for the necessaries, and I may add in this case, one of the luxuries of a favored people ; for a feast of warm maple sugar in early spring in a "feast fit for the gods."

The Israelites were promised in Canaan a land flowing with "milk and honey." While in Canada we have a tree that flows, not "milk and honey," but a sap which yields a sweet more delicate in flavor and more useful than honey.

The farmer who possesses a good sugar orchard reaps the first harvest of the year from his maples; and this at a season when little or no other farm work is practicable; and besides laying in a family supply of pure and wholesome syrup, sugar, and vinegar, it is often a source of income to the farmer who understands his business, and avails himself of every opportunity which surrounding circumstances offer.

I do not now propose to give a treatise on the manufacture of maple products; but science has come to the aid of the farmer in this line of agriculture, as well as in many others, and if our forefathers could be invited to visit a well equipped sugary of the present day, with all the modern appliances in use, and compare them with the old methods of the tapping gauge, wooden trough, and iron kettle, they would marvel at the change.

The maple, besides being a sugar producer, is valuable for its lumber, which is used for many purposes, including the manufacture of furniture, shoe pegs, etc., while as an article of fuel it is considered one of the best, and most popular trees of the forest, and commands the highest price per cord.

As a shade tree, it is one of the most desirable to plant, especially as a roadside tree; its thick foliage of beautiful green has a very cooling and refreshing effect upon both man and beast travelling under its shade on a hot summer's day; and at the first approach of autumn frosts it becomes a "thing of beauty." Arrayed in a dress combining the most delicate and gorgeous tints, varying from green to brown, and brown to bright crimson, producing an effect which the artist strives to portray and the poet to immortalize in verse.

As the maple is our national tree, let us spare the ax, and be united in extending its cultivation, and so increase its products, and thus add to the beauties and comforts of our rural homes.

The President (Mr. Brodie)—I remember receiving a letter from a friend of mine who went out to the Ottawa region lumbering, in which he said that he had been three years up there and never saw a white woman or sugar. It is a good thing in this province we can enjoy both.

Hon. Mr. Fisher—I always feel like saying a good word for the maple trees of Canada, not only because the maple is our national emblem, but because I believe that by means of the maple groves which are retained for utilitarian purposes, we can have those patches of woodland throughout our country which are so necessary for the successful cultivation of our soil. We know that in the early settlement of the basin of the St. Lawrence, the settlers cleared off the tree from the land to such an extent as to injure the whole country. We know that in our North West one of the greatest necessities is the establishment of tree plots for shelter and to attract moisture from the atmosphere. We know that in this part of the country, where the surface is denuded of trees, we are exposed to much more rapid changes of the temperature and conditions. To retain moisture in the atmosphere, tree growth is absolutely necessary. One of the means by which our condition can be improved in this respect is by endeavouring to induce our people to keep maple groves on their farms. In the

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Eastern Townships it is well understood that a few acres of maple will give a very profitable return, perhaps not equal to the return from the cleared field, but a return which justifies the maintenance of the wood. At the same time, there are other extraneous advantages, which, without the maple tree, it would be hard to induce the people to retain. There are numberless homesteads which are unfit in the ordinary way for cultivation, being rocky, stony, rough land, and on these homesteads groves of maple would be invaluable. A great deal of land has been cleared which it would have been much better to have left in its original forest condition. For the first few years it makes good pasture lands, but after a while it becomes worthless as such, and I do not see anything to be done except to replant it in maple trees. I am satisfied that the man who does so, though he may not reap the profit himself, will be conferring a benefit on his posterity who will ever bless him for what he has done.

Mr. Halcro—With regard to the maple tree, I am greatly in favour of the maple emblem, and the tree is both an ornamental and a useful one. I think that in the locality where the trees have been all cut down it would be a very good thing if the farmers would replant the trees. They could derive quite a lot from these trees. This would not only be ornamental, but useful, both for the country and the individual farmer. The farmer could tap these trees in the spring and derive benefit from them. I think that farmers would add a great deal to the value of their land by having trees planted all along their line fences, which, of course, would not interfere with cultivating the land; besides it would be a useful tree for animals pasturing or for the general use of the farmers themselves.

Mr. Chapais—That wholesale destruction of maple trees to which Mr. Fisher has alluded was carried on on a very large scale in our district below Quebec. We have suffered from it very much, and have tried to overcome the difficulty. The Horticultural Society of L'Islet County offered, fifteen years ago, prizes to those who would re-wood the largest number of acres of land in maple, and I remember that at one exhibition one man brought a certificate showing that he had re-wooded 60 acres. I may tell you something in my own experience rather interesting in that line. I remember when I was six years old I went one spring, for the first time, to a sugar bush to eat sugar, and was very much pleased. The year following the wood of these maples was burnt in my father's stove. Then I saw wheat growing on that land. Two years ago I was invited by the owner to go and eat some sugar grown in the sugar bush on that land again. That is forty years' experience, and if that example were followed, we would soon have many sugar bushes throughout the country and plenty of maple, not only for sugar, but for firewood.

On the slopes of the mountains along the St. Lawrence down below Quebec, if we were to plant maples and prevent animals from injuring them when young, we would soon have these slopes plentifully wooded, as the maples grow very fast.

Prof. Craig—Mr. Fisk has aptly referred to the beauty and value of the maple tree as a roadside shade tree. One of the bad habits—in fact an abomination—

in connection with the planting of road and street trees, is that in selecting specimens people endeavour to get a tree as nearly full grown as possible; but as it does not do to plant the tree with the whole top on, they take the sapling from the bush where they grow very thick and tall, and lop the whole top off. This melancholy looking specimen is planted along the roadside, the top is usually decorated with a piece of colored cotton or sheeting, it may be, to keep the cut surface warm. The result of the heading in is, that a very strong growth of sprouts is induced; these spring from the extremity, and the next year the tree resembles an old fashioned birch broom. Finally these branches, growing so close together, crowd each other to death, and I know many instances of trees rotting in the heart and losing half their tops by strong winds only twenty years after they have been planted, when they should be healthy and vigorous. I draw attention to this to show that it is a very bad way to treat transplanted trees, if you wish to have them long lived and healthy.

Mr. Shepherd—Is there any one here who has had any experience in exporting maple sugar to England? Does anybody know of syrup having been exported in bottles, jars or tins?

Mr. Ness—I did do a little of that. When I was going home some years ago, I had some friends to whom I boasted of having such nice syrup in my country, and I took home six or seven jars. When I got to Glasgow the customs officer looked at them very suspiciously and had to see the whole of the contents. I got through after a good deal of persuasion, and sent the syrup by express, but at the time people were very much afraid of dynamite and my friend to whom I sent it was afraid to take it from the station. Finally he got it home, and to my surprise the people there did not seem to see very much in it. They thought their refined syrup was just as good.

Mr. Shepherd—Was it in good condition?

Mr. Ness—Yes, the best; but they did not seem to appreciate it as we do.

Mr. Wintle—In London they get it somewhere, because we never used to be able to get maple syrup, but this last season they had it at the Army and Navy Stores.

Mr. Shepherd—A month or two ago I received a letter from a firm in London, who seemed to deal pretty much in Canadian products, asking if I would not undertake to make some shipments this spring of maple syrup put up in bottles or jars. I wrote to say that I would get some information on the subject. I put this question, for the London people seem to be acquiring a taste for maple syrup, and I got an answer that it seemed to be increasing.

Hon. Mr. Fisher—Years ago, when I was in England at college, I used to get a present of maple syrup every year, but my friends would not touch it. I

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thought it very nice, and since then I have been in the habit of sending some home every spring to various friends who have acquired a taste for it, and I find the taste is growing.

Mr. Fisk—I think it is an acquired taste, just as it is necessary to get educated up to eating bananas.

Mr. Shepherd—Is it possible to get any large manufacturers in the Township to undertake to put up maple syrup in bottles?

Mr. —Mr. Westover sends quite a lot to the States.

Hon. Mr. Fisher—There is a man in my county who sends about a carload of it to British Columbia every spring.

Mr. Ness—How should we plant our trees? Prof. Craig found fault with our way of planting.

Prof. Craig—It is, of course, a good deal easier to find fault than to make a good suggestion. For the roadside, undoubtedly the two best shade trees are the elm and the maple. The best way is to secure small nursery grown trees if one can take the trouble to do so. Plant them in a nursery row and cultivate them two or three years. You might grow them in your garden and let them take the place of a row of vegetables or other garden stuff you are growing there and in this way give them cultivation. By transplanting you produce a large amount of fibrous roots, enabling you to transplant them very easily. In the meantime you can also train the tree into the shape you wish it to take. The best time for planting is the spring. I have had much better success in planting in the spring than in the autumn. Even red oaks planted in the autumn one year, some time ago, killed back to some extent.

Mr. Ness—Would you advise planting evergreens?

Prof. Craig—If you are in need of a windbreak, plant Norway Spruce or White Spruce. The Norway will give you a windbreak the quickest, but the White Spruce will give you a longer lived windbreak. It depends entirely on the object you wish to attain. I should by all means plant a long lived tree. Many of us are in such a hurry to get results that we plant poplars or willows, but I think those who have planted these trees and find them beginning to fail after fifteen or twenty years will be sorry they did not plant in the first place trees that would serve during future generations as well as their own lifetime. The poplar and willow, while they grow quickly, take just as much ground as good trees, and when they reach the period when they ought to be right trees they begin to fail. But the elm, maple and oak are trees for generations to come, and valuable for timber as well as shade and ornament.

Mr. Ness—My experience of shade trees is that trees planted in the open field, especially elms, make large hollows in the ground.

Prof. Craig—You mean about the base of the tree there is a depression? It is usually the opposite. The tree usually raises the earth up as the roots increase in size.

Mr. Craik—Pine trees have that effect, but those large willow trees have the opposite effect. I have seen quite a cavity made by them. I have planted pine trees which I grew out of the bush that measure now five and a half feet in circumference.

Prof. Craig—I can understand the willow raising the earth at a distance from the trunk, because the roots are very wide-spreading, and frequently have a greater diameter ten feet from the base than at the base. They increase in the number of fibres and laterals at the extremities so as to materially raise the ground at some distance from the tree, but I can hardly understand the same thing occurring in the case of the elm. There is one thing we lose sight of, and that is that the first action of tree growth is to raise the soil by the multiplication of small fibres. As the roots grow, they lose a small number of root fibres, and these go back to humus and take up less bulk in the form of humus and soil than did the fibrous roots, but I do not see how the general level of the soil would be lower than it was when the tree was planted.

ORCHARD COVER CROPS.

Prof. Craig—I wish to draw your attention again to a subject about which Mr. Shutt spoke to you last night and was also briefly referred to by myself. I emphasized the necessity in the Province of Quebec of growing orchard cover crops. I shall now tell you particularly why I think orchard cover crops in the Province of Quebec should be provided every year. What I mean by such a crop is simply this: I believe that when orchards come into bearing they should have clean cultivated ground and should have it all to themselves. That is to say, the orchard trees are sufficient crop upon that soil, and no other crop should occupy the ground during the growing season of the trees; but if you have clean cultivated soil, there is danger in this climate of the tree suffering from root killing in such severe winters as that of last year and again this season. We usually have our protecting blanket of snow covering the ground, which prevents the frost entering to any great depth. Neither last year nor this have we had that covering of snow, and the result was, and will again, no doubt, be a considerable loss of fruit trees from root killing. The proper orchard cover crop serves two purposes. It gives to us that valuable plant food called nitrogen and it prevents the frost penetrating the ground to such a great depth and with the same severity as in the case of a bare soil. Mr. Shutt told you of the properties of that valuable family of plants to which the beans and clover belong, collectively known as "legumes." He showed you how they were able to take from the atmosphere, nitrogen by means of minute workers in the little nodules of the roots and by this means distribute it throughout the tissues of the plants. Therefore, when we grow these plants on the soil and turn them under we return to

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the soil a considerable amount of valuable plant food. With the view of finding out which of the clovers is best suited for our purpose in the climate of Ottawa—and that will serve as a guide to a great many portions of Quebec—I made some experiments last year, the result of which I will give you briefly. These experiments were brought to a conclusion by having the plants from a given area analyzed in the Chemical Laboratory by Mr. Shutt. This information will be placed in your annual report in connection with the remarks made by Mr. Shutt. To come back to our method of cultivating the soil: We plough somewhat deeply in the spring, turning a shallow furrow as we approach the trees. The succeeding cultivation should be shallower and shallower as we approach the period at which the tree ripens its leaves and matures its wood. The shallower the cultivation the more likely are we to conserve a large amount of moisture in the soil, and as water is the means by which the plant food of the soil is carried up and distributed through the tree to the leaves, it is absolutely essential to active growth. Then immediately on the close of cultivation, which with us is about the 15th of July, the cover crop should be sown.

What the meaning of a Cover Crop is—In brief, it means sowing such a crop in the orchard after cultivation ceases in summer as will protect the roots of the trees by preventing at once alternated freezing and thawing and deep freezing of the ground; that will add something—the more the better—to the fertility of the soil when turned under; that will improve its tilth or mechanical condition, and, lastly, that will occupy the ground to the exclusion of such plants as may wander out of place—weeds. When soils, especially those of a clayey nature, are constantly cultivated without being subjected to the ameliorating influences induced by producing some kind of vegetation, not only do they become mechanically unfitted for the production of healthy and vigorous plant growth, but the plant food may take on forms not readily assimilable by plants. In northern sections, perhaps the strongest reason that can be urged in favour of the practise is the protective influences cover crops exert against the often severe root injury wrought by sharp frost to trees growing upon bare soil.

Cover Crop tried—In 1895 a number of plants were tried with a view of ascertaining some facts regarding the advantages of each in this climate for the purposes outlined above. Half an acre each of the following fodder plants were sown on Aug. 15th, with a seeding of rye, at the rate of one and a quarter bushels per acre.

No. 1. Crimson Clover.....	20 lbs. per acre.
No. 2. Mammoth Clover.....	12 "
No. 3. Alsike Clover.....	12 "
No. 4. Alfalfa.....	15 "
No. 5. Common Red Clover.....	12 "
No. 6. White Clover and Orchard Grass....	"
No. 7. Alsike Clover and Orchard Grass....	"
No. 8. Crimson Clover and Orchard Grass ..	"
No. 9. Peas.....	2 bushels per acre.

The following notes show the condition of these late in the autumn of the same year and early in the following spring :—

Plant.	CONDITION.		Remarks.
	Fall, 1895.	Spring, 1896.	
Crimson Clover..	2-4 inches high, smothered by rye; light covering by the time of the first frost.	Entirely killed out; no plants to be seen May 12th.	Smothered by rye.
Mammoth Red Clover	2-3 inches high, weakly; ground fairly covered by rye.	Light cover; best where unprotected by rye.	Fairly good cover.
Alsike Clover....	2 inches; very light covering; poor catch.	Wintered well; fair cover where alone.	Fairly even growth; light cover.
Alfalfa.....	5-8 inches; good catch, showing well through rye; tops killed by first "black" frost.	Wintered well on low ground; killed out on knolls.	Good growth where not crowded by rye.
Common Red Clover	Very weak; nearly crowded out by rye.	Badly killed; very light cover; patchy.	Much too weak to be effective.
White Clover and Orchard Grass.	No improvement over last.	Killed out.	Too weak.
Alsike Clover and Orchard Grass.	Better than last; cover light, but fairly even.	Light crop on low ground.	Too weak.
Crimson Clover and Orchard Grass	Crimson clover weak; orchard grass makes a good showing.	No clover; orchard grass makes some show.	Too weak.
Field Peas.....	Nearly crowded out by rye	Only rye left.	Smothered.

Summing up the conclusions, it would appear that (1) rye sown as a nurse plant at the rate of one and a quarter bushels per acre proves too thick and too strong a grower for most of the clover and prevented their full development; at the same time it furnishes a certain amount of protection. (2) The seeding down took place about one month too late to secure the best results in this locality. (3) The best cover obtained was given by (a) Alfalfa, (b) Mammoth Red Clover, (c) Alsike Clover and Orchard Grass.

Cover Crops tried, 1896—Upon the same piece of orchard soil as that used in 1895 one acre each of the following cover crops were sown on July 13th, 1896. These were seeded alone, lightly harrowed and well rolled :—

Crimson Clover.....	20 lbs. per acre.
Mammoth Clover	15 "
Alfalfa Clover.....	15 "
Common Red	12 "
Soja Beans.....	60 "
Cow Peas.....	2 bushels per acre.

Notes—Crimson Clover—Appeared in 5 days, even, fairly strong. Aug. 12th, 3 inches high, covering ground fairly well; strongest in partial shade. Oct. 14th, strongest plants 15 to 18 inches. On the lighter and poorer parts of the orchard the plants are rather weak.

Mammoth Clover—Appeared rather sparsely in 6 days. Aug. 12th, growth moderate, weeds principally "purslane" (*Portulaca oleracea*), taking possession. Oct. 14th, strong, even growth, throughout; average, 12 inches high, giving a close heavy covering.

Alfalfa—Came up in 5 days, remarkably even and strong catch. Aug. 12th, 8 to 10 inches high, completely covering the ground. Oct. 14th, knee high, very uniform. Growth strong, even on light sand.

Common Red—Appeared unevenly in 6 or 7 days. Aug. 12th, 2 to 3 inches high; ground partially covered. Oct. 14th, 6 to 10 inches high; rather thin here and there. Not heavy enough.

Soja Beans—Appeared promptly and evenly in 5 days. Aug. 12th, plants 8 to 12 inches high, vigorous. Oct. 14th, quite black and leafless; killed by first frost; ground practically unprotected at this date.

Cow Peas—Germinated evenly in 5 or 6 days. About right as to quantity; making strong growth. Aug. 12th, plants 10 to 12 inches high, nearly shading ground. Oct. 14th, exactly the same condition as Soja Beans.

There is little to be said in favour of *soja beans* or *cow peas* as cover crops for northern localities. They grow rapidly, produce a considerable amount of foliage and vine, but are cut down by the first light frosts. Apart from their office as collectors of nitrogen, they do not seem to furnish as much surface protection as buckwheat or rye, and certainly not as much as field peas.

Alfalfa Clover—Is a plant of slender, upright growth and does not branch much the first year if uncut. It does not, therefore, furnish as much leafy covering to the surface of the soil as is afforded by the same number of plants of Mammoth Clover, which stool out better and are naturally more spreading in habit of growth than the upright Alfalfa Clover. This plant does very well on sandy soils, and seems able to penetrate the hardest subsoils and maintain itself where Crimson Clover would starve.

Crimson Clover—Will, I fear, in this locality serve only one of the ends for which it is sown, viz., that of keeping down weeds and adding to the fertility of the soil, without protecting it very much during the winter. It is possible that selected strains of northern bred seed may be produced that will give plants capable of withstanding the severity of our northern winters. A desirable field for patient and painstaking work presents itself in this connection. On light and poor sandy soils this variety makes a very weak growth.

Common Red—This possesses no advantage over the Mammoth Red, and is a weaker grower.

Mammoth—I am of the opinion that this will prove the most satisfactory cover crop for all the northern apple and pear growing sections. It germinates promptly, (good seed) soon takes, and holds possession of the ground to the exclusion of weeds; is fairly deep rooted; covers the ground with a good mat in the autumn, and begins to grow at a moderately low temperature in the spring. A block of six acres of this clover sown July 10th, in one of the apple orchards had produced an ideal protective covering when covered by snow this autumn. (See Mr. Shutt's address for a discussion of the fertilizing value of the clover mentioned above).

Mr. Fisk—Is the Mammoth what was sold by seedsmen under the name of Russian?

Prof. Craig—I do not think I can say whether it is or not.

Mr. Fisk—Vermont is usually considered to be a common clover. The Rawden is of a heavier growth.

Prof. Craig—In England I believe it is known under the name of Cowgrass and Peavine Clover, but the Mammoth Red is, I think, the best name, and it is always better to adopt a uniform common name so that we will know what we are buying.

Mr. Fisk—How often would you recommend the cultivation of the orchard with a crop of that kind?

Prof. Craig—As soon as the ground is in a workable condition in spring, and I would follow that with a shallower cultivation at least once in ten days. Sometimes it is convenient to use a single horse cultivator near the rows, but a disc or cut away harrow finishes close up to the trees.

Mr. Craik—Until when?

Prof. Craig—Until 15th of July. It is necessary to sow as early as that in order to get a good strong growth in the autumn. I have sown as late as the 15th of August, but the growth was not sufficiently strong. There is one weak point in connection with this practice. Occasionally we have a dry season, and sowing a crop on the ground will take up the soil moisture and the trees may possibly suffer.

Hon. Mr. Fisher—When you cut it in October do you then plough it under?

Prof. Craig—It is not cut in the autumn. I leave it lie on the ground and plough it under the following spring. If you do not plough it under in spring, the next best plan would be to cut it when it reached flowering time and leave it lie on the ground as a mulch.

Mr. Newman—Would it furnish nitrogen to the soil without being ploughed under?

Prof. Craig—Yes, the root part would probably be more or less immediately available, and the whole crop, just as soon as it became sufficiently decomposed rendered soluble by the moisture of the soil.

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The President (Mr. Brodie)—Would you recommend ashes to supply the potash and clover to furnish the nitrogen?

Prof. Craig—Wood ashes would have about five per cent. of potash; in addition to potash they would furnish about two per cent. phosphoric.

Mr. Ness—Prof. Shutt mentioned the value of wood ashes. Would decomposed wood, such as swamp wood, give the same result?

Prof. Craig—Ashes are a concentrated form of wood, containing the mineral matter which it takes out of the soil; in the other case you would have the other carbonaceous and nitrogenous matter combined with it. In the case of soft wood, the amount of potash would be smaller than in the case of hard wood.

Mr. Ness—What guide is there to the use of barn yard manure?

Prof. Craig—If I had a sandy soil, I should feel free to use a considerable quantity of wood ashes. If, on the other hand, my soil was good heavy loam with an admixture of clay, I do not think I would need it. You would have to be guided by the character of the soil and the growth of the trees. If you see the trees are making a stunted growth, and the foliage is yellowish, that indicates that they need something more in the way of nitrogenous manure. If making green growth and plenty of wood, it is well to apply some form of potash which will tend to harden the wood.

Mr. Edwards—Are forest leaves a good mulch for an orchard?

Prof. Craig—There is some danger of their harbouring mice, and you would have to hold them down to keep them from blowing away. They would supply a certain amount of potash. They supply more nitrogen than they do potash. A tree uses proportionately more nitrogen in the manufacture of the leaves and wood than in the manufacture of the fruit.

Mr. Shepherd—Does Alfalfa grow very high?

Prof. Craig—About two feet high the first season. We were talking last night about it being impossible to grow clover on light, sandy soil. That is the complaint generally, but Alfalfa will take hold of a very poor class of soil. On one part of the orchard area a hill had been partly removed, and while some of the surface soil was put back, yet the soil was a very light one. Here the Alfalfa took hold notwithstanding, and while it did not make a vigorous growth, yet did well, considering the soil.

Mr. Ness—In using wood ashes, how much should be used per acre?

Prof. Craig—It would depend on the age of the orchard. Supposing the soil was in fair condition I would use forty to fifty bushels of hard wood ashes.

Hon. Mr. Fisher—Do you think you can get a catch at that time every year?

Prof. Craig—In the case of clovers everything depends on the catch. We had moist weather about the time of sowing, and they all took hold and grew very rapidly. It will not grow as vigorously on clay soil as on sandy loam.

Hon. Mr. Fisher—Is it more easy to get a catch of clover than of Alfalfa?

Prof. Craig—Yes, usually; but the Alfalfa germinated strongly with us.

Mr. Cunningham—Do you recommend washing the trunks of trees?

Prof. Craig—Yes; that is a very excellent plan indeed. It entails some work, but prevents borers to a large extent. A simple wash is made by dissolving in water all the water will take up of sal-soda. For instance, take two gallons of water, put in as much soda as the water will dissolve, thicken that with soft soap to the consistency of paint and apply it to the trunks with a white-wash brush. If you carefully wash right to the ground you will prevent the beetle depositing her eggs. The general result is the production of a smooth bark and a healthy, vigorous growth.

Mr. Cunningham—Do you ever apply coal ashes?

Prof. Craig—They would have a very small amount of potash in them.

Mr. Cunningham—mean the lye.

Prof. Craig—That is a very good thing to wash the trunks of trees with also.

Hon. Mr. Fisher—Do you believe that whitewashing the trees is good?

Prof. Craig—I think it is. It undoubtedly has a beneficial effect in this way, that the white will reflect the light from the trunks instead of absorbing the sun's rays, and in this way prevents sun scald. It certainly does not injure. And while I do not think it will kill the insects it will to a considerable extent act as a preventive.

Hon. Mr. Fisher—What time of the year should the trees be washed with sal-soda?

Prof. Craig—To do it thoroughly, one should wash them twice. The apple borers are laid with us between the 15th of May and the middle of June, and we usually make a rule to wash on the 15th May and the 15th June. It costs us one-third of a cent to make two applications every year.

Dr. Grignon—Then you recommend a bushel of ashes for each tree?

Prof. Craig—If it is well spread over the ground. A bushel should not be put immediately around the base of the tree, as that would probably kill or injure the young roots. I often see a lot of manure piled up against the trunk of a tree. This is a mistake. As the tree grows the feeding roots reach out further and further. We can count on the roots being out on either side as far as the branches spread.

Dr. Grignon—Should we put ashes often, or is once every three years sufficient?

The President (Mr. Brodie)—Yes.

Dr. Grignon—I have taken an old orchard. It was suffering, the apples were small, the land had not been cultivated, and I brought it back completely with ashes. That was eight years ago. I understand now that I was too long a time without using it. I also put at the foot of the trees rotten wood rubbish. I found it useful in preserving the freshness of the young trees. Do you advise the whitening of the trunks with lime?

Prof. Craig—In a general way it has a beneficial effect, but at the same time if you wash them thoroughly with the wash I have mentioned it will not be necessary to whitewash. Whitewash has no injurious effect either on the leaves or young bark. In order to prevent pear blight and apple blight I have tried whitewash very thoroughly. I keep a tree thoroughly covered by pumping on the whitewash every day for two or three weeks and there is no injurious effect whatever to the foliage. It did not do any good either, because as soon as it washed off the blight took hold again.

Mr. Cunningham—Is there such a thing as the bark getting bound on the tree?

Prof. Craig—Sometimes in the case of stock grafting one part of the trunk will grow quicker than the other. The sap passes up and is unable to return below the union and the growth takes place above, which the lower bark tightens in. The sap ducts are closed, and the bark, instead of remaining soft, becomes abnormally hard. In that case I have had beneficial results from splitting it with a knife.

Mr. Shepherd—On the shady side of the tree?

Prof. Craig—On all sides. For instance, when you graft a plum on a cherry, or vice versa, very often the top will outgrow the stock. I have seen a cherry top four times as big as you would expect it to be judging from the size of the stock below.

Mr. Gilbert Wintle, of Como, read the following paper:

BEES AND BEE-KEEPING.

As a preface to my remarks this evening, I wish to explain that what follows is not addressed to practical bee-keepers. Rather I address those who do not keep bees, but who may none the less be interested to hear an account of their habits and of the wonderful social economy of a bee community, and also to learn how the modern bee-keeper, by skilful manipulation, is able to control and direct their labors with very successful commercial results. If I should be so fortunate as to interest any one sufficiently to make him decide to put what he hears into practice by starting a few stocks of bees himself, so much the better. But that aside, it seems to me that of all audiences the one that should be most

ready to listen to all that concerns the ways and doings of bees should be an audience of fruit-growers, since, as every botanist knows, it is the bees that, by mixing the pollen, fertilize the blossoms, with the result that fruit is formed, and if the bees do not visit the blossoms then a barren crop is the result.

In considering the hive bee, which is the only kind I shall refer to to-night, the fact that has to be grasped first of all is that the solitary bee is nothing except when considered as a member of the hive, or bee community. A worker bee in summer time only lives six weeks, and never sees the result of her labors; but the community lives on and profits by them. What I propose to do is to follow a bee community through one complete life-cycle, that is to say, from the time when it issues forth as a swarm from the parent hive until, having safely passed the winter, it is ready next year to send out swarms itself. Most of us have seen bees swarming, we know how they come boiling out of the hive, flying round and round, and making that peculiar excited buzzing that is well known to the bee-keeper as the swarming note, until the effect is that of a dark cloud of eddying and (apparently) furious insects. In old bee books you will see the swarm spoken of as being led by the queen; but I will digress here to state that more accurate observation has since shown that this is a mistake. The queen comes tumbling out among the rest just like any other bee. Gradually this cloud of insects moves as a whole in the direction of some convenient tree or bush, generally quite close to the hive, say twenty yards from it. And now the cloud seems to get gradually thinner, and a careful inspection will show that a small cluster of bees is forming on one of the branches. This cluster gradually increases in size, until it has absorbed nearly all the bees in the air, by which time it resembles, if I may be allowed a very homely simile, nothing so much as a great black jelly-bag. At this point, presumably, the bee-keeper has come up and hived the swarm, and we have seen no more of it; but in this case we will imagine that no bee-keeper comes to interfere, and so we shall see what the bees will do when left to nature.

People are apt to have such curiously variant ideas about the number of bees in a swarm, or in a hive, that, in order that we may be on sure ground before going on, I may say here that the cluster which we have just seen formed consists, in the case of an average swarm, of about twenty thousand bees, and that probably about three times that number have stayed behind to carry on work in the parent hive. Twenty thousand does certainly seem a great many; but if any one who has seen a swarm, will remember how the air through quite a large space was literally black with bees, and will then reflect how small an insect a bee is, I think that he will cease to wonder at the figure. Though most of the swarm are in the cluster, a few are away scouting, that is to say, they are looking for a suitable place for a home. Occasionally a few of these scouts come in and join the cluster, having apparently been unsuccessful and given it up. At last, however, all in a body, as if they were indulging in a miniature swarm on their own account, the successful scouts return, the cluster melts away, and, with the scouts leading, the whole swarm makes a final move to its new home. Nine times out of ten this will be some hollow tree. The first thing that the bees do after taking possession of their new quarters is to see that the queen is safe. The queen is the only perfect female in the whole community;

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that is to say, she is the only bee that can lay eggs and reproduce the species, so if anything has happened to her the whole swarming has been a failure, and the bees must go ignominiously back to the parent hive. As soon as they have found her the worker bees set about their first serious task, the building of comb. It is the more important that no time should be lost in setting to work, since the queen lays her eggs in the cells of the comb, so till this is ready she must remain idle.

Before the bees left the parent hive each worker, like a prudent adventurer, filled her honey sac (which constitutes a considerable part of a bee's anatomy) with honey, on the principle, I suppose, that as she had helped gather it she might take it away, so the new community is ready to start comb building with honey taken from the parent hive. The comb, you may say, is not made of honey, but of wax. Exactly; but the wax is made of honey, that is to say, the bee eats the honey and then secretes the wax by a gland. The process is as follows: The bees suspend themselves in long festoons from the roof, and when every worker is in place perfect stillness is kept, the temperature rises, and gradually on the under side of each bee appear little globules of liquid wax, which soon harden and become little flakes or scales of dry wax. Then one of the bees near the top takes a scale of wax from her body, chews it to make it plastic, and attaches it to the top of the hive. Another follows, and soon, bee by bee, each one adding a little here, or thinning off there, the comb begins to assume definite shape. It is not necessary for the bees all to hang together like this to produce wax, but the stillness and high temperature favor its secretion, and in an empty hive, when a comb is wanted at once, this is how they always proceed.

And now the hive settles down to ordinary routine. The queen lays eggs; and so many does she lay, and so great is the strain on her system, that a dozen worker bees have to attend her and keep feeding her. Other workers are posted as sentinels at the entrance, and any marauding bee or wasp is stopped, and perhaps stung by them if he tries to enter. Other workers, their number varying according to the temperature, do duty as what are called fanners, and with their wings keep up a constant circulation of air through the whole hive, and so thoroughly do they do their duty that on a hot day a lighted match held in front of the hive entrance is almost blown out. A much larger proportion of worker bees are engaged in making the home tight and weatherproof. These little masons, or rather plasterers, get from the trees a kind of gummy substance called propolis, with which they proceed to fill up every crack or cranny that might let in the rain. Sometimes they mix this propolis with wax. But the main body of the worker bees are neither queen attendants, nor sentries, nor fanners, nor plasterers, but foragers. All through the day they are going and coming, sallying forth, brisk and slim, and returning, flying slowly, with distended honey sac, and perhaps legs packed with pollen as well, to deposit their plunder in the comb and then set out for more. The expression "legs packed with pollen" requires explanation. The hind pair of legs of the bees are provided with hairs, which, in conjunction with the bee's thigh, make a kind of basket, and when she visits a flower, after she has filled her honey sac with

nectar, if there is any pollen she packs it into these. The bees eat pollen as well as honey, but not very largely. Its main use in the hive is for making into a paste with honey, which is fed to the grubs. On the fourth day these same young grubs will be hatched out, and from now on there will be yet another duty for the worker bees to perform, that of nurses. Just at first the nurse bees feed the grubs with a sort of pap which they secrete. One might almost call it milk if it did not seem absurd to speak of bee milk. But the grubs are not allowed much of this, and soon have to be content with the above mentioned paste of pollen and honey. The gland which produces the pap tends to atrophy, and dry up when the bee is about three weeks old, so this nursing duty falls to the share of the younger workers. When the grub is full grown they seal her up in her cell with a little cap of wax, stiffened with propolis, until just three weeks from the time the queen laid the egg she cuts her way out, no longer a grub, but a perfect bee. Now that the younger generation has appeared to reinforce the remnant of the original twenty thousand all should go well. More combs will be built, breeding will go on faster, and large stores of honey will be laid by for the winter. So far I have only mentioned the queen bee and workers; but the community contains a third kind called drones. These latter are the males, but they do no work, and as soon as the honey flow shows signs of slackening the workers drive them from the hive. As the honey flow lessens still more, fewer bees go out as foragers, and more work as plasterers; in fact, in the quite late autumn they are practically all gathering propolis and painting it over the inside of their home, and this goes on till winter begins, when they cease to go outside the hive, and all form one big cluster for warmth amongst the combs.

There is not much to say about the winter period. The bees are not exactly dormant, for every now and then they have to leave the cluster for food, and it is during these short journeys that they are in greatest danger of freezing to death. When spring comes work begins again, especially for the queen, who must lay her hardest, since the workers who have gone through the winter will not last long and need to be replaced. In fact, to such an extent is breeding carried on, that soon the hive is too full. Then nature decrees that the queen and a quarter or so of the bees should feel the swarming fever, and some fine day they go off to start a new community in some new home. And the hive, the community we have been following, left without a queen, will it die out? No; for the bees will find themselves a new queen, and this is how they do it: They choose some cell in which the queen who has just deserted them, or is just going to desert them, has laid a worker egg, and without injuring the egg they enlarge this cell to about three times its original size. When the little grub hatches out, the nurse bees, instead of feeding it for a day or so on their pap secretion and then on a paste of honey and pollen, as they do an ordinary grub, feed it altogether on the secretion. What with the stimulative powers of this mysterious food and the extra room for development given by the enlarged cell, the bee which finally emerges is a perfect queen. Next year this new queen will go with a swarm, and the bees will have to raise another, that the community may live on; and so on each year. Thus you see that though the bees have only one queen, yet, so long as there is an unhatched egg, or even a very young

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grub in the hive, they can always re-queen themselves if they lose her. We have now traced, albeit only in the crudest outline, the life cycle of a bee community under natural conditions, that is to say, under bee management. Now we will look at the matter from the bee-keeper's point of view, beginning with a glance at the history of bee-keeping.

In prehistoric times, when all men were hunters, they probably obtained honey by bee hunting; if they did not think of it themselves the bears were there to show them the way. But when men began to settle down, to till the ground and to cultivate crops and fruit, they must surely have hit on some simpler method of getting their honey than the clumsy one of hunting for bee trees in the forest. I say must have, because in those days there was no sugar, and honey, which we now look on as a luxury, was the only sweetener, and therefore almost a necessity. At any rate, the records at Thebes show that the ancient Egyptian was a bee-keeper, and one who went into the business on a pretty extensive scale. He used to load up great flat-bottomed boats with hives of bees and float them down the Nile, timing to reach each point a little after the annual overflow of the river had subsided, when the whole valley would be bursting into blossom. I may add that the same sort of floating apiary is used on the Nile to this day, and is also used, though less extensively, on the Danube. Some years ago the same thing was tried on the Mississippi, but was not a success; but of course the conditions of the Nile and its valley are unique. Bees were kept by the Greeks and by the Romans, and it is interesting to know that Mount Hymettus, which was celebrated for its honey in the days of Homer, is equally celebrated for it to-day. Beyond the fact that it was pretty commonly practiced, I don't think that very much is known about Greek or Roman bee-keeping. The Latin poet Virgil certainly writes about bees; but he writes about them in their wild state; besides which his statements are—well, poetical. That is to say, they do more honor to his imagination than to his accuracy. In India we get on surer ground. Bees have been kept in nearly every part of India since remote ages, and very generally the same system prevails. This consists in having for a hive a long shallow box. Sometimes an earthenware cylinder is used, like a drainpipe with the ends closed. The swarm is introduced through a door at the back, which is then shut, the bees having to use a small hole in front. When the bees build their combs they will begin near this entrance hole, that is to say, in front, and from then on the queen will keep more or less to this front part of the hive for egg laying purposes. The pollen, too, since it is wanted for the grubs, is also stored in the front part, while the whole of the back part of the hive is used by the bees for storing pure honey. When the bee-keeper wants to gather his harvest he opens the door at the back and blows in smoke. This frightens the bees into the front of the hive, while their master cuts out the combs of honey at the back. Then he shuts up the hive again, and the bees, whose breeding arrangements, it will be observed, have not been disturbed at all, set to work with redoubled energy to gather more stores, which in due time the bee-keeper will take as he did the first.

And now, from bee-keeping in India let us turn to bee-keeping as it was practiced in Europe, or for the matter of that, in Canada too, at the beginning of the present century. The bee-keeper (it almost makes one blush to think

about it) used to get a swarm of bees and put them in a straw hive, and leave them to their own devices! In the autumn, having previously decided what bees he meant to "take," as he called it, he proceeded to do so by the simple expedient of sulphuring them to death. For his trouble he generally got some fifty pounds or so of dark-looking, sulphur-smelling honey, mixed up with eggs, pollen, dead bees and dead grubs, and, if he were very lucky, perhaps a couple of combs of white virgin honey, fit to put on the table. The first advance on this system of bee keeping, for in no sense of the word can it be called *bee-culture*, was to put the swarm into a very small hive, and then, when it was judged that the bees had filled it, to give extra space by adding two more hives, communicating with it, one on each side, and sometimes a third on top as well. The queen generally confined her egg laying to the centre hive, so that when the bee-keeper took away the extra hives, or honey-boxes, as they were called, in autumn, he found them full of pure white honey; he also saved his bees to work for him another year. This, of course, was a great stride in the right direction; but, for all that, it was little more than had been done in India for centuries. This is how we should be keeping our bees to-day except for one man, Mr. Langstroth, who, in 1852, invented the moveable frame hive, the main feature of which has never been improved upon, and which, it is not too much to say, has revolutionized bee-keeping throughout two continents. Like all great inventions, it is quite simple—when you know. It is now always used in conjunction with what is called comb foundation, another epoch-making invention, and perhaps the two are best described together. The hive is a wooden box, in which are hung wooden frames, made to be just a little smaller than the inside of the hive. The ends of the upper bar of each frame project a little and rest on ledges made for them near the top of the hive inside; the frame then hangs perpendicularly by its own weight. Fastened in each frame is a sheet of wax, which has been stamped with the pattern of the honey-comb; this latter is the foundation. The bees have thus no bother with wax making. All they have to do is to work this sheet of wax into a perfect comb, and all the honey which would have gone to make wax is saved to the bee-keeper. When honey is coming in quickly another box of frames and sheets is placed on the first, sometimes a third over that. When the bee-keeper takes his harvest he simply lifts the frames, each of which, of course, contains a complete comb full of honey, and puts them into a machine called an extractor. The honey is thrown out by centrifugal force, and the combs are ready to go back to the bees to be refilled. This, of course, applies to liquid honey. If the bee-keeper wishes to sell his customers honey in the comb, instead of superimposing more boxes of frames on the hive, he employs crates of "sections," which are those little square boxes in which we see comb honey in the grocers' shops. This is the modern bee-keeping in its simplest form. But, of course, with every comb in the apiary moveable, and interchangeable with every other comb, the bee-keeper has his bees and their actions under a control that would never have been dreamed of fifty years ago. For instance, is one hive weak in bees and another breeding faster than he wishes? What is more simple than to take a comb of eggs from the strong hive and give it to the weak? Is a swarm wanted in a hurry? Well, take a frame or two (bees and all) from several hives and *make* one. The modern bee-keeper also breeds his queens in a separate hive called a nursery,

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and in the autumn he catches his drones in patent traps, instead of letting the workers waste their time in driving them away. But volumes might be written, in fact a great many volumes have been written, on the art of bee-culture, and not one of them, still less anything that I can say here, is any use to a beginner without practice. *Experientia docet* holds good, I suppose, in every craft, certainly in none more than that of the bee-keeper.

So my advice to any one wishing to start bees is: Buy a couple of stocks in good modern hives, and for the first year keep them for comb honey. It will never pay to buy an extractor for two hives, and beyond hiving the swarms and taking the honey do as little to them as possible. Of course you must get a good bee-book to show you how to do even this, and equally of course, you will want to do all the other wonderful things that you see described in it; but don't. Be content to go slow at first, and in a few years you will find yourself making artificial swarms, breeding queens, catching drones, and all the rest of it with the best of them, and, what is more to the point, making a very comfortable little addition to your income into the bargain; but don't try too many experiments at first.

The President (Mr. Brodie)—I am sure we all feel very much indebted to Mr. Wintle for his most interesting and valuable paper on bees and bee-keeping. The subject is one of peculiar interest to fruit-growers and horticulturists, and I hope that at our future meetings, the precedent now set will be continued, and that we may have a series of papers and discussions on this most interesting matter. After hearing Mr. Wintle's paper, I feel quite a longing myself to try and see what I can do in that line. With Mr. Wintle his work is evidently a labor of love, and he deserves the thanks of this meeting for this most interesting addition which he has made to our usual programme.

Mr. Jack—Does Mr. Wintle consider the foundation he has shown us the best kind? I find in extracting the honey that the foundation is apt to be thrown out.

Mr. Wintle—Have you wired your foundation?

Mr. Jack—No.

Mr. Wintle—Decidedly you should wire it; but you must be careful to have the best kind of wire which will not rust.

Prof. Craig—I think this is an exceedingly appropriate innovation—this introduction of bee-keeping into the work of our society. I am delighted with Mr. Wintle's paper, and not only thank him personally but also the gentlemen who invited him to come here and address our Society. I hope this paper will set the fashion in our programme, and that we will have a paper on bee-keeping every year. We have many members interested in that art, and as Mr. Wintle has pointed out, bee-keeping is so intimately connected with successful fruit growing that we should not lose sight of it.

Mr. C. P. Newman read the following paper :—

CONDITIONS THAT INFLUENCE THE SIZE AND COLOUR OF APPLES.

The overproduction of this last season seems to point out to us that the market for ordinary and second rate fruit is vanishing.

The quantity of fruit now produced in an orchard is no gauge of the profits. In observing our own markets I notice they are changing very much from what they were.

Not long ago apples as a popular fruit had pretty much their own way; southern and other fruits were imported only at certain seasons and at considerable cost and were pretty much of a luxury.

This is all changed; the market is now supplied at all seasons with many fruits at low prices.

So that when apples fail to attract the consumer, it is not a question of looking up some other apple, but of taking some other kind of fruit.

It has been, and I think will always be, said that the apple is the king of all fruits; but its reputation is in the hands of the grower; other fruits are improving, and the apple must improve with them. I open this subject now with my own experience with two important qualities of an apple—its size and colour.

I have not found that they are both produced by the same conditions, and so will consider them separately,

FIRST—CONSIDERING SIZE.

The first and most important condition is a healthy leafage.

Anything that attacks the leaves injures the size of the fruit.

This is very conspicuous on a branch attacked by the tent caterpillar; or on a tree affected by the spot.

Now that such a wholesale method of destroying these enemies as spraying has been found, to protect the leafage of an orchard is a simple matter.

Another important condition is manuring; the roots have to be well fed.

My experience has been entirely with stable manure in the form of a top-dressing.

I have found it perfect as far as I know in its results.

I think it should be applied in the fall preceding the bearing year of the orchard.

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Another important condition, and one that I think is being overlooked, is that the tree should be persuaded to bear annual crops.

It is, I believe, the natural disposition of the tree to do this, but it requires artificial assistance.

The influences that cause a tree to produce all its fruit every second year, are unfavourable seasons for the bloom setting, which causes the tree to set a full crop of buds.

Now in so far as these unfavourable seasons are caused by insects or disease, they may be overcome.

I think the tree might be influenced (1) by manuring the bearing year. This will help it bear its fruit and help it also to set some buds for the next season.

(2) Being very careful in the off season to protect and have the bloom set.

(3) In the bearing year thinning the fruit.

It is a very desirable result at all events, to have a tree bear a medium crop annually. It will improve the size of the fruit very much and will be better for the tree; for these full crops often injure trees with the strain.

Another important influence is to make several pickings.

The advantages of this are you get the maximum weight of fruit possible off a tree; you have a smaller quantity of windfalls, and you have a finer fruit.

I have found this specially applicable to summer apples, though I think two pickings may be profitably made with the Fameuse.

The first picking should be made a little earlier than the apple's season, and the last may extend it considerably.

Another condition that improves size is cultivation.

Cultivation undoubtedly makes a larger apple; it makes it also juicier and also richer—that is, sweeter.

But the apple does not color as brightly nor will it keep so long.

For fruit in this province, from my own experience, I cannot recommend cultivation.

For young trees it certainly hastens the growth and is desirable for wood forming.

COLOUR.

The first and most important condition is sunshine on three sides of the tree with good air circulation.

It is my opinion that with old orchards that have been too closely planted that it would be better to remove whole trees rather than severely prune them all.

Another important condition is a very dry soil under and about the tree when the apple is colouring.

Anything that retains moisture in the soil, such as a heavy top dressing or cultivation, injures the colour.

The sun should shine on the soil beneath the tree at some time of the day.

If hay is cut it should be cut at such time that the surface is short and brown in the colouring period.

Another important condition that improves colour is early maturity.

An apple that matures early ripens under a hotter sun and colours better.

Trees bearing annual crops mature their fruit earlier than trees with full crops. Making several pickings matures the fruit left on the tree earlier.

And I have found that trees of the same variety colour sooner than other trees with the very same conditions.

I can find no other reason but that the stock affects the time of maturity.

And early maturity, especially on late fruiting kinds of apple, is a desirable result.

Lastly, I have found some trees colour much better than others with the same soil, same surface condition, and same manure.

These trees are not of one variety but on many the colouring varies between blotched and striped.

The Astrachan, which is usually blotched, I have found striped; the Duchess, which is usually striped, I have found blotched, and the Fameuse both blotched and striped.

I can find no other reason for these conditions but that the stock the tree is grafted on has an effect on the color of the apple.

But the stocks that influence sufficiently to notice are few and far between, and must possess some quality not common.

Mr. Shepherd—The question of colour is very important. One of the reasons why colour is not always as satisfactory as it might be is because the trees are too closely planted together, so that the apples on the lower branches never get the sun, but only those on the upper branches. This is particularly noticeable in the Fameuse. The apples growing on the tops of the trees are well coloured where they get the morning and afternoon sun. It is particularly noticeable in orchards like Mr. Newman's and others about the Lachine Road, which are old orchards. In fact, you can walk under Mr. Newman's trees and never see the sun at all, their branches cover the ground so completely. I think Mr. Newman will bear me out in saying that the fruit in the lower branches, as a rule, is not highly coloured at all. We have all made the mistake

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of planting our trees too closely together. Those who are setting out orchards should be careful to plant their trees far enough apart. I planted an orchard last fall with the trees thirty-six feet apart. My man thought that was altogether too much. I said in this age of spraying trees, we would not be able to get around our trees and spray them from every side unless they are far apart, and we must have sun. To get colour and size we must have space.

The President (Mr. Brodie)—Did I understand Mr. Newman to say that he did not approve of cultivation?

Mr. Newman—Not for the fruit. I believe in cultivation in order to produce wood of a young orchard up to nine or ten years old.

The President (Mr. Brodie)—It is very remarkable in the Island of Montreal this year that our best apples were got off the oldest trees. Some of them were from trees fifty years old. I think that Mr. Newman told me that it was off some of his oldest trees he got the best apples.

Mr. Newman—I got just as good off the old trees as off the young trees?

Mr. Edwards—Our President recommended me to try ashes for colouring, and I found we had better coloured Fameuse after using the ashes. I think we do not keep our trees open enough, and I believe with Mr. Shepherd that we should plant our trees further apart.

The President (Mr. Brodie)—When planted close together, do they not protect themselves from the wind? Would it not be better to set them out close together and then take some of them up?

Mr. Shepherd—But you will not do that.

Mr. Chapais—In our district, if we do not plant them close together we will have none.

The President (Mr. Brodie)—I find that when trees are planted close together they thrive better when young.

EFFECTS OF SPRAYING.

Mr. Shepherd—It strikes me that we ought to discuss spraying a little, if we have the time, before taking up Mr. Pattison's paper.

The President (Mr. Brodie)—We will take up Mr. Pattison's paper the first thing in the evening session.

Mr. Shepherd—The question of spraying ought to come up again.

Mr. Cunningham—Has grafting anything to do with the flavour of the fruit?

Prof. Craig—Yes and no. I have seen curious results following the grafting of a fine variety on a sour crab stock. I have seen the quality of the fruit produced on that crab considerably affected and usually impaired. That result

is not, however, the constant. There is another thing worth noting. We can hasten the season of ripening of the fruit to some extent by the stock on which we place it—that is, if we top-graft it. Generally there is no effect on the fruit if we bud or graft on the tree root, because the stock will in every case finally overrule the character of the root both as to form and hardiness. I have said we can hasten the season, and I have a case in point. Six years ago I top-grafted a Northern Spy on a Yellow Transparent and a Northern Spy on a Scott's Winter stock. They have all fruited since, and the season of Northern Spy, as fruited on Yellow Transparent, is very considerably earlier than the season of Northern Spy as fruited on Scott's Winter. If we top-graft, we may expect some effect as regards the keeping quality. If we want our best apples to winter well, we should graft them as far as possible on long keeping stocks.

Mr. Cunningham—When I was a boy my brother used to do his own grafting, and it happened there was a very sour apple tree in the garden, and he started cutting off the branches and top-grafting different kinds of fruit on this tree until he had the whole top cut off. The fruit grafted on this sour stock was not at all the same flavor. I think there is a great deal in grafting on to a very sour stock or to a naturally sweet stock.

Prof. Craig—I think that the change may be more apparent with the first crops of the fruit; than when the top grows larger a more evenly balanced stock results. It is possible in time that the top would overrule the stock entirely. The tendency is that way.

The President (Mr. Brodie)—Would Mr. Fisk give us his experience of spraying?

Mr. Fisk—I have not prepared anything on this matter, but I can say this: from last year's experience, I am a greater disciple of spraying than ever before. Two years ago, with the experience I had in my orchard, the fruit did not show the benefit of spraying so much as I had hoped it would in comparison with the orchards round me which had not been sprayed. But this last season the result was quite apparent. The orchards in my neighborhood which were not sprayed had very little fruit, and those which had been sprayed the last two or three years showed a very marked difference in favor of spraying. I think that as the years go on, we shall be more and more convinced that spraying is an institution which has come to stay, and to which we must resort if we want perfect fruit. Not only spraying alone, but high cultivation is needed in order to produce the fruit we want to send to the other side and command the best prices.

Mr. W. Craig—Living near Mr. Fisk, I failed to apply the first application before the leaves came out, and sprayed only once after the fruit had pretty well formed, and it showed a good effect, but it was not done early enough, because my fruit did not average as good as Mr. Fisk's. If I had sprayed earlier it would have had much better effect. In other years I intend to begin it earlier, and do more spraying.

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The President (Mr. Brodie)—In my own experience I think there is no place in the Province of Quebec where we have suffered more from this fungus growth than on the Island of Montreal, and particularly on the Lachine Road, where I reside. The spotting this year did not begin until the 20th of July, but then it spread very rapidly. I had to spray about five times, and with great success. Mr. Shepherd knows that when he came to try and secure some apples from my neighbours, out of three hundred barrels he would not have got ten barrels of clear ones. Of course spraying is very disagreeable work, and one is apt to shirk it, and give it up in disgust. One of my neighbours sprayed once, but, for some cause or other he gave up, expecting that the apples would be all right, but he was disappointed.

Dr. Grignon—On the 10th of October last, I went to Mr. Joseph Blanchard's, Abbotsford, and asked him if he had employed Bordeaux mixture. His apples were very often unsatisfactory, and this was the first year he had fine apples. He sprayed them five times. That year his apples brought him \$1.20 a bushel. He sold them in little baskets, and they were beautiful and large. To show the influence of the Bordeaux mixture, he showed me on the same tree a branch that was not sprayed and carried its fruit still, and on that branch the apples were spotted, while the apples were perfectly healthy alongside it. There I had a striking example of the good effect of the application of Bordeaux mixture. I had to make five applications, but the Cure, my neighbour, only made two applications, and he had many spotted apples. In the case of my three neighbours who made no applications, their apples were small and spotted. At St. Hilaire I met nineteen farmers who told me they used Bordeaux mixture and were so delighted with the results that all the parish were going to use it.

The President (Mr. Brodie)—We have all had the same experience.

Mr. Shepherd—I wish to say that I am a complete convert to the idea that spraying will clear us of the fungus. The first year I applied it was three years ago, and I made the test in this way. I left two or three trees in each orchard, which had no application at all of the Bordeaux mixture. The difference between the fruit on the trees not sprayed and the others was very marked. The fruit on the unsprayed trees was unsaleable and miserable. Not only that, but the leaves were badly attacked by the insects, and the trees made very little growth. Last season the fruit generally was better than it has been for some years. Out of a crop of five hundred barrels, I do not believe I had one barrel of spotted fruit. The St. Lawrence were the worst spotted; my Fameuse were very clear. I have in one of my orchards about twenty trees of the St. Lawrence which are now twenty years old. They were planted too close together, so that the branches intersect, and it is impossible to get round the trees, and you can only spray from two sides. The spraying was carefully done, but the Bordeaux mixture never fell on the leaves between the trees at all, and the result was when we began to pick the St. Lawrence they were splended looking from the outside, but when we opened out the branches where they intersected, the fruit was absolutely unfit for eating or selling, and almost altogether covered with the fungus. My man was very much struck with that, and became quite convinced of the good effects of spraying. He had previously been a little doubtful, but

was now quite convinced. It was one of the clearest evidences that the Bordeaux mixture, well applied, with a good pump, and applied at least three times, will give us good fruit.

Mr. Pattison—I would ask Mr. Shepherd if he applied the first application of two pounds to fifty gallons of water early in the season.

Mr. Shepherd—Yes, before the buds burst. Just two pounds of copper sulphate to fifty gallons of water.

Mr. Pattison—I have a number of Flemish Beauty pears which were entirely worthless. About three years ago I began spraying. At that time we used one pound to fifty gallons of water. Since then I have increased the strength, and was very particular to spray my trees thoroughly as early as possible in order to take off the fungus you see on the bark. I must emphasize the importance of the first application. Prof. Craig says two pounds of copper sulphate to fifty gallons of water. That could be done I believe in the fall just as well. The object is to neutralize or kill that fungus that we find particularly on the Fameuse and Flemish Beauty, or any of these pears subject to fungus. We cannot do it as effectively with the Bordeaux mixture as with the first preparation. One season I applied nothing else, and did it thoroughly. I gave two sprayings of the sulphate preparation and did not use the Bordeaux mixture at all, and I had a larger percentage of clean apples than if I had not sprayed at all. Perhaps if I had sprayed with the Bordeaux mixture I would have done still better. I rose just to emphasize the importance of the first application as early as possible. Of course it will not do after the leaves have made their appearance.

Mr. Jack—Mr. Pattison has just spoken about the application of this solution of copper sulphate and water. You apply two applications before the blossoms burst. I would like to say that I have never sprayed with the copper sulphate solution. I have done nothing except with the Bordeaux mixture, and for the last two years I have experimented on the Flemish Beauty pear. This year I do not think we had one cracked or blemished pear on the two trees which we took special precautions to spray. Of two others, which were amongst the raspberry canes and we could not get at handly, the fruit was badly spotted and cracked. We made three applications, once before the blossoms burst, and the two others after. The first as soon as possible after the blossoms fall and the next about fourteen days later. We intended to make four, but we had not the time, and were sorry afterwards we did, not because we found the spotting very late, later than usual. I would recommend the Bordeaux mixture all the time because I have found that the copper sulphate solution washes off.

Mr. Thomas—What would be the cost of spraying with the Bordeaux mixture?

The President (Mr. Brodie)—It depends on the size of the tree.

Mr. Thomas—Say 20 feet across or 24?

The President (Mr. Brodie)—I have figured it up at \$2 for fifty trees for each spraying.

Mr. Shepherd—That is too high.

The President (Mr. Brodie)—They were very large trees.

Prof. Craig—In the case of trees say 20 to 25 years old, to make four sprayings per season, \$5 per acre is the outside estimate. The mixture would cost half a cent a gallon.

Mr. Thomas—What is the cost of a new sprayer?

Prof. Craig—You can purchase a pump and fix it in a barrel at an average cost of about \$12, or you can buy a pump set in a barrel, with the hose and nozzles and the whole thing complete, for \$15.

The President (Mr. Brodie)—A brass pump?

Prof. Craig—Partly; the working parts are brass.

The President (Mr. Brodie)—I find that any pump which has any iron about it is rusted very rapidly by the solution.

Prof. Craig—I would utter one word of caution in this connection. In some varieties of apples we may cause a rust on the skin that will injure the sale to some extent. This rust is caused by the Bordeaux mixture corroding the epidermal layer of the skin and causing rusty patches to grow here and there. This occurs more during seasons when there is a good deal of moisture in the atmosphere. Ben Davis seems to be particularly liable to be affected by the spraying. I have seen cases where the crop was injured to some extent. The Longfield is also easily affected. I only mention this so that those of you who observe the peculiarity may recognize the cause. It is not, however, sufficient to deter you from spraying, because the benefit you receive from spraying will far outweigh any disadvantages that may arise. I have always recommended the wisdom of making a stock mixture at the beginning of the season to facilitate the work. Put your lime in one barrel and your copper sulphate in another barrel. It makes some difference whether you pour the copper sulphate into the lime or the lime into the copper sulphate. A chemical combination takes place which effects the fungicidal properties of the mixture. Some very careful experiments have been made on this line, and you should also bear in mind that it is better, in making the Bordeaux mixture, to pour the lime into the diluted copper sulphate and stir it up quickly, and it is better to dilute them to some extent before mixing.

Mr. Thomas—How do you know when you have enough?

Prof. Craig—It is only necessary to watch the surface of the leaves of the trees.

Mr. Thomas—Is there any danger of poison in using it on a windy day?

Prof. Craig—No danger.

The President (Mr. Brodie)—Take four pounds of lime at a time instead of forty pounds, and you will get it finer in selecting it and it will strain easier.

Prof. Craig—It is a great convenience to have the mixture ready when you want it.

The President (Mr. Brodie)—I have always had the sulphate of copper diluted to about forty pounds to forty gallons of water, but I find by dissolving the lime as I needed it I had better lime.

Mr. Fisk—Does Prof. Craig consider it, from an economic point of view, necessary to give the five applications? Can we not do with less?

Prof. Craig—I think on the average—the occasion shows when more are necessary—three good sprayings will be sufficient. Occasions may arise when the fungus develops rapidly late in the season, as it did this year, and we must meet it.

The President (Mr. Brodie)—Or you may have neighbours on either side who do not spray, and you have to spray oftener than you would otherwise.

Mr. Chapais—When you speak of three applications, do you mean the first one to be only sulphate of copper?

Prof. Craig—I do not count the first one in those three.

Mr. Pattison—On the Experimental Farm do you always commence with the sulphate of copper?

Prof. Craig—Not always; but it is a good practice. I think if I were to choose, I would choose three applications of Bordeaux mixture without the first one, making the first application of Bordeaux mixture just before the blossoms opened. Another one I would make when the blossoms have fallen, about a week later. Then put in your Paris green for the codling moth, and make another good application two or three weeks later.

Mr. Fisk—Would you not put the Paris green also in the first?

Prof. Craig—Yes, it is just as well to put it in all three.

The President (Mr. Brodie)—This Bordeaux mixture prevents the rot in potatoes as well. In spraying potatoes to kill the potato bugs I used the Bordeaux mixture and added the Paris green. In some cases where the potatoes were badly rotted the past three years it was very successful.

Mr. Fisk—Must you not add a greater portion of Paris green than for apples?

The Chairman—Yes, far more.

Mr. Jack—This summer I experimented on potatoes. I made five applications for rot and bugs. I found it made a difference. I left half a row of some sorts not sprayed to see the difference. I do not know whether the potatoes which were sprayed were finer in quality, but they were free from rot.

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BEST VARIETIES OF APPLES FOR EXPORT

Was the next subject on the programme.

Mr. Shepherd—Speaking from my point of view, I should say that the best varieties of apples to cultivate for export would be certainly the Fameuse first, and the McIntosh Red a very close second. I may say that the Wealthy, a few years ago, seemed to export very well in cases, and be much appreciated, but whether it is because the English people now get more Fameuse than formerly, they do not seem to care for the Wealthy so much. That is the report I have received this year. In two or three establishments I have been shipping to they made it a condition that I should ship Fameuse and not Wealthy; that is, for table apples in cases. On the other hand, I have shipped the greater part of my Wealthy in barrels, and they realized \$1.75 net in Glasgow. Perhaps the Scotch people like them better than the Londoners. I would recommend the Fameuse and McIntosh Red for cases. I would recommend Winter St. Lawrence to a limited extent in barrels, and Canada Baldwin and Canada Red. Blue Pearmain this year exported very well, but I do not know that it is an apple I would recommend for general cultivation. Of the barrelled fruit, I would say Canada Baldwin, Canada Red and Golden Russet are the best. I have never exported sufficient of Scott's Winter to tell whether it would become a favorite apple on the other side.

Mr. Fisk—What about Ben Davis?

Mr. Shepherd—I do not grow it. I discarded it some years ago. I take no stock in apples of poor quality. Lots of people prefer Ben Davis and think a great deal of it. For the last twenty years I have had a nursery in connection with my orchards, and certainly Ben Davis has not proved hardy enough. The young trees are tender. I have planted Ben Davis several times in the end of my orchard and found them not hardy enough. The apple is a splendid keeper and good shipper, but I do not care to go into it. The apples I recommend for export are the Fameuse and McIntosh Red in cases, and the Canada Baldwin, Canada Red and McIntosh Red in barrels.

Mr. Barnard—Are these cases more expensive than barrels?

Mr. Shepherd—Yes; they cost about 40 cents apiece by the hundred; but of course you can get a case that will cost ten cents, and if you wrap your apples in paper and pack them tight, they will carry all right. I prefer the compartment case for my business, because I have a particular trade which it seems to meet.

Mr. Newman—I think that cold storage will make a great difference in shipping. If we have cold storage, I think the Alexander can be shipped very profitably. It is one of the most showy of apples. I made a shipment of ten barrel and they brought fifteen shillings a barrel, but they arrived in rather bad order.

The President (Mr. Brodie).—Net?

Mr. Newman—No. Two dollars and a quarter on the Montreal wharf, and they were not in good order. Duchess, I think, can be shipped profitably also by means of cold storage, if we have too many here for the market. The other apples, Fameuse, Wealthy and St. Lawrence, I would not advise anyone to ship. I think they are better appreciated here.

Mr. Edwards—I believe the Alexander will ship well. I have a friend who took some two years ago, and he was very much pleased at the condition they arrived in. I cannot say much about what I sent this last season. I am afraid I was a little late in sending them. They should be sent before they are fairly ripe. To show what difference there is between Mr. Shepherd and myself, I have a small nursery, and my Ben Davis is a very thrifty young tree.

Mr. Shepherd—Where you are situated you can grow Northern Spy and we cannot.

Mr. Edwards—We cannot grow Northern Spy profitably.

Mr. Shepherd—But they will live.

Mr. Edwards—Yes.

Mr. Shepherd—Where you can grow Ben Davis, it is a good thing to grow; but I cannot grow it.

The President (Mr. Brodie)—I agree with Mr. Newman that this season Alexander has come next to the Fameuse as the best apple for export. Then comes the Golden Russet and McIntosh Red, although I am not growing them for export. I know, however, they will be a good apple for that purpose. Canada Baldwin has been with me a total failure. I planted twenty-five years ago and have only one tree left now. They were planted on a southern exposure, and they are all sun scalded around the trunk. I would recommend the Fameuse, McIntosh Red, Golden Russet and Alexander. The Wealthy is not appreciated on the other side.

Mr. Thomas—It is better to pull the apples on the green side for shipment.

The President (Mr. Brodie)—It is better to wait until you have colour before pulling, but do not leave them on too long.

TARIFF CHANGES.

The next subject for discussion on the programme was the question: Should there be any change in the tariff in regard to duty on fruit?

Mr. Fisk—I should say no.

Mr. Edwards—I am not prepared to say. I am not posted in the tariff business.

Mr. Newman—I am a free trader all along the line, and would allow everyone a chance.

The President (Mr. Brodie)—Do you believe in one-sided free trade? The Americans send their apples here and will not take ours.

Mr. Newman—There is a clause in the tariff providing that if the Americans take off their duty, we will take off ours. I believe in reciprocity. Of course, I would not take off our duty and let them keep on theirs. I am not a free trader while the other people are protectionists.

The Secretary (Mr. Dunlop)—All I can tell you is this: During my visit to western New York I found out that in the canning and evaporating establishments alone they used some two million barrels of apples this year. They did not realize to the growers more than 25 to 30 cents a barrel. If we had no duty in Canada we would get a lot of these apples over.

Mr. Thomas Carr—We have more apples than we need, why should we get them from the United States? Why not give us free trade?

The President (Mr. Brodie)—From Hemmingford I hear that they have shipped about ten or twelve carloads to the United States.

Mr. Shepherd—I do not know that I have formed any decided opinion. Since I have been in conversation with Mr. Dunlop, I can see very well that if there were no duty on fruit, and the Americans could send their apples to this country free, we might as well go out of the business.

Prof. Craig—What about California fruits?

Mr. Shepherd—They pay a duty now. I would not take that off.

Prof. Craig—California pears are imported into Montreal by the carload. The trade began two or three years ago in a small way, but it increased each year since, and seems to be flourishing under the present tariff condition. It brings a lot of fruit into very keen competition with our winter varieties of pears.

The President (Mr. Brodie)—That is the only good fruit they send us. Their plums have no quality.

Mr. Shepherd—The people are not discriminating. The fruit has a good appearance, and that is what attracts them. They buy it because it looks well, independent of its quality or flavour. California fruit, in the vendors' windows and at the corners of streets in Montreal does make a fine show.

Hon. Mr. Fisher—The California people take more trouble in packing and selecting them.

Mr. Shepherd—Their fruit is very attractive in appearance. We cannot grow plums of the size they do. Their peaches and pears are very large. I do not understand how it pays them to sell at the prices they do in Montreal, and yet I understand that ten cars a day are sold sometimes in Montreal at auction.

Prof. Craig—Their peaches, when they reach us, are certainly remarkable as to their keeping qualities. In fact, I believe they would keep if boys were

running round loose. They are a most remarkable combination, tasting like sweetened wool, that one could very well imagine. They are fine, showy peaches, and the same remark may be applied to their plums, and to some extent to their pears, though their pears are better quality.

Hon. Mr. Fisher—California fruit comes in refrigerator cars all the way from California and pays extra freight, and yet in our markets undersell our fruit. As far as I can make it out the present duties on fruit do not seem to protect.

Mr. Shepherd—Would they not sell cheaper if there were no duty ?

Hon. Mr. Fisher—Perhaps so.

The President (Mr. Brodie)—Most of these California fruits are grown by cheap Chinese labour.

Hon. Mr. Fisher—Along with all the other Agricultural and Horticultural Societies of the Dominion, your Society had a circular addressed to you, asking that your views should be presented before the Tariff Commission. As you are aware, there is a committee of the Government going round, meeting the people to find out their views with regard to the revision of the Tariff, which will certainly take place next session. An opportunity is given to all classes and interests to present their views. A circular was sent to the fruit-growers with that object; and if this society has any suggestions to make, it would be wise to express them, so that they may be known to the Government when making the tariff. There are two aspects to the question. One is the duty on products, and the other is the duty on the things used in the manufacture of those products. One would help the industry, the other would injure it, and these two things have to be considered together. Those engaged in any industry should give their views, so that they might be considered in the difficult task of rearranging the tariff.

Mr. Shepherd—Do you mean that it would be advisable to pass a resolution ?

Hon. Mr. Fisher—If you have any views to express. I do not wish to enter into a discussion.

Mr. Shepherd—When the commission came to Montreal, there was an invitation to the society to present its views, but the executive in Montreal had no authority to speak for the society. We could only go as individuals, and we concluded it would be better to leave the subject for the general meeting.

Hon. Mr. Fisher—It is not too late now to express your views to the Government.

The President (Mr. Brodie)—My opinion is that the fruit imported is a different class of fruit altogether from that we grow here, and that consequently we do not need protection. It is true that we even export our Fameuse apples to the States in spite of their immense crops. We can grow better fruit here than they can in the States. For instance, my man was selling apples that are

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grown from American varieties, these Plum Cider apples, and he took in some second quality Fameuse. The result was he had almost to give away those Plum Cider American apples, while he could easily sell the Fameuse on the market.

Mr. Edwards—That cheap American fruit brings down the price and you can never get it up again. It just gluts the Montreal market.

Mr. Irving—After the people have had this fruit from the States they do not want ours when it comes because they associate it with American fruit.

Mr. Newman—I find that the apples which spoil our market are the Red Astrachan and an apple called the Colvert.

Mr. Carr—We should do with our fruit as we have done with our cheese, work away until we get to such perfection that we can defy anybody.

The meeting then adjourned.

NIGHT SESSION.

The Society met at 8 p.m.

The President (Mr. Brodie)—I am glad to see so large an attendance here this evening despite the weather. It shows that in selecting Howick as our place of meeting we have done wisely, and inclines us to look forward with confidence to an increased interest in the work of our society in this section of the country. There is no reason why our farmers should not grow enough fruit to last the year round. I would advise the boys to coax their fathers to give them a piece of ground on which to grow strawberries and to be a little insistent, about it. It will involve a little labour, but it will pay in the end. And besides, fruit is very necessary to keep up the health. You will hear to-morrow at the Dairy Convention about a balanced ration to feed cattle. The human animal requires a balanced ration as well, and fruits are a very necessary portion of it. Wherever people use fruit in abundance they are usually healthy. I shall now ask for the report of the fruit committee.

REPORT ON FRUIT EXHIBIT.

By N. E. Jack, Chateauguay Basin—Princess Louise, handsome well-coloured specimens; Grimes Golden; Fameuse; Russet, resembling Swayzie Pomme Grise, of rich buttery flavour.

A. Wright, Fort Covington-- Ben Davis, fine specimens; Blue Pearmain; Pewaukee; Bottle Greening; Bethel, very fine.

J. M. Fisk, Abbotsford, Que.—Stettiner Red; Swedish apple, resembling American Baldwin; good keeper.

W. A. Craig, Gibbland Farm, Abbotsford—Scott's Winter, fine; Johnston Seedling, winter; Shiawasee Beauty, Fameuse type.

Robert Brodie, St. Henri—Gloria Mundi; Golden Russet; Flushing Spitzenburg; Blue Pearmain.

Mr. J. Fraser, Lachine—La Salle, not in condition to judge of quality, having been frozen.

G. G. Stewart, Howick—Bellefleur; Plum Cider; Haas.

R. W. Shepherd, Como—Rochelle specimens; handsome, but out of condition.

Geo. McLenagan, Howick—Exhibits Long Stem Russet.

W. F. Halero, Hudson—Seedlings for exhibition only; not in good condition.

James Brodie exhibits Wolf River and Gano, the latter very fine.

Experimental Farm, Ottawa, exhibits 14 varieties, most important of which are: Sutton Beauty, Malinda, Lawver, Salome, McMahon White, Cooper's Market, Ontario, Northwestern Greening.

REPORT OF SEEDLING COMMITTEE, 1897.

Plate exhibited by Geo. G. Stewart, Howick, Que—A small, round smooth-skinned, striped red apple, evidently a good keeper, but on account of small size cannot be commended.

Two plates of seedlings, without name of exhibitor, do not possess qualities of sufficient value to warrant a recommendation.

One plate, Robert Ness; handsome, but poor in quality.

VERBAL REPORT OF CHAIRMAN OF FRUIT COMMITTEE.

Prof. Craig—I do not think that the residents in this locality clearly understand that one of the functions of this Society is to encourage the production of seedling apples, keeping in view the possibility of finding one suitable for export from the Quebec standpoint to the European market. Allow me to say you will find in the Rules and Bye-Laws of the Society that a prize is offered for the best seedling apple produced and exhibited in accordance with the rules before this society for five successive years. I merely mention this to bring before you the fact that you may have in this locality valuable seedling apples whose value you have not fully recognized. If you have such, remember to send a plate of them to the officers of the Society to be exhibited and passed upon at its next meeting. Twenty specimens are required. A prize of ten dollars will be awarded. This prize is open to competition in each of the nine districts of the province which are represented by the directorate of the Society. I shall not delay you long with the report of the Committee on Seedlings, because, unfortunately, competition has been very light, no doubt owing to the fact that many in this vicinity were not aware of the provision I have just mentioned. I shall make in passing some remarks on the fruit exhibited.

SEEDLINGS.

A plate of apples was exhibited by Mr. George Stewart, of Howick. While the Committee commend the apple as one having excellent qualities, yet we are not prepared to recommend its cultivation on account of its small size. The demands of the European market call for a larger size.

There are two plates of seedlings without the name of the exhibitor. However, these do not possess qualities of sufficient value to warrant a recommendation.

A plate of handsome seedlings, and evidently very good keepers, has been exhibited by Mr. Robert Ness. These are not sufficiently high in quality to warrant their propagation.

I would have you keep in mind the keeping quality, as well as the dessert or eating qualities of the apple, must be considered.

NAMES OF VARIETIES FOR EXHIBITION ONLY.

Then, with regard to the fruit exhibit as a whole, your committee would also like to report, and before doing so I desire to call your attention to the value of these exhibits. Many of you have certain varieties whose names you do not know. If you have them, send them in and the experts of the Society will examine and name them correctly when possible.

Mr. Jack, of Chateauguay Basin, exhibits very fine specimens of the Princess Louise apple. This is an apple which is supposed to be a seedling of the Fameuse. It originated at Grimsby some years ago, and is now being introduced. He also exhibits specimens of Grimes Golden. To my taste this is of fine quality. If you wish to know what a really good apple at this season is, and wish a standard to judge your seedlings by, take the Grimes Golden. It has, however, a weak point, which prevents our recommending it for growth in this province. The tree is tender; but so far as quality is concerned, you may consider it a standard by which to judge our seedlings.

Mr. Jack also exhibits Fameuse, and he has a plate of Russets, of which the Committee are not quite sure as to the name. It resembles Swayzie Pomme Grise in appearance, but seems better in quality. That means a great deal, because Swayzie Pomme Grise stands very high as regards quality.

Mr. Wright, of Fort Covington, shows some fine specimens of Ben Davis. If the trees are hardy in this vicinity this is a very valuable apple for export purposes. He also exhibits Blue Pearmain, Bottle Greening and Bethel.

Mr. J. M. Fisk, of Abbotsford, shows a real winter variety of what is commonly classed among Russian apples. This is called Stettiner Red. It is, however, not a Russian apple, but a Swedish apple, and came to us by way of Iowa in one of those importations made by the late Mr. Charles Gibb. You will find it an apple very closely resembling the American Baldwin, which has a world-wide repute, and is pretty widely grown in New York and other States of the Union.

Mr. William Craig, of Abbotsford, shows good specimens of Scott's Winter and Shiawassee Beauty, the latter of Fameuse type; but I do not think equal in appearance, and not quite equal in quality. Johnson Seedling; this is an apple planted among the early seedlings on Gibbland farm. The tree is seventy or

eighty years of age, and still healthy and bearing annually. It is not a fruit of high quality, but the owners find it a very profitable variety on account of it being a productive and an annual bearer.

Mr. Robert Brodie, of St. Henri, shows large specimens of that old variety called Gloria Mundi: also Golden Russet, with very little of the characteristics of the Russet about the stem. He also shows a Blue Pearmain, and another apple which your committee thinks resembles the Flushing Spitzenberg more than anything else, but are not quite sure.

The President (Mr. Brodie)—I have always thought it was Flushing Spitzenberg until you corrected me yesterday.

Prof. Craig—Mr. J. Fraser, of Lachine, exhibits the La Salle. This variety is unfortunately not in good condition. I may say en passant that a number of the varieties we have examined here are not in good condition. They have been either kept in cellars with vegetables or other fruit which has impaired their flavor, or have been kept in a warm room. They are not in a normal condition at present, and it is not fair to these varieties to give any decisive opinion.

Mr. G. G. Stewart, of Howick, shows some fine Bellefleurs, an old French variety, widely grown in Nova Scotia. I do not think the tree is sufficiently hardy for cultivation in Quebec. In Nova Scotia it is known as Bishop's Pippin. He shows also some cider apples and some specimens of Haas.

Mr. R. W. Shepherd, of Como, shows specimens of his new variety, the Rochelle. The remarks I made as to the condition of the others applies particularly to these specimens. They are not in a condition to enable us to gain an accurate idea of their quality, so that I am obliged to confine myself to saying that they are handsome, and I must omit saying anything with regard to quality. I may say, however, that Mr. Shepherd has sent me to Ottawa specimens of this variety, and it has been carefully described, and the description will be found in my forthcoming annual report.

Mr. George McLenaghan, of Howick, exhibits a plate of Long Stem Russets.

Mr. W. F. Halero, of Hudson, shows some seedlings, but not in good condition.

Mr. James Brodie exhibits Wolf River and Gano, the latter very fine.

The Experimental Farm at Ottawa makes an exhibit of fourteen varieties. These unfortunately arrived a little late. However, they are on exhibition now, and you may have an opportunity of looking at them later. These have not all been grown at Ottawa, but are part of a contribution by a co-worker at the Experimental Station at Geneva, New York. Among these exhibits you will find some interesting specimens. The Sutton Beauty, for instance, is an apple which has been widely advertised of late as one of the coming export varieties. I draw your attention to it, so that you may examine the fruit. You will find it of good quality, but with regard to the tree I can only say it has not proved

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hardy at Ottawa. In your more favored clime here it may do better. I would draw particular attention to the Lawver. I have specimens here, and if you taste the apple you will find the flavor excellent. McMahon's White, Ontario, and North Western Greening are also exhibited. The latter is an apple widely advertised, and comes from Wisconsin. In a general way it does not impress me, on account of the quality and lack of attractive appearance as a valuable variety, although the tree is hardy. Among other late winter varieties are the Malinda and Salome. The latter I have found fairly hardy at Ottawa, and the apple is one of the best of keepers; but it does not rank high in quality. There is also Cooper's Market, which is exhibited merely as being one of the old fashioned varieties of Western Ontario and Western New York. It is an apple of good quality, but not to be recommended in Quebec.

On motion of Mr. Shepherd this report was adopted.

Mr. Pattison, of Clarenceville, read the following paper:

GRAPE CULTURE, ANCIENT AND MODERN.

WM. MEAD PATTISON, Clarenceville, Que.

Modern culture of the vine has so often been dealt with in my contributions in the past to this, as well as to the Montreal Horticultural Society, and "line upon line, precept upon precept" so repeatedly given, that in this instance perhaps a broadening of the subject might be more interesting, and I propose to refer to ancient methods and literature bearing on it and kindred subjects, first showing how the pomologist treated his soil and cultivated fruits and vines before the Christian era. The directions, as given at that remote period, you will observe, are in a remarkable degree still applicable to the present day. The personage I will introduce in this connection, is Virgil, the Husbandman, Pomologist and Latin Author, and with your indulgence will first give some account of his life and works. Seventy years before Christ there was born on a farm in Lombardy, then outside of Italy, and known as "Cis Alpine Gaul," the first Latin Poet treating on Husbandry and Forestry. The youthful Virgil, we may infer, was proud of his vocation, and on approaching manhood had no inclination to exchange it for a situation in a Bank, Warehouse, or other vocation, but, like a dutiful son, held to the old farm, storing up the information for his future works, which became the recognized Latin Classics of succeeding ages.

Concluding his elementary education at Cremona and Milan, at the age of sixteen, his father sent him to Rome to study Rhetoric and Philosophy. In his spare moments he wrote Latin verse with such cleverness that his preceptor brought his productions to the notice of Mæcenas, the Prime Minister of the Empire, who in time appointed him endowed crown poet, the revenue of which placed him in easy, if not affluent circumstances, so that he purchased a beautiful Villa at Naples and a piece of land at Nola, where he could gratify the tastes he had acquired in early youth. There, thirty-seven years B. C., he wrote the Eclogues, a collection of the pastorals. Encouraged by their reception, he devoted himself for seven years to his famous four books of Georgics, or Art of

Husbandry, which sixteen centuries after were translated into English by Dryden, the Poet Laureate to Charles II. of England. To this translation your attention is asked while we cull and present some of the gems.

In the preface to these books Virgil shows the gratitude of his nature by dedicating the Georgics to Mæcenas, his benefactor, stating that his discourse will be on Farming, Soils, Grain, Sheep, Cattle, Vines and Bees, thus :

“What makes a plenteous harvest, when to turn
The fruitful soil, and when to sow the corn ;
The care of sheep, of oxen, and of kine,
And how to raise on elm the teeming vine,
The birth and genius of the frugal bee ;
I sing, Mæcenas, and I sing to thee.”

In the next stanza he invokes the Deities, supposed to preside over the various departments of husbandry, viz. : Bacchus, Ceres, Pom, Minerva, etc. Then addresses himself to the Roman Emperor Octavius Cæsar Augustus, and concludes with the pathetic petition :—

“But thou, propitious Cæsar ! guide my course,
And to my bold endeavors add thy force ;
Pity the poet's and the ploughman's cares,
Interest thy greatness in our mean affairs,
And use thyself, beimes, to hear and grant our prayers.”

His next subjects are “How and when to Plough, Rotation of Crops, Ashes, Drainage, Irrigation, Weeds, etc., thus :

“The sire of gods and man, with hard decrees,
Forbids our plenty to be bought with ease,
And wills that mortal man, inured to toil,
Should exercise, with pains, the grudging soil.
Himself invented first the shining shire
And whetted human industry by care ;
Himself did handicrafts and arts ordain,
Nor suffered sloth to rust his active reign.
Ere this, no peasant vexed the peaceful ground,
Which only turfs and greens for altars found ;
No fences parted fields, nor marks, nor bounds,
Distinguished acres of litigious grounds ;
But all was common, and the fruitful earth
Was free to give her unexacted birth.”

As to soils, he says :—

“I teach thee next the differing soils to know :
The light for vines, the heavier for the plough ;
Choose first a place for such a purpose fit,
Then dig the solid earth, and sink a pit ;
Next fill the hole with its own earth again,
And trample with thy feet, and tread it in :
Then, if it rise not to the former height
Of superface, conclude that soil is light,
A proper ground for pasturage and vines.
But if the sullen earth, so pressed, repines—
Within its native mansion to retire—
And stays without, a heap of heavy mire,
Tis good for arable, a glebe that asks
Tough teams of oxen and laborious tasks.”

Fall preparation of the vineyard :

These rules consider well : with early care
 The vineyard destined for thy vines prepare ;
 But long before the planting, dig the ground
 With furrows deep, that cast a rising mound ;
 The clods exposed to winter winds will bake,
 For putrid earth will best in vineyards take,
 And hoary frosts, after the painful toil—
 Of delving hinds, will rot the mellow soil."

On transplanting in ground, he says :—

"Some peasants, not t'omit the nicest care
 Of the same soil their nursery prepare—
 With that of their plantation, lest the tree
 Transplanted, should not with the soil agree.
 Besides, to plant it as it was, they mark
 The heavens four quarters on the tender bark,
 And to the north or south restore the side,
 Which at their birth did heat or cold abide.
 So strong is custom, such effects can use
 On tender souls or pliant plants produce."

He next gives the proper distances for vines :

"On hills or rising ground, good distances apart,
 Extend their loose battalions largely wide ;
 Open the ranks and files on either side,
 But marshalled all in order as they stand,
 And let no soldier struggle from its band.
 As legions in a field their fronts display,
 To try the fortunes of some doubtful day—
 So let thy vines in intervals be set,
 But not their rural discipline forget ;
 Indulge their width and add a roomy space,
 That their extremest lines may scarce embrace.
 Nor this alone t' indulge a vain delight,
 And make a pleasant prospect for the sight ;
 But for the ground itself, this only way
 Can equal vigor to the plant convey ;
 Mid crowded want the room their branches to display."

DEPTH OF PLANTING FOR VINES.

"How deep they must be planted, wouldst thou know ?
 On shallow furrows vines securely grow.
 Not so the rest of plants ; for "Jove's" own tree,
 That holds the woods in awful sovereignty,
 Requires a depth of lodging in the ground ;
 Therefore, nor winds, nor winter's rage o'erthrows
 His bulky body ; but unmoved, he grows ;
 For length of ages lasts his happy reign,
 And lives of mortal man contend in vain.
 Full in the midst of his own strength he stands,
 Stretching his brawny arms and leafy hands,
 His shade protects the plains, his head the hills commands."

HOW TO PRUNE VINES.

“ But in their tender nonage, while they spread
 Their shining leaves, and lift their infant head,
 And upwards, while they shoot in open air,
 Indulge their childhood and the nursing, spare
 Nor exercise thy rage on new born life,
 But let thy hand supply the pruning knife.”

LABOUR, CARE AND PIETY EVER NECESSARY TO THE FARMER.

“ First, Ceres taught the ground with grain to sow,
 And armed with iron shares the crooked plough ;
 Where now Dodonian oaks no more supplied
 Their mast, and trees their forest fruit denied,
 Soon was his labor doubled to the swain,
 And blasting mildew blackened all his grain ;
 Tough thistles choked the fields, and killed the corn,
 And an unthrifty crop of weeds was born.
 There burs and brambles, an unbidden crew—
 Of graceless guests, the unhappy fields subdue,
 And oats unblest and darnels domineer,
 And shoots its head above the shining ear,
 So that unless the land with daily care
 Is exercised, and with an iron war—
 Of rakes and harrows the proud foes expelled,
 And birds with clamors frightened from the field ;
 Unless the boughs are topped that shade the plain,
 And heaven invoked with vows for fruitful rain,
 On other crops you may with envy look,
 And shake for food the long abandoned oak.

Farming implements now engage his attention, and the choice and preparation of seed. and deploras the downward tendency of things, as the farmers of our age are wont to do :—

“ Thus all below, whether by nature's curse
 Or fate's decrees, degenerate still to worse ;
 So the boat's brawny crew the current stem
 And, slow advancing, struggle with the stream ;
 But if they slack their hands or cease to strive,
 Then down the flood with headlong haste they drive.”

His next subjects are saving time : Work for holidays and rainy weather, evening labours of the farmer and his wife, reads thus :

“ Some works in dead of night are better done ;
 Or when the morning dew prevents the sun
 Parched meads and stubble mow, by Phœbe's light,
 For moisture there abounds, and pearly rains
 Descend in silence to refresh the plains.
 The wife and husband equally conspire
 To work by night, and rake the winter fire.
 He sharpens torches in the glimmering room.
 She shoots the flying shuttle through the loom,
 And till the watchful cock awakes the day,
 She sings to drive the tedious hours away.”

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He concludes his first book with weather signs by moon and stars, rising and setting of the sun, good and bad omens, etc. Book Second begins:—

“ Thus far of tillage and heavenly signs ;
Now sing, my Muse, the growth of generous vine ;
The shady groves, the woodland progeny,
And the slow product of Minerva's tree.”

SOIL FOR EACH PLANT.

“ Nor every plant on every soil will grow ;
The Sallow loves the watery ground, and low,
The marshes, Alders. Nature seems to ordain
The rocky cliff for the wild Ash's reign ;
The baleful Yew to northern blasts assigns,
To shores the Myrtles, and to mounts the Vine.”

VINE DRESSING AND CULTIVATION.

“ To dress thy vines now labour is required ;
Nor must the painful husbandman be tired,
For thrice, at least, in compass of the year,
Thy vineyard must employ the sturdy steer
To turn the glebe, besides thy daily pain
To break the clods, and make the surface plain.
Thus in a circle runs the peasant's pain,
And the year rolls within itself again.”

FALL PRUNING OF VINES.

“ Even in the lowest months, when storms have shed
From vines the hairy honors of their head,
Not then the drudging hind his labor ends,
But to the coming year his care extends.
Even, then, the naked vine he persecutes :
His pruning-knife at once reforms and cuts.”

FALL PLOUGHING OF VINEYARD.

“ When peaceful vines from pruning-hooks are free,
When husbands have surveyed the last degree,
Yet still they find a future task remain :
To turn the soil and break the clods again.”

Virgil here enters into olive and apple tree culture, and cedars, pines and other trees, and dwells on their use, after which he congratulates the farmer on his various happiness, in contrast with the luxury of palaces, thus:—

“ O happy, if he knows his happy state !
The swain, who, free from business and debate,
Receives his easy food from Nature's hand
And just returns of cultivated land !
No palace, with a lofty gate, he wants
T'admit the tide of early visitants ;
He boasts no wool, whose native white is dyed
With purple poison of Assyrian pride ;
No costly drugs of Araby defile
With foreign scents, the sweetness of his oil ;
But easy quiet, a secure retreat,
A harmless life that knows not how to cheat ;
With home-bred plenty the rich owner bless,
And rural pleasures crown his happiness.
Unvexed with quarrels, undisturbed with noise,
The country king his peaceful realm enjoys.”

THE HAPPINESS OF RURAL PHILOSOPHERS.

"Happy the man who, studies nature's laws,
Through known effects can trace the secret cause;
His mind possessing in a quiet state,
Fearless of fortune, and resigned to fate,
He feeds on fruits, which, of their own accord,
The willing ground and laden trees afford."

He contrasts employments of men:—Senators, lawyers, misers, money-getters, etc. Then dwells thus on the peaceful life of the Peasant:—

"The Peasant, innocent of all these ills,
With crooked ploughs the fertile fallows tills,
And the round year with daily labor fills;
Thus every several season is employed,
Some spent in toil and some in ease enjoyed;
His cares are eased by intervals of bliss;
His little children, climbing for a kiss,
Welcome their father's return at night;
His kine with swelling udders ready stand,
And, lowing for the pail, invite the milker's hand."

The Third Book deals principally on animals on the farm, with directions applicable and observed in the present age. The Fourth Book, on Bees, Gardens and their plants, dealing minutely, and often very beautifully, with his subjects. He concludes the Georgics thus:—

"Thus have I sung of fields and flocks and trees,
And of the waxen work of laboring bees;
While mighty Caesar, thundering from afar,
Seeks on Euphrates' banks the spoils of war;
While I, at Naples, pass my peaceful days,
Affecting studies of less noisy praise;
And bold, through youth, beneath the beechen shade,
The lays of shepherds and their loves have played."

The directions in Virgil's Second Book of Georgics regarding trees and vines, their natural soil and treatment, as well as those on budding and grafting the apple tree, are applicable to the fullest extent to the present day.

MODERN GRAPE CULTURE.

Virgil's directions, though given for the balmy climate of Italy, will apply to us in a remarkable degree. Yet success in grape culture in northern latitudes, within the limits of our short season, impels us to restrain nature and direct her energies towards the developing of fruit, rather than exhaust itself in its natural tendency to go to wood. This end we attain by summer pruning. Virgil's advice respecting this: "Let thy hand supply the pruning-knife," is fully applicable. Now, in this climate, it is imperative to success that this nipping off, with the thumb and first finger, of the tender extremities of the most rampant canes from the height of the growing season till the end, should be regularly practised. If this is neglected the fruit buds left in fall pruning, will be robbed of their strength, and consequently produce inferior and imperfect clusters.

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The President (Mr. Brodie)—We have had the benefit of Mr. Pattison's experience in the cultivation of grapes on several occasions at our previous meetings, but nevertheless he seems to be able to invest his subject with a fresh charm each time he addresses us. We have all enjoyed the paper which he has read to us very much. As Mr. Pattison has so well shown us by his apt quotations from the classical authors, the cultivation of the grape is one that has ever excited the greatest interest among the most cultured portion of the community, and in this Province we certainly owe a great deal in that line of horticulture to the efforts of just such men as Mr. Pattison. I am sure I am but feebly expressing the sentiments of the Society when I say that we consider his paper a most valuable addition to our programme.

Dr. Bazin—What variety do you recommend for planting in this clay land?

Mr. Pattison—I do not consider clay land, unless thoroughly drained, is suitable. Nothing will kill a vine quicker than moisture or a wet and heavy quality of soil. With reference to my not mentioning wine culture, let me say that that is a very extensive subject, which could not possibly be entered upon in an article such as I read this evening. There are many conditions required in the manufacture of wine, and I must say that I have not been very successful myself. You require to have all the apparatus for testing the must. Besides that, in our climate the grapes do not mature, and have not the quality of saccharine matter necessary for proper fermentation. We have to treat them with sugar. I understand that the wild grape makes the best wine. These gentlemen speak of the best varieties for heavy soils. I recommend the Champion; but no grape will grow on heavy soil unless the land is well drained. Where I have had land of that nature in my own place I have always carted in sand to mix with it. In the first place I have it thoroughly drained and tilled so as to carry off the water.

The President (Mr. Brodie)—I have seen grapes grown successfully here on clay soil. The Agawam and the Sweetwater and some other varieties which I cannot mention at present. Of course the soil was well drained, but it was heavy stiff clay all the same. Mr. Ogilvie is here, and as he has had considerable experience in grape growing, I would ask him to give us his views.

Mr. Ogilvie—The varieties you speak of have done very well with me on a clay soil. It is not under drained, but is on a dry hill side. They do very well and have done so for many years.

The President (Mr. Brodie)—I would call on Mr. Dunlop, our Secretary, to give us his experience in travelling through Western New York in order to ascertain the methods followed there of disposing of their surplus fruit.

The Secretary (Mr. Dunlop)—During the latter part of November I was commissioned by the Honourable Minister of Agriculture of this Province to visit Western New York for the purpose of observing the methods followed there for utilizing their surplus fruit.

I will read a copy of my report submitted to the Department :

REPORT ON THE EVAPORATION OF APPLES IN WESTERN NEW YORK.

By W. W. DUNLOP, Secretary.

In accordance with instructions received from the Department of Agriculture to visit the western portion of New York State for the purpose of observing the methods there employed to utilize to the best advantage their surplus fruits, more particularly apples, I have travelled through the Counties of Wayne, Monroe, Orleans, Niagara, etc., and beg to submit the following report of my observations :

APPLES.

The varieties grown are chiefly late-keeping apples, consisting largely of Baldwin, Golden Russet, Rhode Island Greening, King, Northern Spy, etc., the choice fruit of which is usually barrelled and stored in ordinary and cold storage warehouses in proximity to the various railway lines, enabling the fruit to be transported to distant markets at any time during the winter without danger from frosts, the railway companies providing suitable cars for its transport. The second quality of fruit is used for the evaporator and for canning, although in seasons of abundant crops it is often more profitable to the grower to dispose of the whole product of his orchards for canning or evaporating purposes, sorting out only the small and inferior fruit, as these will not do for canning or for making good evaporated stock. In this way he saves the cost of barrels, hand picking and packing, as contracts are made for the product, "to be shaken from the trees and delivered in waggons." The small and inferior apples are largely used in the manufacture of cider, vinegar, and chops, the latter being the apples simply sliced and evaporated, without being either peeled or cored.

EVAPORATORS.

The County of Wayne is the home of the evaporating industry in this State. Some 25 to 30 years ago a small commencement was made, and the development has been so rapid that there are now some 2,500 evaporating plants in operation.

In 1894 there were shipped from Wayne County 22,500,000 lbs. of evaporated apples, and it is estimated that the product of the present year will be about 36,000,000 lbs., to produce which will require 6,000,000 bushels of apples.

In most of the evaporators the machinery is run by hand and foot power, but in some of the larger plants it is run partially or wholly by steam power, and the appliances are very complete for the economical handling of the fruit. The driers most generally used may be divided into four classes, viz., hot air, upright tower, the portable hop kiln, and steam drier.

All of these styles do good work. The hop kiln is the cheapest to construct and to run, but the hot-air upright tower makes the finest fruit as a rule.

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PORTABLE EVAPORATORS.

These are not now used to the same extent as formerly, but for family use are still popular. A machine made at Marion, Wayne Co., New York, by R. Topping is much used. These machines are made in four sizes: No. 1, capacity 3 to 5 bushels per day; price \$13.00, without furnace. No. 2, 10 bushels per day; \$28.00. No. 3, 15 bushels; \$40.00. No. 4, 26 to 30 bushels; \$50.00. Nos. 2, 3 and 4 with furnace complete. The Trescott Manufacturing Company of Fairport, New York, also manufacture portable evaporators, varying in capacity from 15 to 150 bushels per day.

THE KILN DRIER.

The kiln is simply a chamber with a slatted floor heated from underneath with hot air or smoke pipes, or steam pipes. The floor is made of hard wood, sawed about seven-eighths of an inch wide on the top and half an inch at bottom, and laid one-fourth of an inch apart on floor; the slats being narrower at the bottom, they do not clog or fill up, but allow the free ascent of the heat from below.

The smoke stack from the furnace runs through the room, and suitable apertures are provided for the escape of the moistened air created by the evaporation.

The kiln is generally used for drying the skins and cores of apples and for chops, sometimes for the making of "white stock," that is, the commercial grade of sliced evaporated apples, but is generally less efficient in the production of a first quality of fruit than the other styles of evaporators, because the fruit is not so completely under the control of the operator. The fruit must be shovelled over from time to time to ensure a good product. The handling is in itself a menace to good fruit, and where there is any quantity on the floor it cannot all be dried equally. That which is dried enough is generally obliged to wait until the least dried portion is perfected. Yet there are instances in which the operator exercises sufficient care to turn out a product which is indistinguishable from the tower dried fruit.

The particular merit of the kiln evaporator is its cheapness.

THE TOWER DRIER.

This is the form of evaporator most generally in use. In the smaller establishments the stack or tower is usually constructed of wood, with a foundation of brick in the portion which contains the furnace.

There is a great liability to fire, however, when constructed in this way, and as insurance rates on these buildings are very high, the stacks of the larger evaporators are built entirely of brick.

The stacks are from 35 to 40 feet in height, the walls 4 inches thick, plastered on the inside, and of a size to admit the trays generally used, which are 49 inches square. One or several stacks are placed in the same building, according to the capacity of the establishment. The stacks start from the

basement, and under each is built a furnace; two openings are provided for the admission of air from the basement, which, passing over the heated furnace, dries the fruit as it ascends to the outlet, carrying with it the vapors of the fruit.

Above the first floor of the building through which the shaft rises, a small door covers an aperture in the shaft sufficiently large for the entrance of a man in case cleaning or repairs are needed. The lower section of this door is hinged, enabling it to be raised for the insertion of the trays of fruit, each shaft containing about 25. These trays are raised by a lifting apparatus, so that the fresh fruit is always inserted at the point nearest the furnace, and the time of lifting so arranged that when the tray first inserted reaches the top of the lift, on second storey of the building, it is ready for removal.

THE STEAM DRIER.

Steam is sometimes used, and for operations on a very large scale probably furnishes the most efficient and economical heat. Coils of steam pipe are laid in horizontal tiers, the space between each two tiers being just sufficient to allow of the easy insertion of one or two trays. Each tray is therefore independent of all others above or below it, and may be allowed to remain in its original position until the fruit is finished. A narrow horizontal door is provided for each space. These tiers of steam pipes may reach a total height of five or eight feet, and several stands of them are placed alongside, and the whole is usually boxed in with lumber. It is estimated that 4,000 feet of one inch pipe gives a capacity of 300 bushels of apples per day.

As previously stated, the greater number of the evaporators in use are of the tower or stack form, and are of only moderate capacity, turning out from 75 to 300 bushels per day. These are in general owned and operated by the proprietors of orchards, and family labor employed to a great extent.

Evaporators of this capacity, where only hand power is used, can be constructed very cheaply, the cost of plants having a capacity of 100 to 200 bushels per day ranging from \$800.00 to \$1,400.00. To turn out 100 bushels a day eight hands are usually employed, four of whom may be women. The buildings are usually of two storeys and a basement, constructed of wood. The basement serves for the furnaces and the fuel supply, anthracite coal being generally used. The first floor is the receiving room for the fruit that is here prepared and placed in the shaft of the evaporator. The second or top floor is used for the storing and packing of the prepared fruit which is removed from the stack at this elevation.

PROCESS OF MANUFACTURE.

The apples are first pared and cored, which is done by a machine worked by either steam or hand power, the capacity of one of these machines worked by hand is from 65 to 75 bushels per day and the substitution of steam power does not appear to materially increase the product, as in many large establishments using steam power, they prefer the hand-worked parer and corer. After passing

through the machine small portions of

Women are employed in packing apples are now ready for the fumes of burning

This is an important factor in the flavor of the fruit. The acids of the apples are prized. There are a great deal of work more or less to half an hour of

After bleaching having a capacity of The apples are fed into space taken out of the evaporator. The each tray being raised from below, until it reaches the storage room

Here it is all in order that the reduction of moisture, at least dried a portion

The drying is done during the night and during the day

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They are afterwards packed from European commercial stock.

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The demand is about half that for good

The process of drying of all capacities, in respect that they are handling of the fruit

through the machine the pared and cored apples are then trimmed, that is, any small portions of skin remaining and any unsound portion of the fruit is removed.

Women are employed for this labor, two for each parer. The trimmed apples are now ready for bleaching, which is accomplished by subjecting them to the fumes of burning sulphur.

This is an important operation, as too long an exposure would spoil the flavor of the fruit and too little would not prevent the air from acting on the acids of the apple, depriving it of that snowy whiteness which is so much prized. There are many different forms of bleachers in use, performing their work more or less rapidly, the time of exposure varying from 12 to 15 minutes, to half an hour or more.

After bleaching, the apples are then conveyed to the slicer, a small machine having a capacity of 40 to 50 bushels an hour, and which is operated by a boy. The apples are fed to the slicer in such a way that they are cut into rings, the space taken out with the core forming the centre, and are then in shape for the evaporator. They are then spread thinly on trays and placed in the evaporator, each tray being raised at suitable intervals to be replaced by a tray of fresh fruit from below, until the finished product is taken out at the top and deposited in the storage room on the second floor.

Here it is allowed to remain for some days, being turned over at intervals in order that the product may become more uniform by the absorption or exhalation of moisture, the thinner or drier portions absorbing from the thicker or least dried a portion of their moisture.

The drying is the slowest part of the operation, and the kilns are kept going night and day.

WASTE.

The parings and cores are evaporated separately, owing to the cores requiring a greater time to dry.

They are afterwards mixed and sold as "waste." The demand is principally from Europe, and the price realized about one-fourth the price of good commercial stock.

CHOPS.

These are prepared from the small and inferior apples, which are chopped or sliced without being pared or cored, the whole product being evaporated.

The demand is chiefly from Europe, and the price obtained about one-half that for good stock.

The process of manufacture as outlined may be applied to establishments of all capacities, the larger ones using steam power, differing only in this respect that they are enabled to introduce many labor-saving appliances for the handling of the fruit.

Judging from the great number of the smaller evaporators in operation this advantage must be at least compensated for to the farmer who evaporates the product of his own orchard, and thus receives any profit there may be in the operation; at the same time providing occupation for the members of his household at a time when the demand in other directions is not pressing. The work of evaporating is usually done during the months of October, November and December.

As in other industries, there are many grades of products turned out of the evaporators, depending, to a great extent, on the quality of the fruit used, and the care and skill of the operator. Evaporated apples are classed in the markets as fancy, choice, prime, and poor to common. The prime are again divided into two grades, wood-dried and wire-dried.

This distinction is created by a law passed by the German Government prohibiting the importation of any dried apples unless accompanied by a chemist's certificate certifying that the apples are free from any trace of zinc.

When Germany is buying quite freely, there frequently is a difference of one-fourth of a cent a pound between wood and wire-dried fruit of the same grade. For the home market the wire-dried fruit is preferred, the traces of zinc, owing to its contact with the galvanized wire trays, being found by analysis to be too small to be in any way injurious.

DISPOSAL OF PRODUCT.

The evaporators, as a rule, do not dispose of their product direct, but to dealers who buy in large quantities and distribute to the home and foreign markets as required. The principal consuming countries abroad are Germany, England, Belgium, Holland and France. In seasons when the grape crop is short in France large quantities of chops and waste are used, chiefly for the production of cider, cheap wines, and for distillation. In Germany the same products are largely used in the manufacture of jelly and of coloring materials. The jelly is flavored with essences, and is not distinguishable from that made from the natural fruits. The strawberry, raspberry and other jellies, of which large quantities are used in New York, are said to be to a great extent derived from the products of their own orchards exported to Germany in the form of chops and waste, and returned as choice strawberry and other jellies.

PACKING.

The better grades of evaporated apples are usually packed in boxes containing 50 lbs.; the bottom of the box is first removed, a layer of the fruit neatly arranged on a sheet of paper, the rings of fruit over-lapping each other, and the box then filled and the bottom nailed on. Choice and fancy may be put up in smaller packages, and a paper box containing one pound is sometimes used.

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Care must be taken in keeping this fruit during summer, and it has been found necessary to keep the white stock in cold storage, otherwise it is liable to be discolored by the heat, and its market value reduced.

The poorer grades, also chops and waste, are packed in barrels.

From 200 to 275 lbs. may be packed in a barrel, and for export it is usually required that a barrel shall not contain less than 250 lbs.

CIDER AND VINEGAR.

The manufacture of cider and vinegar is a large and growing industry in this State.

The operations are usually conducted on a large scale, and machinery takes the place of manual labor wherever possible. Probably the largest establishment of this kind in the State, or in the world, is that of the Genesee Fruit Co. at Holley, N.Y., which has a capacity of 10,000 bushels of apples per day, and an annual product of more than 1,000,000 gallons.

In the yard outside the cider mill apples can be dumped from the farmers' waggons into a hopper sunk in the ground, from which an elevator takes them to the top of the building, and to the machine which grinds them into pomace. The pomace passes into large vats on the floor below, from which it is drawn as the presses, still another floor below, require it.

The extracted juice is carried by steam pumps and pipes to any portion of the various buildings where needed for the vinegar generators, storage or shipping. The juice and vinegar is stored in large wooden tanks ranging in capacity from 2,500 to 80,000 gallons. The pressed pomace, the removal of which used to be a source of expense, is now burned in the boiler furnaces.

The varieties of apples are seldom separated for cider making, with the exception of the Golden Russet, from which is made the popular Russet cider. The greater quantity of the cider produced is used in the United States, only a limited quantity being exported, the chief demand being from Great Britain.

Most of the cider produced is used in its natural sweet state. By exercising great care in the manufacture, fermentation may be delayed or prevented to a certain extent. The racks and cloths should be regularly steamed and sterilized, so as to remove all particles of fruit as well as germs which cause fermentation, and the juice, as soon as it leaves the press, removed from contact with the atmosphere and kept at a low temperature.

In the making of refined ciders various processes are employed which are considered by the manufacturer as trade secrets and not divulged.

A sand, lacking in iron, and obtained from Sherburne, Massachusetts, has been largely employed in refining cider. The juice was filtered through the sand, but this has now been superseded by wood pulp.

It is generally conceded, however, that to keep cider sweet for any length of time salicylic or other acids must be employed.

For economy in package and frieght, cider is sometimes condensed into one fifth of its original volume, this is done by evaporation in machines constructed for the purpose. The cider is restored to its normal condition by the addition of an amount of water equal to that evaporated.

The apple juice is converted into vinegar by means of generators or convertors. These are large upright wooden tanks of varying capacity. As in the case of the operations in connection with the refining and keeping of cider, the manufacturers do not care to give details of the process, which, as far as I can learn from outside sources, is somewhat as follows:

The generators are filled with beech wood shavings, corn cobs or other material, which will not affect the flavor of the juice. This material is then saturated with vinegar, when the generator is ready for operation. The fresh juice is admitted at the top by means of an automatic arrangement which, when full, reverses and distributes the juice evenly over the whole surface of the tank; this is repeated as the machine again fills, the liquid constantly descending through the satuated mass until it reaches the bottom, by which time it is converted into vinegar.

The principle which secures this rapid fermentation appears to be the free contact with the air obtained by the juice in its descent, aided by the heat generated by the fermentation.

The vinegar thus obtained is used almost entirely in the home markets, where it finds a ready sale. State laws are enacted providing for the proper labelling and sale of vinegars, thus providing against competition from the cheaper, or acid-made, stock.

GENERAL REMARKS.

Notwithstanding the number of evaporators, cider and vinegar mills, and canning establishments, the product of the orchards of Western New York this year was too great to be used. Large quantities of apples were allowed to remain in the orchards after having been gathered and the first quality sorted out and barrelled. This was most noticeable in Niagara County, almost every orchard containing large piles of red, green and golden fruit (Baldwins, Greenings and Russets) spoiled by the frost.

Good apples for canning or evaporating are supplied at ten to sixteen cents per 100 lbs., and for cider and vinegar as low as five cents per 100 lbs.

Evaporated products are quoted at:

Apples, prime	3 cents per lb.
" chops	1 to 1 1/4 cents per lb.
" waste	3/4 to 1 cent per lb.
Juice, or Sweet Cider	3 cents per gallon.
Prepared Sweet Cider	4 " "
	(Guaranteed to keep 90 days.)
Vinegar	4 " "

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These prices are exceptional, owing to the unprecedented crop, and both growers and manufacturers unite in the opinion that there is no money for them in the business this year. The average prices obtained during the past few years have been nearly double those quoted for the above products, enabling the evaporator to pay from fifteen to twenty cents a bushel for the fruit.

The earlier or summer varieties of apples are not evaporated to any extent; being softer, they do not give such a large product as the hard fleshed varieties, and being deficient in sugar the product is not of much value for the making of cider or vinegar, for which purpose much of the waste and chops of the harder varieties are employed.

The evaporated product from a bushel of soft or summer apples ranges from 4 to 5½ lbs., and of winter apples 6 to 7½ lbs.; the cost of manufacture being the same, 10 to 12 cents per bushel. The size of the apples add to or lessen the product, there being less waste in those of large size.

CONCLUSIONS.

The chief object in evaporating fruit is that in this form it is more easily kept and more cheaply transported to distant markets. The fruit is not materially changed, or the purposes for which it may be employed; thus, immature or poor fruit will ensure a product no more fit for use than in its natural state. The success or magnitude of the fruit evaporating industry would therefore appear to depend upon the quality of the fruit, an abundant supply, and the prices at which it could be obtained.

The foreign markets are at present chiefly supplied from the United States and it is claimed by the fruit growers of Western New York that they can grow apples at a profit, and supply the evaporated product at five cents per pound. If we are to prosecute this industry on a large scale in the province of Quebec our farmers must grow more winter apples, as the summer varieties are not profitable for evaporation.

The President—(Mr. Brodie).—I was in an establishment in the city of Montreal where they canned quite a lot of apples, and the manufacturer told me that when apples were plentiful they were not afraid of making any kind of jams. With essences, he said, we could make all kinds, even small fruits or anything else.

Hon. Mr. Fisher.—I was talking to a large canner in Western Ontario, and he told me they sent a large quantity of canned apples to England at a fair profit. They do not make them into jam or jelly, but just peel and quarter them and partially heat them and then close them up and seal them. They were used largely in England for deep apple pie, which English people are very fond of. They sent a large number of car loads this year.

The President (Mr. H. Brodie)—Perhaps Mr. Newman can tell us what he does with his surplus apples.

Mr. Newman.—I make large quantities of cider, but to go into a description of how I make it would be rather long.

Prof. Craig—What varieties are the best suited for making cider?

Mr. Newman—The Fameuse apple gives the best flavor and generally a richer cider than ordinary apples. The richest cider of all is made of the Pomme Grise, a small Russet.

The President (Mr. Brodie)—Is there anything secret you do not mention about keeping your cider sweet, or is it open to the public?

Mr. Newman—Well, salicylic acid is used to a large extent, and it is harmless. It may not be the best known now.

Mr. Chapais—It is forbidden in France.

Mr. Newman—Yes, but it is perfectly harmless. It has been used thirty or forty years in the States and immense quantities of cider are drunk there. There has not been a single accident affecting the health arising from it.

Mr. Shepherd—I can bear witness to the admirable cider Mr. Newman produces. One of the leading grocers in Montreal told me they could not get it soon enough, there was such a demand for it. So I fancy it must be good. I was reading not very long ago in an English newspaper that sweet cider is an admirable thing for rheumatism, and I think this idea was expressed by myself in one of our newspapers. I read this article in the "Public Opinion," a weekly which reproduces the opinions of all the leading newspapers in England and the Continent, recommending English apple growers to make more cider than they do now. Years ago they used to make a great deal more cider than they do at present. It is generally advocated as being beneficial in case of rheumatism. There is a sweet acid in the cider which cannot be obtained in any other beverage?

Mr. Chapais—I think I can show why cider is good for rheumatism. It is because it contains *salic salicylic* (salicylic acid), which is considered a cure for rheumatism.

SMALL FRUITS.

The President (Mr. Brodie)—All Scotch people are fond of gooseberries, and as our Secretary grows the finest gooseberries I have seen on the Island of Montreal, I think he could tell us something on that subject which would interest us.

The Secretary (Mr. Dunlop).—I must say that last year I grew too many gooseberries and found the market overstocked. This fruit is one of the easiest things to overstock the market with, because there is only a small demand for it. I would not advise anyone to go largely into their culture in this Province, but only for their own use. They are so easily cultivated that every man should grow some in his own garden. I have tried English varieties, and have been very successful with a number of them, and would not be without them for a good deal. The varieties are innumerable. Some succeed under certain conditions and others do not, and it almost requires a trial for each individual to see how a variety will suit. There are some more generally cultivated than

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others. I might mention the well-known Whitesmith, Crown Bob and Industry. Among the new varieties I had one sent to me under the name of Fraserii. This has done very well, as also have Golden Eagle, White Eagle, Roaring Lion and Sportsman. Mildew is one of the difficulties you have to contend with, and the tenderness of the tree. They are not nearly so hardy as the American varieties, such as the Downing and Houghton seedlings. Mildew is very easily overcome by spraying with the Bordeaux mixture.

Mr. Ness.—How do you kill the worms?

The Secretary (Mr. Dunlop).—A little hellebore or Paris green kill the worms. Either put the hellebore on dry or in water—about a tablespoonful to a pail of water. Paris green is more effective and much cheaper.

Mr. Halero.—What time do you apply the first application of Paris green?

The Secretary (Mr. Dunlop).—Very soon after the leaves are developed. Look closely into the lower part of the tree and you will see the punctures made in the centre of the leaves by the worms. This is one thing which has deterred people from growing gooseberries and currants more than anything else. I do not think they realize how little trouble it is to control it.

The President (Mr. Brodie)—Do they not require pretty severe pruning?

The Secretary (Mr. Dunlop).—Yes. If you have few branches the berries will be better developed. By pruning and manuring very heavily you may produce fruit of extraordinary size. It is only for exhibition purposes, however, that you want fruit of this size.

Mr. Shepherd.—What about soil?

The Secretary (Mr. Dunlop).—I like a heavy soil. I do not mean wet soil, but a clay loam well drained.

Mr. Shepherd.—What about cultivation?

The Secretary (Mr. Dunlop).—They require high cultivation to give good fruit. They want lots of feeding. They want both potash, phosphoric acid or nitrogen. I do not think that you can feed them too high. The best time to prune them is very early in the spring. Some people prune them in the fall. In a severe climate I like to do my pruning in the spring before growth begins. It is a mistake to allow the buds to swell before pruning.

Currants (except black) and gooseberries produce their fruit on wood of two years or over. Therefore, you must keep enough wood of two years or over to insure your crop. If you have too much wood of one year's growth you thin out, and only leave those you require for succession. If a branch has borne for several years, I replace that by younger wood.

Hon. Mr. Fisher.—How long do you leave your bushes?

The Secretary (Mr. Dunlop).—In this climate they do not last as long as in England. Bushes are known to remain productive in England for forty or fifty years. In this country, after ten years, it is better to replace with newer plantations.

Mr. Brodie.—Have you the Pearl?

The Secretary (Mr. Dunlop).—I have had it sent me on two different occasions, and find it very little, if any, improvement on the Downing. The plants I received were sent by the Ontario Fruitgrowers' Association, and ought to be true to name.

Mr. Shepherd.—Do you find the Industry is the best?

The Secretary (Mr. Dunlop).—It is not considered one of the finest in quality or the largest in size. It has good foliage, and is very productive in England.

Hon. Mr. Fisher.—You prefer to prune in the spring?

The Secretary (Mr. Dunlop).—Yes, before the buds are swollen. In growing any of these fruits to a large extent, you have to do a certain amount of pruning in the fall; the spring is so short. Small fruits are generally protected by snow, and not as likely to be injured by fall pruning as apple trees.

Mr. Shepherd.—Do you grow your bushes in the tree form or allow a number of shoots to grow?

The Secretary (Mr. Dunlop).—In this climate it is safer to grow them in the bush form, as otherwise they are likely to be broken down by the snow. I generally train two or three shoots from the ground, at the same time keeping the branches well from the ground, so as not to allow dampness.

Hon. Mr. Fisher.—Grown in that form, are they not more likely to split?

The Secretary (Mr. Dunlop).—They very seldom split. It is a matter of taste. You can grow them successfully in either way.

Mr. Pattison.—Do you not find the borer less destructive when you grow the berries in bush form?

The Secretary (Mr. Dunlop).—Yes; it has attacked our black and red currants very badly, but so far it has not affected the gooseberries very much.

Mr. Pattison.—I tried single stem and got sick of it, as the borers destroyed it the first thing.

The Secretary (Mr. Dunlop).—I think all the small fruits generally are cultivated in the bush form here.

The President (Mr. Brodie).—Mr. Jack, of Chateauguay Basin, grows the finest raspberries sent to the Montreal market, and he might give us a few notes on their culture.

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Mr. Jack.—We do not give them any special fertilizers at all. We use wood ashes to a considerable extent. There is a question I would like to bring up. Prof. Craig did not advocate cutting off the tops. As he will know, some of our pickers are only three feet high, and if we allow the canes to grow full height, are we to give ladders to these pickers? Both Cuthbert and Golden Queen winter kill very badly.

Mr. Shepherd.—Do you lay them down for the winter?

Mr. Jack.—No; we have experimented in that way and did very poorly. I do not think we could have done it properly, according to Prof. Craig's theory. We bent the bushes over when about seven feet high and put upon them a foot of earth at the tops, but did not cover them. I fancy the highest part from the ground was about two feet, and as the winter in the early part of 1895 was very severe, and there was no snow, that did not protect them properly. When these raspberries were taken up in the spring the tops were perfectly healthy, but not the intermediate parts between the root and the top. We cut them off about five feet from the top, expecting that they would sprout all the way up, and there was not any difference. In fact some were worse. That is, they did not give us good results.

The President (Mr. Brodie).—What would be the best three varieties you would recommend for private gardens.

Mr. Jack.—I would say decidedly Golden Queen for the white and Cuthbert for the red. We are trying the Louden just now.

Mr. Bazin.—Are you not of opinion that late pruning is the cause of winter killing? In conversation with Mr. Jack, Sr., he told me they had worked too late in pruning and had stimulated the bushes rather than checked the growth.

Mr. Jack.—We have tried several ways. We have tried laying them down and clipping them in the winter and the spring, and really I do not know that there is much difference. A severe winter seems to stop the flow of sap altogether.

The Secretary (Mr. Dunlop).—I understood that when you laid your raspberries down last you covered only the tops and had no snow, and the rest of the cane was not protected. In that case they were practically not protected at all. I laid mine down in the same way and the tops only were protected. The rest of the canes were recumbent and not protected, and they would kill that way almost as badly as if standing up. I laid mine down in a different manner this year, and hope to have different results. I held them in place with a shovelful of earth and covered them completely with a light straw manure. There is no advantage in laying them down unless with a view to having them covered with snow.

Prof. Craig, I suggested, in cutting back, to do the cutting back in the spring, so that you would remove the part that was winter killed. And I said that our experience for three years indicated that more fruit was given us by the canes which were not cut back in summer. This cutting back in summer

produces a number of laterals, and these do not make good, healthy fruit buds. In many cases of raspberries, the buds are killed while the ends of the canes which were protected were perfectly sound, while the intermediate spaces between the base of the cane and those protected were entirely killed. In order to protect effectively, it is almost necessary to grow the plants more or less in hills. Then, when you lay them down, start at one end of the row and remove a little soil, which is done very quickly with a spade, near the base of the hill on the side towards which you incline your plant. Then in pressing it over, place your feet against the base of the cane and press the whole clump together. This is easily done by grasping the cane with a six-tined fork and laying them over. It takes two men to do this work properly. You work backwards; one hill or clump overlaps the other, if they are placed in hills about three feet apart. I know that Mr. Jack grows them under hedgerows, and it is more difficult to cover them when grown in that way.

If you restrain the growth of the shoots by taking them up in early spring and if grown in clusters, they can be bent over and covered quite easily. Two men will cover an acre easily in one day. If, however, we should be visited by such a winter as last, and do not give the protection Mr. Dunlop recommends, the unprotected portion of the cane would be so killed as to cause the loss of the crop next season. Protection undoubtedly pays in most portions of the Province of Quebec. It will not only pay in increased product but in increased earliness of the product. For instance, if you cover a row of Cuthberts you will get ripe fruit from those five or six days earlier than you will from the canes which are unprotected. I am quite convinced from experience and observation in the province of Quebec, we cannot from year to year grow raspberries without taking these precautions to protect them from severe cold.

Hon. Mr. Fisher—I have suffered a good deal, in my experience, from a disease which seems to attack the berries. The fruit forms and then dries up and shrivels, and sometimes the twig on which the fruit is shrivels up three or four inches from the top. The rest of the stem seems to be healthy. This has been going on for a number of years. I chiefly cultivate the Cuthbert, but the other varieties are also subject to this disease. I do not know the cause, but it has reduced the crop I ought to get one-half every year.

Prof. Craig—My attention was first called to this disease by Mr. Dunlop. It affected very seriously a patch of Caroline, a yellow variety of raspberries. As described by Mr. Fisher, the fruit shrivels soon after it forms, and with the fruit a small portion of the stem which carries it turns black. I investigated the trouble, and sent specimens to mycologists in the United States and elsewhere, but could obtain no light on it whatever. We tried experiments in spraying the plants on the farm at Ottawa. We had it there on the Caroline, and to a small extent on the Marlboro. But it disappeared, and has not appeared there since that time.

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Prof. Craig—No; it simply disappeared, and has not reappeared. I am unable to throw any light on it. If any of you have plantations seriously affected by this trouble, probably the best remedy would be to clear them out and get new, fresh, healthy stock.

The Secretary (Mr. Dunlop)—Not only the Caroline but the Brandywine I was unable to grow on account of the blight. It also affected the Marlboro one or two seasons, but very slightly. The Cuthbert, so far, seems almost entirely free from it. I have a few specimens of the Caroline left, and year after year they are affected in the same way, and I practically get no fruit.

Hon. Mr. Fisher—I have no Caroline. The bulk of mine are the Cuthbert. The other varieties are also affected.

Mr. Shepherd—My experience is exactly that of Mr. Fisher. My Caroline are very badly affected, so much so, that they do not give one-quarter of the crop they did. It is a very fine raspberry, very fine flavored, and very heavy bearing. I only grow it for home use. I have never seen the other varieties affected—the Cuthbert or Marlboro.

Mr. Jack—Do you grow the Marlboro for home use?

Mr. Shepherd—I grow them all for home use. I have a great many young friends, and they stick to me in the raspberry season very close. If you want to find out the best apples in the orchard, your young friends will show you where they are. I have one tree called the Early Joe, which, for dessert purposes, is supposed to be the finest flavored apple in the world. I do not think I ever tasted an apple which has such a flavour. I have only one tree, and shall try to get some more, but it is really difficult to keep many of the apples, the children are so fond of it.

Mr. Pattison—It is very unfortunate that this disease should attack the Caroline, because, for domestic purposes, it is the most palatable fruit we have; I have experimented on some thirty varieties, but prefer the Caroline, and should really like to find some process by which we could destroy that rust. The leaves seem to be perforated with little holes.

Prof. Craig—That is a different thing. Accompanying these holes in the leaves, you will find patches and indentations on the stems. That is a disease which will yield to treatment by the Bordeaux mixture. It is best to spray in the spring, when the young growth has grown about a foot. Make two applications before the fruit is picked and one after.

Mr. Pattison—The Caroline is too soft to market.

The President (Mr. Brodie)—Is it better than Brinckle's Orange?

Mr. Pattison—No, but it is very productive and hardy. The growth of laterals I generally nip off and not let the frost kill them. I have had the best results by continually keeping them down. Mr. Gibb, just before he died, sent me the Crystal, and I am trying that now. It is a very fine raspberry.

The President (Mr. Brodie)—For private gardens, I would recommend the Turner for first early berries and the Cuthbert, but I prefer the Clarke for my own use. It is too tender a variety for market, but is very fine in quality. For making jam, there is nothing better than Shaffer's. In the yellow varieties there is nothing comes up to the Brinckle Orange and the Golden Queen. I have had no experience with the Caroline at all.

COLD STORAGE EXPERIMENTS.

Mr. Shepherd moved, seconded by Mr. Barnard :

That the members of the Quebec Pomological Society view with satisfaction the possibility of making trial shipments of fruit in cold storage.

The resolution was adopted.

FRUIT EXPERIMENTAL STATIONS.

Mr. Chapais moved, seconded by Dr. Grignon :

That the Committee having charge of the question of Fruit Experimental Stations be continued in charge for the present year, and be instructed to obtain an interview with the Provincial Government in order to further the project.

Resolution adopted.

RESOLUTIONS OF THANKS.

Mr. R. W. Shepherd moved, seconded by Mr. J. M. Fisk :

That the thanks of the Society are due to Mr. Robert Ness and the people of Howick for the kindness and hospitality extended to the members of the Pomological Society at this meeting and to the ladies of Howick for their courage in attending the sessions of the Society during the most inclement and stormy weather, and thus by their presence lending a spirit of enthusiasm to the work of the Society which was very much appreciated.

Mr. Shepherd—I am sure this will meet with most hearty response. It is the desire of our Society to visit every town and village in the course of time throughout the entire province of Quebec. Our object is to instill into the hearts of the people an interest in fruit growing, a desire to grow the best fruit, and in that view we are always ready to entertain invitations from any centre, and when we do not get an invitation we take the invitation ourselves and select the place we consider best fitted, as we did in this instance. I must say that we have been most cordially received wherever we go and that Howick is no exception to the rule. We shall always look back upon this meeting with pleasure, and we especially appreciate the interest which you have shown in our work despite the very stormy weather, and I assure you that if we ever have the good fortune to return to Howick, we will consider it a great pleasure.

Mr. Fisk—It affords me great pleasure indeed to endorse the remarks of Mr. Shepherd. We have enjoyed our visit very much, and feel sure that it will not prove a fruitless one, and I for one shall always look forward to a renewal of our visit.

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The President (Mr. Brodie)—I must add the weight of my authority, as your Chairman, to what has been so well said by Mr. Shepherd and Mr. Fisk. Despite the unpropitious weather, we have enjoyed our visit very much. The warmth and cordiality with which the people of Howick have greeted us have more than compensated for the rigor of the elements. It is very satisfactory indeed to find that our visit has been so successful, and, as Mr. Fisk has said, it will no doubt bear an abundance of good fruit.

Resolution adopted.

Mr. Ness—On behalf of the people of Howick, I must say that we are very grateful to your Society, Mr. President, for having paid us the honor of a visit. We shall all certainly look back to this visit with pleasure, and hope at no distant day to see it repeated.

BLACK WALNUT TREES.

Mr. Jack—Have any of the gentlemen present had any experience in growing black walnut trees?

Mr. Ogilvie—My experience has been very limited, but it has been successful. We have two or three trees that have grown beautifully, but they are not very old.

Mr. William Craig—About three years ago I planted a couple of acres of black walnut and was disappointed not to see any come up the first year; but I was surprised when I came to cut the barley the ensuing year to find the walnuts up quite thick. We cut the barley carefully, and the walnuts are now doing fairly well. I am in hopes, at some future day, of being able to show a good many black walnuts as well as a chestnut plantation, and I think it would be a good investment.

Hon. Mr. Fisher—I think they often take two years to germinate. On two different occasions I have obtained nuts and planted them, and a good many came up the second year—in fact nearly all that did come up then. I find, however, that in my district they will hardly stand the climate. I have only one tree out of thirty or forty that came up, and out of a couple of hundred nuts which I must have planted. It is probably four or five years old now, and is growing fairly well. Except for commercial purposes, I do not think much of the black walnut. It leaves out early in the spring and loses its leaves early in the fall. The butternut, which is native to us and much more hardy, seems to be about as handsome a tree as the black walnut. Of course, for commercial purposes, where it can be grown for such purposes, in the course of time one would get a very valuable return from the timber, but otherwise I am disappointed in the walnuts.

The President (Mr. Brodie)—Sir Henry Joly de Lotbiniere has about seventeen acres of black walnuts, some of which are about seven or eight inches in diameter. They do very well with him. We have two or three with us, and one has started bearing nuts. Of course the nuts are not nearly as good in quality as the ordinary butternuts, and the tree is not to be compared with the butternut tree as an ornamental tree.

Prof. Craig—When I was at the exhibition of Abbotsford Fruitgrowers' Association last summer, I was exceedingly pleased to see there an exhibit of the rapidity of growth and of fruit production of the black walnut. In the spring of 1891, a number of seedling trees were sent out to the members of the Quebec Pomological Society by the Experimental Farm. These were planted by the members of the Society, and the fruit shown at this exhibition was produced by one of these trees. The tree has had five seasons' growth, so that it has yielded nuts at six years of age. I do not call attention to this to emphasize the value of the black walnut as a nut producing tree, because I do not think that in Canada it will be of much economic value from that standpoint, but I do think that it would be a splendid investment for many of us who have rocky uncultivated tracts of land to plant nuts of this tree and allow them to occupy soil at present giving no return. There is almost an unlimited market for black walnut—\$150 a thousand feet for extra fine, and \$75 to \$100 a thousand feet for ordinary lumber is paid, and all we obtain at present is imported from Tennessee and other Southern States. I would drop one word of caution in this connection. There is a great difference in the hardiness of the trees, depending upon the locality from which you procure the seed. If you procure the seed of Southern grown trees, the trees are almost sure to winter kill. If, on the other hand, you obtain the seed from the most northern limits where the trees are grown, you are pretty safe in planting it in almost any portion of the province of Quebec.

Mr. Jack—Are not the trees apt to be broken by the wind?

Prof. Craig—In growing them for commercial purposes, they should be grown sufficiently close to afford some mutual protection and also to induce them to grow upright, as otherwise they will be too branchy to be valuable as to lumber.

The Secretary (Mr. Dunlop)—Mr. Newman has a fine walnut tree growing in his place, which produces annually large crops of nuts. He might give us some information about that tree, and it might be desirable to procure some of the nuts for distribution.

Mr. Newman—We have had two trees. One grew so large and took up so much room in the orchard that we cut it down. It was two feet in diameter and did not show any signs of want of hardiness. The tree I have at present bore quite a heavy crop of nuts, and I believe I have a quantity on hand now. It is a very poor nut to eat.

VOTE OF THANKS TO HON. MR. FISHER.

Mr. Shepherd moved, seconded by Mr Newman:

That the thanks of the Society are hereby tendered the Hon. Sidney Fisher, Minister of Agriculture, for having assisted at all the sessions of the winter meeting of the Society and in furthering generally the development of the fruit growing industry of this province.

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Mr. Shepherd—When we all heard that Mr. Fisher was to be our Minister of Agriculture, everyone of us—I do not care on what side of politics—who had anything to do with farming or dairying or fruit growing, or any other department of agriculture, was delighted beyond measure at his appointment. We all feel that he is essentially the right man in the right place. I need hardly tell you with what pleasure I hailed Mr. Fisher's appointment, having known him since his boyhood, and having been a schoolmate of his as well. I am perfectly sure that whatever criticism the other departments of the Government may lay themselves open to, the Department of Agriculture, under the direction of our esteemed friend and fellow member of this Society, Mr. Fisher, will show a clean record of most valuable work in the developing of Canada's Agricultural interests. It is very satisfactory to us to have the assurance from Mr. Fisher himself that, although he cannot longer take an active part in the directorate of our Society, yet that we shall always find in him at Ottawa a sympathetic friend in everything that will tend to the promotion of the objects for which our Society was formed. I think that even those of us who are on the opposite side of politics will find it difficult to refrain from joining in the wish that Mr. Fisher's tenure of office may be a long, as it cannot fail to be a successful one.

Mr. Newman—I have great pleasure in seconding this motion and in endorsing cordially the sentiments to which Mr. Shepherd has so aptly given expression. It is very satisfactory indeed to find our Society represented in the councils at the capital, for I am perfectly sure that no matter how engrossed Mr. Fisher may be in his new duties, he will never be able to forget that he is a member of this Society, and for many years one of its Directors. In his hands, everyone who takes any interest in agriculture feels that at least that most important industry of this country is as safe as we can possibly expect it to be under any government. And carrying out the spirit of the concluding remark made by Mr. Shepherd. I might say of my friend, Mr. Fisher, in the words of the late Artemus Ward: "Long may he live."

Resolution adopted.

Hon. Mr. Fisher—While I feel deeply sensible of the honor you have done me, I must disclaim any idea of accepting it as appropriate on this occasion, because really I came here as a member of this Society quite as much as in my position of Minister of Agriculture. I felt impelled to attend your meetings by that same interest which has always prompted me to take part in the work of this Society, and because I am satisfied that there is good work which can be done by this and other kindred associations in this country. I have for so many years devoted myself to the different branches of agricultural pursuits that I feel myself in thorough sympathy, and thoroughly identified with them, and can hardly think of other things or work at other things. Let me tell you, as friends as well as co-workers, that I am extremely gratified, not perhaps altogether because of the honour or glory of the position I occupy—although I think that you will admit that it is a legitimate cause for gratification on my part—but because the work to which I have been called is one I have been so long interested in, the one in fact with which my life has been occupied. I feel all the more on that account a sense of great responsibility, knowing, as I do, that

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those who have known me and have been looking forward to the time when a practical farmer should be at the head of the Department of Agriculture in our Government, are now expecting great things of me, and I always dread lest I should not come up to their anticipations. I know that there is a great deal to be done in this country to develop the different branches of agriculture, and I assure you that my earnest endeavor will be to fulfil the duties of my Department in such a manner that when I do give up the keys of office and leave the position I now hold I shall at any rate have the satisfaction of being able to say that during my term I did something for the advancement and development of agriculture in the Dominion. I have been once or twice before in this neighborhood. I know it to be one of the best cultivated, one of the most advanced and progressive parts of the Province of Quebec, and I was very glad indeed when I heard that the Association had decided to hold here its annual meeting. I knew that we would receive a cordial welcome and that those who took part in our discussions would have the pleasure of addressing good audiences. I am glad to see that my anticipations were more than realized, and that our Society has reason to congratulate itself on having decided to hold its winter meeting at Howick. I am much pleased also to be able to-morrow to take part in the meeting of the Dairy Association of Beauharnois, an association to whose meetings I have had the good fortune to be invited on various former occasions, and where I have always found the information and assistance and sympathy that a dairyman requires. Let me say, that I rely, as I think I confidently can, on the support and encouragement of the farmers in the work I have to do. It is only by means of that support and sympathy that I can hope to succeed. The kind words said to me by you, gentlemen, will encourage me in my work. I shall feel very much stronger indeed in knowing that I have at my back the support and sympathy of those whose interests I have in charge. I thank you again most cordially, Mr. Chairman, ladies, and gentlemen, for your kindness in proposing and adopting this motion.

The President (Mr. Brodie)—They say that a prophet is without honour in his own country, but nevertheless I cannot allow you to separate without taking some credit to myself for a prophecy which I made at our last winter meeting, when I predicted that our friend and co-worker, Mr. Fisher, would be the next Minister of Agriculture of this Dominion. Of course the wish was the father of the thought, and therefore I am the more pleased that the event which I have predicted has come to pass. I could indulge in further predictions, but they would be in the line of the eulogiums and predictions which have been so well expressed by Mr. Shepherd and Mr. Newman, who have thus cut the ground from under my feet. I am very much pleased indeed with this visit to Howick, and, as President of the Society, I most cordially endorse all that Mr. Fisher has said of the welcome we have received.

The meeting was then closed.