

FOURTEENTH ANNUAL REPORT

OF THE

Montreal Horticultural Society

AND

FRUIT-GROWERS' ASSOCIATION

OF THE

PROVINCE OF QUEBEC.



PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY

QUEBEC :

CHARLES-FRANÇOIS LANGLOIS

PRINTED TO HER MOST EXCELLENT MAJESTY THE QUEEN.

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MONTREAL HORTICULTURAL SOCIETY AND FRUIT GROWERS ASSOCIATION OF THE PROVINCE OF QUEBEC.

ANNUAL MEETING.

The annual meeting was held in the Fraser Institute Hall on the evening of December 5th 1888. Professor D. P. Penhallow, the President, occupied the chair.

There were present Messrs. William Evans, E. J. Maxwell, R. Brodie, J. Betrix, G. Cheney, Hon. L. Bearbien, Robert Evans, J. B. Goode, Charles Gibb, R. W. Shepherd, Jr., J. W. Molson, J. Fraser Torrance, A. Joyce, Colin Campbell, John Doyle, James Morgan, Jr., Colin Morgan, D. R. McCord, R. Jack, Edgar Judge, J. Bennett, G. Trussell, John Robertson, J. H. Joseph, J. Kirkwood, James McKenna, D. Williamson, C. J. Fleet and others.

The President opened the meeting with the following remarks :

GENTLEMEN :

Before proceeding to the transaction of the ordinary business of this evening, there are certain matters of importance, relating to the present and future welfare of this society, to which it seems desirable to direct your attention.

Since the date of issuing our First Annual Report, fourteen years ago, the history of this society has been one of rapid progress, and more especially within the last four or five years, the field of usefulness has enlarged with unusual rapidity, and the work of the society has been extended in several important directions. The position which we now hold is only second, among all the kindred societies of this continent, to the large and influential Massachusetts Horticultural Society. This result has been achieved chiefly through the medium of our annual reports, which contain a large amount of matter of special value to those engaged in horticultural pursuits.

Our exhibitions have also contributed largely to this end and though their influence is of necessity of a more purely local character, but in the last annual exhibition, at which the display of fruit was of an unusual character, both in quality and quantity, the society may feel just cause for congratulation.

The interests confided to the care of this society are large and of great importance and it must be kept in mind that they do not simply embrace encouragement to the cultivation of flowers, although that constitutes one of our most important functions; but under the terms of our charter the very important and enlarging fruit interests of this province are confided to our care, and I would therefore impress it upon you that the executive officers of this society upon

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whom the burden of this responsibility directly falls, should be selected with special reference to their ability to discharge their important duties in an impartial manner, feeling the full weight of the trusts and responsibilities confided to their care.

For the past three years, winter meetings for the discussion of horticultural subjects have been held. Those for a discussion of subjects relating to the cultivation of plants have not met with the success they deserve, chiefly through want of interest on the part of those most concerned and for whom this departure from former methods was instituted, and the wisdom of continuing them will therefore require the consideration of the incoming Board of Direction.

The meetings for the discussion of the fruit interests have been most successful and promise well for the future. The last one held at Quebec, was supported by a Government grant, and not only did it accomplish a most important work in advancing the fruit interests of this Province, but it has resulted in placing the society upon a better and more substantial basis in its relations to the Provincial Government. Supplementary exhibitions have been held, in addition to the usual autumn exhibition, these have related almost wholly to flowers.

If this work is to continue, the resources of the society will need to be increased. For several years past our income has been inadequate to the work demanded of the society, but the Treasurer's report for this year shows that, owing largely to a more than usually successful exhibition, we have been enabled to meet all liabilities to date. Membership cannot be looked upon as a source of revenue, for as our late Secretary more than once pointed out, it becomes a matter of personal influence and favor, beyond a membership of five hundred, while the small annual fee of two dollars is more than offset by the large number of admission tickets issued to the members. It will therefore be necessary to consider the propriety of seeking increased assistance from the Local Government in aid of our provincial work.

For the benefit of those who are disposed to consider that the interests of floriculture are not sufficiently consulted, it should be stated that the fruit interests of this Province are of much greater importance than any local interests and that, while the resources of the society should be applied as far as possible to the promotion of all interests, the grant which we now receive from Quebec is given wholly upon the ground of our work in promoting fruit culture, and technically, cannot be diverted to any other purpose. The exhibitors of flowers should therefore bear in mind that the success of their particular department depends largely upon themselves, and any disposition to cast blame upon the society for not meeting their particular views, should give way to a generous assistance to the Board of Direction, who have ever been most anxious to promote the best interests of all concerned without undue preference.

One great difficulty this society has always had to contend against, is the want of interest, we might say indifference, exhibited by a large portion of our members, the majority of whom know nothing of the society, beyond the payment of their annual subscription. This is a matter that has engaged the attention of the directors in the past and will demand serious consideration from the incoming Board.

The minutes of the last annual meeting were read and confirmed.

The Secretary read the following report of the operations of the Society during the year.

SECRETARY'S REPORT.

The following report of the operations of the Society for the past year is respectfully submitted.

The first event of importance was a lecture delivered by Colonel Rhodes of Quebec in the Hall of the Natural History Society on the 17th January on the "Care and Culture of Winter blooming plants." A large number of members availed themselves of the privilege of hearing this interesting and instructive lecture, and at the close, a vote of thanks, moved by Sir Donald A. Smith seconded by Mr. A. Desjardins, M. P., was unanimously tendered to the lecturer. The Montreal Florists and Gardeners Club kindly provided button-hole bouquets which were presented to the ladies attending.

The Winter meetings for the discussion of fruits were held in Quebec on 1st and 2nd February. The Provincial Government very kindly allowed us the use of rooms in the Parliament Building, and the Acting Minister of Agriculture, Hon James McShane, promised a grant sufficient to cover the expense of holding the meetings in that City. These meetings were attended by representatives from the various local Associations and fruit growing districts of the Province and much interest was manifested in the proceedings, a full account of which is published in our thirteenth annual report. Our selection of the City of Quebec for the place of holding this meeting was much appreciated by the representatives of the Eastern part of the Province, not only as showing that we were desirous of consulting their convenience in this particular instance, but, that it appeared to some extent to remove the impression that our interests were local, and to imply a desire to make our work more Provincial in its character.

The Winter meeting for the discussion of Flowers was held in the Hall of the Natural History Society on the 28th February. Some interesting papers were read which, with the discussion thereon are contained in our last annual report. This meeting was not largely attended and it is to be regretted a greater interest is not manifested by our members in this branch of horticulture.

The annual prizes for conservatories were awarded on 13th March. These

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were as usual divided into classes A. and B., having a superficial area of 700 feet and under. There were only three entries for the former and two for latter. The names of the successful competitors are published in last annual report.

During the winter a number of conservatories were opened to our members, a privilege which, through the kindness of the owners, we are annually enabled to offer them. Those who kindly conceded us this privilege last year were, Sir George Stephen, Hon. J. J. C. Abbott, Mr. Mackay, Kildonan Hall, Mr. H. Montagu Allan, Ravenscrag, Mr. R. B. Angus, and Mrs. Redpath, Terrace Bank.

Our annual fall exhibition was held in the Victoria Skating Rink on the 18th, 19th, and 20th, September. The entries were very numerous and the competition keen, nearly all the sections being competed for. The collection of apples was particularly fine some 1800 plates being on the tables forming a display which has seldom, if ever, been equalled in this Province. The season was not so favorable for grapes and although a large number of varieties were exhibited many were not thoroughly ripened. The collections of decorative plants, as usual, formed the leading feature in the floral department and were much admired by the thousands of visitors who attended. The exhibition on the whole was one of the most successful held for years.

The Chrysanthemum show was held in the hall of the Natural History Society on the 12th, and 13th, November. The entries were not numerous, owing no doubt to the unfavorable weather of the past two seasons which has deterred many from growing these plants.

There has been a slight increase in membership during the past year; we have now 568 members paying a subscription of \$2, and 23 non resident members paying \$1, an increase of 41 members in all. This result has not been accomplished without effort as since 1883 there has been an annual decrease of membership.

The membership in this year was the largest in the history of the Association 894 names being on the roll. In 1884 this had decreased to 856, in 1885 to 721, in 1886 to 603, and in 1888 to 550. During the past year we have lost 59 of our old members, some through death, others through departure from the city, but the greater number through a want of inclination to subscribe; thus, although we have added 100 new names to our list the result shows a gain of only 41 members.

This society now appears to have arrived at a stage in its existence when a larger revenue is needed to enable it to extend its operations, and it would be well to consider whether such a result can be obtained though an increased membership alone. The experience of the past few years would seem to show that, neither in receipts from exhibitions, nor from membership, can we reason,

ably expect any substantial increase in this direction, and in order to obtain an increased revenue other means must be devised.

At the last annual meeting it was suggested, with a view to increasing our membership, that subscription books be given to members who would endeavour to obtain new subscribers. This suggestion was acted upon and a number given out. Mr. G. Cheney who promised to obtain 15 new members has more than fulfilled his promise by sending in his cheque for the subscriptions of 17 new members. Mr. William Evans has also done his share and the society is greatly indebted to these gentlemen for their efforts in this direction.

The financial statement of the past years operations is as follows.

Financial Statement of the Montreal Horticultural Society and Fruit Growers Association of the Province of Quebec for the year ending 30th November 1888.

RECEIPTS.

Cash on hand 1 December 1887.....		\$37.64
Members subscriptions, 568 a \$2.....	\$1136	
“ “ “ 23 a \$1.....	23	\$1159
Provincial Government on account grant of \$1000.....		750
Donations for special prizes.....		76
Dividends Bank Stock.....		66
Poultry Coops Sold.....		60
Aetna Insurance Co. rebate.....		13
Reports sold.....		2.25
Proceeds one share Bank of Montreal Stock sold.....		444.50
Subscriptions for 1887 received after close of year.....		20
Exhibition receipts.....		494.05
W. W. Dunlop Treasurer on loan.....		500
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		\$3622.44

EXPENDITURE.

Sundry accounts.....	\$31.75
Advertising and printing.....	261.66
Rent.....	94.25
Library account.....	43.55
Cartage.....	3.10
Telegrams.....	89
Insurance.....	23.72
Stamps.....	40.00
Expenses Quebec meeting.....	204.22

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Prizes.....	1271.50
Exhibition expenses.....	629.72
Express.....	9.75
Commission on collections.....	84.90
Stationery.....	23.80
E. J. Maxwell loan returned.....	350.00
W. W. Dunlop secretary treasurer.....	500.00
Cash on hand deposited in Merchants Bank.....	49.63
	\$3622.44

You will notice by this statement that it has been found necessary to dispose of one of our shares of Bank of Montreal stock.

During the past year our receipts have been equal to our expenses, but in preceding years the expenses have not always been provided for, so that at the close of 1887 there was a balance of \$350 due to the Treasurer, also some unpaid accounts making a total of about \$400 to be provided for. This, the directors have thought proper to liquidate by the sale of one of our shares of stock. It is not always possible to limit our expenses to our income, which is not fixed, owing to the variation in our receipts from the September exhibition, from unfavorable weather, and other causes over which we have no control. Owing to no provision having been made by the Government for the printing of our report, in their estimates for the past year, they have retained the sum of \$250 from our grant and have also not yet paid us the sum of \$250 promised in aid of our fruit meeting in Quebec last winter. Both these amounts, we have been assured by the Honorable the Premier, will be paid us after the next meeting of the Legislature, and will provide for the loan credited to the Treasurer.

The accounts of the society have been duly audited and found correct by Messrs J. M. M. Duff, accountant, and J. H. Cayford.

The society is greatly indebted to Messrs. G. Cheney, F. Cole and others who have kindly contributed special prizes for competition, also to the members of the press for their courtesy in reporting its proceedings.

W. W. DUNLOP.

Sec.-Treas.

Moved by Mr. R. W. Shepherd, Jr., seconded by Mr. James McKenna :

That the Secretary's report and financial statement be adopted. Carried.

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The following report of the Library Committee was then read by M. Charles Gibb.

The Library Committee report as follows :

Number of books presented since last meeting.....	82
Number received in exchange for our reports.....	40
Loaned by Fraser Institute.....	13
Purchased.....	—
Total number of volumes.....	141

The greater part of these however are acknowledged in the 13th report of the society, as we acknowledge all received up to date of publication.

Amount spent on binding.....	\$8 80
Number of books in library bound.....	1032
Paper.....	98
Total number of volumes.....	1130

Although not properly a part of this report, we would mention that the Directors, last year, authorized the binding of 150 copies of the 10th, 11th and 12th reports, at a cost of \$25. These were used mostly for exchanges, and it was deemed necessary, owing to the number of bound volumes we receive in exchange for our paper covers.

The binding of these reports in quantity would cost about 10cts per volume and this committee would strongly advise the Directors to bind all reports in future needed for the members of the society or for exchange. Reports in paper covers are quickly lost, and their preservation by binding in cheap covers would compensate for the outlay.

Reichenbachia, the great work on orchids, which is being received in parts as they appear, is intended as a memorial to our late Secretary, Henry S. Evans. 28 parts have been subscribed for, we require 20 more subscriptions at \$2.75 each to cover the full expenses.

The library now contains about 1032 bound volumes and 98 unbound making a total of 1130 volumes, and the society may congratulate itself that it is increasing rapidly and at so small cost.

Respectfully submitted,

G. H. CHANDLER.
E. J. MAXWELL.
CHARLES GIBB.

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Moved by Mr. R. W. Shepherd, Jr., seconded by Mr. Walter Drake :

That the report of the library committee be adopted. Carried.

Mr. G. Cheney stated that he was surprised there were not more members and suggested to the incoming Board of Directors, a change in the manner of collection, he thought the subscriptions should be collected earlier in the season and that members should endeavour to get new names and the Secretary attend to the old ones, by this means the membership might be largely increased.

Mr. John Doyle asked for some information about the library and regretted that all the books were not for circulation to members.

Mr. Charles Gibb replied that about one third were for circulation, comprising all those which could be replaced in case of loss, but, that it was not considered advisable to allow books which could not easily be replaced to leave the building and, that this was the rule generally adopted in libraries of this kind.

Messrs. Edgar Judge and D. R. McCord asked for information with regard to "Reichenbachia" which is being subscribed for as a memorial to the late Mr. Henry S. Evans.

The President replied that some 19 subscriptions were required to complete the work. The following gentlemen immediately handed in their names for the number required: Messrs. C. J. Fleet, Edgar Judge, John Robertson, J. W. Molson and J. H. Joseph 2 copies each, R. Harvie, James Morgan, Jr., Colin Morgan, James Torrance, Hon. L. Beaubien, Thomas Hall, Walter Drake, D. Williamson, T. Williamson, one copy each.

The elections of Directors was next proceeded with.

Messrs. James Morgan, Jr., and Frank Roy were appointed scrutineers and after having taken up the ballot papers retired.

The consideration of the notices of motion made at last annual meeting to change By-laws 14 and 15 of this society was then taken up and the proposed changes read to the meeting.

Moved by Mr. Edgar Judge, seconded by Mr. J. H. Joseph.

That By-law No 14 be amended by striking out the following words "A member of the preceding year.

On this motion being put to a vote it was declared lost.

Moved by Mr. J. H. Joseph seconded by Mr. E. Judge :

That the subscription for life membership be increased to twenty-five dollars.

Moved in amendment by Mr. John Robertson seconded by the Hon. Louis Beaubien.

That it is not advisable to make any changes in By-laws 14 and 15. Carried.

The Scrutineers reported the following Board of Directors elected: Prof. D. P. Penhallow, Messrs. R. W. Shepherd, Jr., Charles Gibb, William Evans, E. J. Maxwell, A. Joyce, R. Brodie, W. J. Wilsire and John Doyle.

The chairman exhibited a plan of a proposed new building to be erected for horticultural purposes and gave an estimate of the amount required, and an outline of what had already been done by the Board of Directors in this matter.

Moved by Mr. C. J. Fleet seconded by Mr. D. Williamson:

That this meeting approves of the steps already taken by the Directors and that they be authorized to take further steps towards the consummation of this end. Carried.

The meeting then adjourned.

CONVENTION OF FRUIT GROWERS.

The annual meetings for the discussion of fruits were held in Mr. A. Joyce's hall, Montreal, on January 29th and 30th, 1889.

FIRST DAY.

The Convention met at 3 o'clock p. m.

Professor Penhallow, president of the Montreal Horticultural Society and Fruit Growers Association of the Province of Quebec, occupied the chair.

There were present: Dr. T. H. Hoskins, of Newport, Vt.; Messrs. R. Brodie, Charles Gibb, Abbotsford; N. C. Fisk, J. M. Fisk, Walter Roach, Abbotsford; Canon Fulton, R. W. Shepherd, Jr. Como, Abel Brosseau, W. R. Honey, Abbotsford; James McPhillips, John Hardisty, Montreal; A. A. Wright, Renfrew, Ont.; David Westover, Frelighsburg, Secretary of the Missisquoi Horticultural Society; J. C. Chapais, St Denis, Kamouraska, W. Gill, Abbotsford; W. Reid and others.

Prof. Penhallow opened the meeting with the following remarks.

LADIES AND GENTLEMEN.

We were greatly in hopes that the Hon. Col. Rhodes, recently appointed Minister of Agriculture, would be present at this meeting. He accepted our invitation to attend, and undoubtedly some serious circumstance has tended to prevent his being here now, but we hope to have him at a later meeting. As is customary, I will make a few remarks before we proceed to the ordinary business of the meeting. The annual return of our meeting must be a source of satisfaction to those who are interested in the very ancient and honorable pursuit of horticulture. Probably there is no occupation which can contribute so largely to culture, well being and happiness, and, I might add, to the physical strength of the people. Among the many good things the soil yields to the industry of the skilful cultivator well grown appetizing fruits are not the least prominent. Fortunately to-day abundant means of cheap transportation, a better knowledge of the laws of physiology, and the requirements of the human system, together with a more exact knowledge of the methods of cultivating and storing fruits, have all contributed towards placing the best fruit within the reach of the poor as well as the rich, and from an article of luxury it has come to be an item of necessity in daily life. Any disaster therefore which could by any possibility seriously impair this great industry would be regarded with serious apprehension as a public calamity. It is, therefore, with unfeigned interest that we watch the adoption of public measures which are destined to foster the growth of an industry of such large and far reaching importance as this. I need not of course remind you that it is one of the special functions of this and kindred associations to diffuse knowledge, which will aid in such progress and it is therefore a subject of great interest to us to observe what is being done outside the sphere of such societies. In Germany and England, schools for the advancement of Horticulture have been in operation many years, but on this side of the Atlantic we are unfortunately in this respect far behind, and indeed the defects are so well marked and thoroughly recognized that those who desire thoroughly skilled agriculturists are obliged to cross the water for them. This is by no means as it should be, but it is a deficiency which time will no doubt remove. It is true that our experimental farms, recently established, are likely to give most valuable assistance and encouragement within their own particular sphere, and as similar institutions in the United-States prosecute special scientific investigations promoting the cause of Horticulture we will be able to benefit by their work, through the publication of the results. I may add that it is also a most encouraging sign for the future of Horticulture to find a gentleman who is prominently connected with this art, and whose special qualifications in that

respect are so well recognized, called to the direction of the most important interest of Agriculture in this Province.

Before calling for the first paper on the programme, I would like to make an announcement which I have been requested to communicate to this meeting from the Natural History Society. It has been the custom of that society for many years to have annually a course of lectures known as the Sommerville lectures. For a few years past it has been their practice to have these lectures delivered in a literal series, so that there may be connection between them all. These lectures are being continued, and should be followed by all who are engaged in horticultural pursuits and who can manage to attend. The lecturers are Sir William Dawson, the Honorable Mr. Joly, Mr. Charles Gibb, Mr. James Fletcher of the Experimental Farm at Ottawa, and Mr. W. F. Skaife.

Dr. Hoskins delivered the following treatise on

IRON CLAD APPLES.

The subject which was assigned to me, that of American Iron Clad Apples is perhaps the most interesting one which the pomologists in our part of the country have to grapple with. But perhaps the term "ironclad" needs a little explanation. A great many people have asked me what was meant by that term. To many the term "Ironclad Apple" seems to have no meaning at all, but to those among us who have been engaged raising fruit in Northern Vermont and the Province of Quebec it has a very deep and serious meaning. Anyone who has been planting apple-trees for a quarter of a century as I have in the cold north, has abundant reason to know that there are a great many apples which are far from being ironclad. Nevertheless, the term is not a perfect one. What we in Northern Vermont and the Province of Quebec call ironclad, would not be considered so in Northern Minnesota. The fact is by ironclad we mean apple-trees which the cold of winter will not destroy or seriously injure, and the term can only be used in that relative manner. Thus the Red Astrachan and the Tolman Sweet are two apples which are regarded as ironclad in the Champlain Valley, for there the winter never hurts those trees seriously or their flower buds. But sometimes we meet with a tree the wood of which will resist the winter cold without apparent serious injury, and yet the tree will not bear well, particularly after a very severe winter. A very nice apple originating in the St. Lawrence Valley, the McIntosh Red, is with us, as regards the tree, hardier than the Fameuse. The same winter which will destroy the Fameuse will leave the McIntosh Red substantially unharmed, so that, if we would judge by that, we would say that the McIntosh Red was much nearer ironclad than the Fameuse. Nevertheless the Fameuse tree though it may be injured after one of the very severe winters such as we have

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had during the past four or five years, yet every branch of it left will be loaded with apples and will continue to bear until the branch itself dies. This is not the case with the McIntosh, and I take it, the reason is that the flower buds are more tender in the McIntosh than the wood buds. It is not of much use to have an ironclad apple-tree as regards the tree unless it is also ironclad as regards its flower buds. We have been looking with a great deal of anticipation to the Russian apples to furnish us with trees that will be truly ironclad. When we first realized the fact that the Duchess of Oldenburg would thrive almost anywhere in this Province, and certainly anywhere in the State of Vermont; when it was found to thrive in Wisconsin and Minnesota, and in sections where all other fruit trees are killed, and when it was ascertained that the tree originated in the Empire of Russia, we came to the conclusion that we might find there a class of tree which would fill all our needs; but as time rolled on we saw much less reason to feel confident that such was the case. The whole Empire of Russia lies north of the line between the United States and Canada and a great deal of it very much north. The great fruit-growing region of Russia is about twenty degrees north of where we now are. It may be that the winters are not any more severe than they are with us, yet their seasons are a great deal shorter, and that is what we have failed to give due weight to. The seasons being shorter there than here, the apples there which mature just before the cold weather comes on, will mature here a month or six weeks before that, during which time they are subject to influences which have a deteriorating effect. I do not despair in finding among Russian apples some which will be long keepers. In fact I have some myself which are long keepers, but the mere fact of long keeping alone, taken by itself is of small consequence. An apple may keep, and we may be willing it should for two years before we want to eat it, and there is one Russian apple with which I am acquainted, the Little Seedling, which I think, with fair treatment, will keep two years, but it is small, very poor in quality, and unattractive in appearance, and it is not likely to be worth anything in the market. We want an apple that not only will keep, but one that will sell, and therefore we must have one of fair size, attractive appearance, and of at least fairly good quality. The public taste, as regards fine points in choice fruits, is not so educated but that they are willing to take an apple which a connoisseur could hardly call first class. Take the Baldwin for instance. It is the great market apple of the district from Massachusetts westward to Lake Michigan; yet I think very few people who have fine taste in the matter of fruit would call the Baldwin a first class apple. Still if it is good enough to sell, and pay well, and to be highly valued not only as an apple for domestic use but for exportation, its cultivation is not to be despised. The Baldwin stands pretty high in the English market, and yet I read recently in a Horticultural Journal in London, that even over there they have found out that it is not a first class apple. Where

we are wanting is that we have not among the ironclads suited to this climate a very large number of long keepers. We are very deficient in that point and may as well acknowledge it. Yet, among those we have, are many very good apples. The native apples of this Province average high, I might say often very high in quality. There are hardly any of them that I could call poor apples, and they all have a fine appearance. Of course they have their defects owing to the ravages of the fangii, the seasons, etc., but aside from that if we can get a good cross from them with long keeping apples we will achieve a great success, and I believe we will. The fact that they average higher than the American apples is demonstrated by the fact that the Americans prefer them to their own. At a recent meeting of the Dairymen's Association in the city of Burlington, I met a number of gentlemen from Southern New England, among whom was the venerable Mr. Gold, who has been 20 years or more the Secretary of the Connecticut Board of Agriculture, and is not only versed in agriculture but in horticulture, and he says that the favorite apple on his farm in Connecticut is the Fameuse. And the Fameuse sells in Boston for an average of \$1.50 to \$2.00 more per barrel than the Baldwin. There it is known as the Snow Apple. In Vermont after we get north of the 42, 43 parallel of latitude, except in the Champlain valley, it is practically impossible to raise apples, but in the 23 years during which I have been experimenting in that line, I think I have satisfied my neighbors and the people generally of the North East section of Vermont that we can raise there all the apples we want, and need not depend on the lower country for any apples at all. In 1866 when I first settled in Northern Vermont there were practically no apples in that vicinity, and I hardly ever saw an apple that was sold at less than \$5 per barrel. Now we raise half the apples that we use in our own market, and that means more than that proportion compared with our former consumption, because all the towns and villages have sextupled in population since that time. We find that our trees, when we plant the right kind, stand as well, bear as well, and are as profitable as any orchards in New England, but still we must make some advance. We must have more long keeping apples. We want more apples of the winter class, that will keep at least through winter. The Roxbury Russet and the Baldwin are talked about as winter apples, but I think we must have a different classification. We have summer apples and fall apples, and what we call winter apples, in which are included spring apples. What we require is a spring apple that will last until summer fruit comes in. That has been the object of my most anxious search, and among the Russian apples I have not been able to find it. The only apple we have that will keep among the Russians is the Borsdorf, which under favorable conditions will grow as large as the Fameuse. This tree grows in the grass, and the apple is of good quality for home use. For that purpose I would recommend a few trees, but it will never pay to export. The most hopeful apple we have now among us, is an apple that like every other has its faults, but it is one which, with a little more patience

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will become a leading market apple. I allude to the Bethel of Vermont. It originated in the White River Valley and is a large handsome apple, and a good winter keeper, fully as handsome and the tree as good a bearer as the Baldwin, but its fault is that it does not come into bearing very young. I am in hopes however that by top-grafting it on some of the summer Russians which bear so young will bring it into bearing sooner, and I am encouraged in that view because some of my experiments have shown me that tardy apples can be hastened by grafting them on the Tetofsky and other quick bearing trees. The Tetofsky is a tree which bears very young and small, before it is six feet high. There are among the Russian apples some very slow in bearing. There is the Prolific Sweeting which, root-grafted will not bear until 14 or 15 years, but I have trees not half as old as my root-grafted, top-grafted on Tetofsky, which bear so plentifully that they have to be propped. I hope the Bethel top-grafted on the Duchess or Tetofsky or some other quick bearing variety will come into bearing sooner, and then it will be a very valuable fruit. The Bethel is like the McIntosh Red, the flower buds are not very hardy but I believe that down the St. Lawrence valley, the Bethel, top-grafted on the Duchess or Tetofsky or other quick bearing Russian, will give an apple that will suit the market, and be at least of a quality equal to the Baldwin and be placed on equal footing with it on the English market. I believe that it is proposed at this meeting to discuss the question as to whether there is more than one variety of the Fameuse. Now, the Fameuse has always been a great favorite of mine, and I have taken a great deal of interest in collecting specimens in different directions. I have come to the conclusion, which may seem exaggerated, that instead of there being one or two kinds of Fameuse there are about 300. The Fameuse is an apple grown exclusively in considerable large orchards in the Province. Now the reason why the apples do not come true, or proximately true is, because the seed is taken from trees which are grown near trees of other varieties, and it is my impression that where apples grow all one kind in an orchard, seeds taken from the trees in that orchard will re-produce pretty nearly the same variety. I am inclined to think in many cases the Fameuse is reproduced so exactly that the seedlings pass right along for genuine Fameuse. But they vary also in reference to the stock and the soil. I was shown some Fameuse trees in Vermont all grafted from the same tree. Two bore the Fameuse rouge, red all over, rather smaller than the striped Fameuse; the other four bore the striped Fameuse, but scions taken from those trees do not reproduce back. I understood the nurserymen got them all from the one tree. That is pretty conclusive evidence that there is no absolute distinction between those varieties. We have apples that look very much like the Fameuse and have the white flesh of the Fameuse. The St. Hilaire, because it is a little finer looking apple, is used to top off barrels of Fameuse, and to the ordinary observer it is not easily detected as being a different apple. It is not only in Canada

that the Fameuse seedlings exist, for the Fameuse is a popular apple all over Vermont.

Here is a seedling Fameuse which evidently is not the Fameuse, but will pass very well for it with people who only want a good apple, and it has a taste like the Fameuse and the white flesh. The Shiawasse of Michigan resembles the Fameuse, but I do not think it would pass as such. The Shiawasse Beauty spots as badly as the Fameuse in some parts of the Province. With me it does not spot at all, but I would despair of being able to sell it as Fameuse, because it is a flatter apple, the color is not the same, and the flavor quite different. It has the white flesh, but is distinctly more acid than the Fameuse, and it could be easily sorted out amongst the latter. In regard to spotting, I suppose I have the worst place for spotting you could find anywhere, and when I first came to your fine orchards here it took me as long to find spotted Fameuse as to find a fair Fameuse in my orchard; but I am sorry to say that has all changed. A great obstacle to raising the Fameuse with me is the fact that we have to throw away half our apples, but the people like the apple so well that they are willing to pay \$1.00 more per barrel for it than for others. This apple is worthy of trial although of course it will not replace the Fameuse.

The Wealthy is one of the ironclad American apples which you all know something about. I have been growing it 16 or 17 years and I do not think the fruit can be beaten for its season. But the question is, what is its season? With me it is all winter, but in this valley where you are, one thousand feet lower than we are, and 1500 feet lower than the country around Lake Memphremagog, you do not find the Wealthy keeps any better than the Fameuse, but in the hills the Wealthy can be grown, if handled properly to keep to the first of March without any great loss. That is the way I find them, but I take them as soon as they are fairly colored and put them in the coldest place I can find, and keep them there where they are not subjected to changes of temperature. When gathering my Fameuse, I thought I would take a load up the country in my spring waggon, but owing to the bad roads I did not care to bring my waggon so far. About two weeks afterwards I went into the barn and thought it smelled very good. I found the apples perceptibly warm, and pulled one out in the middle of March. I found it in nice eating order. That gave me a hint, and now I have the Wealthy, a good eating apple at any time from the middle of October to the 1st of March, then they begin to rot so fast that it is best to get rid of them. Down here, near the river, I do not think it is any better in October than the Fameuse. In our country on the North side of the river, you will find the Wealthy can be managed so as to keep until the first of March. I will say a few words about another American ironclad, the McMahons White, of Wisconsin. It is a very vigorous and thrifty grower, often more so than the Duchess when young, but

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it does not come into bearing quite so early as the Duchess. When it does come however, it comes with a rush and the first crop is a full crop. The tree is very strongly branched and the branches do not break down with the weight of the crop. They are a nice green apple with a red cheek, and they succeed the Duchess and are about the same quality. Some people like them to eat, but their taste is not the same as mine. They are a large nice apple, just what the ladies want for a pie apple as one of them will make a big pie.

The longer you keep the Duchess in cold storage the better it is. I have a cool cellar, and as soon as the Duchess this year was fully colored, I packed carefully into baskets about 20 bushels, and after they were in fine condition I sold them.

Northfield Beauty was produced from the seed of the Siberian crab, according to the producer, and no doubt if so, it was a cross bred apple. It is as hardy as the Wealthy, and is fully as good in color and as handsome. It does not bear so much but it bears enough. The Wealthy bears too many apples, and it hurts the tree to bear too young and too much, the result being the trees are short lived. I do not think we can depend on them for more than six or seven crops, and it is hard to prevent them bearing, as, at the present price of apples, it does not pay to thin them.

I think the Northfield Beauty is worthy of trial in Canada. It has stood all the hard winters of past years without much loss or injury, but it bears a smaller crop than the Wealthy.

I have got a pretty good apple that keeps all winter. It is the Scott's Winter which was found growing in a farmer's orchard on the shore of Lake Champlain. The original tree is about 27 or 28 years old. It is a good looking apple, but the size is small.

These are specimens of the Scott's Winter grown, in an orchard on pretty good land but not in grass. The apple is sharp and sour all winter, but as soon as the weather begins to moderate in the spring it gets better. It is one of the long keepers that gets better in cold weather. Those people who like sour apples are very fond of this and I can sell as many as I like. People want an apple that they can keep till April and May. For an apple which is a fine dessert apple and will keep as long as the Scott's Winter, I would recommend the Iowa Russet. I have one tree about 16 or 17 years of age, and as yet it has never suffered the least particle of injury. It is a handsome highly polished apple and the tree is a prolific bearer. It does not come into full bearing until the trunk is about three to three and a half inches in diameter. It originated in the private garden of Professor Budd of the Iowa Agricultural College, before he came to the College. The more I see of this apple the better I like it.

A voice:—Is it likly to spot?

Dr. Hoskins. I never saw a spot on in. However the McIntosh Red spots as badly as the Fameuse.

Mr. Gibb. How long has the Bethel been known?

Dr. Hoskins. It has been known in the White River Valley as long as thirty or forty years, but it has never extended beyond there. A farmer went through there twenty five years ago to St. Lawrence County, New York, and a man named Clarke got from him the scions of the Bethel, and propagated it as the Snow Apple, and it was known as the Snow apple all through the St. Lawrence County.

Mr. J. M. Fisk. Do you recognize the Bethel as the apple known in Huntingdon as the Winter St. Lawrence, and in Shefford and Missisquoi as the Shaker Pippin?

Rev. Canon Fulton. My idea of the spot is that it is caused by the apple first being punctured by an insect, which causes a microscopic amount of juice to ooze out. That stops the dew drop until it has evaporated, and a black deposit is made which may be wiped out and which does not injure the skin, but the sun's rays are absorbed by the black, and a hole is burnt the same as the black oozing out of the sap would burn the bark of a tree, and if the summer is wet then a lichen forms around the organic matter that is left.

Have any experiments been made to test this?

Professor Penhallow. No systematic attempt has been made in that respect here. There have been a few experiments made upon a somewhat systematic plan in the United States to overcome the spot by external applications, but, so far as I am aware, none have yet met with definite success. It is rather a difficult matter 'o treat those fungoid growths either externally or internally. Some success has been met with in both directions, but it requires more systematic research than we have yet made. With reference to Canon Fulton's remarks, the observations as to the spot made within the past two years show it to be a distinct growth which originates first in the interior of the apple and progresses through the epidermis, and then diffuses from the centre of the black spot, and it forms a scaly coating on the surface of the apple.

Canon Fulton. You can take it off in the first instance and leave the apple perfectly clean.

Professor Penhallow. That may be true because it does not extend very far in the interior.

Canon Fulton. I am satisfied that in apples which have the spot, you can cut the spot off in all of them and you will see it does not come from the inside.

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Professor Penhallow. It is chiefly superficial.

Rev. Canon Fulton. It would not be organic then in the tree, and it is well known that some Fameuse trees will in favorable years grow fruit free from spots. Take one of those spots, and looking at it through a microscope you will see like a diamond drop on it, and according to the position the apple is in, you know the quantity of organic matter that would be deposited in a month and would adhere to it. The damage depends a good deal on the sun's rays striking the fruit. I have no doubt organisms have something to do with it and that it is not in the tree.

Mr. J. M. Fisk. I would just call attention to the Bethel I do not know whether it is understood that it is the same as the Shaker Pippin and Winter Lawrence.

Rev. Canon Fulton. It is not exactly the same.

Dr. Hoskins. It is a handsome fine spreading tree, one of the handsomest in my orchard, but it is in a rich spot.

Rev. Canon Fulton. With me it is not a great grower, but just about the same as the Alexander.

Mr. J. M. Fisk. The Alexander is rather a spreading tree.

Rev. Canon Fulton. No, it does not spread very much in our County.

Mr. Westover. It is the apple shown at our exhibition as the Shaker Pippin but as Dr. Hoskins has called it the Bethel and seems to know its history, I am willing to accept that name. In one place it is called Shaker Pippin, in another the Bethel, and in another the Winter St. Lawrence. It is constantly coming up in different sections under different names.

Dr. Hoskins. The apples may look alike and not be the same apple.

Mr. Westover. The tree generally agrees with the description the Dr. has given, a hardy, thrifty, healthy bearing tree, rather slow, but not remarkably slow.

Mr. Fisk. What is the difference between Yellow Transparent, Charlottenthaler, and Grand Sultan?

Dr. Hoskins. I cannot say. I have planted all of them quite extensively. One experiment I tried was to plant a row of Yellow Transparent scions alongside a row of Grand Sultan. All the Yellow Transparent scions came from the United States importation in 1869 and 1870. I planted a row of Grand Sultan and a row of Yellow Transparents. The result of that experiment was that in about eight years every one of the Grand Sultans were dead and the Yellow

Transparents were as good as ever. I would not be afraid to wager that when the apples are picked you could not tell the one kind from the other. The Charlottenthaler and the Grand Sultan are exactly the same kind and died young. If you want to make money out of the Yellow Transparent you must raise them in your garden and will get fruit of large size. I had a good many and sold them in the stores for a cent a piece.

Mr. J. M. Fisk. I have had the same experience in regard to the appearance of the fruit in these three varieties. When I mix up the apples in the same basket I cannot tell which is which, but if the trees are mixed I can pick them out one from the other. I have not had the experience of Dr. Hoskins with regard to planting.

Mr. Brodie. The trees I got for Grand Sultan resemble the White Astrachan.

Dr. Hoskins. If you cannot tell them from White Astrachan, you have not the Grand Sultan. The trees are entirely different in appearance, and the fruit is different in season. The White Astrachan is later than the Grand Sultan and the Yellow Transparent.

Mr. Brodie. I sold two barrels of the Yellow Transparent in July last year.

Mr. J. M. Fisk. Dr. Hoskins speaks of the Wealthy as being a better keeper on high ground than it is with us. Does it fall before ripening?

Dr. Hoskins. It does not fall before it gets ripe but it gets ripe too soon. As a rule it is not natural for apples to fall until they are pretty nearly ripe. My rule is to gather them just as soon as they are fairly colored and put them in a cold place. I have a cool deep cellar where I put them at once, and I gather them in the morning before the sun is up. That makes a great difference.

Mr. Gibb. With regard to the Grand Sultan, the Grand Sultan that was imported by Ellwanger and Barry of Rochester N. Y. is White Astrachan. The Red Transparent of the same importation was also White Astrachan.

Mr. Brodie. I got them as Grand Sultan from Mr. Fisk.

Dr. Hoskins. The White Astrachan was imported into New England at the same time as the Duchess, Alexander, the Red Astrachan and the Tetofsky. The White Astrachan was poor and we have planted apples that looked better and sold better.

Mr. R. W. Shepherd Jr. I have grown the Wealthy longer than anybody in this district and was the first to put the fruit on this market, and I find the Wealthy is a very valuable and hardy tree but has many faults, the chief of which is its over-bearing. This year, I could not sell fifty per cent of my crop because the apples were too small. I find that the last in the barrel are in as

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good eating order as the Fameuse. I have exported them in cases to Hamburg, London, Glasgow and Edinburgh, and the reports I have received show that they arrived in excellent condition. It would be a most valuable apple in this district if we could devise a plan for preventing its overbearing.

Dr. Hoskins. I have about 400 trees of the Wealthy, and on going through my orchard I find they are now in the best condition.

A voice; Are they as liable to spot as the Fameuse.

Dr. Hoskins. They do not spot at all.

Mr. Brodie. I barrel the Wealthy at the same time as the Fameuse, and take them off the ground more than off the trees. I agree with Mr. Shepherd that they are inclined to overbear.

Mr. Wright. The Northfield Beauty would never grow with me because it was not hardy. Another apple I have is the Magog Red Streak which is quite hardy. I have never lost any Yellow Transparents, and I find the Peach of Montreal is the hardiest tree I have.

Dr. Hoskins. The Wealthy has taken the wind out of the sails of the Magog Red Streak.

Mr. Shepherd. The Scott's Winter is the best winter apple for commercial purposes, that we grow.

Mr. Jack. Have you ever attempted to trim your Wealthy apple trees?

Mr. Shepherd. I have tried it. A few years ago four of my trees were girdled by the mice. They were then pretty small, about the size of my wrist. We cut off a branch from the top and bridged over so that the sap would pass over the place that was injured. To do this we cut off the tops of the trees. These trees that were thus arranged bore about one dozen each. They were the largest Wealthy I ever saw and I exhibited them. That gave me the idea that if we pruned down our Wealthy heavily it might be well, and I intend next spring to cut off the tops of the Wealthy. They are growing like poplars, and the pruning will make them bear larger specimens of fruit.

Dr. Hoskins. I would suggest that experiments be made in top grafting the Wealthy. No orchardist in Maine, New Hampshire, Southern Vermont or Connecticut ever plants the Baldwin without top-grafting. It will be the same with the Wealthy. If you are going to top-graft, find the kind it is best on, and top-graft on that.

Professor Penhallow. Would Mr. Shepherd state to what extent he pruned down?

Mr. Shepherd. I took off about 25 per cent of the top.

THE MOST PROFITABLE VARIETIES OF APPLES.

Mr. D. Westover. I will give a short list of the varieties I have cultivated. I find mostly that the old varieties are not up to the new kinds that have been shown here to-day. The apple I have found most profitable for an early apple is the Red Astrachan. Also the Golden Russet, the Ben Davis, the Alexander, Duchess, the Wealthy, Tolman's Sweet. I would confine myself if I were planting, largely to those varieties. As an early apple I find the Red Astrachan the most profitable of any. The Duchess is hardier and a very fine apple but a little too late for an early apple. The Scott's Winter, the Wallbridge and some others I have tried, but have been rather disappointed in them. They had drawbacks which prevented their being profitable. The Longfield is very promising and has kept pretty well.

Mr. Brodie. The Fameuse still takes the lead with me as the most profitable variety. The next is the Duchess of Oldenburg; the Duchess grows better in Quebec than in any section farther south. The Alexander is third on the list, and this season has produced magnificent fruit. The St. Lawrence comes next. It matured later this year on account of the cold season and did not bring as good a price as the Alexanders. The next on the list is the Ben Davis, which with me kept until the month of June, and the price compared very well with the prices of the others. I have about six trees of this variety, planted nine or ten years ago, and they gave me seven barrels of a crop. Out of nine trees of the American Golden Russet of the same age I only got three barrels. The quality is not the best but they will always sell well in the spring of the year. I was the first to sell the Yellow Transparent, which is a heavy bearer, and I got a fancy price for the apples. The Wealthy this season has been poor with me, as I had to pick too many off the ground. They require to be pulled earlier, about the same time as the St. Lawrence or shortly after to do well with us. There are many promising new varieties, such as the Utter's Red, and an apple which I got from Mr. Lacombe, as the Nonpareil. The latter has a vigorous growth very much like the Montreal Peach and bears heavily.

Mr. Shepherd. How old are the Utter's Red;

Mr. Brodie:—About 10 years, I also fruited the Belle de Boskoop for the first time this season, they are of quality, and in appearance like the Ben Davis; the trees were literally crowded. I can grow varieties which it is hard to grow in Shefford and other places.

Mr. N. C. Fisk :—I think you will find a great many differences in varieties as to profit, and locality has a good deal to do with it.

The following papers on the subject of the best five varieties were read.

FIVE VARIETIES FOR PROFIT.

G. E. ROACH.

Duchess. This I consider the most profitable apple we can grow. Tree very hardy, annual and abundant bearer. Fruit fine and even in size and as yet has always sold for a good price, one of the best cooking apples and very fine for eating when ripe. Well worthy of general cultivation.

Fameuse. I still hold to this as coming next to Duchess for profit. The tree is one of the hardiest and a heavy bearer. Although the fruit is not even in size and apt to spot yet it will average well, tree for tree, with any other variety except Duchess. Is in good demand in our market and in its season I can sell three barrels to one of any other variety.

St. Lawrence. This is a well known variety. Fruit as a general thing large and fine. One of our best table apples and although not a good keeper sells readily in any market.

Tetofsky. Tree hardy and an abundant bearer. Fruit of medium size and of fine quality. One of the earliest to ripen and sells readily.

Red Astrachan. Although this tree is not one of the hardiest yet I have found it very profitable. The fruit is fine and well colored and a good table apple, bears heavily every other year. The great fault is that it ripens its fruit unevenly, yet if you have a number of trees to pick from this is not of much consequence.

In our local market, St. Hyacinthe, it brings from 50c. to \$1.00 more per barrel than Duchess.

N. C. FISK.

I have been requested to say a few words as to the best varieties of apples for profit and general culture.

There are various opinions as to the best varieties, and we find that able and experienced men from different parts of the Province differ, and locality, soil, and proximity to market, would cause a difference in profit.

For instance Yellow Transparent, and Peach are both profitable varieties, when produced in a locality close to market, and can be sent there without injury, they will not however compare with the Duchess for profit, if subjected to rough transportation or delay.

A great deal depends on the condition of an apple when it arrives in market, as to the profit, and it is well understood, the higher the color of an apple, the better it pleases the eye, and the bruises show less.

I think one who wishes to plant an orchard and have fruit for the different seasons would do well to plant as follows :

For summer varieties:—Yellow Transparent and Duchess of Oldenburg :

For autumn and early winter:—St. Lawrence, Wealthy, Alexander, Fameuse.

For late winter, Canada Baldwin, where it will answer, and Golden Russet Ben Davis, Winter St. Lawrence.

As to the most profitable variety, I think it is pretty equally divided at present, between Duchess, Wealthy and Fameuse.

The Fameuse would be the most profitable variety of all, if it did not spot, notwithstanding this blemish it holds its place well as to profit.

It was thought the Wealthy would keep longer than the Fameuse, but, as far as my experience extends, it ripens earlier and does not keep any better than Fameuse.

The season of the Duchess, is short, but not so short as most summer varieties.

As to hardiness of tree, the Duchess stands first, Wealthy second, Fameuse third.

Duchess :—I place Duchess first, for the reason that it is one of the hardiest and most productive varieties we have. A tree that adapts itself to a variety of soils, and fit for general cultivation. The fruit is of good size and appearance, and is so free from scab to cause little or no waste. It cannot be called a first class table apple, but it takes the market well and commands a ready sale.

Fameuse :—To Fameuse I give second place, although it varies so much from year to year in producing clean fruit as to affect its commercial value, it is an apple of such high quality as to become a general favorite with all who know it, being the first sought for on the market in its season will always sell, even if not quite free from spots. This fact, combined with its productiveness, must cause it for a time at least, to retain its position as one of our best.

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Wealthy :—For third I place *Wealthy*, on account of its hardiness, productiveness, and clean appearance of fruit. It rivals *Fameuse*, but it does not keep as well, and in quality will not compare with it, nor does it hold to the tree until fully ripe and well colored as does the *Fameuse*, but it is a fruit of good quality and if picked early, will ship well and return a good profit per tree.

Yellow Transparent :—To *Yellow Transparent* I give fourth place, Although this variety is not so generally grown as is the *Red Astrachan*, it was imported by the U. S. Dept., of Agriculture in 1870, and ripens earlier than the *Astrachan*.

The tree is equally as hardy, more upright in growth, and more productive, while the fruit is not so attractive in appearance it is less acid, a good table fruit, and on account of its extreme earliness will command a ready sale at remunerative prices.

Alexander :—Although this apple is coarse in texture, its extreme size and beauty would alone, if necessary, keep for it a place among the leading commercial varieties. But it has two other good points, it is hardy, and productive. The fruit although large hangs well to the tree, and when in full bearing makes as pretty a sight as any tree in the orchard.

Mr. Shepherd. In making out a list of the most profitable varieties, it would be well to take an average over five years because a tree which may do well one season may not be profitable in the others. Two or three years ago, in a paper which I read at one of our meetings, I said, that I did not consider the *St. Lawrence* was a profitable tree at all, but since then I have begun to think that the *Fall St. Lawrence* is profitable. The trees are 15 years old, and if I were to give you the profits of trees for the last year, they would rank as follows; The *Fall St. Lawrence* yielded \$4.75 in fruit; The *Duchess*, \$3.70; The *Canada Baldwin*, \$3.00; The *Winter St. Lawrence* and *Fameuse*, \$2.50; The *Wealthy* \$1.75, which is accounted for by the fact that 30 per cent were not saleable. We had high winds last fall and the weather was unusually stormy which went against the *Wealthy* and the fruit was knocked to the ground before it was rightly colored and saleable, but for an average of five years I would put the *Duchess* first, the *Fameuse* second, the *Wealthy* third and probably the *St. Lawrence* next. Then there is the *Switzer* which I consider very satisfactory. The *Scott's Winter* will pay to grow as a late winter apple, but situated as I am it does not pay me to cultivate late keeping apples. My most profitable apples are the *September* and *August* ones. I can send them to *Montreal* in two hours and a half, and put them on the *Montreal* market, and thus I find the *September* apples the most profitable.

Mr. N. C. Fisk. Do you not find the *Duchess of Oldenburg* the most profitable summer apple?

Mr. Gibb—*Capt. R. T. Raynes, Forden, Cote St. Antoine*, has found *Alexander*

the most profitable, no other variety has yielded as much money per tree. Two years ago he sold the fruit of one tree for \$23.75, this tree is about 25 years planted and under good though not extra cultivation. Peach and Duchess have proved the next most profitable.

Mr. Shepherd. Yes, I do not fancy the Red Astrachan except for home use. The Yellow Transparent I think will be profitable.

Mr. N. C. Fisk. It depends altogether on locality, I cannot agree with Captain Raynes about the Montreal Peach. They are the hardest to sell on the Montreal market in my opinion. I was glad to sell some at 25 cents a bushel last year. It does not do to barrel them at all as the least shaking in the waggon will bruise them badly.

Mr. Honey. It is a good idea to take an average of five years and let the grower make a statement of how much he has realized from each tree. Two years ago I showed Mr. Fisk four Duchess trees on which I made \$30. This year the St. Lawrence has been the most profitable apple we had because they kept well into October, and they retailed from 20 to 25 cents per peck in October, when we were glad to get 15 or 20 cents per peck for Duchess of Oldenburg.

Dr. Hoskins. What I said would not have much bearing to people who have ready access to the Montreal market. The Duchess is an apple that everybody can raise and you cannot help its bearing. I have never shipped any here but have sold them to be shipped here. The merchants brought me the barrels and I furnished the apples at \$1 per barrel. They pay well enough at this rate, but I cannot reckon them as profitable as Transparent which I have sold at one cent a piece.

Mr. N. C. Fisk. You have never shipped Yellow Transparent.

Dr. Hoskins. I do not think it would do to ship them in barrels, but it would do to ship them in crates.

Professor Penhallow read a telegram from the Hon. Col. Rhodes, saying he could not attend the meeting but he had the pleasure to inform the Association that the sum of \$1,000 would be placed on the estimates to be voted to this society.

Mr. Brodie. Mr. Honey mentioned the Red Astrachan as one of his most profitable apples. I have trees ten to twelve years old but after they bear a crop you will find the following year the limbs dying off gradually. I would rather have the Duchess as regards profit.

Mr. N. C. Fisk. I could make more money out of the Duchess at 25 cents than out of the Red Astrachan at \$1.

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Mr. J. M. Fisk. For the last two years I have been troubled with a small worm in the month of June which attacks every apple except the Red Astrachan. Have others had a similar experience?

Mr. Brodie. I have had no experience of that worm in my orchard.

Professor Penhallow; Are the ravages simply confined to the leaves?

Mr. J. M. Fisk; Yes.

Mr. Brodie. Does Dr. Hoskins think that our cold seasons have anything to do with the scab on apples. 1887 was a remarkably warm season and it was the first season we had clear apples. Before that the seasons were cold and the apples were badly spotted.

Professor Penhallow; With reference to the attack on the trees by insects I visited Mr. Fisk's orchard but unfortunately it was long after the insects had attacked it so that there was nothing to be observed in that respect. It would be extremely desirable when the insects again appear to catch one of them so that they might be identified.

Mr. Jack. I know of parties who forwarded specimens to the Agricultural farm but there was no report.

Professor Penhallow; It sometimes happens that the attacks of insects are confined to trees which are in a diseased state. Some insects were first found in Maryland and have now worked their way northward as far as New York, and it is curious that these insects have never been known to attack a healthy tree. We have to keep that fact in mind in considering its operations.

Mr. Fisk. With me this insect attacks even healthy trees.

Mr. Brodie. My Alexanders were all sent to Quebec and realized from \$2.00 to \$3.00 a barrel, and we sent about 30 or 40 barrels.

Mr. N. C. Fisk. How I come to know that they decay so easily is because I sent a carload which was not delayed more than ten days and the Alexanders were in worse condition than the St. Lawrence although both were sent at the same time.

Mr. Honey. They must have been picked during the heat of the day and were heated up when they were sent?

Mr. N. C. Fisk. No, they were picked during the cool part of the day and carried into a fruit house.

Mr. J. M. Fisk. As a rule Alexanders will keep better than the St. Lawrence.

Mr. Brodie. A number of years ago some of my Alexanders rotted on the trees a little and I did not know the reason.

Mr. N. C. Fisk; I have kept them till February but when you come to barrel them they seem to heat and become rotten.

SPRING *versus* FALL PLANTING

Mr. J. M. Fisk. All varieties are better planted in the spring in our climate.

Mr. Shepherd. My experience is to raise the tree out of the nursery in the fall, heel it in, and plant it in the spring. It makes better growth than if taken right out of the nursery in the spring.

Mr. N. C. Fisk. What benefit is there in taking up a tree and heeling it in? If you let it stand in the nursery until the sap starts and the bud expands then it is a disadvantage to take up the tree, but if you take up the tree before the circulation is started it is certainly better than taking it up in the fall and heeling it in. There is no advantage in the latter method unless you want to take the tree from a distant place and plant it early.

Mr. Shepherd. The tree gets such a shock taking it up in the spring and planting it at once that it does not recover for sometime. If you take it up in the fall when it is in a dormant state and heel it in at once there is a natural healing process going on during the winter. If you take that tree up in the spring you will find a healing process going on and the tree makes better growth.

Mr. Brodie. I agree with Mr. Fisk. When heeling in there is always a risk no matter how well you do it. I heeled in 200 trees quite carefully. In some the bark ripped on one side, and spoiled the tree ever afterwards.

Mr. N. C. Fisk. They often heat too.

Mr. Brodie. Yes. I planted 400 trees right out of the nursery and I do not think I lost 10, which is good for a dry spring.

Mr. J. M. Fisk. The greatest advantage in fall digging is that you can get the varieties you wish to obtain from a nursery much more readily than in the spring. I have taken a tree from the nursery when it was starting into life and that never checked its growth. When we take forest trees to plant we do not take them up and heel them in, but in the spring take them from the woods and plant them at once. The greatest advantage is the fact that parties ordering trees secure them to be planted in the spring and the nurseryman works off his stock to better advantage.

Mr. Jack. Do you not think that if taken up in the fall the roots become calloused, and form roots more readily than when planted in the spring?

Mr. Gibb. There is a distinct advantage in taking up a tree in the fall, then

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heeling it in, and planting it in the spring. I heel in and cover only the roots, but just before the last cold weather I throw a lot of earth on the trunks as well as the roots. If this covering is done too early the trees will heat and become worthless. One spring I planted 144 budded trees. The trunk of a budded tree is never quite straight. After the trees were planted I could tell which side had been up, and which side had been next to the ground as they lay in the trench during winter. The branches which were exposed above the snow did not make anything like the growth that those did which were next to the ground. That showed the distinct advantage of taking up in the fall and heeling in for the winter. I have heard Professor Budd say that the best time to take up a tree was in the spring when the buds were beginning to swell. I tried that a year ago in planting out an orchard of some 30 varieties. These trees made hardly any growth and needed continued nursing that year, and next to give them a start. The trees shiver during the winters in our climate, and receive an additional shock in transplanting.

Mr. A. A. Wright, Renfrew Ont. I am in favor of spring planting except in certain cases. I live in a very northern section.

Mr. N. C. Fisk. If you take up a tree in the fall you do better to plant in the fall. I took up 300 in the fall and planted them, and for three years I lost only one per cent. I lost only three trees out of the 300. They were planted the first of November just as they were taken out of the nursery. I planted five varieties.

Mr Wright. I should say if there was a difference the early varieties should be planted in the fall.

It being six o'clock the Convention adjourned.

The Convention re assembled at 8 p. m., Mr. Charles Gibb, Vice President in the chair.

Mr. Gibb. Apple growing like other industries has its vicissitudes, and this year the consumers have the best of it, and we who are apple growers are not very happy. Captain Raynes told me that he had sold the produce of his orchard for \$75 the past year, that is for the surplus over and above the needs of his family and friends, while in other years he has sold the surplus of his orchard for \$2049. But this state of things is not altogether a new experience with us. In 1837 or 1838 really good Fameuse, shipped from Montreal, brought on the wharf at Quebec only \$1 per barrel. Since then good Fameuses have realized \$6.00 per barrel. I will call on Mr. McBride to give us a paper on the market aspects of fruit growing.

Mr. J. T. McBride read the following paper.

MARKET ASPECTS ON FRUIT GROWING.

Being asked by Mr. Gibb to put down a few thoughts about "How to make most money out of our fine Canadian apples;" I have much pleasure in giving you the experience of thirteen years in American and Foreign markets, hoping to give some thought or hint that will be of service to one or many.

To open the subject allow me to say a few words regarding the packing of apples; in far too many sections little or no care is taken in this department, the fruit is pulled in a very violent manner. In some remote districts they still resort to the old plan of shaking or clubbing. After being pulled it is thrown into a basket or box, then carried and dashed on a pile somewhere in the orchard. In place of these methods, the greatest care should be taken to have all apples picked with as much care as that with which eggs are handled, for every bruise deteriorates their value, as well as injuring their beauty and keeping qualities. Instead of being dumped in heaps, they should be quietly put into barrels, which previously had been placed in different parts of the orchard. When filled these barrels should be drawn into the barn, or under cover somewhere, where rain or snow will not reach them. This plan also possesses another advantage, viz the packers can proceed daily with their work, be it fine or otherwise, thereby saving time and money. We would also suggest packing aided by a table which is more rapid, more convenient, and the packers can cull more closely.

Too much care cannot be taken with regard to packing, it always has and always will pay to cull closely, never put an apple into a No. 1 barrel that you would not be pleased to see on your own dining-table. There is a demand for No. one, two, and three. No. two's often bringing within a fraction of No. ones, but a barrel into which everything has been shovelled, and branded "finest hand picked Canadian apples" is sure to get some one into disrepute. It is needless to say all apples should be put into new barrels, carefully faced, well selected, thoroughly shaken and judiciously pressed. As you know a Russet requires and will stand more pressure than a Peach apple. No barrel should ever leave a Railway station or Steamship landing, where the least slackness is perceptible; for if any such are shipped, depend upon it your account sales will be disappointing, or if sold on order a most unpleasant letter will soon be in your Post-Office box. Salck barrels please neither man or woman; all barrels should have lining hoops on tops and bottoms. Our early apples frequently bring more money when shipped to market in baskets, but new baskets, pretty covers, and neat address cards, should invariably be used.

All very small, spotted, unshapely or bruised fruit should be dried, evaporated or made into cider, it will never pay to put such into barrels or baskets, and then add freight and commission.

In former years we made money by handling apples. Latterly it has not

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paid to do so, the fruit that now makes most money is what reaches market first, that is of each variety as the season advances, the same rule holds good in all branches of the green fruit trade. Last December we received magnificent California peaches kept in Chicago in cold storage, and found it difficult to secure even as high a price as was readily paid in October, the demand now is for the first of everything, not the last; fruit out of season is difficult to place with profit.

All barrels should be plainly marked with a stencil; the variety of apples, the packers name and address, also to whom they are consigned, stencils are cheap, any commission house will gladly supply them gratuitously. We are not all good at spelling and writing, a mis spelt variety, or badly written address, will to some extent depreciate the selling price of a fine lot of apples.

Being in the commission business we hesitate before saying much about the consignors of apples. But we honestly think that if no local buyer, or firm offer is at hand it will pay all growers to rush their apples off as soon as possible to some reliable house, where there is a daily demand, who will make sale at highest market price, and remit with account sales promptly. It is always best to be personally well informed regarding prices, so if you have a good offer made at home, take it, but if such an offer is not at hand put your apples where they will most readily come in contact with a purchaser.

We think there are too many varieties of apples grown, some kinds when properly culled and packed will always sell, but many outside or poor apples have to be imposed on customers, who very unwillingly accept them. When a buyer orders his winter supply, he generally asks for Baldwins, Spies, Greenings and Russets, he will not object to a few barrels of Cranberry Pippins, Kings or Spitzenburg but into each car we are compelled to put a few Tolman Sweets, Rambos, Swaars, Wageners, Fallwaters, Red Streaks, Sweet Russets, to say nothing about twenty different winter Pippins, which no one knows whence they came, or when they will end. All such outside and undesirable kinds should be grafted, the same remarks hold good regarding fall apples, we receive some magnificent luscious fruit, but we also have to take into store many that should never be packed or marketed, in many instances it does not pay the expense of packing and shipping, no one is to blame except the quality of the fruit.

A few words about other fruit such as Pears, Peaches, Berries, Cherries, Currants, and Grapes, the same rule applies to small fruit as to apples, they should all be handled with the greatest care, packed and shipped in the most attractive style, the prettier the parcel the higher the price. Our California and Hudson River friends show us a splendid example in this respect, the fruit is sorted with the greatest care, in many cases each article is papered, and placed in rows and nearly always shipped per express so as to reach market as fresh and

fragrant as possible. Our worthy Express Companies, Railway Magnates and Steamship Corporations have lately made many beneficial changes in their modes of carrying fruit, but still much can be done, to assist fruit growers in making money. We believe from personal contact with the carriers of fruit that they are willing to do all they can to help us.

We are pleased to notice the high position Montreal has attained as a fruit market, we think that in the near future she will take a better place as a market and shipping port. A movement is on foot to establish a Montreal Fruit Exchange, for the sale of fruit by auction, if successful it will be beneficial to all connected with the culture and sale of apples.

We believe this Canada of ours has a great future before her as a fruit growing country, especially apples. Let us do our part to make our apple packages and mode of transportation second to none, already our splendid apples command more money in Liverpool, London and Glasgow, than the product of any other country, (excepting the American Newton Pippin). I shall always be willing when asked, to give any information gained by many years of practical experience, desiring with you to give Canada a world wide reputation for honestly packed extra fancy apples.

The following paper by Mrs. Annie L. Jack was read :

THE PACKING AND MARKETING OF APPLES

It is a more difficult problem to pack and market successfully the fruits we grow, than to bring the cultivation to a successful issue. Granted good soil, suitable climates and careful cultivation, the elements of nature tend to mature our fruits. But when the trees are ready for the harvest, comes the most difficult task of all. So many theories exist as to methods, one asserting that it is best to carry all in baskets to the fruit house or barn, there to undergo the sweating or shrinking process, and to be packed at leisure. This plan has many disadvantages. Dust will gather on the apples and the second handling is certain to rub off the waxy protection we all value for its preservative quality. The extra rolling about is apt to injure soft fleshed varieties, and the work of carrying in, adds to the expense of the picking. Packing in the orchard can be done to advantage by keeping the rows of barrels near the pickers, and having the three qualities of apples all sorted from the baskets. It has however one drawback, the fruit is not always uniform in color, some being shaded, others exposed to the sun, and it requires an experienced packer to mix them judiciously, so that they will be of the same quality. With this exception it has proved the most expeditious, and trustworthy method of packing.

The marketing of our apples is a subject for much consideration, and in a like the past, many growers found that packages, freight and commission

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eat up any profit that should come to their own pockets. The commission men take all the fruit sent to their hands, without due consideration as to outlet for the same, the end often being that fruit spoils in their cellars, and is worse than a total loss if it had taken place in the orchards.

Fruit growers are every year becoming more alive to the fact that only honest packing pays, and it is a pity their efforts in this direction are not more encouraged by the purchaser, who should be willing to pay a fair price for well packed fruit instead of running a risk in buying a cheap article that is sold without brand, and one of the tricks of the trade is worthy of mention and has been exemplified in our own case. Barrels bearing our brand have been bought up the second season, and filled with culls then sold without removing the brand of choice Fameuse apples.

The only redress for this is to put the brand inside the barrel in a printed form that cannot be erased.

If the Society could employ a few honest dealers to sell its fruit and have it understood that we were united to grow good fruit and sell at paying prices, there would be less opportunity for the middle men to become overstocked, and fail to look after our interests, for the name of the Montreal Horticultural Society would be a sufficient guarantee.

A case in point as to the tricks is the fact that a city dealer sold small fruits as our growth, to friends who he knew would purchase on account of the name when we had no dealings with the firm, and had not a plant of the fruit so sold. Another case was when a retail dealer made more profit by weighing a pound of grapes than we did for growing them.

This subject, gentlemen, is of the first importance in these discussions. How to profitably pack, and market our fruits.

The Rev. Canon Fulton read the following paper:

PICKING, SORTING AND PACKING APPLES.

Apples should be picked about a fortnight before they are ripe by turning the stem over from you, by so doing you save the bud and terminal twig which is required for the next season, if the tree is an annual bearer. Boys on medium sized ladders can take all the fruit from the outside of the tree followed by men with ladders of sufficient length to reach the top and inside. The apples as picked should be carefully poured into boxes or crates which will contain two bushels, made of two inch slats, with a space between the slats to allow the air to circulate through the apples. As filled, they should be piled in a shed in such a position as to get a good current of air to pass through them, thus enabling you to pick with the dew on or after a shower, which was a very important

time saving appliance, last year in particular, and even in fine weather it enables you to pick two or three hours earlier, which is no small item gained in time and money. I am indebted to Mr. G. B. Edwards for the idea, who has used such boxes for some time with satisfactory results. When the apples are perfectly dry they ought to be poured gently on a triangular table with sides to it, and an opening on one end to allow the culls to fall into a bag. In grading apples I agree with Mr. Shepherd that all extra apples ought to be kept separate, the others according to size of the apple, should be selected free from bruises and worm holes and a fair average should be put into barrels or boxes, without facing and a card or piece of strong paper having a notice printed on it to this effect placed on the top of each box or barrel.

"That if the purchaser of this barrel or box discovers any poor or imperfect fruit or finds it faulty in packing the undersigned will consider it a favor if he will write his grievances on the back of this slip, giving his name and Post-office address and mail it to ;

J. A. F., Montreal P. Q.,

Packed by J. A. F."

The facing or topping out of fruit is one of the most reprehensible of all the dishonest practices connected with the fruit trade, and I think that we should combine to send our fruit properly marked with the name of the fruit grower as indicated, which would show conclusively that we desire to supply the market with fine, properly packed fruit; that we are striving to please consumers in place of swindling them.

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

PICKING AND SORTING.

There are two kinds of apples pickers the *Careless* and the *Careful*. The former either shakes the fruit to the ground or throws it into the basket: the latter first lines the inside of his basket with a piece of cloth or canvas, and handles his fruit like *eggs*.

The careless picker does not draw a very fine line between his 1st or 2nd class fruit, in fact he has no really second class, everything goes into his No. 1 barrel, except what is absolutely bad, but he is very careful, however, to place the finest specimens at the end of the barrel which is to be first opened. The careful picker having filled a couple of baskets, carries them to two barrels (branded, respectively No. 1 and No. 2), that have been placed near the tree, side by side, and resting a basket on the edges of the two barrels, takes out the fruit, as carefully as the good wife handles her eggs, placing the perfect full sized fruit in No. 1 and the smaller, but sound fruit in No. 2 barrel, throwing the unsound

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and unsaleable specimens into a pile on the ground to be gathered up afterwards and fed to the stock.

This is honest picking and sorting, and he who perseveres in this system must surely be rewarded, if not in this world at least (let us hope), in the next.

Establish first a reputation for careful picking grading and packing fruit, so that dealers can guarantee the quality, and extra prices must be the result.

It is very discouraging, I know from experience, to have your carefully picked No. 1 fruit compete with the class of apples usually sold in this market as first quality.

“Why, said an apple grower, of this Island of Montreal, to me, last fall, “If I sorted out my apples according to your ideas, it would never pay me at all “and it is not the general practice here; it would take too much time altogether “and would never do.

Another grower informed me that he had tried both ways, careful picking and grading, and careless picking without grading and he was doubtful if it paid to be honest; for his carefully picked fruit, which cost time, had to compete with the carelessly picked, gathered in no time.

It is a pity that it is so, let us not be discouraged but try and persevere to establish a good name, after all is it not the true principle of success in every trade for no one can ultimately succeed in any business who does not first establish a name for the excellence of his wares?

Mr. G. E. Roach, of Abbotsford, read the following paper:

PICKING SORTING AND PACKING.

I have been requested by our board of direction to hand in a paper to this meeting relating to picking sorting and packing of apples. I must say that I would much rather be a silent listener than give vent to my views on this very important subject. I consider this subject one of the most important to our fruit growers.

If fruit growers in general could see the importance in its true light it surely would bring about a marked difference in our fruit markets.

With my own experience for the past few seasons I have noted that our market is on the decline instead of increasing. Now is this due to dishonest packing or is there some other cause. I have had occasion to repack from several different packers, and with but few exceptions find them far from being rightly packed. I noticed in last year reports the remarks of Mr. Jack on the different rates of commission on the different products. I must side with the com-

mission men on this subject as there is a considerable responsibility depending on them. They have to represent to their customers an article which they have no way of testing, they must take fruit as it is consigned to them and run their own chances of losing their customers if it does not turn out right. On the other hand, butter, cheese and grain can be fully tested, so such articles can be handled at much less rate of commission than the apple. I cannot see how the matter can be remedied, unless fruit growers organize an association and have strict rules as to picking and employ their men to handle their produce, otherwise we must expect the present state of affairs and give in to the terms of the commission men. I will not tax your valuable time on the subject of picking as it has been described to perfection by Mr. Robert Brodie in last years report. I will give my method of packing, I have a table of very light material 3 feet wide by 10 feet in length with a 4 inch cleat on all sides and lined. I place this on two light horses of a convenient height. I have the baskets or barrels emptied carefully into this tray. I place three barrels No. 1, 2 and 3, I commence by filling No. 1 first then No. 2 and 3, my No. 1, I try to have them No. 1 from top to bottom of the barrel. I find I can draw more profit by this method of packing than by packing the three grades in one barrel.—

R. Brodie. I think some of our buyers have a good deal to be blamed for with regards to this "facing up" of apples. Two buyers from Quebec used to come to our orchards and buy up the apples, and the last remark they would make on leaving was ; "Face up well whatever you do." They were educating the people to face up well and defrauding those who eventually used the apples

J. M. Fisk. Nobody shies a stone at the consumer, though everybody shies a stone at the purchaser and middlemen. The consumer is supposed to get a barrel of apples for about half what it is worth, and if there is a spot on one or two of the apples the barrel must be sent back to the grower. I was in Mr. John Robertson's store on Phillips Square, three or four years ago, when he was just receiving back a barrel of Fameuse that had been returned to him. He said they were sent back because three of the apples were not up to the mark, and all that was on them was a spot about as big as a pea. They were not my apples, I never saw them before, and I do not suppose you could pick out a dozen that had spots on them.

Rev. Canon Fulton. I think there is great unanimity among the Fruit Growers as to the shipping and packing, and also as to the necessity of having some accredited agent to do the selling. I find fault with the Government in allowing worthless southern apples to come in free to compete with ours, and there is no more comparison to be made between apples grown in Tennessee and Southern New-York than between oleomargine and good dairy butter. It is well known that the further north you can go to mature the apple, the better

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flavored it is. I have been sending to one man in Glasgow for 13 years, off and on, and in a private letter which he sent me the other day concerning other matters he addressed me as being in Ontario. We ought to have some person on the other side who will educate our cousins into some knowledge of the geography of the Dominion and of the value of apples. The further west you go in Ontario the more the apples deteriorate in the matter of keeping, and as to the selecting of apples I think we should have a uniform grade without any facing. As Mrs. Jack has pointed out we would obviate a great deal of difficulty by putting a label inside the package, which would show the consumer where he could get redress and would show conclusively that we desired to do what was right. Something ought to be done to prevent those southern apples coming in free..... apples which are not fit for human food. These worthless apples are made a basis of quotation for our superior fruit, and if the shippers chose to combine and bring in those apples to compete with ours we would be compelled in self defence to form a Fruit Growers Association that will have an accredited agent to whom we will send our apples and which would enable the consumer to know that what he purchases can be relied upon.

Mr. Gibb. Apples have been sent to Montreal when the Montreal market was overstocked, and had the producers been made acquainted with the state of the market they would not have sent them. In Burlington, Vermont, the fruit men have a Board of Trade by means of which they are kept posted.

Another question is that of boxes versus barrels. Some have been lamenting that we are dealing with a public which does not understand good fruit. But I think we had better take up the subjects one by one. Let us take up first the subject regarding the knowledge that the growers ought to have of our general market. We should not be in blissful ignorance of the condition of the market, and not send our fruit to a market which is not ready to receive it.

Rev. Canon Fulton. The market is governed by the commercial laws applicable to everything else, and we should exercise the same forethought that the merchants of Montreal do. They import their goods as they are required, and their goods are not dumped down here for merely people of this city. They send out their travellers to the different points where there are markets, and I do not think there is anything like overproduction. But in our case the apples were sent in to a glutted market. If we would combine and have that iniquitous law rescinded which allows American worthless apples to come in and compete with ours, we could send our fruit to those places that do not grow apples in the North West and elsewhere, to manufacturing places, and have an accredited agent to dispose of them. There are places in England, even in the United States in which our accredited agent could instruct the people and show them the desirability of purchasing the apples we produce. Fruit growers have to plant an orchard and wait several years before they can get a return, and that being

the case, the Government should take it into account, and now that we have a Provincial society should consult it when they make any changes in the tariff.

Mr. Brodie. The Americans on their part could shut off our Canadian apples from going there. There has been quite a quantity of Canadian apples sent to the States, and I am sorry to say many of the carloads sent were not profitable to the buyers, but on the contrary the buyers made a loss. Our Fameuse, as Dr. Hoskins has said, was beginning to be appreciated by the people there. Although the American apples do us injury by being admitted here free, the Americans could do us far more injury if they wished to retaliate. I think that if we leave things as they are they will work their own cure. The people will soon find out what American apples are.

Mr. Honey. One reason for the glutted state of the market was the bad condition of the country roads. We have not sold 10 barrels where we used to sell 50 a year ago. Another year with the same crop and the same roads, would bring about as great a loss as this year.

Mr. Brodie. The weather has a good deal to do with overstocking the market. Being able to barrel only two days in the week on account of the wet weather I had a great deal on hand at the close of navigation which I would not have had if the weather had been more favorable.

Mr. Gibb. Our apple-growing districts are surrounded by districts that do not grow apples, and one reason why so many were sent to Montreal was that owing to this continued rains and the consequent state of the roads they could not be sent to those other places. Another reason is that money has not been so plentiful this year as formerly, and the people have not been buying apples to the same extent as they would another year.

Mr. S. S. Bain. I am glad to see that the Growers are willing to give a first class article and in a first class style—a thing very much needed in Montreal market. I have been a nurseryman for years in the old country, and I know that no matter how well fruit coming from Montreal may be packed, the bad packers give an uncertainty to the market, so that the consumer does not know what he is getting. What is necessary is to raise the standard of your packing to such a condition that you sell your fruit exactly as you do some of the dairy produce. Some of the dairymen in the Eastern Townships put their name on the butter so that the consumer can tell where the butter is from and what kind he may expect. Another thing not touched on is the different sizes of the apple barrel. The consumers want as big a barrel as possible. You ought if possible to get your barrels graded to a certain size and have a certain quantity of apples in a barrel; then the public could rely on getting a certain article and a certain quantity of that article at a certain price.

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Mr. McBride. I think the law regulates the size of the barrel. With regard to packing barrels, there are very few first class apples packed. I sold 10,000 barrels of apples this fall and had no trouble but we did not have one car in ten that was properly packed. For the last 30 years in Canada the trouble has been to get barrels properly packed. I am not speaking so much of this Province. It is the western apples that we handle here. Chicago takes as many apples as we can buy. The American apples come in generally before the Canadian apples, and they are better than our early apples. We bring in apples from the Mississippi and sell them from \$2 to \$3 a barrel before our good apples are ripe. During my 14 years experience of packing apples, I find that if you go to an orchard and insist on picking out the first class apples, you will be ordered out of the orchard before you get through. The orchardists compel you to take everything and besides when you have a large business you cannot personally inspect the packing. The packers are local men and most of them friends of the farmers. We pay for first class apples, and yet they will put in everything and if a bushel or two be left out you are abused. I have never packed barrels in this Province but have packed elsewhere a'l over as far south as Kansas. The trouble is the farmers will not let you make a suggestion and this year we had to protest because they wanted us to take rubbish. I have never had trouble selling good apples. There is demand in Liverpool for any quantity of first class apples you can get.

Mr. Wright. We were told that there are many varieties of the Fameuse apples. I think that same thing applies well to the different varieties named Pippins. I got a carload this fall, and there were a great many pippins in it, A. B. C. and D. pippins. I think they ran the whole alphabet right through. They do not look at all like the other classes of apples. There are some red ones, some green ones and if there had been any blue ones we would have had some. When we get a really good packer whom we know is reliable we stick to him every time. This fall I thought we were getting apples from the same man with whom we had dealt for years, but it turned out that the fruit of another man had been sent to us, and we were given this mixed variety. I assure you he will never sell us another carload. If you really put up good fruit you can sell it. I really believe that if parties will put up really fine fruit and continue to do so they will become known to the consumers and will reap their reward in this world as well as in the next. As Artemus Ward says : "they will have twins every time."

Mr. Shepherd. I think M. Wright has struck the key note. The grower must establish his reputation, so that the seller knowing that the fruit has been packed by a certain grower can guarantee it.

Mr. Wright. It is the fault of the farmer, if, when he has good apples he mixes them with others.

Rev. Canon Fulton. The farmer who has a limited amount of apples can look after them and see that they are properly packed himself, but those who have large orchards have to trust to three or four packers and if any gentleman is a candidate for a saintship send him to me in the fall of the year, and if he does not earn it I will be very much surprised.

Mr. Gibb. The Rev. Canon Fulton suggested the putting up apples in boxes of a certain size—What is the size.

Rev. Canon Fulton. One and one half bushels. First I pack them in paper and oat hulls. If any gentleman could suggest a clean inexpensive packing it would be a great boon. I find that in closing up a barrel very great care must be exercised by the packer or the apples will be spoiled.

Mr. Brodie. I think that boxes get rougher handling than barrels. I took up a box of apples with me to the Toronto exhibition and although I was there myself to look after it, I could not help seeing that it was handled very roughly. There were about one and a half bushels in the box and they were much bruised by the time they arrived.

Mr. McBride. There is no package as good for apples as a barrel, properly packed and honestly faced. Every package must be faced.

Mr. Wright. I know that parties require the apples to be faced even if they are good all the way through. A barrel faced will sell every time. These parties who buy are not accustomed to buy every year and the thing that looks well is the one that takes.

Rev. Canon Fulton. With respect to the boxes, Mr Smith allowed two boxes, each containing a bushel to go for one barrel, and they were packed better than the barrels in the hold. There was no trouble whatever, and I have never lost an apple, and I got great credit in London for the apples. The reports were that they were all of good quality and I got as much for a box as for a barrel.

Mr. Shepherd. I have had no experience in shipping in boxes, except in what is called the Cochrane case made like an egg box with compartments, and in every instance I have had most favorable reports. The Fameuse, the Wealthy and the Winter St. Lawrence shipped in these cases have gone over in perfect condition, and only in one case, was one of the boxes forced open. The system I have is to bind with telegraph wire and drive in barbed wire staples. Mr. McBride has said that the barrel is the only perfect package. I do not think you could ship Wealthy or Winter St. Lawrence or first class Fameuse in barrels, and put them on market in the same condition as they would be when shipped in a Cochrane case. The slightest bruise affects the Fameuse. If you open a barrel of Fameuse which have been fastened down a week and pick out the fruit you

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will find that every apple shows a bruise. All the first class apples which are not hard enough in the flesh must have a better package than a barrel. I shall continue to pack my extra fine specimens in those Cochrane cases. I do not sell a case less than \$3 in Montreal, and each case holds one bushel and a half. The difficulty is the cases are a little expensive costing about 75 cents each.

Mr. Brodie. I had occasion to send home a small quantity of Fameuse in barrels, and the letters I received showed that the parties were delighted. Some were sent to London, some to Edinburgh and some to Dundee, and they arrived in good condition.

Mr. N. C. Fisk. The producer generally packs his barrels but does not see them open. The packer should understand whether it is necessary that the apples should be well sweated before they are packed. I find they will sweat several times during a month and that they must be thoroughly sweated before being packed.

Mr. McBride. No doubt they should not be packed before they are thoroughly sweated. If you pack them before sweating they will sweat in the barrel. Nearly all our winter apples this year had sweated in the barrels and no wonder they did not keep.

Mr. J. M. Fisk. Will not an apple sweat two or three times?

Mr. McBride. Not enough to do it much harm

Rev. Canon Fulton. I am opposed to anything like sweating because an apple is a living thing, which has to run its term just as we have. I contend there is no such thing as sweating if the apple is put in the proper place at the proper time. The sweating is the maturing, and the texture of the apple is destroyed more or less by that operation so that it will not keep. I have never had any complaint of apples that I sent to England. On the contrary the people there have been thoroughly satisfied. If an apple is left in the orchard in the fall of the year, there is always a change of temperature. You might say that a jug of water will sweat, but it is the atmosphere condensing upon it and if you take off the top apples of a barrel you will not find sweating in the middle; but if you allow them to be put into a heat and get warm they will mature, their texture is lost and the decay begins. There are microbes on the apple and in the air ready to go for them. Dr Hoskins was of opinion that the apple should be put into a sort of refrigerator and cooled off properly before being packed after being dried in that way. What we require is cold storage. We must retard as much as possible the maturity of the apple.

M. Gibb. I think the idea in former times was that we should let our apples remain in heaps under the trees to sweat there. Another way is to bring them into a shed and pile them there in heaps. Another way is to put them into

barrels and carry those barrels into the sheds, to remain in these barrels until they are sorted and packed. Still another way is that recommended by Mr. Jack, viz: that the fruit should be packed into the barrel in the orchard direct from the tree.

Mr. Honey. The last way is much the best if you can get enough help. In many cases I have sorted apples and put them into barrels. They should be picked and after they are in the barrel they will settle two or three inches; then head the barrel. The oftener the apples are handled the worse it is for them. Once you put them in the barrel they should remain there.

Mr. Bain. For six years I have packed quite a number barrels of Fameuse and sent them to England. I pick them right off the tree. And as a proof of the efficacy of this system the same man always bespoke them before the trees were in blossom.

Mr. Brodie. I follow the system Mr. Bain has just mentioned of picking the apples off the tree and putting them into the barrel at once with as little handling as possible. I head them up in the orchard. This year has been a specially difficult year for barreling apples. When it did not rain we had heavy dews and it was hard to get the apples dry enough to barrel them.

Mr. Shepherd. My system was to carry all the apples into a shed. Two barrels are placed side by side with the basket between. I took out the apples like eggs, put them into the barrels marked No. 1 and 2.

Mr. Bain. Did you ever know a first class dealer to handle fruit in any way but like eggs.

Mr. Shepherd. A great many fruit packers recommend net baskets, and then taking from the basket into the barrels.

Mr. John Doyle. You would have to pay as much in wages as you would get for the apples.

Rev. Canon Fulton. One point ignored is the time for packing. I have got the St. Lawrence shaken off the tree, and they kept better in the same basket than those picked at the same time for the exhibition. The Fameuse is the hardest apple we have in the orchard for packing. I can show apples to day that were shaken off the tree in sufficient time and are perfectly sound.

Mr. Honey. I think the reason you find the St. Lawrence keeping better than the winter apple is that when you packed the St. Lawrence it was matured and the winter was not.

Mr. Jack. You would recommend as a general practice the shaking of the apple?

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Rev. Canon Fulton. No, last year was an exceptional year. It did not pay me to pick poor worthless fruit off the tree. The best fruit were picked and as regards the others I put cloths at the bottom and had them shaken off.

Mr. Brodie. The great danger in shaking off is you break off the buds that will produce fruit for another year.

Mr. Honey. No more would be broken off in the shaking than if you picked them.

Mr. Doyle. If Mr. Brodie would leave them there, he would not have the trouble of shaking them off as they would fall to the ground.

Mr. Brodie. I have a foreman who watches the packers and I superintend the packing myself. I can get plenty of help conveniently and I pay off those who do not do the work properly. This year has been an exceptionally hard year to pull apples thoroughly. They ripened late and it was hard to pull the Fameuse before the severe frost came on, and then they broke off easily.

M. Gibb. Is this meeting in favor of picking apples direct from the trees into the barrels?

Rev. Canon Fulton. Mr. Edwards has carried that out successfully for some years. He has had crates through which the air rushes and had the apples put into a shed where the air could pass through them, and I do not think he ever lost a barrel.

Mr. McBride. How are you going to do in the west about assorting apples where you have 1200 barrels of apples in the one orchard. We pay two or three dollars a day for men to sort apples, and where you pack 300 barrels a day, where will you get men to assort them as fast as they are picked? We cannot be there at the packing. That might do very well where you have 100 or 200 barrels or 40 or 50 barrels in a private orchard.

Mr. N. C. Fisk. I agree with Mr. McBride. Boxes will only do for something fancy, but you could not go into it as a system. We can put three bushels in a barrel which will cost considerably less than boxes. Again that would be throwing the whole business into another track, which will require a great deal more time.

Mr. Brodie. Montreal Fameuse cannot stand too much handling. They stand much less handling than western winter apples.

Mr. N. C. Fisk. Boxes will do very well where you can get plenty of men to work, and enough packers to follow those men. But you cannot always get the proper men to pack.

Mr. Bain. One of the greatest evils is the commission men buying orchards. They buy for so much a barrel, and they are bound to get all they can. The man who wants to pack his apples in first class shape has to compete with these.

Mr. Jack. I think the suggestion of Mr. McBride touching the establishment of a board of exchange could be advantageously acted on. We might then get such information as we could profit by. Very few of us have access to proper information about the condition of the market.

Mr. Brodie. In that case we should try to get Englishmen to come here instead of making a present of our apples to the old country. Is that the object of a fruit exchange.

Mr. McBride. A fruit exchange is a joint stock company to start an auction room for the sale of green and dry fruit. In all the American Cities, fruits are sold by auction. We have had two meetings and a secretary appointed.

Rev. Canon Fulton. As to the correcting of packing, I think with Mrs. Jack, that the only feasible way is for the consumer to write to the grower to correct the packing. The consumer should know where the apples come from.

As to boxes versus barrels, it seems that apples of fine quality especially perishable apples may be sent to England in good condition in boxes, but in a wholesale way, for general purposes the barrel is the best.

Mr. McBride. He does not look to the grower, but to the seller.

Rev. Canon Fulton. There is nothing tangible in that; but if you had a printed check in the inside, on which the consumer could write his grievance and which he could send by mail to the grower and packer, then the proprietor of the orchards if he had more than one packer, could find out the packer by the number of the check.

Mr. McBride. Do you know where the packer would be in that case? He would be in the poor house. If the consumer had any claim on you, he would take your farm, farm-house orchard and all. You could not allow a claim of that kind on the fruit, as the consumer would claim often without cause. The best way is to pack and put your name on the top of the barrel.

Mr. Gibb. As to the question of packing it seems that in small orchards this meeting approves of the plan of packing delicate fruit like the Fameuse directly from the tree into the barrel; but in the case of fruits like the Baldwin and Greening, that is less necessary because their firm texture enables them to stand better the wear and tear. One point brought up by Mr. Doyle is that the public do not, half the time, appreciate good fruit. A barrel of Ben Davis that

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looks red and nice, sells well, and a barrel of good Pommes Grises does not bring the money it should: the public taste is seriously at fault in this matter. This question of the fruit exchange has been brought up, but I cannot say it has been discussed. You have not given an opinion on that question.

Rev. Canon Fulton. It depends on how it is carried on. In Liverpool fruit sold under the hammer has been sold to particular friends, and sometimes resold again. The audience is limited to a few who are on the inside track, and are not in the interest of the grower.

The meeting then adjourned until the following morning.

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SECOND DAY.

The convention met at ten A.M., Prof. Penhallow in the chair.

The Secretary read a paper written by Mrs. Annie L. Jack.

CULTURE OF THE STRAWBERRY.

The cultivation of strawberries in this province is not extensive nor are the low prices of the past three or four years any encouragement toward planting. In our own experience we class this fruit below apples, grapes, or raspberries in remunerative returns. The preparation of the land demands a process of clean culture, the planting is laborious, and the fight with weeds a steady warfare. Then comes winter protection which must be given to ensure a crop, it being the second year before there are any returns. The picking must be done when the plants are dry from dew which means in the heat of the summer days, and in no other department of gardening is Dudley Warner's "cast-iron back" needed so much as in the picking of this fruit.

For soil we migrate between a clay soil and a rich loam alternately, and some seasons they do well in one and sometimes in the other, but, like the methodist preachers they only begin to be established in one place before the travelling process begins again, the only reason given by wiseacres, being that it is *good for them*.

Excepting that some varieties rust there is no special disease attacks them. But the cut worm is a host in itself and it takes but a few of them to clean out a good sized patch of thrifty plants, and as it often happens in blossoming time we find our hopes blighted by this underground enemy. Then when the fruit is ripe the early bird swoops down upon the largest berries for its breakfast and by the time the dew is off for our picking the ripest fruit has lost its luscious heart,

or cheek. When the fruit is all gathered, carefully selected and packed, sent to market, and boxes, crates and commission paid, there is often but little left for the growers pocket, except the gathered weeds to pollute the rest of the farm, for at picking time the roots of the plants must not be disturbed and so a terrible day of reckoning comes.

The public taste is not educated up to the point of knowing choice fresh fruit, and if offered such on Monday will tell you "Oh, I bought them for three cents a box on Saturday," without a single regret for the enterprise that paid a cent a box for picking, a cent each for the wooden box to hold the fruit, and the rest for freight and middle men. An instance, amusing, but not profitable was mine two years ago. A citizen foraging in the country for strawberries found that we had some and ordered two boxes. They were fair fresh luscious strawberries, and she planked down eight cents remarking. "They were four cents a box when I was in town on Saturday." It happened these berries were to go in at ten cents a box, but I did not remonstrate.

Among forty varieties or more tested, we find Cumberland Triumph, Miner's Prolific, Sharpless, and Kirkwood, in the order of ripening, suit our soil and conditions best. The Sharpless commends itself for size, Montreal consumers want a big berry and must be gratified, but it is not so profitable as the more even sized varieties. The after culture of this fruit must be constant with cultivator and hoe. Runners more than are needed must be kept down and to quote Warner again "If there is a variety that declines to run, and devotes itself to private fruit growing I should like to get it."

It is this running that is fatal to the mixing of plants, and for this reason we have our plants grown between rows of Grape vines and cultivated on each side so as to keep varieties pure. Among new kinds the Jersey Queen commends itself for bearing a fair crop of even sized berries as does the Manchester.

Mulching is of more advantage on a loose than on a clay soil, but always pays for the trouble in the increased size of berry, and cleanness of fruit in wet weather.

We prefer spring planting, and in rows rather than hills, and think the slight shade given by the grape vines is beneficial.

The persistence of Western fruit growers in flooding Montreal with fruit, often surprises those who know the markets, and while strawberry growing is a good thing for those who have gardens, and should have the special attention of farmers in isolated places, we cannot recommend it as a means for attaining wealth or even a competence where land and labor are dear, and fruit is cheap.

The Secretary Mr. W. W. Dunlop, read the following paper contributed by himself.

THE STRAWBERRY.

This is one of the most popular of fruits. Ripening at a period when the heat of summer first begins to induce a longing for more ethereal food, its mingled sweetness and acidity combine to give it a value and appreciation not attained by any of the small fruits. We need not wonder at this universal fondness for the strawberry, it dates from our earliest recollections, and, unlike many of the loves of our childhood, remains with us in maturer years. Differing from other less delicate fruits it is alike agreeable to the young and the aged; the robust or the feeble, and the temptation offered by the delightful fragrance and appearance of its fruit may be safely indulged in by all.

There are few soils in which the strawberry will not thrive, but, though some varieties will give good results in different soils, and without special treatment, the greater number require soil and conditions suited to their individual requirements, and to this fact may be attributed the great diversity of opinion with regard to varieties, a fact not confined to the strawberry alone, but applicable in a greater or less degree to all the fruits in cultivation.

The leading authorities on the cultivation of the strawberry agree that water is one of the most essential requirements of the plant. We find the choicest fruit of the wild varieties in situations sheltered from the drying winds and on moist but not wet soil, thus, the importance of moisture is demonstrated by our greatest authority, and the intelligent cultivator will not fail to profit by this lesson from Nature and by skilful preparation of, and manuring his land, may do much to gain this condition of moisture without which the highest results cannot be obtained.

The system of cultivation most commonly practiced at the present time is what is called the "matted row," or bed system.

The ground is prepared in the spring by ploughing in a dressing of manure and the planting done in rows of from 3 to 3½ feet apart with plants from 12 to 15 inches in row.

The cultivator is passed frequently through these rows during summer, going always in one direction when the young plants commence to spread over the ground in order that they be kept in a narrow row. Various modifications of this system are also practiced, some growers setting the plants 12 or 15 inches apart each way leaving a blank row about every 4 feet as a path for the weeder and pickers. The runners are permitted to grow and at the end of summer the ground is usually well covered with plants. The weak points of this system are

the labor of the first season without any return of crop, inability to apply manure to plants in matted rows, after the first crop there are so many exhausted plants and the weeds have generally gained such a foothold that it is seldom profitable to leave the plants for a second crop, but, perhaps the greatest drawback to this system is that owing to the number of plants occupying the ground, moisture, in an ordinary season, is not supplied in sufficient quantity, and the fruit ripens prematurely and is of small size. Notwithstanding the many drawbacks to this system of culture the yield in a favorable season is sometimes very large.

The following system I have found to be very satisfactory. Early in spring plant the ground required for strawberries with potatoes, corn, or some crop which may be removed in August. After the removal of the crop give a good dressing of manure, plough and subsoil the ground stirring it to a depth of not less than 15 inches if possible. A deep and thorough pulverization of the soil together with the incorporation of a liberal supply of manure will provide for the necessary condition of moisture, and one acre thus treated will produce more than two with ordinary cultivation. Toward the middle of August, or as soon after as plants are sufficiently rooted and the weather is favorable, planting may be commenced.

Make rows 3 feet apart and plant 12 to 15 inches in row. In removing the plants do not shake the earth from the roots and if taken up after a rain few will fail to grow. If possible apply a sprinkling of hard wood ashes in line of row and give a slight mulching of well decomposed manure which will help to give the young plants a vigorous start. Keep down the weeds with a cultivator and cut off all runners as they appear. With this treatment the plants will, if set in August, give nearly a full crop the following summer, and, even if planted early in September give a fair crop of berries. The advantages claimed for this system are. A crop of potatoes or corn may be taken from the ground the first year which will reduce the cost of cultivation. The plants will be larger and more vigorous than those planted in spring owing to their not having been allowed to produce runners and being in stool form can be more easily cultivated, manured and mulched. The ground not being crowded with plants less moisture will be required and the berries will be larger and the season of ripening extended.

Many of the larger varieties will only prove profitable if cultivated in the manner described, while those which commonly do well in the matted row system may after the first season be allowed to form narrow beds if desired. It is absolutely necessary however with all varieties to keep off the runners the first season, when planted in the summer, in order to give the plants strength to mature a crop the following season.

In varieties there are many candidates for favor and each year is adding to the list.

The old Wilson is still the leading market berry and for distant shipment is without a rival. This berry is sold when red, not ripe, and to this fact is due its good keeping quality.

The plant is adapted to a variety of soils and is very productive. The quality of the fruit is good when fully ripened but as marketed it is too sour to be called good, except for canning. The Crescent is a fitting companion for the Wilson, and where the market demands quantity alone, these two varieties will continue to remain favorites owing to their productiveness under even indifferent culture. The fruit of the Crescent ripens some days in advance of the Wilson and is of a more attractive color. In firmness and quality it is only medium.

Of the larger varieties the Sharpless, Manchester, Cumberland, Jersey Queen, Bidwell Miner etc., are more or less grown for market, in some cases with very profitable results.

With the ordinary treatment given to the Wilson and Crescent none of these varieties will prove as profitable, but, with a higher cultivation suited to their requirements, few will fail to yield favorable returns, if grown for a market where large and choice berries are in demand.

Many new varieties are annually introduced some of which may prove to be very valuable, but, while a little judicious experimenting with new varieties is to be commended, do not neglect the older ones. A little experimenting in high culture, even upon a variety generally considered inferior, will sometimes produce astonishing results.

Mr. Wright. With reference to varieties, there are three that stand out prominently above all other strawberries in Ontario. The Crescent Seedling, Wilson and Manchester. These are grown more than any other varieties, but the latter I do not think is a superior berry for shipping. Formerly the Wilson's took precedence, but now it is only secondary. I am not speaking in reference to the quality. For a long time it was impossible to find a superior to the Wilson for permanence and monetary returns, but now I think the palm is generally conceded to the Crescent. Then comes the Wilson; and for a large productive berry, remunerative to the grower, the Manchester takes the lead of all others. Some argue it is better to plant in the fall, and in some sections fall planting does exceedingly well. The plan Mr. Dunlop suggested in reference to preparing the soil is an exceedingly good one. I particularly refer to that part of his address where he says if possible to use wood ashes in the rows for that is really one of the finest manures for strawberries we have. As a general thing we plant in the spring and it pays the best, although in some instances fall planting is exceedingly good and remunerative as well.

Mr. Dunlop. I would like to ask Mr. Wright if the Manchester rusts very badly in his locality. With us it is probably one of the most productive of the large varieties, but if the soil does not exactly suit, the foliage suffers so much from rust that it does not give good results. It is generally claimed that it succeeds better in a light soil, and I find this to be the case. In heavy soil it rusts very badly. If it were not for that, I would almost confine myself to growing Manchester for a large berry.

Mr. Wright. That is of course one of the faults of the Manchester. We have not found a perfect winter keeping apple, and I do not suppose you will find a perfect strawberry. It does rust and succeeds best on lighter soil, still notwithstanding that we find it one of the best we have. If any here have not grown Crescent Seedling they must understand it is not a self-fertilizer.

Mr. Gibb. Have you any choice in the varieties you plant alongside the Crescent Seedling to fertilize it?

Mr. Wright. I have always used Wilson's Albany.

Dr. Hoskins. I would like to enquire of Mr. Wright and the other gentlemen who have favored us, if they have tried the Windsor Chief? That has been very successful with me as a late variety, and also the Kentucky. The Windsor Chief needs a fertilizer, and is as late a berry as the Manchester. I have found the Kentucky fairly productive in itself. The Manchester has answered well and the Wilson, if well grown, is as good a berry as we have. The Crescent is rather soft for shipment and light in color but a wonderful producer, and suits the market where quantity rather than quality is required.

Mr. Dunlop. The Windsor Chief, I think, is the same variety as the old Champion.

Dr. Hoskins. Those who have grown them side by side, say that although they show relationship they are not the same. Mr. Hale, probably the largest strawberry grower in the country says they are decidedly distinct.

Mr. Dunlop. I have grown the Champion in a small way, and it has been very productive, but I like the Manchester so much better, that, the season being about the same, I have abandoned growing the Champion. Being close to the market here, the former reaches market in good condition. The Champion is a firmer berry and will carry a greater distance, but is not to be compared to the Manchester in quality.

Dr. Hoskins. I find the Manchester as firm as the Wilson, and it makes a very good berry. The Windsor Chief is a very good berry.

Mr. Jack. The Glendale is a berry admirably suited for canning purposes.

Mr. Westover. I would like to make enquiries with regard to an insect which is very troublesome with us. It goes by the name of the grub. It is a large white grub and seems to burrow under the roots. The first you know of its presence is the vine wilts. It is very troublesome and cleans out beds very quickly.

Dr. Hoskins. I think that if you will plant your berries only on land that has been long in cultivation and manure with artificial fertilizers you will not be troubled with the grub. It is common in grass land and newly turned sod. The beetle, which is the common June bug, is parent of the strawberry grub, and is liable to deposit its eggs where there is a good deal of organic matter such as newly turned sods. I have a great deal of trouble with the grub when I have the temerity to use newly turned sods. When I plant the berries on old land and use artificial fertilizers I never see this insect.

Mr. Chapais. The greatest trouble with us is the disturbance of roots by frost. In the fall we sometimes have snow and rain and the ice covers the strawberry bed, and then the heaving is very difficult to deal with. I have used lots of stuff to mulch them with, and I think the best we can find is straw covered with branches of spruce.

As to the grub I was much troubled with it three years ago, and I found that in cultivating the ground in early September, about two inches below the surface, with a grubber is the best means of destroying the grub. That worm takes three years to perform his metamorphosis. The first year he goes into the ground two inches, the next year he goes lower still, and comes up in the third year. If you disturb them at first, when they are deposited in the form of an egg, you have a chance to kill most of them by turning up two inches of the surface and exposing it to the rays of the sun, and if you use only artificial manure that is one of the best ways to get rid of that pest.

Mr. Dunlop. Will Mr. Jack give some information about the Kirkwood which is one of his favorite varieties.

Mr. Jack. We found it very hardy and prolific and in quality about the best. We planted our strawberries on land that had been cultivated many years.

Mr. Westover. The beds I had in mind when I put my question were beds that had been planted on new land, that is pasture just turned up. They did splendidly the first year but the next summer, shortly after blossoming, they began to go. You could take up any quantity of the vines with the roots completely gone.

Mr. Gibb. What do you use for winter covering for protection?

Mr. Wright. I go to the planing mill after the ground is frozen in the fall

and get shavings and put them between the rows, and all over the strawberries. In the spring I send a man with a short handled broom who just brushes them off the strawberries into the rows. That protects the roots from heaving. It is in the spring that all the injury is done. That is an excellent thing to keep the berries clean. It gets in all the interstices between the leaves and vines and keeps the berries clean from dirt and sand.

Mr. W. Mead Pattison read the following paper on.

SUMMER PRUNING OF GRAPES.

This subject has been chosen, as the past season was very remarkable as a wet, cold and unfavorable one for out-door grapes, and generally few ripened; therefore methods adopted to confine the energy of the vine to the development of its fruit would perhaps be more profitable at this time for our consideration. Such seasons demand more careful attention to summer pruning, without which it is impossible to prune judiciously in the fall, and the result of neglect entails disaster and discouragement. The term pruning does not imply the slashing with a knife or sickle we often see practiced when the vines get beyond control through neglect of early attention, nor the extent of fall pruning; but labour which can be done by the thumb and finger. First in nipping the soft growth of the bearing branches at the proper time. Secondly in closely watching the canes intended for next seasons fruit and by the same process forcing the energy of the vine back for the development of strong buds necessary to produce large and perfect clusters. These are conditions absolute in their demands if success is to attend grape culture in our Province. Their practice, if I may be permitted to say, contributed to the ripening of over 80 varieties on my grounds the past season, many of which from their extreme lateness much further south, it would have been thought in time past absurd to attempt to cultivate in Canada. There is a popular impression prevailing that there is some difficulty or mystery, particularly in fall pruning, only within the scope of a professional gardener, but the fact is any person with a little forethought and observation can easily master the subject, as it is governed in a great measure, on the principle of "the survival of the fittest" and consigning the weak and superfluous to the pruning scissors. It is presumed that the canes have been judiciously pruned the fall previous, not only with a view of fruit but to keep the vine within its prescribed bounds and to guard against the canes conflicting, as all the foliage must be open to the air. The vine uncovered and tied to the trellis (with us about the middle of May) the genial rain and heat arouses the driving power of the roots and the buds begin to swell. Then the cultivator must be on the alert, looking carefully over his vines and brushing off all unnecessary buds which if left to grow would soon lead to difficulty, when it could not be so easily remedied for in fall pruning

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an allowance is made for accidents to buds, besides those buds which have no business at the base of the vine cannot be so readily observed. At this time if any of the oldest canes are likely to soon require to be replaced by new ones a bud at the base or a sprout from the ground may be selected and a sharpened lath placed behind it to indicate the fact as well as to tie the renewal cane to as it advances. This work is by no means to be overlooked as it is the first step in the conservation of energy to be followed throughout to attain the desired result, namely, early and well developed fruit. As the season advances and the clusters begin to assume form, before commencing work stand before the vine and study its situation and the results desired. The canes required for next year's fruit, at this time leave unchecked, but the fruit bearing branches nip off one leaf beyond the last bunch of grapes. This is better done before they blossom. The first pinching in a short time tends to force the dormant buds at the axils of the leaves into activity, and a shoot soon appears which must be checked as soon as a leaf or so is formed, according to the liability of the foliage of the variety to insects or other devitalizing influences. The leaf serves to further eliminate the sap required by the grape as well as to shade it, for it is a well known fact that the leaf requires the sun and air, as it is the lung of the plant, and nature struggles to shade the fruit. The vine should be gone over at regular times through the growing season to see that all laterals on the fruit bearing branches are kept in check, this can be done as other work is going on. Removing super abundant clusters should be attended to early and the strength of the vine thereby reserved for the remainder. In August the canes reserved for next year's fruit must be carefully looked after and such proportion of their ends taken off as will insure better developed buds near the old wood, the strength and habit of the variety should determine the extent of this checking, such rampant growers as Brighton Lindley and Agawam must be given more work to do and consequently require longer pruning. I have latterly found that Brighton, if trimmed in fall as close as Concord and some others, goes too much to wood, but if left with from 4 to 6 buds on each spur bears an abundance of admirable clusters, but this subject will lead me into fall pruning beyond the prescribed limits of this paper. Growing the grape is peculiar in one respect; you have not only to care for the present crop but must keep in mind the crop of the coming year, if you neglect to prepare for the following season in advance of its arrival your vines will become an unprofitable nuisance and after a few years you become perplexed and discouraged. The treatment above indicated can be carried, in injudicious hands, to extremes resulting in injury to the vine, an equilibrium must be preserved so that both roots and foliage harmonize in their correlation to each other. Mistakes may have led some to practice the "let alone system" an illustration of which may warrant me in bringing in here a local incident at Clarenceville last fall. Early one morning a friend brought me a handfull of grapes he gathered along

the sidewalk, the result of some boys raid the night previous, looking at the straggling unripe clusters I said: "Thank you for your sympathy but, Sir, these grapes are not mine, they show unmistakable evidence that they were raised on an entirely different system." For conclusion will say that no new or dogmatical theory is given in the foregoing, and if the facts are of value to some disconsolate amateur, and will give him encouragement for the future, the purpose is served. For most departments of Pomology we must all feel a satisfaction at the results attained in our Province of late years, and can all heartily join in expressions of gratitude due to the prime moving spirit whose zealous labours encouraged the formation of Fruit Growers Associations in our Province and who has inspired others as well as myself with a small proportion of his enthusiasm on the subject of fruit culture in its various branches.

Mr. Gibl. How do you prune in the fall such rapid growers as the Brighton? Do you prune as closely as the Delaware.

Mr. Pattison. You do not leave as many spurs. You have to make your own conclusion as to that. I must take back what I said a few years ago in reference to Brighton because I find adopting this practice of pruning that the fruit has improved very much. I was much discouraged and was commencing to take them up, but I happened to see some statement in an agricultural paper in reference to these strong growers. I thought the defect at one time was in my ground being too rich, but I find now that the defect was in pruning too close, and by giving them more work to do better results are attained.

Mr. J. M. Fisk. You get more fruit then when the vine is so pruned?

Mr. Pattison. Yes, and much better fruit.

Mr. J. M. Fisk. One of the difficulties with me is that it not a very heavy fruiter with the ordinary fall pruning.

Mr. Bain. Is it necessary to provide special covering for winter.

Mr. Pattison. I have tried everything but I think there is nothing so natural as the common soil provided it is not of a clayey nature. A great many cover the canes but my experience has been that it is merely the buds you want to protect. The object in covering is to preserve the buds, and in the spring as the frost leaves the ground the covering gradually draws the frost from the bud and leaves the bud vigorous.

Mr. Jack. Have you discovered any new enemies of the grape during the last season.

Mr. Pattison. There are two enemies of the grape, the flea and the blue beetle. The latter we have to guard against very early in the season. They remain on the vine with the object of eating the embryo fruit or the buds just

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as soon as they are open. It is very difficult to catch those fleas, but perhaps I can give you a hint of value in reference to them. If you will not expend your energies in trying to catch them during the day, but wait until towards dusk or very early in the morning..... (I prefer just after sunset) you will find you can catch them very easy with the thumb and finger. In the evening they are not on the alert. They are very injurious to the Brighton and some tender varieties.

Mr. Jack. Last season was the first time I noticed them.

Mr. Pattison. Just so with myself. The Thrip was very bad last season. All my tender white grapes were spoiled to such an extent that they were hardly fit to sell.

Mr. Gibb. What is your remedy for Thrip.

Mr. Pattison. I have tried a number of remedies. The most popular remedy is to go through the bushes in the dark with a torch. The torch I use is a common saucepan fixed over with a kerosene top, then with the handle of the saucepan you take it along and have the boys shake the vines and in that way you catch a good many, but mostly the males. I have adopted another practice of taking a frame and spreading a piece of cotton on it and putting tar on it, and by this means I can catch them in the day time. They are certainly a very great nuisance. Mr. Peel, when we were at Granby, suggested using a decoction of tobacco, and syringing the vines. I tried that, but mostly on the Bacchus which is very much troubled with the Thrip and I could not see much difference. The main thing to protect against the Thrip is clean cultivating; that is not allowing any place for them to winter in. Keep all rubbish away from the vines as soon as you prune them in the fall, and if your trellises are built with poles that have bark on they will harbor in this bark and also whitewash the fences against which the vines are. I find the Thrip are more troublesome against the board fences.

Dr. Hoskins. Do you find the Brighton is more tardy in ripening in a cool season like the past other early varieties.

Mr. Pattison. I have never had any real success with Brighton until this last year.

Dr. Hoskins. In my rather haphazard way of growing grapes I find among the early varieties the Brighton always refuses to ripen at all during a cool season but I have not practiced the method of pruning you have described. With regard to the Thrip they are worse and worse with me every year. There is a remedy lately recommended which I think very favorably of. That is the sticky fly paper. If you touch a leaf the least stir causes the Thrip to jump out, and when they stick against the fly paper they stay there. It is an insect which if

you can reduce it pretty well you do all that is necessary. It is only where it appears in great numbers that it does damage.

Mr. Pattison. The plan the Doctor has suggested is based on the same principle as the sheetsmeared with tar on a frame which you hold in your hand. But I think sticky fly paper is more practicable because you can get it nearer the plant while the frame you have to hold at some distance.

Mr. Gibb. I tried torches and I tried dousing in ice cold water but this latter benumbed rather than killed them. I tried a piece of cardboard covered with a mixture of tar and oil, and those that flew against this were caught, but I did not catch enough of them.

The Herbert has done the best of Roger's Black Hybrids. I used to say Herbert or Aminia or Wilder. I gradually threw out Wilder because it mildewed and so did Aminia, but Herbert has been all along from year to year the most satisfactory. Then the Worden is thoroughly satisfactory. If I could only have one of those varieties I am inclined to think I would take the Herbert, but Herbert and Worden are very satisfactory. The Brighton colored less with me last year than any year before, but it was sweeter and better than any grape I had. The Delaware was fairly good. Of white grapes the Duchess is my best. I have named my best 5 varieties out of about 51 which I have fruited and if I wanted another to make the six varieties it would be the Lindley.

Mr. Pattison. Have you ever tried the Barry?

Mr. Gibb. I have not.

Mr. Pattison. Mr. Bailey, of Plattsburg, N. Y., once bought the Barry to our exhibition in Montreal, and he said that it was ahead of the Herbert or any other of the Roger's grapes. As the Barry grows older it grows more in favor with me, and I think it is a little ahead of the Herbert, but very little. We are somewhat perplexed to choose between the Barry, the Herbert, the Aminia and the Wilder. They are all very nearly alike. The Wilder produces a showy heavy bunch. The others are more compact, but I would encourage the cultivation of the Barry. I think in the course of eight or ten years you will find the results will justify what I have said.

Mr. Gibb. Have you tried the Essex? It is somewhat like Herbert, a little thicker in the skin and keeps better. It has done well with me.

Mr. Pattison. Yes. I got all these vines from Mr. Campbell of Delaware, Ohio, and am always sure they are true to name. I can always rely on whatever he sends, and on what he says with reference to them, as he is one of the best authorities on grapes in the United-States.

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Dr. Hoskins. I have not heard anything said about the Champion or the Rocklington. These grapes are used a great deal for making jelly. Some of my customers, who like to serve jelly with meat, say the Champion having a rough flavor, is better for that purpose than any other.

Mr. J. M. Fisk. What early variety is better than the Champion for any amateur to grow. The finer qualities of grapes require much more attention.

Mr. Pattison. We want to give the Champion all the credit due to it. It is certainly about the most profitable grape we grow. It comes in so early, and if a system that will induce early ripening is practiced, you will find it very profitable. This past season although I have not very large vineyards, they being more an experimental than a commercial enterprise, the first Champions that I sent to market brought high prices, and afterwards they netted me 14 cents a pound, which I consider remunerative.

Mr. Fisk. You can grow two pounds of Champion while you grow one of Delaware.

Mr. Pattison. It is more profitable than the Delaware at 16 cents a pound. We have a grape that has just been introduced called the Jewel. It was sent to me by Mr. Burr of Kansas with quite a number of others. I find that the Jewel is a really fine grape and very little behind the Champion in time of ripening. I think it is the coming black grape and will take place of the Champion. It will keep well until December. The Early Victor introduced by Mr. Burr was extolled very highly and great things were expected of it, but we were very much disappointed and I consider it a variety scarcely worth cultivating. This past year I had reduced my varieties to 95, but added quite a number sent to me by southern growers, which made the number 105.

Dr. Hoskins. A gentleman has handed me a paper here with the question; what is the composition of sticky fly paper. I suppose from its appearance it is made with a light colored resin, with something to thin it, perhaps some oily substance. I have heard it said that it is made of resin and castor oil..... something that will keep it from getting dry so that it will lose none of its stickiness.

Mr. Wright. I wish to say a word or two in favor of the Champion grape. I find it the fruit out of which we can make the most money. It is the hardiest, the best bearing and the earliest grape. It does not make any difference if it is the poorest grape. I went over the grounds in St. Catharines with Mr. Dunlop and he said; "See that row of Champion vines, I made more money out of that than out of any three rows of the others." It is earlier in the market and sells at a higher price. I have had magnificent baskets of Delaware grapes and Niagara grapes

and had to sell them for whatever I got. I knew the men that raise those were losing money on them, but those that had the Champion grapes made good profit.

Mr. Sinclair. Have you tried the Jessica. It is as early as the Champion and as good to eat, and it is a white grape and that takes better in our market?

Mr. Wright. They did not ripen well.

Mr. Sinclair. We find they ripen well.

Mr. Wright. The trouble with us is they do not often ripen.

Mr. Gibb. I would like some experience with Moore's Early.

Mr. Wright. I find it a very good grape. The bunches are nice and come in early and sell well.

Mr. Pattison. When I arrived here I saw that my name was down for a paper on the best varieties of grapes and set about making out a list. Partly in answer to Mr. Wright I want to show him that I give the Champion what credit is due to it. In my list of the best varieties of market grapes the Champion comes first; then the Worden follows, and after it the Concord, Barry, Herbert and Wilder.

For home use my list is as follows: The Jewel, Eumelan, Barry, Herbert Norwood and Burnet. If you set out a weak Eumelan vine you are sure to come to grief. If you set out a good strong vine, in five or six years it improves very much. The white grapes for home use, I class as follow: Lady, Eldorado, Jessica, Allen's Hybrid, and Purity. As to the best market varieties of white, I have placed at the head the Niagara, and following it the Empire State, Belinda, Lady, Duchess and Martha. Lady is the best grape we have but it is of little use as a market grape.

Mr. Wright. There is one thing I object to in that list and that is the Concord. It is all right in Mr. Pattison's section of country, but it does not ripen every season with us. At the last meeting in Hamilton, a gentleman from New-York said they were discarding the Concord because it did not ripen every year with them. With us we are discarding it altogether and replacing it by the Worden.

Mr. Gibb. There are but few sections in which the Concord ripens satisfactorily. In the greater part of the country the Concord does not ripen. With me it is merely a jelly grape. The same may be said of Burnet.

Mr. N. C. Fisk. As far as my experience goes, the cultivation of the grape in Quebec will never be commercially a success, because it costs us too much to

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grow them. I am glad to see so many experimenting, and I would like to have the opinion of experts as to whether the cultivation of the grape is likely to be a commercial success in Quebec.

Mr. Wright. What is the reason you cannot compete with other sections of the country?

Mr. N. C. Fisk. We cannot ripen. We can grow grapes for family use, which will ripen some years, such as the Adirondack, Brighton and Duchess.

Mr. Wright. The Champion?

Mr. N. C. Fisk. The Champion are not eatable and you cannot sell them to make money out of them.

Dr. Hoskins. The last grape I would discard for home use, and it has not been mentioned, is the Salem. It is the only American grape which has the meatiness approaching the European grape.

Mr. Pattison. I found the Salem very unhealthy in the foliage.

Dr. Hoskins. There is no money in it but it is good for home use.

Mr. N. C. Fisk. They can grow them in Western Ontario and send them here and undersell us every time. The same remark applies to the United States. They can sell at 4 cents a pound and wipe us out.

Mr. Wright. I do not see why you cannot grow as many Champion grapes in this neighborhood as in the Niagara district.

Dr. Hoskins. So far as the varieties which will ripen here are concerned I think we had better grow them. We have the market for them. No doubt they will bring better prices than those which come in paper boxes and become more or less musty.

Mr. J. M. Fisk. I noticed in the last number of the Country Gentleman, recently the death of an eminent grape grower, Mr. A. J. Caywood, of Marlboro, N. Y. He was the originator of the Duchess and many other varieties which have proved of great value to the Northern States and Canada. It would be well if this Convention would make some recognition of the loss which the country has sustained by his death.

Mr. Gibb. I knew Mr. Caywood well. He was an extensive experimenter hybridist and he originated some valuable varieties.

Mr. Pattison. I have much pleasure in endorsing the suggestion of Mr. Fisk; I hold the memory of Mr. Caywood in great reverence.

Messrs. Fisk and Pattison were appointed a committee to draft a resolution of condolence.

The discussion on grapes was resumed.

Mr. Gibb. We have had a season of comparatively little heat, and though I do not live in one of those favored sections where the Concord can ripen properly yet I have had fairly good grapes of many varieties last year. The year before I had 42 varieties that were ripe, sweet and good. I think the worst season I have had was 1882 when the Delaware was only fair in quality, and so was the Herbert and some others, but I had some 20 to 25 varieties that were really good. I intend to continue grape growing because I get some jolly good grapes every year.

Mr. N. C. Fisk. These are for your own use.

Mr. Gibb. Yes, it is for home use and not a commercial matter. The question as regards the expense is simple. No doubt we can grow as good Champions as can be grown anywhere else but we have to cover in winter. Further south they have not. It pays best to get our grapes from a distance or go in for winter covering ourselves.

Mr. Wright. I do not know whether you have organizations here similar to those we have in the Province of Ontario. There every County has its farmer's club which holds meetings from time to time. During the least busy season of the year, and then during the winter season the Farmers Institutes in every County hold meetings which are attended by the leading Agriculturists and Horticulturists, and a great deal of most valuable information is given at those meetings. There is one subject which has caused considerable discussions in these meetings and that is the subject of planting trees. It would not perhaps therefore be out of place to give you a short article on that matter.

Mr. Wright then read the following paper.

TREE PLANTING.

It is only reasonable to suppose that the first question that would be asked would be.

Why should we plant trees?

In answer we would say, because they very materially enhance the value of our property, whether it be a village lot, town plot, or the more extended farm. It does this because it makes your property far more beautiful, attractive and homelike.

Every member of your household will appreciate your labors and exertions in this direction and you will be more than paid for your trouble by the satisfaction that you will derive from seeing your efforts crowned with success.

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Planting can be done in our country with so little trouble and expense, that the great wonder is that it is not more generally adopted. Trees form such excellent wind-breaks in winter affording shelter to both man and beast, and in summer they supply such delightful and agreeable shade from our, at times almost tropical sun, that when once enjoyed no one would willingly be without them.

The Government of the Province of Ontario has acknowledged their great usefulness, by making all trees planted on the borders of the highway, the property of the adjacent owner, and also by appointing Arbor Days, for general and provincial planting, more especially in connection with the various schools scattered throughout the province.

Having once decided to plant the next question arises.

Where shall we plant?

It may seem out of place to say that street trees should be planted in the street, nevertheless we know that they are not always planted there. I know that it is quite customary, in small villages and even in towns of considerable size, to plant a row of trees along the front of the lot within a foot or two of the street line. In fact I did this very thing myself, but had I known then, what I know now, I would have planted them in the street within a foot or two of the outside of the sidewalk which is undoubtedly the proper place for them to be. It may be urged that they are more easily protected, when placed just inside the fence, from the depredations of wanton men and boys and from the injury they might receive from horses and cattle. But, properly formed guards, will be found to be ample protection from either, except it may be in exceptional cases. A row of trees across the front renders it almost, if not quite impossible, to plant the grounds with any effect in the modern style, where shrubbery and blooming plants form the chief attraction on the well kept lawn. Then follows the query.

What kind of trees shall we plant? I know that in some places fruit bearing trees have been selected but in our rigorous climate, there are so few of this class that we can use, and then they are so liable to be broken and permanently disfigured by attempts to gather the fruit, that it would be wiser that they should be almost, if not entirely discarded in favor of forest-trees.

Perhaps there are none of this class that look more sightly or that can be more easily grown than the Common Basswood.

When planted by itself it assumes a beautiful rounded form, has magnificent large shady leaves, and in addition to its beauty it yields an abundant supply of

the finest honey for our industrious bees. It can be easily procured, bears transplanting well, and is very hardy.

The hard or Sugar Maple is another desirable tree in many respects and yet it has its faults.

It is easily obtained, forms itself into a most comely shape, but it is not so easily grown as many other varieties, as it is liable to be winter killed in exposed places, it sun scalds very badly at times, and is also subject to be attacked by the borer.

The American Elm, in localities where sleet and ice are not liable to form in excess on its long slender gracefully pendant branches, stands almost without a rival.

It can be planted in a low wet-soggy locality, where very few trees of a desirable character will exist, or it can be planted with equal success upon the higher and more elevated grounds. The common Canadian Ash also thrives well in low localities, assumes a very pretty shape, and is well worthy of trial.

The Soft Maple is perhaps more extensively planted in certain sections of the north than any other tree.

Taken "all in all" it has few superiors. Its branches almost always assume a somewhat rounded form and throughout the entire summer they are covered with a thick green healthy foliage, but in autumn on the very first approach of frost, they adorn themselves with most gorgeous and fantastic colorings, which cannot but gladden the eye of every beholder.

There is one other variety which we cannot pass without a kindly word as it possesses so many points of excellence. I now refer to the Oak. 'Tis true 'tis slow of growth, but then when once it comes to maturity it is hard to find its equal in either appearance or healthfulness of constitution.

I have seen fine specimens grown on the way side from seed planted by the proprietor, which at ten years of age had become really fine little trees.

The Ironwood, Birch, Hickory and many other varieties might be added to this list, but these here mentioned will be found to be among the best of our common, easily procured, deciduous forest trees.

I know of no better course to pursue when selecting varieties than to cast your eyes about your own locality, see what specimens thrive best with your neighbours, ask them what faults their trees have, if any, and then select from these that apparently thrive best.

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do as some fruit growers do, plant one of every variety upon which you can lay your hands, but if you decide to plant Elms plants only Elms in that locality. On some other side of your plot you can of course plant some other variety but it never looks so well to have all kinds on one small lot, or even in one short street.

In planting all things considered, early spring should have the preference, the earlier the better, if the frost is sufficiently out of the ground, but if it cannot be done in the spring by no means neglect doing it in the fall. Evergreens, which I have not touched in my list can be planted at almost any season of the year, providing the operation be performed on a damp or rainy day. Their roots being composed of such a large amount of resinous matter a very slight amount of exposure to the sun or wind is almost sure to be fatal to this kind of tree.

How can we best induce our neighbours to undertake the operation of systematic and intelligent Tree Planting?

How many of us fully realize the wonderful influence for good or for evil that is possessed in the examples that are set before a people.

Years and years ago a man of small means builds a one story log house, with a roof curved at the base and extended on the front far enough to form the covering for a verandah and behold a whole nation in the province of Quebec even unto this day follow his example. The cleanly and frugal French Canadian housewife imitates the cleanliness of the surrounding snow by covering her homely cottage with the healthgiving lime, and forthwith thousands upon thousands of the nestling cottages of our thrifty French Canadian Habitants are made to adopt a similar covering and appear annually redressed in their new snowy covering. The most reasonable answer then it seems to me that can be given is for each and every one of us to set a good and living example before our neighbours by planting liberally and successfully ourselves, and thus by our actions at least, we would say in the language of Scripture "Go thou and do likewise."

Mr. William Gill. I am quite in sympathy with the paper just read. Where I live every person attempting to preserve the forest is at the mercy of anyone who is clearing his land by setting stumps on fire. I know of an instance where a person set a rotten stump on fire in order to make a smudge, and the result was a large quantity of forest was destroyed. These persons appealed to the law, which authorizes them to set fire to stumps during certain months in the summer. That law should be abrogated. Of course, when a country is new the great object is to clear away the trees, but to-day in many countries we are more interested in preserving what is left of our forests than in clearing land. The Legislature ought to pass a law making every one who sets a fire at any

time in the year responsible for the damage he may cause, Parliament should be memorialized to come to the assistance of those who are endeavoring to preserve our forests.

Mr. Westover. In the section of country where I reside we have no forests but simply sugar orchards. Many of these are situated on high lands exposed to sweeping winds. I would like to ask Mr. Wright what tree he would recommend as a protection?

Mr. Wright. In our section we are planting both spruce and the common cedar.

Mr. Westover. Is not the cedar slow growing? Some have planted the willow.

Mr. Wright. The willow is not a desirable tree to plant. It is an easy and rapid grower but it is a very poor tree. The wood is valueless and the limbs are easily broken.

Mr. Westover. Would you recommend bass wood?

Mr. Wright. That certainly is a fine tree and does not break off so easily as the spruce in a high wind. That is the objection to the spruce and the pine.

Mr. Westover. We want something the caterpillar will not destroy.

Mr. Wright. They will not injure the spruce.

Mr. J. M. Fisk. Mr. Wright speaks of the Evergreen as a tree you could plant almost any time in the season. I was under the impression it was one of the trees we should not plant in the fall of the year, and I got that impression from what I have read.

Mr. Chapais. I never succeeded when I planted them later than August.

Mr. Wright. I have planted them in the fall and succeeded very well. It seems as if the Evergreen tree was one in which a great many fail. The people are not careful enough with reference to the roots. If they dig up these trees on a wet day and plant them on a wet day when there is no wind the operation is always sure to be successful.

Dr. Hoskins. I am glad the subject of wind-breaks has been brought up. It is a matter of great importance to all fruit growers to have the orchards protected from high winds. It is a mistaken idea that the white cedar is a slow grower. I agree that the sugar maple is not entirely hardy outside our forests and the white maple is subject to losing bark on the southwest side. I have an acre of lawn upon a sandy loam, a very bare place to plant trees; my experience on that dry sandy soil is that the white cedar will grow as fast as any. I set a hedge over 14

years ago. One foot a year. The white spruce grows 2 feet apart. The hardest of all is the cedar.

Mr. V. Our association of the spruce is a capital idea. The stovepipe is a good protection.

Dr. H. Quite large. The came the

Mr. I. November. They should always be planted in wooded places.

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years ago, the trees a foot apart in a single row, and they averaged a growth of one foot a year. They make a perfect windbreak and are now 14 feet high. The white spruce, where you can get it, is equally good, and may be set four or five feet apart. The white spruce is not appreciated at anything like its value. It is the hardiest of all the Evergreens. I find it a hardy grower and as rapid as the cedar.

Mr. Wright. I was deputed last week to go to Almonte on behalf of one of our associations to give an address on Horticulture. I was mentioning the fact of the splitting of apple trees by the sun, and a gentleman rose and gave a capital idea. He said he went to the woods and got birch bark in the shape of a stovepipe, put the bark around the apple tree and it was an efficient protection.

Dr. Hoskins. It is only in occasional years this occurs. The tree may be quite large before it suffers. I have protected my trees but when the bad years came those protected trees were as bad as the others.

Mr. Pattison. I have been very successful in planting cedar in the month of November. A great mistake in setting out cedars is to plant them too deep. They should not be put below their natural position in the forest. I have always practiced getting them in an opening if possible, and not from a thickly wooded place.

Dr. Hoskins. I would never take a cedar out of the woods. If you get them there they are pretty sure to die. With us there are plenty of old fields and pastures where cedars are springing up and that is the place to get them.

Mr. Westover. I find no difficulty transplanting cedar when I take them out of the open field. The only trouble is they grow so slowly. I planted cedar twenty years ago for a windbreak to my orchard and they are now only about 14 feet high, but on dry ledgy soil I admit.

Dr. Hoskins. Perhaps the ledgy soil accounts for it. No land could be dryer than mine, but it is not ledgy.

Mr. Wright. There is not enough moisture in your ground. In British Columbia these trees grow to an enormous size on account of the moisture.

Mr. Gill. What effect have trees on the rainfall. For the last three or four years have not been so dry as some years ago, and nobody can deny the fact that our forests are disappearing. That militates against the idea that trees are necessary in order to have plenty of rainfall. I have read of some countries which have been stripped of their trees but which are now being replanted and good results as regards the rainfall have followed.

Mr. Gibb. As a rule it is conceded that the planting of trees does not so much increase the rainfall as it does the humidity of the air. That is the chief end in view in planting trees. My experience is that cedar trees dug out of the swamp do well on my dry upland if taken from the unsheltered outskirts of the forest. If taken from dense growth of evergreens, they winterkill.

Mr. Jack. 20 years ago I planted some in the first week of June and to-day there are a great many that would make saw logs.

Mr. Dunlop. I have had some little experience in the planting of white spruce and other trees of the same family, and I found that I had no success at all with fall planting, and unlike most trees the later you plant in the spring the more chance you have of succeeding. It seems to me the growth must be started before you plant the trees, and the locality has everything to do with the matter. If planted from the middle of May to the middle of June you find it one of the easiest trees to transplant, but if planted any other time it is one of the most difficult. I have planted in the fall and also early in the spring and they do not seem to grow. The trees seem to get a check then from which they never recover.

Mr. Gibb. We are pretty well agreed that our cedar is our best hedge tree. It grows into a hedge quicker than any other, and will grow into a windbreak. My own which were planted as windbreaks 15 years ago are about 18 feet high. With regard to the question of forest fires brought up by Mr. Gill, I believe the Hon. W. W. Lynch our late Provincial Minister of Crown lands took this matter in hand, but what the result will be, owing to the coming in of a new Government I cannot say. I know that the matter received much attention at the hands of the former government.

THE QUESTION BOX.

Give the name of some pear suited for cultivation in the Province of Quebec?

Mr. Jack. There is no pear that I know of that has done well in this Province.

Mr. J. M. Fisk. Have you not found the Flemish Beauty to succeed well?

Mr. Jack. No.

Mr. J. M. Fisk. In Abbotsford we find it the best of any.

Mr. Jack. 12 years ago I planted 300 pear trees and to-day I do not believe I have 30 of them left. Among these I had the Mount Vernon, and Flemish, Beauty. I have never had two barrels of pears any season yet.

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Mr. Westover. Although not a grower of the pear to any extent, there are a good many pears growing in our town. The Flemish Beauty and Onondaga are those that seem to stand the best. Some years ago I bought five trees, three Flemish Beauty and two Onondaga. Three of the trees are living to-day and they bear well. I had a good crop last year and a smaller one this year. They had just ordinary orchard culture; that is, growing in the grass with now and then a top dressing of ashes and of manure. The Flemish Beauty are living, but I could never see any difference between the fruit of these two varieties.

Dr. Hoskins. Then you have all Flemish Beauty.

Mr. Westover. Whether from sun scald or injury two of them died, which, I do not know. About 5 miles further south of me, they claim the pear is as hardy as the apple. They are not particularly confined to any distinct variety, but there are a number of seedlings, and good ones, that thrive and are hardy.

Mr. Jack. I may have been wrong in my mode of treatment. We forced them into rapid growth.

Dr. Hoskins. I have been trying for 20 years to grow pears at the head of Lake Memphremagog. I have grown the Onondaga until the trees were about four inches in diameter of trunk. Then came a severe winter and destroyed them, but one of my nephews saved some pear trees in good shape. I set mine out where they had the full benefit of the sun, but this man had not any place handy except at the back of his house, at the north side, where he set out a row pretty close to the building. Five of the trees the sun does not shine on at all, and yet he saved his trees.

Mr. Gibb. We must not forget the advice of the late Mr. Jas. H. Springle, who had on trial over 300 varieties of pears in Montreal. He described 50 varieties in the Society's first report in 1876. He shows that the grand old pear trees formerly growing about Montreal were not of specially hardy varieties, but they were manured only by the dew of heaven, and therefore made but a slow growth which ripened thoroughly. Modern pear trees are too often grown in rich soil and their half ripened wood is unable to stand our severe winters. I find this to be true. The Flemish Beauty is as hardy as our average apple trees if making slow growth. Perhaps some day we may check the growth of our pear trees by grafting upon the thorn or in some other way. Excessive growth is fatal to the pear tree in this climate. However the sheltered City gardens of Montreal feel this a little less than I do at Abbotsford. I have tested our 30 varieties, not including the new importation of Russian and German varieties. Of these only 4 kinds have been any approach to successes, viz., (i) Flemish Beauty, hardiest best bearer, (ii) Clapp's Favorite, (iii) Oswego Beurré? received from the late Wm. Iunn under wrong name of Beurré Diel, a more a less bergamot shaped

late autumn pear with a tinge of acidity, good bearer but not long lived, (iv) St. Ghislain, hardy tree, fruit small but of fine quality. Pear trees planted in open exposure like mine suffer from the cold winds at the time of blossoming, so that fruit is not in proportion to fruit buds. I think the question whether the cultivation of the pear can be made profitable in Quebec from a commercial stand point will be answered in the negative by this meeting, but we must remember that there is a milder climate in Montreal than in the surrounding country, and Captain Raynes says that if he were planting a large orchard now, he would plant it mainly with Flemish Beauty pear and the Lombard plum.

Mr. Fisk. Did these trees fruit well?

Dr. Hoskins. Yes, finely, and they bore large and handsome pears. They do not color well because they do not get much sun.

Mr. N. C. Fisk. I have grown the Russian variety of the pear, Bessemianka (or Seedless), to test its hardiness. I budded it upon a good sized pear stock and let it grow the whole season. It grew 6 feet but did not winter kill one inch.

Mr. Gibb. My Russian pear orchard is very satisfactory so far, but the trees have not yet fruited. I have a large number of German and some Polish varieties which are not hardy. However my pear trees are growing too fast, and will not live the same length of time if they grew more slowly.

What are the best varieties of native and European plums suitable for cultivation in the Province of Quebec?

Dr. Hoskins. I have a plum that was sent to me with a lot of things from the Iowa Agricultural College. I have concluded that agricultural colleges are not to be trusted in giving correct names. I got a long list of things from there, and they were all labelled, but the labels were not correct. But two famous trees came to me called the blue and white Arabka which are going to be valuable fruits, good in color, but not in size. I watched the fruit grow very carefully. It was a beautiful amber colored plum, and when ripe showed a little red. I thought is the prettiest plum I had ever seen in my life. I took it into the house and laid it on the bureau, and every day it became redder, until by and bye it became a red plum. It was very good, as red as our native wild plum, but it had the prune shape, and evidently belongs to the European or Asiatic plum. It is fully as good as the Moore's Arctic or the Lombard.

Mr. Gibb. My experience with the European plum is by no means satisfactory. Our winters are a little too cold. The Lombard has borne well, but only bears once in a few or many years. My Russian plums do fairly, rather than well. They do not thrive like the Canadian plums but among the native plums the one I think most of is the De Soto. I have only had it bear twice, two

years, but bears profusely in my nursery of about 12 depends ma

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years, but it is better in quality than the ordinary Wisconsin wild plum, and it bears profusely. I have also the Dwarf Mountain of Iowa. I found a little tree in my nursery lying down. I found the little thing prostrated by the weight of about 12 good sized red plums of good quality. My hope of growing plums depends mainly upon the Western American varieties.

Dr. Hoskins. I have got quite a lot of DeSoto trees, and they bear well. They are late but better than any of our native wild plums. The trouble with those is that the good ones are the worst looking. The best to eat are the smallest and meanest looking ones for any purpose, but there is a good market for them. I consider them a better canning plum than the European varieties, because they have a better flavor. I prefer them even to peaches for canning. They can be very much improved by cultivation and hybridization, and in this way we will get a variety of plums that will be hardy and well flavored.

Mr. Wright. How large is the DeSoto?

Dr. Hoskins. It is nearly as large as the Lombard, has a solid flesh. The western wild plums have a round stone; our Canadian wild plums have a very flat stone.

Mr. J. M. Fisk. I have grown the DeSoto for a few years and found it not only an early but a very prolific bearer. It bears on very young trees, and although it is one of the latest ones to ripen, I consider, as long as it does ripen, that is not a defect. In fact it fetches a better price by coming in later, than it would if the native plums were then in season.

Mr. Wright. We have a native plum, the Leopard, in our section, and its only fault is that it is a soft plum. The lumbermen were accustomed to throw away their plum stones on the banks of the creeks and a lot of trees grew up.

Mr. Gibb. I believe in taking foxy grapes for jelly, they are the best. But those plums which have a certain amount of astringency in the skin and stones are very second rate for canning. The DeSoto is the most free from that objectionable feature of any native plum I have. One of the varieties that has done very fairly is the Miner. It bears less than the DeSoto, but ripens about the 1st of October, and keeps until about the 1st of November. It is a deep dull red with a flavor something like a musk melon.

Mr. Wright. I am trying to find a blue plum that I can grow.

Mr. Westover. Ten years ago the Damsons with us almost grew wild, but it is so subject to black knot that there are none left, and there is no possible means of saving it.

Mr. Gibb. I was at Mr. F. Sharp's, Woodstock, N. B., last year. He grows

the Moore's Arctic, in such quantity that he ships it by the carload. The tree is not hardy enough for that climate, so he digs a long trench, plants his trees rather close with the roots extending only in two ways, then before winter sets in he bends the trees down. Moore's Arctic is a very young bearer and no doubt, bending the trees down tends to make them overbear, and Mr. Sharp simply lets them die of overbearing. The amount of fruit it produces is enormous, and an immense plum industry has grown up in that part of the country.

The convention then adjourned and met again at 8 o'clock p.m.

Mr. J. C. Chapais read the following paper on this subject:

SOD IN ORCHARD.

It is an acknowledged principle that the best for an orchard is to have its soil cultivated as much as possible, in order to prevent it from coming in grass. Is this principle rigorous? Is it always and everywhere profitable to follow it?

Those two questions came to my mind from observations I have more than once made in the orchards of the Eastern part of the Province, below Quebec.

The winter of the year 1871 was a disastrous one for a large number of fruit and ornamental trees, in that part of the Province. Hundreds and hundreds of trees were killed by the severe temperature of that winter, one of the most inclement we have ever experienced. When came, in the following spring of the year, the moment to verify the injury, I have made, (though I was then only an *amateur*, but instinctively attracted by everything in the shape of a tree), observations, the exposition of which may help to throw a light on the two questions I have put before you.

I will give you communication of my observations as then made:

1. A large number of fruit trees were killed in orchards, the soil of which was under cultivation, and where the trees had no mulch.

2. A smaller number of trees were killed in orchards, the soil of which was under cultivation, but where the trees had received a good mulch.

3. But a smaller number of trees were killed in orchards in sod, where the trees were standing apart from the sod on a circumference of 24 or 30 feet, which was kept mellow and covered with a good mulch.

4. No trees, or so few that it is not worth mentioning, were killed in old neglected orchards, having received no cultivation whatever for years, and where the trees had their roots buried under a thick sod.

5. Almost all clumps of ornamental trees planted so thickly as to interfere

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with the penetration of the rays of the sun through the foliage, and consequently with the growth of grass under them, were killed.

6. Very few ornamental trees planted in meadows or on lawns were injured.

I have often verified the same facts since, but, never on as large a scale as in the year 1871.

What conclusions can be inferred from those facts? In my opinion, here are some of them:

1. In the very cold regions of our country, it is wrong to cultivate all the surface of the ground of orchards without putting any mulch on the roots of trees, and all trees growing in a soil having no sod nor mulch are apt to be killed, in those regions, during exceptionally severe winters.

2. In the same regions, there is much less risk to cultivate the soil of orchards, if a good mulch is applied over the roots of trees, in order to cover all these roots:

3. It is yet still better, in these regions, to keep orchards in sod, provided grass is prevented from growing nearer them 4 or 5 feet around the trees according to their size and that this space is kept mellow and covered with a good mulch.

4. Lastly, from what I have stated before, one would jump at the conclusion that the best way to protect trees against so bad circumstances as those met in the year 1871 would be to promote the growth of a thick sod over the very roots, all around the collar of the tree. But, that last conclusion would be wrong altogether, for it is more than proved that this practice is just the one that makes poor ricketty trees, badly grown, and really not worth the trouble of keeping. The remedy, in that case, would be worse than the disease.

I have made a special study of the causes from which is derived the fact that trees in a mellow soil, well mulched, and surrounded by sod, at four or five feet from their trunk, get more protection in that condition than those having the same cultivation and care, but being surrounded by cultivated soil all over the surface of the orchard, and here is what I believe to be a fair explanation of the case:

The mulch applied to the foot of trees effectually protects the roots of the tree. Now, these roots, as everybody knows, have organs of nutrition, which are, most of them, found near their extremities. These organs consists of hundreds of small rootlets, very delicate, of which the largest part is found at the circumference of the circle of roots covered by the mulch. Most often, even the

mulch does not extend far enough to get over these rootlets. But, supposing they are well covered, let us see what takes place. The cultivated soil surrounding the circumference where the rootlets lie in the ground is exposed to all the inclemencies of the season. It became deeply frozen, its surface thaws easily in mild weather, it freezes again with the cold coming back, and varies in its condition at every variation of the temperature. The external part of the mulched circumference undergoes laterally, to a certain width, the variations undergone by the soil surrounding it, and the rootlets lying in that laterally exposed part of the circumference are thus exposed to be killed, notwithstanding the mulch which covers them. If, instead of that cultivated soil, the circumference is surrounded by sod, then, that sod prevents the soil from undergoing as much the variations of the temperature, and acts as a protection for that part of the circumference adjacent to it.

From what I have just stated, I feel inclined to come to the conclusion that the best plan to choose, for orchards of the coldest regions of the Province, is to keep them in sod, taking care to keep mellow and clean the soil at the foot of trees, for a space of 4 or 5 feet all around the trunk, and to apply a good mulch on that space.

Prof. Penhallow. There is a great diversity of opinion with reference to the benefit to be derived from sod or clean culture in orchards. In New-York State, among the peach and pear growers, the opinion largely prevails that sod culture is best for the orchard. Other growers maintain exactly the contrary, and I am not aware that any growers in that region have made sufficiently extended and systematic observations covering a sufficient number of trees and a sufficiently long period of time to warrant their forming a decisive conclusion; but the observations Mr. Chapais has made are extremely interesting in this connection.

Dr. Hoskins. I do not know that I can voice the general opinion, for I think our farmers do not observe these things very closely. I have had of course occasion during the past 25 years to observe things which tended to the formation of judgment on that subject. For the first four or five years after I bought my farm, I lived in a village and did not see how things were in the winter; but I had set out trees in different places, and was surprised in the spring to find some in good order and others dead, but not dead on the top. They did not leaf out at all or put out only a few leaves, and died, and I found the roots were dead. The cause of the decay was a mystery to me until I found out that the spots where the trees had died were the spots where the snow had blown off. No matter how iron clad the tree might be, it would be killed as quickly in these places as the tenderest apple tree. The fact is the roots of the trees are not nearly as hardy as the tops. If you will plant a tree where the snow will not lie

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Prof. Penhallow.

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in the winter, you will lose the tree unless you mulch it. If you mulch heavily, the mulch takes the place of the snow and will keep out the frost though not so well as the snow will.

Prof. Penhallow. The deep snow will often draw the frost.

Dr. Hoskins. One man has a small area of ground where the snow is sure to stay, but in a large orchard there will be places where the snow will blow off. Most persons will infer the Russian apples which are iron clad are iron clad as to their roots.

Mr. Brodie. In my experience the past few years I have lost a good many trees which were on a bare hill where the snow blew off, but I took a few crops of sweet corn off for the market and left corn stalks to gather the snow. The snow lay finely all over, but of course the cattle were deprived of a sweet bit.

Professor Penhallow. This question has another important bearing. Is it better, so far as any benefit may be derived from the trees during the period of growth, that the land should be in sod or clean culture. We must decide which is best for the purposes of cultivation and protection.

Mr. Brodie. I like to cultivate my trees until they are so large that we cannot cultivate them properly, that is until they are about ten or twelve years old. I have my orchards planted with trees mostly about 30 feet apart each way. The trees are all low branched, and when we cannot plow up close to them we put them in sod.

Dr. Hoskins. The June grass seed makes a nice bed for the apples to fall upon.

Prof. Penhallow. Would you leave the ground permanently in sod?

Dr. Hoskins. We cannot cultivate them and get them to grow to the age of fifteen or eighteen years unless we put them farther apart. I rely on top dressing altogether.

Mr. N. C. Fisk. The trees stop growth earlier while in the sod and ripen the wood better. That is the greatest point in favor of leaving the trees in sod where the trees are liable to kill. Where they are not cultivation is better. The trees in sod stop growth sooner than when cultivated.

RUSSIAN APPLES.

Dr. Hoskins. In the remarks I made yesterday I made some allusion to the disappointment which so far had attended us in the cultivation of Russian apples as regards getting long keepers. Although it is possible that we may get some

long keepers from among the imported Russian trees the chances are small that we shall get good sized apples of good color and flavor among them. We might get them from Southern Russia, but then we run the risk of getting tender varieties. Red Astrachan is from the extreme South of Russia, and is not truly an ironclad apple. It seems to be pretty well established that formerly we had a class of apples quite distinct from anything we have received from Western Europe, but the Russians have mixed up with these a large number of other apples which they have received from North Germany and perhaps from Finland, and Sweden and Denmark. The long list of apples imported by the Department of Agriculture at Washington has been shown by Mr. Gibb to contain a mixture of many sorts, of many characteristics, and many different origins. It is too soon to generalize or philosophize upon the character and nature of these apples which we have got from Russia, and which seem to be of Asiatic origin. I am inclined to believe that among them there is a class of apples which have been received from North Asia, probably crossed more or less with the apples that have got into Russia from the other side. The Russians themselves seem to admit that their apples have a very wide derivation in regard to their origin. But the North Asiatic it seems to me is going to be the one which will be most successful in the northern part of the western continent, particularly in our North West and prairie regions like Dakota, Minnesota, Manitoba and the newer territories. The characteristic of the most thoroughly ironclad portion of Russian importations of apples is their perfect hibernation. The thaws and the warm spells do not make them show their buds. They seem to know by experience it will not do to put faith in any warm weather that may occur between the first of December and the last of March. That is their most valuable characteristic. The next most important characteristic would be the rapidity with which they make their growth, they come from a country where the season of growth is very short, but a longer season does not make any difference with them; they bring all the Russian characteristic with them and stop growing pretty early in July. No matter what kind of weather we have, between that and snow fall, they cannot be persuaded to push another shoot. They seem to have lived in a severe country so long that they cannot be fooled any longer by the sun. Another characteristic of that class of apples is their heauty. The red apples and the red striped apples are noted for their brilliancy of color and their regularity of form, and the same qualities are noticeable in the yellow apples. Some of the Russian apples are white when they are ripe, not chalk white but as white as they can be with a little tinge of yellow. The Yellow Transparent is peculiar in not having the fault attributed to the Wealthy, that of dropping. They will hang on until they are completely ripe and do not lose their quality. I have left them on the trees, when the trees were in sod, until nearly the last of September and they were as good to eat then as in the middle of August, but they

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became almost white. Early bearing is characteristic of most of the Russian apples, but some of those which have the most prominent characteristic of the North Asian family are not early bearers; but almost all bear young and abundantly. The Prolific Sweeting is the only exception and the Golden White. They are late bearers. I got my scions in 1870, which makes the trees nearly nineteen years old, from the root grafts. In the same row I have a considerable number top-grafted on the Tetofsky. Not one third of these has yielded, but those that have will bear more apples than the root-grafted trees. Generally they are nice growers in the nursery, make nice straight stems and neat heads, and that is every thing to the grower, because the average farmer is not educated up to the point of preferring a bad shaped tree of a good kind to a good shaped tree of a bad kind. If the nurseryman attempts to deliver trees that are naturally crooked the buyer thinks he is trying to get rid of his poor trees.

I think by crossing our kinds with the best Russians, we will eventually succeed in getting a long keeping apple which will have the Russian characteristics in a great degree. In olden times, when people drank cider, we had large orchards of seedling trees, as people did not understand grafting. The result is they say in Maine if every one of our commercial apples should be exterminated, they would be replaced by good or better ones in the old seedling orchards. Maine has not produced a single first class long keeper. The only long keeper that Maine originated is the Maine Russet, and that is an apple we do not hear much about. What we must do is to grow seedlings from Russian apples growing among our ironclad American apples. There is room for great improvement in our apples. We should plant American and Russian ironclads together so that they will cross and then plant the seedlings.

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

NEW RUSSIANS.

The apple growers of this Province are naturally looking forward with a good deal of interest to the development of the New Russians. For from among these we had hoped to fill many of the blanks in our late keeping varieties which have not proved sufficiently hardy for general cultivation.

We have not yet had sufficient experience with these new varieties to fully determine how far these expectations are to be realized, therefore, the question is to a great extent premature, at least I find it so with my limited experience, as it is only five years since I introduced for trial some thirty varieties into nursery and as yet have but a few planted into orchard, still, I can safely say from

close observation while these have been under cultivation, that their comparative hardiness with many of the old varieties, is without question a great improvement.

As a rule, the Russian variety prepares for winter by dropping its leaves in early autumn, and maturing its terminal buds before the cold weather sets in, while on the contrary, many of our old varieties continue to hold their leaves, and in some instances even to make new wood until the frost blackens and blights both leaf and twig.

Thus we have by the late importations secured a type of hardiness, which we have every reason to feel will prove of great advantage by introducing in several instances varieties, which promise to rival the popular Duchess, not only in hardiness, but also in productiveness, beauty and quality of fruit.

During the past season, nine out of the thirty varieties I have on trial, fruited in nursery row, which makes a good showing for early productiveness.

The names of these varieties are: Titovka, Mottled Anis, Liveland, Raspberry, Arabka, (imported by Dept., in 1870), also Arabka, (a summer variety imported in 1883), Longfield, Steklianka Ostrokovskaya, Vargul, and Hiberna.

Here, Mr. Chairman, I beg leave to suggest that as we have two varieties imported under the name of Arabka, and as one is a winter fruit, while the other is a summer or early fall fruit, that they be designated as *winter Arabka*, and *summer Arabka*. A plate of the winter variety is now before us on exhibition, grown by Mr. Chas. Gibb.

The summer variety, in color, is not unlike Duchess, but in form more oblong, and of better quality not so acid, and ripens later than Duchess.

As I did not fruit many specimens of these new Russian varieties the best of them were selected for exhibition, and appeared on your tables at the Riuk last September, consequently I did not have the opportunity to sample many of them in their best condition, some being over ripe after exhibition, while others were quite crude and unripe.

In appearance the fruit is quite up to the old varieties, being of good size, color and attractive, while in texture and flavor, they do not average with our Fameuse and St. Lawrence, still, many of them are *good*, and will undoubtedly in the near future be found among our leading commercial varieties.

Mr. Charles Gibb, Abbotsford, read the following paper on

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RUSSIAN APPLES.

It is the value of the Russian apple upon the soils of our own province that we wish to know. We know something of their hardiness and bearing in certain parts of Russia. We know something of their behavior in Wisconsin, Iowa and Minnesota, but these facts are pointers in a certain direction, and the test of their value to us must be made upon our own soils.

There is a tendency to grow these Russian fruits in climates of much greater summer heat than they are accustomed to in their old homes, and yet to expect them to maintain their old world character. I showed this very plainly in my report upon the late keeping apples of Russia last year.

There are influences modifying the climate of Europe. The Atlantic, the Gulf Stream, the Baltic and Black seas, the Sahara desert, have a modifying effect which extends eastward to the Mal Mountains. The Russians are growing apples, plums and cherries in quantity where the winter temperature is 2 degrees colder than Chicoutimi, colder than any part of this province where we are likely to try them, but our summers here are warmer than in the higher latitudes of Russia, and the apples as we grow them here are larger and finer colored but coarser in texture and earlier in their time of ripening and therefore not as long keepers as in the higher latitude of Russia. For let us bear in mind that the importations of apples from Russia were from latitude 51 to 55 in Eastern and Central Russia and from latitude 57 to 61½ in the Baltic provinces.

Last season I fruited about 35 varieties, of some of them however only a few specimens.

Arabka (E and B). This promises to be of value. I have 5 trees planted as three years old in the spring of 1884, and which have borne for the the third time. The young trees last year were loaded with their large dark purplish fruit and were greatly admired by all who saw them. The fruit when picked in October was simply acid and without sweetness, later it improved somewhat. I put a barrel of it in the cellar. They kept till March and April and some until May. The fruit is not like the Baldwin, not the texture for a commercial late keeper. Last season lacked summer heat and this may have added to its keeping qualities. As a home use winter apple for cold climates it is well worthy of trial.

This variety was imported by Ellwanger and Barry of Rochester, N. Y., from some source in Moscow, (not from Mr. Schroeder), and is a true Arabka. It must not be confounded with the following :

Arabka. This I received from Prof Budd and I suppose it to be that received

by him from Dr. Regel being his No. 257. Arabka No. 184 of United States importation of 1870, is perhaps the same. It is so far my most healthy tree and evidently a tree adapted to very cold climates. The fruit is striped like a Duchess but more regularly and beautifully painted upon its white ground. It is quite conical, subacid and leaves a woolly residuum which does not melt and ripens more or less with Duchess.

Longfield. I have 5 trees of this planted in Spring of 1884 which have borne for the third time, so that I have had enough bushels of it to form some idea of its value. It is certainly a young and profuse bearer, and at the same time, so far a fair wood maker. The tree weeps and is an awkward grower in nursery and orchard. The fruit has usually a brightly blushed cheek. Yet for market purposes, a larger, firmer and darker colored fruit, even though not equal in quality would sell better, and for home use it has to compete against Fameuse and Wealthy. It combines many good qualities but so do others.

Repka (184 Dept. Ag.) is the best keeper I have fruited among the Russians. On young trees it bears well and is medium in size. On older trees, I expect it to be smaller.

Repka (of E. and B.) must not be confused with the above. A pale yellow oblate fruit of pretty good quality, a summer variety I have taken a fancy to.

Yellow Transparent and *Thaler*, (Charlottenthaler) are now pretty well known as valuable varieties ripening before Red Astrachan. If not quite such young and abundant bearers I am inclined to think they would live longer.

Grand Duke Constantine (of E. and B.) looks just like Alexander, but it is smaller, the flesh is firmer and less acid. For market Alexander would be best, for eating I would prefer this.

White Borodovka (Bielborodovka) of Ellwanger and Barry bore a few fine specimens last year. They were large, half red and very showy, I forgot to taste them. I did taste this at Rochester 3 years ago and found it very good.

Royal Table (Furstlicher Taffelapfel) is a German apple sent to the Iowa Agricultural College by Mr. Schrieder, of Moscow. It is a very young and abundant bearer, above medium size on young trees and mostly red. In autumn it is very firm and promises to be a late keeper, but I have not proved this and rather doubt it.

Basil the Great (Vasilui velikui) and *Repka* native (hitherto known as Turnip Juicy) have borne a few great oblong apples. As far as I can tell they appear alike both in tree and fruit. I received them from A. G. Tuttle, Baraboo, Wisconsin.

Christmast (Roshdestvenskoe) bore me a goodly number of large oblong

fluted fruit of a drying and d

Of other v the trunk of th to this and othe hardy tree but fruit of good s there by A.G. fruit rather sm *Enormous* is a st long before rip sized apples wi to be valuable fru) received b small flattish w about this. *Bas* sweet and I do a few apples, t

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Prof. Penl our hardiest, a while if some s the pollen from by obtaining a

flated fruit of pretty fair quality, but my two trees have both been affected with a drying and dying of the bark upon the trunk.

Of other varieties *Titovka* has disappointed me, a large handsome fruit but the trunk of the tree very subject to dead patches of bark. One tree died owing to this and others are already injured. *Ostroloff*, I have looked upon as a very hardy tree but it is subject to this same disease. *Sandy Glass* is a good tree and fruit of good size but green and inferior in quality. *Moscow* (imported from there by A. G. Tuttle, Baraboo, Wis.) is a very hardy tree and bears well but fruit rather small and water cored (maliv) and not equal to *Repka* (E and B.) *Enormous* is a strong grower and very hardy tree but what fruit it had all dropped long before ripe. *Red Anis* and *Yellow Anis* (of Dep. Ag.) are much alike, small sized apples with a good deal of red and of fine texture, but I would expect them to be valuable where the summer heat is less than here. *Mottled Anis* (*Anis pestrin*) received by the Iowa Agricultural College from Mr. Schroeder of Moscow, is a small flattish wrinkled white apple not of value. I think there is some mistake about this. *Barloff* (of Dep. Ag.) received from Mr. Tuttle is subacid instead of sweet and I doubt its being true to name. *Antonovka* is young yet but has borne a few apples, tree all right so far.

Cross (*Skrigapel*) received from Prof. Budd bore a few last year but I am not in love with it.

Of the other varieties received from Ellwanger and Barry, *Peter the Great* is a bitterish sweet. It is hardly likely that so great a name would have been given to so great a fraud. *Sevinkia* a slow grower and not a young bearer of medium sized striped apples of good fine quality. We do not need it. *Nicolayer*, I think by Dr. Regels description is the *Nasliednik Nicolai Aleksandrovitch*, a small sweetish oblong striped apple of fine quality. *Cardinal* a good sized reddish summer sweet. *Red Transparent*, *Count Orloff* and *Grand Sultan* all proved to be the old *White Astrachan*.

Raspberry (*Malinovka*) and *Golden White*, I have not fruited but have seen them doing well in Wisconsin. Both are hardy trees and abundant bearers. The former a small white fleshed bright red late summer fruit, of fine quality; the latter a rather attractive fruit of fair size and medium quality.

The many Russian varieties now beginning to bear in different parts of our province will soon begin to show their value upon our own soil.

Prof. Penhallow. Dr. Hoskins spoke of the crossing of Russian apples with our hardiest, and best varieties. It has often occurred to me that it might be worth while if some systematic efforts were made in that direction. That is by taking the pollen from a good tree and fertilizing a known variety with it and thereby obtaining a cross the pedigree of which one would know. That could be done

without difficulty. The advantage of indiscriminate pollenizing that occurs in a large orchard is that there is no time lost in the operation, but there you cannot trace the pedigree exactly, whereas if the process were carried on systematically by hand and the insects kept from the the flowers, you would know exactly the result.

Doctor Hoskins. The one does not exclude the other. We can try both ways. But the encouragement in indiscriminate pollennization must be derived from the well known fact that every good apple we have, was got in that way. We do not possess a single apple produced by artificial crossing, nevertheless I do not say one cannot be got. The thing most easily done is that which is most likely to be done. It does not require any scientific skill or knowledge to effect a cross, but to say that is one thing and to make an ordinary farmer do it is another. I want to add a word about the Yellow Transparent and that is that they will begin to be profitable just as quick as the currant. In the fourth year it will average half a bushel or more. That is one thing which leads to the belief that the tree will not be long-lived, but you can keep replanting. They do not grow very large, and you can plant them close. You can plant them 12 by 30 feet and immediately put another row in the middle with the expectation that there will be room enough, but I am planting grapes between them. My idea is to keep renewing them, and I believe you will find them the most profitable apple you can raise. There is no other apple will compete with it in its season.

Mr. Brodie. How long can you keep the Golden White?

Dr. Hoskins. I have kept them until the first of January, but I never kept them as long as they would keep.

Mr. J. M. Fisk. Our experimental stations ought to take up hybridizing in a scientific manner, and the fruit growers conduct their experiments in the way Dr. Hoskins suggested.

Mr. Gibb. On Sunday last, Prof. Saunders called upon me, and said he was very sorry he could not remain over for this meeting as he would have liked to have given us notes upon the work of the experiment station at Ottawa. He asked me to save the seeds of Russian apples which he wished to plant to see what they would amount to.

Q. Is there more than one variety of Fameuse under cultivation?

Mr. Gibb. I remember gathering notes on that point in 1876, when I was gathering facts for the first report on fruits for the Montreal Horticultural Society. We had a series of meetings of all the old fruit growers, some of whom have

since passed away. Sherbrooke street Fameuse, also a redder, and better than the gardeners on the other street, and in fact better than the striped Fameuse. I will produce the striped Fameuse to decide.

Mr. Brodie. I procured those trees which I put from Capt. Ray's those I got from you cut them off a thicker skin a County collection like Fameuse, a Fameuse. In my collection there is the Fameuse.

Mr. Shephard. Fameuse, they are both the red and are striped and specimens of the Fameuse will

Mr. Brodie would be to apples themselves.

Mr. Gibb. apples known to which comes from at Abbotsford in exhibition at Ross. There is the St. barrels at St. H.

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since passed away, and this question was discussed. It came up in this way. On Sherbrooke street, in the olden time, there were a great many orchards bearing Fameuse, also along Dorchester street, but those along Dorchester street were redder, and better colored, and they sold better on the market. So that when the gardeners on Sberbrooke street wanted to get scions they went to Dorchester street, and in that way sought to perpetuate the dark red Fameuse rather than the striped variety. But the question was, would the striped Fameuse produce the striped, and the red produce the red. On that point they could not decide.

Mr. Brodie. In my orchard I have a few trees on the front part of the farm which I procured from Captain Raynes of Cote St. Antoine. I have also a few trees which I procured from Mr. Simon Lacombe of Côte des Neiges. Those from Capt. Raynes were of the striped variety, and more conical in shape than those I got from Mr. Lacombe. The latter were flatter, and dark red, and when you cut them open there would be a red streak right through them. It also had a thicker skin and would ship and sell better. When I was gathering for the County collection for Hochelaga, I found in Mr. Berthelot's orchards, apples just like Fameuse, and you could sell them for Fameuse and could not tell the difference. In my collection I have the Fameuse Noire from St. Hilaire and then there is the Fameuse Sucrée. These already make quite a collection of Fameuse.

Mr. Shepherd. The Fameuse Noire grown at St. Hilaire are not the Fameuse, they are seedlings of the Fameuse. In most orchards you will find both the red and the striped Fameuse on the same tree. Sometimes the majority are striped and sometimes red. I think you will be able to pick out perfect specimens of the red and the striped from the same tree, and I do not think that Mr. Brodie will be able to tell the difference.

Mr. Brodie. The shape of the apple speaks for itself. The way to decide would be to appoint a committee to visit the orchard and to decide for themselves.

Mr. Gibb. We must not bring into this discussion Fameuse seedlings or any apples known to be not Fameuse. For instance there is a large sweet Fameuse which comes from St. Hilaire. It was sent from there to the Gallipeau orchard at Abbotsford many years ago. It was also exhibited at the Abbotsford Society exhibition at Rougemont by Mr. S. Bertrand; but it was judged to be not Fameuse. There is the St. Hilaire (Cabane du chien) which was once used to top Fameuse barrels at St. Hilaire. There is the Fameuse Sucrée of the Coteau St. Pierre.

There is another, a small apple which is known as the Sweet Fameuse, and which was brought to Abbotsford from St. Hilaire 30 years ago. The question

is, is there more than one variety which will pass before our own horticultural Society as Fameuse. Captain Raynes says he has two varieties: the striped Fameuse which he received from Mr. Day at the back of the mountain, and the red Fameuse which he received from some other place. He says although some of the trees produce both, he can pick out by the fruit which are the trees grown from Mr. Day's importations of the Fameuse anywhere through his orchard.

Mr. J. M. Fisk. No doubt there is a great mixture in the seedlings of the Fameuse, and it is very likely some nurserymen have got scions from the seedlings of Fameuse, which have been propagated under the name, but for my part although there are two distinct colors in the Fameuse, the dark red and the striped, and you might often be able to pick both from the same tree, you cannot distinguish the two as regards flavor.

Mr. Brodie. The red Fameuse has a thicker skin.

Mr. J. M. Fisk. There is no variety in which the fruit varies so much as in the Fameuse, not only in form but in striping and color. You will take specimens from the same tree which you would consider totally different apples.

Mr. Brodie. I know some gentleman from the city who, when they buy apples to send home to their friends, always tell me to pick out the red variety. They find the red ships better than the other.

Mr. Brousseau. In 1865 I bought one hundred Fameuse. I then scarcely knew a Fameuse tree from anything else. When they came into bearing, I found some trees would have much lighter colored apples than others. Alongside of these I had a row of St. Lawrence. I began to speculate as to whether the mingling of the pollen had some effect in making this difference of color, but since then the subject has been discussed a good deal. That difference still continues. One tree will be light color and the other a very bright red. I do not see much difference in flavor and they are nearly alike in shape.

Mr. Brodie. This red variety that I mentioned Mr. Lacombe from Côte des Neiges was very particular in selecting to propagate. Most of the young orchards planted on our road produce this red variety for it sells better. As to this striped variety, I think there are some old trees in our place, which have been there fifty or seventy-five years and which are pretty large. Friends of ours who came from Shediac took scions of those striped varieties with them, and that is almost the only kind that grows there. The red apples we have are seedlings and resemble the seedling Dr. Hoskins has given us very much.

Mr. Shepherd. I should like to see the thick skinned Red Fameuse Mr. Brodie talks of. They are very unusual. I have never seen one yet.

Mr. J. M. Fisk. It is possible Mr. Brodie has a seedling Fameuse which has

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been propagated. You will often find striped and red on the same tree. You will find the red on the top of the tree, where it receives the south wind, and the striped on the other side.

Mr. Jack. I have a tree in my orchard standing perfectly alone which has no red apples on it. They all have this distinct stripe. I have quite a number the apples of which are altogether red.

Mr. J. M. Fisk. There is no perceptible difference between the growth of the striped and the red.

Mr. Gill. I consider the vigor of the tree has a good deal to do with the strength, the flavor and the appearance of the apple. Canada Baldwin, beginning to decay, will grow sometimes apples as large as a healthy tree. But they bear a sour apple and sometimes striped. That may be the case with Fameuse and other varieties.

Mr. Jack. Do you not think, Mr. Brodie, that the skin of the the red is somewhat tougher than the striped, but not thicker?

Mr. Brodie. Yes.

Mr. Westover. In grafting, I prefer the red Fameuse, and select my scions from those trees which have borne the red. When they come to bear they do not all prove to be red. There are stiped ones too.

Mr. N. C. Fisk. There are many curious freaks in apple trees, often owing to the stock on which the trees are grafted. I will give you an instance. One half of a tree, a budded tree, bears one year and the other half the other year. As to the color I cannot say. You may bud from the same tree a whole row and you will have the striped and the red all along, and if you bud off the striped you will have both on the same tree.

Dr. Hoskins. There are undoubtedly cases in which scions taken from the striped Fameuse tree will produce, some of which bear all red apples and some striped apples. A great many of the old orchards in Canada consist of partly seedlings. There are many ladies who make it a matter of conscience to plant the seeds and the result is that a great many seedlings are raised. Fameuse being grown so exclusively in the one orchard must be bred in and in. It would seem to me very strange if the seedlings raised in Canada for the last two hundred years should not in some cases produce exactly fruit like the parent. It is possible to have great variations from the seed and also to reproduce the type exactly.

Mr. J. M. Fisk. Does anyone remember what the typical Fameuse of years ago in Montreal was like?

A Voice. It was red.

Mr. Jack. Some 50 years ago I came across the first Fameuse. There were 12 trees in the orchard planted in 1814 and 1815. Those trees produced striped Fameuse.

Mr. Bruyere. The oldest in my orchard was the striped Fameuse also.

Question. Would it be more profitable to allow orchards to remain in sod or under cultivation.

Mr. N. C. Fisk. Any apple tree should be kept under cultivation a certain distance around the tree until it get fully established. It is not very often a man is successful in cultivating apples where he lets the sod go on shortly after planting. He should keep the trees at least four or five years under cultivation.

Mr. Shephard. A perfectly healthy Fameuse tree is very difficult to find. In our district there are scarcely any perfectly healthy Fameuse trees above 15 years of age. One great trouble is that the nurserymen who choose scions are not particular enough to take the scions from perfectly healthy trees. They take scions indiscriminately, without regard to the health of the tree, and that way the tendency to disease is increased. I think the days of the Fameuse are numbered. The Fameuse will bear magnificent specimens of fruit as long as it lives. I have seen them with only one branch sticking out loaded with fruit while the rest of the trunk was diseased and rotten. Very often the fruit is much deeper colored and better to put on exhibition when taken from a diseased tree.

Dr. Hoskins. There is a common superstition among fruit growers that if the scions are taken from an old tree the young tree will bear a great deal quicker, and when I was a nurseryman, I had a good many people coming to me saying that if the scions were taken from young trees, the trees would not bear. Well, I think that cutting scions from old trees tends to degenerate the stock, and I take all mine from vigorous young trees.

Mr. Brodie. What is the cause of black heart in the trees?

Dr. Hoskins. A hard winter.

Mr. Brodie. In young trees, do you think forcing the trees rapidly in the nursery makes them subject to that?

Dr. Hoskins. Yes.

Mr. Jack. Is black heart a disease?

Dr. Hoskins. No, it is disorganized wood caused by the rupture of the

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sap passages. The sap spreads in between the fibres of the wood and it runs black.

Question. Are there any Canadian seedling apples?

Mr. Shepherd. The St. Lawrence is a seedling apple and a very good one. The original tree only died four or five years ago about half a mile from here.

Mr. J. M. Fisk. The St. Hilaire and Victoria also.

Mr. Chapais. There is a seedling called the Hermine at St. Roch des Aulnaies.

Mr. Shepherd. I have about twenty Canada Baldwin trees planted in 1875. I consider them about the healthiest and most satisfactory trees I have. As far as the tree goes, it has been very satisfactory. It has a strong thick trunk, strong branches, bears its fruit the whole length of the branch, and never breaks down with the weight of the fruit.

This year with me they were unusually fine, and there was no second class fruit amongst them. They were good color and above average size. I think it is a very satisfactory variety for shipping.

Mr. Gill. At Abbotsford we have the Dominion Winter, a seedling which is very highly thought of by a good many nurserymen. It is a tree which bears early and abundantly and is quite hardy. The only thing is its appearance is not so much in its favor. At this time of the year it is of a greenish yellow color, but is almost a first rate apple.

Mr. Gibb. There is upon the table a plate of the Edith to which I would call attention. It is a seedling apple which received first prize at the meeting we had in Granby.

Question. What should be the average life of Fameuse on a southern exposure grown in gravel loam of seven feet deep?

Mr. J. M. Fisk. It depends a great deal on the winters you have. The average life of a Fameuse with us is 20 to 25 years.

Question. Are there any new Canadian varieties worth cultivation?

Mr. Wright. The McIntosh Red and the Brockville Beauty.

Mr. Shepherd. They are both good apples.

Q. What is the cheapest and best press by which cider can be made fresh for home use?

Professor Penhallow. If you want a really sweet cider is there anything better than the old fashioned wood press?

Mr. Fisk. No.

THE LATE MR. A. J. CAYWOOD, MARLBORO, N. Y.

Mr. Pattison moved, seconded by Mr. J. M. Fisk the following resolution.

The convention learn with regret of the recent death of Mr. A. J. Caywood of Marlboro New York, deem that some expression of the loss thereby sustained to the interests of Pomology generally is befitting, it is moved by W. Mead Pattison and seconded by J. M. Fisk and resolved.

That in the demise of Mr. A. J. Caywood we recognise the loss sustained to the Fruit Growers of our Country of one whose life has been zealously devoted to the study and improvement of various branches of Pomology. His successes in production of Duchess, Ulster, Walter and other varieties of out door grapes as well as various small fruits has rendered valuable services to his fellow men. We deplore his loss and beg to extend our expression of sympathy to his family and the Fruit Growers of the United States.

Prof. Penhallow. A few years ago when living in New York, I enjoyed the personal acquaintance of Mr. Caywood and visited his place on many occasions. I had the advantage of knowing from personal observation of what he was doing. We all know from his reputation and also by our personal acquaintance with him, that he was doing a very large amount of work for horticulture, and it is only right and proper that we should express our regret at his demise.

FALL AND SPRING PLANTING.

Mr. Chapais. When we discussed the question of fall and spring planting Dr. Hoskins was not here. I would like to have his opinion?

Dr. Hoskins. I could answer that question a great deal better if you could tell me what kind of weather we would have after the planting took place.

Professor Penhallow. Say average weather.

Dr. Hoskins. The usual custom is to plant in the spring but if we have a good fine temperate winter, not too cold and not too much snow, I find better results from planting in the fall; that is the trees make better growth the first year, but if we are going to have a cool moist summer with plenty of rain, we will have as good results by planting in the spring. If, however, you get a dry uncomfortable summer, all the tree can do is to live through it.

Mr. Chapais. There was also the question of the heeling in of trees.

Dr. Hoskins. When trees are received in the fall, if they are not hardy they must be "heeled in."

Mr. Shepherd. Do you think there is no healing process going on during the winter? You cannot take a tree out of a nursery without breaking some of the roots. Do you not think if raised in the spring and the roots broken it receives a shock from which it does not recover in the same way, as if it were raised in the fall and heeled in carefully.

Dr. Hoskins. Why heel it in and not plant, heeling in is a kind of planting? Will not that healing over take place just as well when the tree is planted at once?

Mr. Shepherd. The great advantage is that the soil which has been loosened in filling up the hole is not as compact as it was before the hole was made, and the soil being so loosened the frost penetrates to a greater depth; but you can overcome that to a great extent by heeling in your trees in a good place, and heaping up the soil over the trees so that they will not take any injury at all.

Dr. Hoskins. Of course there are different ways of planting trees. It is pretty well known that in digging in ordinary ground and putting in a post although the post takes up a considerable part of the hole there is not dirt enough left to fill up the balance. I plant most of my trees myself, and I work the dirt in with my fingers, because I do not want to depend on inexperienced people or on people who may be in a hurry to get through and go somewhere. I work the dirt in around the roots, but I first cut off every broken root with a sharp knife.

Mr. J. M. Fisk. Would you plant in October or November?

Dr. Hoskins. I do not think it makes much difference. It sends out roots just as soon as the ground thaws. I cannot say positively whether they make any growth in the fall or not. I have heeled trees early in the fall, and taken them out late, and did not see any signs of growth then.

Mr. Gill. I know of trees that I planted the 17th November, the cold weather came in a few days, and they grew in the spring as soon as the warm weather came on.

Q. What are the advantages of an apple tree hedge?

It is stated one horticulturist thinks it is the hedge of the future.

Mr. Gill. I have seen an apple tree hedge in Malone, New York, three feet high, clipped and trimmed on both sides. A good deal is said about the exposure

an orchard ought to have. I know of several orchards between my place and Waterloo which have an open exposure. In fact the ground inclines from the base of Shefford mountain down to the valley and the most healthy orchards I have seen are those with a northern exposure.

A voice. Was it the crab apple or the ordinary apple?

Mr. Jack. There is so little difference in the appearance of the growth that I could not say. I was there in the month of June. I have seen a pruned hedge in the neighborhood of Rochester trimmed in the same way and the fruit on it.

Mr. Brodie. I think in ten years it would be a very uneven looking sight.

Mr. Shepherd. Dr. Hoskins in his address mentioned something about the McIntosh Red being a native of this valley. That is not the case. I have had some correspondence lately with a Pictorial Magazine published in Rochester, the "Horticultural Art Journal," to which I sent some specimens of the McIntosh Red, and wrote them a letter. In my letter I stated that the original tree grew at Dundas, near Hamilton, but Mr. Beadle answered me in the following letter.

"In remarks on the McIntosh Red apple by Mr. R. W. Shepherd of Montreal, allow me to point out to you that my friend Mr. Shepherd has fallen into an error with regard to Mr. McIntosh's residence. He has confounded the County of Dundas in which Mr. McKintosh resides with the town of Dundas near Hamilton, in the County of Wentworth. Mr. McIntosh's post-office address is at Dundee, in the County of Dundas, somewhere about latitude 45, and the Dundas near Hamilton is but little north of latitude 43. You will see by this that the latitude in which Mr. McIntosh resides is some indication that the apple called after him is one of more than ordinary hardiness. A couple of years ago I received from him a half a bushel or so of these apples, which were not only exceedingly beautiful in appearance but larger in size than was represented by your lithograph, and covered with a very handsome bloom. In texture they resemble the snow or Famense, but are much richer in quality."

Dr. Hoskins. I got my trees from a man who represented himself to be a connection of Mr. McIntosh's and he gave me a printed circular which said the original tree was in Dundas County, Ontario.

Mr. Shepherd. Mr. Gibb of Como had a correspondence with Mr. McIntosh and last year bought a bushel of McIntosh Red and kept them in his fruit house until May. The owner stated that the original tree was 80 years of age and still in perfect health and bore fine fruit which never spotted.

Mr. Wright. This tree is certainly very hardy. When I say hardy I want you to understand that its cold-resisting properties are not so great as those of some trees, but for everything else it seems to be the hardiest tree I ever saw.

Its limbs are more like the limbs of the hickory than anything else. You can take hold of the branches and hang on to them.

Mr. Shepherd. I have it top grafted on the Siberian crab. It has borne every year for the last four or five years very fine specimens. It does spot a little.

The Convention then adjourned.

The Convention re-assembled at 8 o'clock p. m. Prof. Penhallow, the President, in the chair.

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

BEST APPLES FOR HOME USE.

The best apples for home use may be placed in two classes, viz: Table and Kitchen. An apple which is a favorite in the family may be perfectly worthless for profitable cultivation. Such varieties as *Early Joe*, *Tetofsky* and *Dyer* cannot be excelled as table apples of their season but do not pay to cultivate for market. *Early Joe* is "*par excellence*" the most delicious of all summer dessert apples and no orchard is complete without one tree at least for home use. The tree is not hardy, yet not so tender as many varieties of less value cultivated here.

The fruit of *Tetofsky* is too small for kitchen use, but the tree is hardy and bears heavily, and being rather dwarfish, is well adapted for small gardens. It is a greater favorite with the children than any other apple of its season, but its small size prohibits it ranking as a profitable variety for market.

Dyer (or pomme Royal) is a tender tree, and difficult to grow in this province, yet the quality of the fruit, when fully ripe, is so fine and pear like that it has no equal for table use in early part of October. I have several fine grafts of this variety growing on Siberian stocks, which are quite hardy. I was obliged to graft it into trees which stood in out of the way places and to gather the fruit in secret, because it was quite impossible to obtain any specimens off the only tree of *Dyer* (a dwarf) which grew in a small orchard near the house. The biblical story was repeated, and *Eve* not only tempted her *Adam* but also her sisters, cousins and her aunts. For summer and fall the best varieties for the kitchen are Red Astrachan, Duchess and St. Lawrence, and for early winter, Winter St. Lawrence and Wealthy. The three last named, however, are good for both table and kitchen.

Fameuse is the best Xmas dessert apple and has no competitor at that season.

The *Pomme Grise* however (that true winter dessert apple) must not be forgotten for the home. Although it is not profitable as formerly, every orchardist or amateur fruit grower should have a tree or two.

Golden Russet is undoubtedly our best late keeper for table use, but it is difficult to say what variety is best for kitchen, probably *Scott's Winter*. In this province we seem unfortunately to be deficient in late keeping culinary apples. We have none that can compare with Rhode Island Greening or Northern Spy, but I have found it impossible to grow even one tree the last mentioned varieties successfully.

Fourteen years ago I planted a couple of Northern Spy, and five times have these trees been killed down and five times have they grown up again, the present young shoots are probably three years old, but it is improbable I shall ever gather any fruit from them. In the county of Huntingdon, however, I believe the Spy can be profitably grown.

Professor Penhallow. It was our hope to have Col. Rhodes here in his capacity as Minister of Agriculture and it was the intention of this society to tender him their formal congratulations upon his elevation to the high position he now occupies. That is a matter which we have been unable to attend to heretofore in the way we would have liked to, and in which we intended doing, but since we cannot do so it is desirable that we should send to him a resolution of congratulation.

The following resolution was then put to the meeting and unanimously adopted.

The Montreal Horticultural Society and Fruit Growers Association of the Province of Quebec in convention assembled, beg to tender their congratulations to the Hon. Col. Rhodes on his appointment as Minister of Agriculture for this Province, and venture to hope that his term of office may be signalized by the adoption of measures which may give a large encouragement to Horticulture.

Q. Will Paris Green kill the caterpillar without injuring the tree?

Mr. Trussell. I have tried Paris Green on a rose tree. It did not kill the rose tree but destroyed the foliage.

Mr. Brodie. I let the caterpillars grow to too large a size before I tried it and it took too much Paris Green to kill them. But probably if I had sprayed the trees when the caterpillars were smaller it would have worked more effectively.

Mr. J. M. Fisk. I sprayed last season for a small worm which I have already spoken about. We had also in the orchard a number of caterpillars of quite a

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good size. In spraying the trees, I threw the spray into the webs sufficiently to saturate them and it killed the caterpillars. This winter I was not able to find any in my orchard while in the neighboring orchards they were quite numerous. I think spraying is effective.

Professor Penhallow. Did you observe any special effect on the foliage?

Mr. Fisk. No.

Mr. N. C. Fisk. I think the London Purple is more destructive to the foliage than Paris Green.

Dr. Girdwood. The Paris Green and the London Purple are both arsenical preparations, and either of them, if put on too strong, will destroy vegetable matter, whether leaves or fruit. If used at all they ought to be used very weakly. I should be afraid to use either one or the other on apple trees with the possibility of leaving the arsenic on the fruit. It should be used very early to give it time to wash off.

Mr. Gibb. I sprayed the whole of my orchard except one part which I left by way of contrast. I did this more in view of killing the Codling Moths, but whether it had special effect I would not be too certain. Whatever caterpillars were feeding at the time were probably destroyed.

Mr. Dunlop. I have tried Paris Green on the gooseberry worm. It does not hurt the foliage of the tree in any way. I use it in a weak solution, not more than a teaspoonful to a pail of water and find it much more economical than hellebore. I would not apply it on the second brood of worms because the fruit is then nearly ripe, but for the first brood it is the best means. It takes too much hellebore to go over a few hundred bushes and Paris Green answers just as well.

Mr. Doyle. I used Paris Green on one occasion to kill the Thrip. All the foliage came off and left the bare stocks. I have never used Paris Green on the trees since. I do not think it is prudent to use it on gooseberries either. A very effective way to destroy the tent caterpillar is to get a mop saturated with coal oil, walk through the orchard where the nests are and you can burn twenty acres in a few hours.

Mr. J. M. Fisk. How would you manage with the forest caterpillar which also attacks the apple? It does not form a tent but is promiscuously scattered over the tree. I think the most effective way is to spray.

Mr. Brodie. The tent caterpillar is quite easy to be killed. I have used Paris Green for a number of years for the Codling Moth and find it works successfully. One year I left the Duchess of Oldenburg without spraying and it was quite perceptible that a great many apples fell to the ground strung by the worm.

Mr. Jack. Do not caterpillars all form a tent?

Prof. Penhallow. No, the caterpillars have different habits of forming their cocoons.

Mr. Hardisty. Three years ago I applied kerosene emulsion to roses infested with rose grubs and found it very effective. It could be applied to fruit trees and would not affect the foliage.

Mr. Gibb. A kerosene emulsion has been recommended by the United States Department of Agriculture, and I sprayed part of my orchard two years ago with it and part with London Purple. Where I had sheep pastured I could not use London Purple or Paris Green.

Mr. N. C. Fisk. I would like to bring to notice the new insect. I think it is a Canker Worm. I never saw anything of it before last year. It is a measuring worm and moves like the currant worm. I did not perceive the mischief until after it was done, and it was done I think in about five days at the outside. It took about a third of my orchard right clean through. In some instances it took every leaf off the tree in about five days.

Mr. Jack. What season of the year did that take place in?

Mr. Fisk. About the last of May.

Mr. Brodie. Several of the apple growers at Cote des Neiges complain of an insect that destroyed a great deal of the foliage and the blossom. It did not reach our locality.

Mr. N. C. Fisk. This was after the blossom had all gone. The apples were as large as good sized Marrowfat peas. In some places they eat the apples right off.

DISCUSSION ON VARIETIES.

Mr. Honey. I am in favor of early varieties instead of winter varieties.

Mr. Shepherd. My experience is very much like Mr. Honey's. I do not think there is much money growing winter varieties in the Province of Quebec, because we have to compete with Ontario fruit. We cannot grow the best varieties of winter apples which are grown in Western Ontario, but we can grow such varieties as the Duchess, the Yellow Transparent, St. Lawrence, Fameuse, the Wealthy, the Winter St. Lawrence and Canada Baldwin. The Canada Baldwin is the only winter variety I can grow, and I do not think it would pay to grow it in large quantities to compete with Western fruits. Another reason why I do not attempt to grow late keeping apples is because their prices are less than those of summer varieties per bushel. The Scott's Winter is another late variety which we can grow, but I doubt if there is any money in it. The most profitable varieties are the earliest summer apples and the fall apples in this Province.

Mr. N. C. Fisk. No doubt wherever the Canada Baldwin can be grown successfully there is money in it. You can compete with the American Baldwin to advantage. It is grown successfully in some localities where the soil is of a clayey nature, and is not quick in the spring. The difficulty with the Canada Baldwin is its propensity to leaf out early. It leafs out as early as the Transcendent Crab, and therefore gets caught very often.

Mr. Brodie. Some of my neighbors manage to keep a few winter varieties, and Mr. Somerville managed to sell winter varieties at six dollars a barrel, but I do not think he will do it this year.

Mr. Torrance. If this society would offer special prizes for late winter seedlings that can be produced in good shape at the winter meeting and are really worth propagating, I am sure in certain sections there are apples well worth looking after. Mr. McColl told me that in his section seedling apples were grown there, that were sold as high to the neighbors as his own, but they have never been brought to our notice.

Mr. Brodie. I can agree with what Mr. Torrance has said about the seedling apples. A great many of our hired help come from that section, and I have often remarked what fine keeping apples they have in those orchards. It is strange that Mr. McColl did not try to bring forward some of these.

Mr. Edwards. What do you think of the Ben Davis for a long keeping apple. It is not perhaps a pleasant flavored apple, but it has a good color and is a good keeper and a market apple.

Mr. Honey. The objection I have to Ben Davis is the tree, after it has been planted about ten years it begins to decay.

Mr. Brodie. My Ben Davis are about ten years planted and show no signs of decay, and they have borne heavy crops. I am well pleased with it.

Mr. Gibb. I planted 18 trees of Ben Davis, twelve years ago, and they are all dead now. They bore very well when they were comparatively young, but three years ago, when the winter temperature of Montreal was a degree lower than the average of the City of Quebec, they died. That was too cold for my Ben Davis.

I have a seedling from Wisconsin called the Kellogg Russet. The tree is a little more upright and a little stronger grower than the Golden Russet. The fruit just like the Golden. An apple I have only one tree of is Peffer's Golden No. 4 of Wisconsin, the apples are of good quality and bright yellow in color. They have the wrong color but the right texture of flesh. The best and most satisfactory late keepers, I have is the Scott's Winter.

Mr. Shepherd. My experience of the Ben Davis is similar to Mr. Gibb's. I had a dozen of trees and they all died out. I have a few in the nursery, and am sorry I have one. I regret that I propagated the Ben Davis at all. I began to propagate it three or four years ago, and since then the trees, which did well until then, died of winter killing. They seemed to be hardy enough in the nursery but not sufficiently hardy in the orchard.

Mr. Jack. What season was it they died in ?

Mr. Shepherd. Two years ago. It was a very disastrous winter, and I lost about 25 per cent of my bearing Fameuse.

Mr. Edwards. The Ben Davis are doing very well in Huntingdon.

Mr. Honey. I have not lost any, but they show signs of giving out. I do not think it is a hardy tree.

Mr. Shepherd. The tree is not sufficient hardy, and the fruit is abominable. It is not fit for human food.

Mr. Brodie. That is a little too hard.

Mr. Shepherd. I do not see why they should crack up this variety as they have in the Western States.

Mr. Brodie. Did you ever try it in the month of June.

Mr. Shepherd. I have tried it in all seasons.

Mr. Jack. Do you not think the quality is equal to that of a great many of the new Russians.

Mr. Shepherd. That is a tender point I should not like to touch on.

Mr. Brodie. I would like to speak a good word for the Grimes Golden for home use. I think the tree is a little tender in some localities.

It bears young. I have three trees from which I got two barrels this year.

Q. Has any one had experience regarding evaporated fruit in the province What varieties are best adapted for that purpose ?

Mr. Brodie. I have tried a little evaporating for home use over the furnace, and only used those apples which I could not sell on the market very well. I never went into the business commercially.

Mr. Gibb. What kind of dryer had you ?

Mr. Brodie. I took the sieve out of my fanniug mill and arranged it over my furnace, and evaporated quite a lot.

Prof. Penhallow. The special advantage in evaporating fruit would be that

Mr. Gibb's. I you could utilize apples which are not marketable, but are perfectly good for
 rsery, and am vaporation.

l. I began to Mr. Jack. The Pewaukee is a favorite of mine for a winter apple. I
 hich did well ave been growing them ten years and planted 150 scions from the first lot. I
 gh in the nur- and them of good size and highly colored.

ter, and I lost Mr. N. C. Fisk. The difficulty with the Pewaukee is that they blow off
 before coloring at all.

lon. Mr. Jack. I consider that a great advantage, because it is very apt to fruit
 ver much, and generally speaking there is enough left to form a good crop, and
 hey are of a larger size on that account.

r out. I do not Mr. Brodie. How long will they keep?

s abominable. Mr. Jack. Until the month of May.

Mr. Brodie. I opened one barrel yesterday to get samples but they had
 little hard usage, and I found about a dozen rotten ones in the barrel.

ariety as they Mr. Shepherd. My experience of the Pewaukee is similar to Mr. Jack's. I
 nd it a good tree which bears very well, but the fruit is a little uneven. There
 re many large and small ones on the same tree. It has a slight tendency to fall
 ff in high winds but not to a noticeable extent. It is very good table apple, but
 do not think it will be a profitable apple to cultivate for our winter market and
 ompete with the western varieties.

great many of Mr. Jack. We have sufficiently fine summer and fall apples, but what we
 want is a good winter apple that will be profitable to grow and of the best quality.
 The Pewaukee, I find, is the most profitable and of fine quality. It would be in
 the interest of the Society to offer sufficient inducements to parties to bring
 forward at our next winter meeting their best apples of this class.

rels this year. Mr. Gibb. I planted twelve years ago a row of eighteen trees of the Pewau-
 ee. It has not proved perfectly hardy with me. Some trees I am going to
 ose, and one or two I have lost. Their bearing has not been as satisfactory as
 I would like, but I must say I have got some very fine fruit. I sent three barrels
 to England this year which were very fine and arrived in good condition, and
 were thought highly of. It has not however been a success with me.

the province Mr. Honey. I think, so far, it is about the best winter variety we have. It
 bears pretty much every year, and the apples, so far have been pretty fine with
 me. As a winter variety, I do not know of any better than the Pewaukee.

anged it over Mr. Doyle spoke favorably of the Hawthornden and said there were a num-
 ber of good useful apples in and around the city, which could be very well culti-
 vated and brought permanently before the public.

would be that

Mr. Shepherd. What are the names of those apples?

Mr. Doyle. I could not give you the different names, but I could give you a lot of the fruit. I could tell you where the trees are to be had, the size of the apples and the habits of the trees. You could see them at any season. They are perfectly hardy, good shipping apples, with sound wood and they bear steadily every year.

Mr. Brodie. I have seen the Hawthornden in my nursery bear heavily. It is a green looking fruit with a blush cheek, and only fair quality. It would not sell profitably.

Mr. Doyle. I would like to ask Mr. Brodie if he ever eat a better apple cooked than the Hawthornden or a better apple for dessert.

Mr. Shepherd. Mr. Brodie only speaks from a commercial point of view. I know that the Hon. J. J. C. Abbott has a good many trees of the Hawthornden apples. Three or four years ago he sent down about forty barrels, and he had to sell them at \$1 to \$1.50 per barrel.

Mr. Edwards. I would rather think the Hawthornden is a very short lived tree and apt to overbear. I have a few, and it is the greatest bearer I ever had. It is a pretty apple, but I would not fancy it for flavor. It resembles the Maiden Blush a little.

Mr. Jack. When I started my orchard, I put in it 25 Hawthornden. They all produced but they are not hardy. They are a fine, large, showy apple, but really I do not consider them hardy. Although a good cooking apple; I do not consider them fit for dessert.

Dr. Girdwood. While looking over the fruit exhibit at Ottawa, I saw the Adams Pearmain which is a most productive apple. We should get scions and try it here.

Prof. Penhallow. A suggestion was made by a member of this association this morning. I am sorry he is not here to present his views. You will understand that this convention cannot take any definite action in the way of executing suggestions, but their action usually takes the form of a recommendation to the board of directors, to see that the measure recommended be put into effect. The suggestion made has reference to the large and increasing export of apples from this province. As those who have shipped know, the export of fruit has been subject to certain fluctuations owing to conditions attending shipments to markets on the other side. Now it was represented that amongst other difficulties encountered was the failure of the fruit growers to appreciate the needs of foreign markets, that is, they ship apples without knowing exactly whether those apples would meet a full demand on the other side. Therefore, they were liable to

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and across apples which would bring a small price where a large one was expected. It is believed this difficulty could be overcome, as well as many others, attending the shipment of fruit, by having an expert come out from England, who, at the proper season, would communicate with the leading fruit growers and societies, and, from a personal inspection of our principal orchards and fruit centres, become acquainted with our resources and offer such suggestions as would enable the fruit growers here to ship only those apples which are able to meet with an active demand; and it was suggested that we should circulate information, from time to time as to what fruit was in special demand in England. The suggestion was also made that this expert be brought out through the agency of the Royal Horticultural Society, which appears to me to be a proper medium, and that the Governors of that society be asked to take an active interest in bringing this object about in the interest of the large fruit trade. It seems to me that the fruit industry, which has been so well started through the medium of the Colonial Exhibition, which has already gained such headway and which promises so much for the future, should be encouraged by the Local Government, and it seems to me quite proper this society should take some action in the matter and endeavor to get the Local Government to co-operate in bringing out such a man. Of course it will be necessary to expend a slight sum to defray the expenses, but that would be a very small matter, and it is one the Government could well afford to undertake.

Mr. Gibb. What we ought to do, if we could only do it, is to make Englishmen come here and buy their apples here, instead of our having to send our apples to Liverpool to be sold at auction.

Prof. Penhallow. An arrangement of that kind might come out of this.

Mr. Shepherd. The establishment of a fruit exchange, which Mr. McBride mentioned, had some connection with this, had it not?

Prof. Penhallow. No, this was suggested independently of that.

Mr. Torrance. How can an expert from England tell anything about our apples until they are ripe, and the time between the ripening of the apples and the shipping is so exceedingly short, the expert would have to work fast to be able to give any advice at all.

Prof. Penhallow. He could visit the orchards before the fruit is ripe, and each Montreal as the shipping point.

Mr. Brodie. I agree with Mr. Gibb that we should try and arrange so as to have the Englishmen come out and buy here. If we have to give away our apples, we may as well give them away to those nearer home. A shipment of 500 barrels was sent to the old country last year which barely realized enough to pay freight.

Mr. Doyle. Englishmen are quite willing to come here to buy apples. After the Colonial Exhibition, I received quite a number of letters from fruit dealers all over England asking if I could send them apples at reasonable prices.

Mr. Shepherd. We all received similar circulars. They were from commission men in England and all auctioneers in the fruit business. They will not come here to buy, but want us to send them the fruit to be sold.

Mr. Doyle. Some of them announced that they were prepared to deposit the money in a Montreal bank before the fruit would be sent at all.

Mr. Brodie. I had a lot of circulars sent to me, but the parties referred me to their own bankers in Leeds, Manchester, and London, and they never mentioned about making a deposit in a Montreal bank. The fruits were to be sold on commission by auction.

Mr. Jack. I think it would be advisable to make a recommendation, touching the difficulty suggested by Mr. Torrance, that could be overcome, because the fruit growing sections in this province are limited, and could be all visited in a short time.

Mr. J. M. Fisk. I would be very glad to second the recommendation. Something might come out of it that might be of advantage.

Mr. Jack. It would be difficult to be in a worse position than we are in, and we ought to take advantage of any suggestion which has a tendency to improve it. At present we are at the mercy of parties who take no interest in our proceedings.

Mr. Jack moved seconded by Mr. J. M. Fisk.

That this meeting recommends to the board of direction the adoption of some measures looking towards improving the means of shipping fruit to England, and advises that if possible an expert be brought out who will advise the fruit growers and shippers here as to the kinds of fruits designed for the English market.

Motion agreed to.

Prof. Penhallow. Another question has been suggested on two occasions, shall we offer special prizes for the presentation of hardy winter seedlings at next annual meeting?

Mr. Brodie. The great trouble is to reach the people who have seedlings. In French Canadian localities, I believe in Isle Bizard and a lot of these out of the way places they grow fine apples. It would be quite an expense to employ men to look them up, but I do not see how you could reach these people otherwise.

Mr. J. distributed

Mr. S. tree. It is five or six

Mr. N. prizes for committee seedlings, but

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Mr. S. October, g eight or nine ance of th they would

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Mr. Jack. Send out circulars offering inducements, and have these circulars distributed in the different parishes.

Mr. Shepherd. Accompanying each exhibit there should be a history of the tree. It is important we should know the age of the tree. If it is only five or six years old, the first crop is not a fair test of hardiness of the tree.

Mr. N. C. Fisk. Not only hardiness but productiveness as well. If you offer prizes for seedlings you must first get the history of the tree and then send a committee to investigate the matter. You can get numerous good apple seedlings, but the question is, does it pay to propagate them?

Mr. Jack. If the apple possesses the requisite qualities there will be no trouble introducing it. Touching what Mr. Shepherd says about young trees bearing, it is seldom you will get one of the native trees to bear early.

Mr. Shepherd. I found a tree on a farm behind my own at Como, late in October, growing behind a hedge. I should think the tree was not more than eight or nine years old. The apples were very fine specimens and had the appearance of the St. Lawrence. I put half a dozen in my root house to see how long they would keep.

Mr. Gibb. A little preliminary work ought to be done; somebody should be sent into the different districts to obtain a good collection of seedlings. That work has already been done to a certain extent. One year there was a fine collection from Chateaugay and Beauharnois collected by Mr. Jack. It was examined at the time and set aside to be re-examined. Unfortunately a flood occurred, and the apples were destroyed by the water. Two or three attempts of that kind had been made. It might be well if the society were to offer special prizes at the next exhibition.

Mr. J. M. Fisk. There is one difficulty in regard to the winter varieties to which Mr. Gibb refers, in giving prizes for collections. Our exhibitions occur so early in September that none of the winter fruit is ripe.

Mr. Torrance. There is force in Mr. Gibb's remark that the only way to get these in from the French section is to send a man, and some of the members would contribute to a special fund to meet the expenses. It is of the utmost importance that apples, such as we are told are growing near Mr. McColls place at St. Joseph du Lac; should be tested. The value of a hardy winter apple that will keep through the winter and sell profitably is incalculable.

Prof. Penhallow. These are important suggestions, and they will be brought before the board of direction.

Mr. Jack. I would suggest that any fruit brought to exhibition should be in the possession of the society and under the care of the board of directors. In no case should a prize be awarded until the fruit has been thoroughly tested.

Prof. Penhallow. It was our hope this year that, in place of this annual convention, which we adopted the policy of holding in various parts of the province, we might have a Dominion convention which would bring together fruit experts from all parts of the Dominion. A large amount of work was done during last summer with the view of bringing this about, and it was confidently expected that we would be able at this time to hold such a convention. Unfortunately, however, as sometimes happens with these things, the plan fell through, not through want of energy on the part of the members of this society and of the Ontario and Nova Scotia societies who took it in hand, but because we failed to secure, for reasons which I need not specify, the pecuniary assistance from the Dominion Government which we had reason to expect. The matter however has not been given up, and the board of direction have in contemplation at present the convening of such a meeting next year, and measures will be taken at an earlier date than they were taken last year to bring the matter before Parliament at Ottawa, when it is to be hoped our efforts will be successful. In that event, our meeting next year will resolve itself into a Dominion Convention. Failing however achieving that object, we will have to fall back on our usual winter convention. The question arises, where shall we go and what will be the character of that convention? The meeting this year is practically an English one; that is the English element has largely prevailed, and the French interest has been but little represented, although a strong effort was made to have our French friends present. Last year, in going to Quebec, our object was to make the public appreciate the fact that we desire to extend our work to all the different parts of the province and to arouse a sectional interest in the work of the association, because the functions of the society relate to the entire province and not to Montreal alone. The character of the meeting in Quebec was to a large extent that of a French convention, although the proceedings were not in the French language alone. The result has been very satisfactory, but it has been suggested that we should go even further, and should in the near future hold a convention the proceedings of which shall be entirely in French, in order that we may thus enlist the sympathies of that large class of the population who otherwise will not be brought directly under the influence of the society. By making the proceedings entirely in French, we will gain from them perhaps new information. That is a matter which will come up before the board for consideration before next year, and I bring it to your attention now that you may understand the desire of the society in the respect and direction in which we are looking for increased usefulness. In closing this convention, I think I may safely congratulate the association upon our success. Unfortunately, the subjects discussed at our meetings are of a somewhat technical character, and therefore devoid of that popular interest which attracts large audiences. We have, however, had at all our meetings a very good and a very representative attendance, an attendance comprising experts from various parts of the province, from Ontario and the

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United States; and the character of the papers has been of very great importance, both from a practical and a theoretical stand point. The discussions which have followed those papers have also been full of interest and replete with suggestions of great practical value. We have had, among other papers, one on Russian apples. This subject is one that has claimed out attention ever since Mr. Gibb went to Russia in the interest of Canadian horticulture. It is not, of course, claimed that every fruit brought in from Russia is necessarily a fruit which must become a desirable fruit in this province, but the idea is, by bringing in these fruits, to see how far there are other fruits elsewhere that can be adapted to our climate and incorporated with our own by crossing. One of the most important lines of work that this society has taken up of recent years is the discussion of Russian fruit, and I hope that discussion will continue in future years, for the value of these fruits is not to be tested by the result of half a dozen years. We must get the experience of practical and intelligent growers,—an experience extending from 15 to 30 years—before we can decide the question, and even that period may not be sufficient, if we are to judge by the experience of scientific investigators in England, such as for instance, Sir John Lawes, and Dr. Gilbert, who have carried on experiments in feeding plants. They have found that, after carrying on experiments in feeding plants over a period of forty years, applying to those plants fertilizers to determine the value of those fertilizers in different stages of cultivation, they are unable to draw a decisive conclusion. Therefore, we should allow plenty of time for the discussion of the question of fruits, and it is important that papers, such as have been brought in by Mr. Gibb, Dr. Hoskins and others, should continue to be furnished in order that the experience of each year may be noted and the whole question gradually sifted down to a substantial basis. We have had also important papers upon grapes by our old friend, Mr. Pattison, of Clarenceville. He is a very experienced cultivator of the grape, and it is to him that we look for a very large amount of information with reference to new varieties. We have had a very valuable contribution from Mrs. Jack on strawberries, and I may say there are no contributors to the proceedings of this society more welcome than Mrs. Jack. Her papers are always full of information and show what intelligence can do in promoting an interest in horticulture. We have also had important papers and discussions on hardy apples, and although the question is by no means settled as to how many kinds we have or the best kinds, yet a good deal of light has resulted from the discussion. We have also had an interesting discussion relative to the value of sod and clean culture in the orchard, concerning which the observations made by Mr. Chapais were valuable and evinced much systematic and intelligent observation. I may say that is the one point where most horticulturists fail in this province. I might say that among horticulturists in this province, there is an increasing tendency towards exact and intelligent observation concerning the conditions which control their fruit than I have found

among any similar body of men that I have met with. But I do not think that we should rest satisfied with that. I think we should take a still greater interest and make more extended, critical and intelligent observations, as it is only in that way we can bring our operations down to a scientific basis. One important work that we have accomplished has been in the direction of determining doubtful varieties. We have here two or three different varieties of apples, the character of which was in doubt, and I believe the result of the examination of the fruit by the different experts here has been to determine their proper names. We have found that varieties of apples, which, in two or three cases, passed under different names, were in reality the same, being known differently in different localities. There we have at once an instance of the advantage derived from bringing together men who are experts, but who, rarely meeting, are liable to start off in a wrong direction. They are likely to get an incorrect idea as to the character of their fruit, and are likely to continue to extend that idea and thus promulgate an error. We have also had, as another conspicuous feature of this meeting, a very large and fine display of fruit. It is rather unusual at this time to have such a display of winter apples as we have on the tables here. There are on these tables 85 plates of winter apples out of which there are 35 plates of seedlings. But there are more different kinds of seedlings than would be represented by the number of plates. We have therefore a most valuable collection of winter fruits. I consider that one of the most important advantages of this meeting. Another feature to which I will call special attention is the grapes which have been brought in from Chateauguay basin. We have no more enthusiastic cultivator of grapes, I will not except Mr. Pattison, than will be found in Mr. Jack and his wife at Chateauguay basin. The grapes they have brought in are a fine example of what may be done in the way of keeping grapes. The grapes they have shown are as firm and look in as fine a condition as if they have just been picked from the vine and the probability is they will keep without deterioration for another month. This result has been attained by careful attention to cold storage and it shows what might be accomplished on a large scale without difficulty by any one who would take the pains to do so. Before we disperse we should convey our thanks to Mr. Joyce for the very pleasant and comfortable room he has placed at our disposal and for the attention and care he has given to all concerned.

AGRICULTURAL EDUCATION

Being the opening lecture of the Sommerville course by Sir William Dawson the LL. D. F. R. S. President of the Society.

[Abstract].

In selecting a series of subjects for the Sommerville course of the present year, the Lecture committee may seem to have gone somewhat afield from its ordinary path; but in reality the topics selected are of paramount interest to all men, whether of the city or the country. It should be interesting to every intelligent person to know something of those great processes by which food is produced out of the earth for every living thing, and by which the products of death are restored to life and usefulness. The cultivation of the soil is in all civilized countries a chief branch of industry, and in some, like our own country, it vastly surpasses all others in importance. The citizen, as well as the farmer, lives by the field, for he depends on it for his food, his raw materials and his customers. Montreal would dwindle into insignificance if the transference through its marts of commerce of the products of the forest, the orchard and the field were to cease. In modern times agriculture and its allied industries have become scientific arts. I can remember the early triumphs of scientific agriculture in the hands of Liebig, Johnston and others. When in 1841 the late Prof. Johnston of Durham began the publication of his lectures on Agricultural Chemistry, they came to the men of that time almost like a revelation. I remember reading them, as they appeared, with as much avidity as if the work had been a new novel, and feeling that a fresh power for good had been developed in the world by this new application of science. It is to this aspect of the subject that I desire to direct attention this evening—to the educational relations of scientific agriculture. The work of the educator is distinct from that of the practical farmer. It consists, not in practising the processes of agriculture, but in teaching the laws which regulate them, or, in other words, the natural properties of the soil and the plant, on which the success of agriculture depends, and the chemical and physiological facts and laws which have been established as the conditions of successful culture of the soil. Education as to these enables the young farmer to understand the reasons of success and failure, of the efficiency of methods of tillage and manuring, and of the injurious effects of various blights and diseases of crops. Such knowledge gives confidence and skill; it enables the educated farmer to detect fallacies in the recommendations of superficial writers and errors of practice, and to decide intelligently as to every step of his work, while it gives interest and dignity to his art, and raises it to the position, not only of a skilled industry, but of a scientific profession. Thus the teacher though not a farmer may become a power in agricultural improvement, and may give substantial aid in increasing the wealth and prosperity of the people.

He may teach of the soil; of its derivation from the rocks of the earth, of its wonderful and complete composition; of its action on manures, in retaining them within it, and parting with them to the roots of plants; of the causes of its fertility and barrenness; of its impoverishment by cropping; of its improvement by tillage, by draining and by the application of various substances to it. He may enter into the reasons of all these, and their bearing on the practical work of the farmer, on his successes and on his failures, and may show how the latter might often be avoided by a proper understanding of the causes which lead to them. He may teach of the relations between the mineral ingredients of the soil and the ashes of the plant, and of the bearing of these on the question of the fertility of some soils and the barrenness of others, and the reasons why any soil becomes exhausted by cropping. He may teach of the plant, of the elements of which it is composed, of the sources, in the earth, the air and manures, whence these are derived, of the kinds and proportions of food required by different plants, and the best means of supplying them; of the wonderful structure of the vegetable fabric, and the manner in which it forms, from the material on which it subsists, the various products which it affords. On these subjects the discoveries of chemistry and physiology enable us to speak with much confidence as to the requirements of each crop, and its relations to the soil, to the air and to manures, as to the uses of rotation of crops, and of special manures, and as to the causes of deficient produce, with many other important points, which, but for such knowledge, would be involved in doubt and darkness. He may teach of manures—a subject hardly less interesting than the previous topics, and quite as useful. Here we have to consider the decay of dead vegetable and animal matter, and its resolution into food for plants; the losses to which the richer organic manures are liable by the evaporation of their gaseous portions or the washing away of soluble substances; the nature and uses of mineral manures, with their various effects, whether directly as food for plants, or indirectly through the chemical changes which they induce in the soil. No subject has in our day more engaged the attention of scientific men, and in none have more important discoveries been made. He may teach of the several cultivated crops in detail, noticing their history, their modes of culture, their preferences in relation to soil, treatment and manure; their produce—its uses to man and animals—and their enemies and diseases. He may, in like manner, proceed to apply the principles learned under these heads to the various modes of tillage, manuring and rotation, and to the treatment and feeding of domestic animals. In this more practical department, the amount of instruction need be limited only by the knowledge of the teacher, and the time at his command. The whole subject of agricultural education is thus of great extent and complexity, and has intimate connection with the sciences of chemistry, physiology and geology. All these topics lie at the very threshold of agricultural knowledge and practice. They may be pursued to any extent, and the highest culture and mental powers may be applied to them, but their elements may be learned by young persons at

school, and a foundation may be laid on which they may build the highest and most successful prosecution of the most useful of all arts.

The lecturer then proceeded to illustrate with the aid of tables of chemical composition, one of these subjects, namely, the relations of plants to soils, by noticing the composition of fertile soils, the ingredients required from the soil by different plants, the manner in which certain plants exhaust the soil, the special uses of phosphates, alkalis, etc., in restoring exhausted soils, the restorative powers of irrigation, the wealth remaining in the subsoil after the surface soil has been exhausted. These points were illustrated by a variety of familiar examples, and the lecturer then referred to a simple text-book of Agricultural Chemistry which he had prepared many years ago, and proceeded to indicate the manner in which the subject had been taught in the Normal School with the view of introducing it into the schools generally, and the importance of giving some public encouragement to the introduction of practical subjects of this kind, which while conducive to mental training and general intelligence, were also of great economic value.

THE FOOD OF PLANTS.

By D. P. PENHALLOW.

An old proverb informs us that one-half of the world continues in ignorance of how the other half lives. If we accept this in the broadest sense, as applying to all organic life, we have a present illustration of its correctness in the fact that, with few exceptions, man knows little or nothing of the vital processes upon which the growth of the members of the more humble vegetable kingdom depend; and he thus fails to grasp a knowledge of those important laws by which plants are enabled to afford him an abundance of sustenance and raiment. It is in relation to purposes of nutrition, that plants may be considered to bear the greatest importance to man, and in this respect, they are to be regarded from a two-fold point of view.

First, they convert the crude mineral constituents of the soil, which would otherwise be wholly unavailable, into forms which enable them to become of direct value for purposes of animal nutrition. They thus afford to man, his principal supply of food. But they also constitute the entire source of nourishment for those animals upon which man subsists, and through the medium of which they undergo further special modifications, by virtue of which they become yet more fully adapted to special requirements of the human system. Man is therefore dependent upon plants as the preparers of his food, both directly and indirectly.

With a more thorough knowledge of animal nutrition, we have come to recognize more generally than in the past, that the quality of food supply effects

a pronounced and a most important influence upon both the physical and mental condition, and this influence must be exerted both directly and indirectly by the vegetation upon which man feeds. We are therefore brought to yet another principle, that any improvement in the character of the food supply, must operate advantageously for man, in a corresponding systematic improvement.

But the great biological laws are not adapted with sole reference to particular forms of life—they admit of general application, and, as we learn from vegetable physiology, the character of the plant is subject to the influence of variable nutrition, in a manner quite parallel to that which we observe in animals. In this, therefore, we discover the possibility of a means of making plants more perfectly adapted to the highest physical wants of man, and any study which tends to promote this end, cannot fail to be of the greatest interest, bringing us, as it inevitably must, into closer relationships with those forms of life upon which we are so largely dependent for health, comfort and enjoyment.

The subject we have chosen for discussion this evening, is one of considerable magnitude—embracing considerations of the greatest practical and scientific interest—and could readily be dealt with from several points of view. Perhaps many would consider that a mere statement of the articles which constitute plant food, together with the fact that the earth and air are the great sources of supply, would fully exhaust the subject, but an enlarged view discloses the fact that the sources of food supply; the preparation of food for the use of the plant; the general process of waste and repair; the selective power of plants in relation to food supply; the number, character and special functions of the elements appropriated; the relations of food supply and nutrition to conditions of health and disease; the relations of food supply to improved qualities of plants for purposes of human food; the special capacity of the plant for digestion, and its relation to the character of food used, are all so intimately connected with the subject as a whole and with each other, that no complete statement can be made without taking some account of all these considerations. Concerning some of them, we are forced to admit that as yet, but little real progress has been made in the direction of their correct elucidation, nor can we look for a final solution until such time as chemistry shall make us more fully acquainted with the composition of plants in various stages of development, and under widely different conditions of growth, and thus provide the key which shall unlock the door to those now mysterious physiological changes peculiar to nutrition.

In the process of nutrition, certain substances enter directly into the composition of various parts of the plants, to the formation of which they are absolutely essential. There can, therefore, be no doubt that they are food substances. Others, however, although taken into the plant, do not enter as an essential ingredient into the construction of parts. Nevertheless, it is found that their

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elimination from the food supply so disturbs the normal processes of growth, as to leave no doubt in our minds concerning their necessity in what are termed the metabolic processes, or the chemical changes incident to nutrition. It is therefore as proper to regard them as food substances as the former.

In order to determine what elements may be properly regarded as plant food, we first of all resort to chemical analysis, and in the second place to special methods of cultivation. When a plant is burned, or when it suffers the slower oxidation of decay—the final results being the same in each case—we find that by far the greater part of the original structure disappears in the form of aqueous vapor, carbon dioxide gas and volatile acids, while a very small proportion remains as an unoxidisable or incombustible residue—the ash.

The relative proportions of combustible and ash constituents, are subject to wide variations, not only as between different species, but even in the same species under different conditions of growth and of food supply. An illustration of this law may serve to make our statement more clear. In the Tenth Census Report of the United States for 1880, Prof Sargent gives the ash percentages for somewhat more than four hundred species of woods. Selecting from these the extremes, we find the following:—

	Org. Mat	Ash
<i>Yucca elata</i>	90.72	9.28
<i>Pseudotsuga Douglassii</i>	99.98	0.02

Again, between these and herbaceous plants, in which relatively less mineral matter is observed, the difference would be more striking. Another illustration of the law stated, is afforded by the results obtained by Arendt in his analysis of 1000 oat plants selected at different periods of growth, with intervals of about twelve days. His results were as follows:—

	June 18. 3 leaves open.	June 30. Heading.	July 10. Blossom- ing.	July 21. Ripening.	July 31. Ripe.
S O ₃	1.06	2.71	2.68	4.83	5.34
P ₂ O ₅	3.27	5.99	10.32	12.90	14.23
K ₂ O.....	17.05	31.11	40.20	44.33	43.76
C ² O.....	4.48	8.50	11.60	14.94	14.71
Mg O.....	1.53	2.71	3.71	5.42	6.45
Fe ₂ O ₃	0.20	0.46	0.61	0.83	0.58
Si O ₂	6.39	15.82	25.45	31.66	36.32
Na O.....	0.86	1.28	1.47	1.12	0.87
Cl	2.28	3.62	5.32	5.96	5.78
Total grammes.....	37.12	72.20	101.36	124.54	128.04
Gain for each period. ...		35.08	29.16	23.18	3.50

If we now turn our attention more particularly to the elements of the first group, or those which disappear in the process of combustion, we find them to be carbon, hydrogen, sulphur, nitrogen, phosphorus, oxygen and chlorine. In the process of rapid combustion, the hydrogen is converted into water and passes off as aqueous vapor. The carbon becomes changed into carbon dioxide—a gas prejudicial to animal life—and disappears in part into the surrounding atmosphere, the remainder being fixed in the ash residue, where we also find the acids of sulphur, nitrogen and phosphorus combined with the mineral constituents to form the corresponding salts. In decay or slow combustion, the same changes are finally accomplished, with the additional formation of volatile sulphur and ammonia compounds. The loss or diminution in volume which a plant suffers in the process of combustion, will thus be seen to correspond, in general terms, to the elimination of the organic matter, which consists almost wholly of carbon, hydrogen and oxygen, with very small quantities of the other elements mentioned.

If we next inquire into the composition of the second or incombustible group, we find it to contain potassium, sodium, calcium, magnesium, iron and silicon. These elements, as already stated, are found in combination with the acids derived from combustion of the elements of the first group. In exceptional cases, manganese, bromine and iodine, as well as arsenicum, copper and other

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0	14.22
3	43.76
4	14.71
2	6.45
3	0.58
6	36.32
2	0.87
3	5.78
4	128.04
8	3.50

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metals may be found in the ash, but for various reasons which need not be dealt with at the present time, they are usually not regarded as constituting elements of plant food. It thus appears that of the sixty-seven chemical elements known to science, only thirteen are to be regarded as of importance in the economy of the plant.

With these general facts before us, we are now prepared to inquire into the sources whence they are derived; and in this respect we may again divide them into two groups, those derived from—1st, the air, and 2nd, the soil.

To the first group belong only two elements, carbon and oxygen. These are presented to the plant and taken up in the form of carbon dioxide. Oxygen is also absorbed in the free state, but in this respect it is concerned in the process of respiration, and not of digestion, and therefore is not to be considered in the present connection.

Carbon dioxide is, as we know, a peculiar product of organic combustion, including respiration of both plants and animals, and when produced in excess, is as prejudicial to one form of life as to the other. Its elimination from the atmosphere in the process of vegetable growth, constitutes one of the most important relations in which plants stand towards the higher forms of animal life. During the Carboniferous age, when life was of a much lower type than now generally exists, plants attained to a luxuriance of growth with which but few modern plants can compare, and while this was the direct result of the peculiar conditions under which they were placed, it also adapted them to the more rapid elimination of carbon dioxide—thereby causing a return of oxygen to the air, and a fixation of the carbon, which, in course of time, became transformed into coal and graphite as we find them to day. Thus the atmosphere became adapted to an improved type of animal life; the plants themselves, being brought under new conditions of environment, suffered important changes, and man is now enabled to convert to his own needs the transformed energy derived from the sunbeams of that remote past.

To the second group of elements, those derived from the soil, belong all the others that have been enumerated. It should be observed here however, that oxygen is also derived from the soil, both as water and as acids in combination with the earthy elements.

The appropriation of food is provided for by means of specialized organs. The gaseous elements of the air are absorbed by the leaves, in which specialized openings or mouths, called stomata, are developed. Through these, the gases of the atmosphere penetrate the interior structure by a process of diffusion, and are there absorbed by the living cells. It is of interest to note, however, that the ability of plants to use the gases which have thus penetrated their structure, is dependent upon certain important conditions, viz:—1st, a favorable tempera-

ture, (2) the presence of the ordinary green coloring matter of plants—the chlorophyll—and (3) the direct influence of sunlight, or at least of its luminous rays. Neglecting further consideration of temperature which is essential to all functional activity, it should be pointed out that plants devoid of chlorophyll, such as mushrooms and other colorless plants, are incapable of obtaining carbon from the atmosphere. They are therefore forced to obtain their supply of this important element either from other plants upon which they feed as parasites, or from the organic products of decay, upon which they feed as saprophytes. Moreover, the power of green plants to appropriate carbon and liberate oxygen is arrested under conditions of darkness—as at night—when the mode of growth is precisely the same as in colorless plants.

The whole relation of light to the appropriation of carbon, is one of the most interesting with which the physiologist has to deal, but it would lead us too far from our present purpose were we to consider it more in detail, though it may be as well to point out that, if ordinary white light be replaced by such luminous rays, as the orange and yellow, this function is not impeded in any way; while on the other hand, the rays of higher refrangibility such as the blue, indigo and violet, arrest this function and thus bring ordinary green plants under abnormal conditions of growth, in which functional disturbance is the unavoidable result.

In this particular connection, it only remains for us to indicate what changes take place when carbon dioxide is taken up by the leaves. Under the influence of chlorophyll this gas suffers decomposition. The liberated oxygen returns to the atmosphere, while the carbon, uniting with the elements of water already present, becomes transformed into starch, sugar and oils,—substances which not only provide for the nutrition of growing parts, but, when formed in excess of the requirements of growth, supply a most important item of food for man.

Various observations have been made to determine the amount of carbon dioxide which plants are capable of appropriating. The results obtained by Boussingault are among the most instructive, from which we quote the following:—

	Area of leaf.	Decomp. of CO per hour.
Cherry-laurel.....	109 sq. c. m.	3.0 c.c.
Pine.....	204 " "	1.1 "
Oak.....	224 " "	1.6 "
Holly.....	52 " "	1.8 "
Mistletoe.....	100 " "	2.0 "
or for equal areas		
Cherry laurel.....	100 " "	2.750 c.c.

Pine.....
Oak.....
Holly.....
Mistletoe.....

In this case, in the air, beyond is of necessity, most nearly the majority. The general so-called digestion are usually done

All the specially adapted therefore be, in this respect, being confined through the

The fluid substances in so inasmuch as will enable the sap, however sapwood, nutrients of the vessels involved in the increase of diameter as aqueducts in the various to the various directly produced

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Pine.....	100	“	“	0.539	“
Oak.....	100	“	“	0.714	“
Holly.....	100	“	“	3.460	“
Mistletoe	100	“	“	2.000	“

In this connection it should also be noted that the presence of carbon dioxide in the air, beyond a certain limit, causes it to exert a deleterious effect. This limit is of necessity variable, but observation has shown that in those plants which are most nearly allied to the coal plants, e. g., ferns, ten per cent is fatal, while for the majority of plants, a much smaller quantity will produce the same result. The general process thus described, constitutes one of the leading features of the so-called digestive function, and as this takes place in the leaves (chiefly), they are usually designated the digestive organs.

All the elements enumerated, except carbon, enter the roots, which are specially adapted to the purpose of taking up food in a liquid form, and may therefore be designated the special organs of absorption. The power of roots in this respect, is nevertheless extremely limited with reference to their total area, being confined to a narrow tract near the extreme tip, and is accomplished chiefly through the medium of root hairs.

The fluid thus absorbed by the roots, and containing various mineral substances in solution, now constitutes what is commonly designated the crude sap, inasmuch as the substances held by it are not in such chemical condition as will enable them to directly participate in the nutrition of growing parts. This sap, however, passes upward through the outer layers of the woody tissue or sapwood, until it reaches the leaves, where it is distributed among the ramifications of the veins to the active, chlorophyll-containing cells, in which it becomes involved in the process of digestion. In the course of this process it suffers increase of density, due in part to the fact that a large portion of water is liberated as aqueous vapor into the surrounding air, while another volume is used up in the various chemical changes, and the fluid, now distributed from the leaves to the various centres of active growth, is said to be digested and capable of directly promoting the formation of new structure.

Although plants in general may be said to be the special agents whereby the crude material of the soil and air is converted into that which is of direct value in animal nutrition, yet we find the law subject to certain important exceptions, since in their power of appropriating and converting food, they exhibit a wide difference.

We are all familiar with the fact that in the animal kingdom, certain forms live upon and draw their entire sustenance from other animals, in consequence of which they are termed parasites. Parasitism is also a common feature o

plant life, and in each case the relations of supply and demand conform to the same general laws. The parasitic plant fastens itself upon its host and draws its nourishment from it. The latter is therefore forced to yield a portion of the food prepared for its own use, and in consequence of the unusual demand upon its resources, it sooner or later becomes diseased, exhibits malformations and may eventually be killed. Under these conditions of growth the parasite does not require to produce its own food; we therefore find that it has no roots, its leaves are imperfectly formed, and it may contain no chlorophyll. Just in proportion, therefore, as the digestive function of such plants is reduced, do they become incapable of fixing carbon and forming the ordinary carbohydrate products such as starch and sugar. Some of the most notable of parasites are to be found in the celebrated banyans of India, which often begin their growth in the tops of lofty trees, upon which they feed until killed.

We again find a very large class of plants feeding upon the products of organic decay. These contain no chlorophyll, have no proper roots and no leaves, or at most mere rudiments of such organs. Like the parasites, they cannot appropriate carbon, except in the form of organic compounds; their existence thus implies their dependence upon previous life. They do not liberate oxygen, but eliminate carbon dioxide as one of their characteristic products. Such plants are designated by botanists *saprophytes*, and are represented by the mold of stale bread and cheese, by the common mushroom and puff-ball, and also by the Indian pipe, one of our common wild flowers.

We thus find that any extended consideration of the subject with which we are now dealing, must recognize the special characteristics of plants in their relation to the appropriation of food, but as more detailed statement would lead us too far from our main purpose, we shall for the remainder of our discussion confine ourselves to those plants in which the digestive function is fully developed, and with which we are more largely concerned as the producers of our food.

The special functions of the various elements appropriated by the plant, are not at all well understood, but the result of investigations so far made, indicate their value in a general way and show in what direction other inquiries should be made. For the purpose of determining how far each element present is essential to growth, we resort to special methods of culture, either in water or pure quartz sand, under such conditions that the number of elements and the exact quantity of each may be known and controlled.

From such a series of investigations we learn that potash is absolutely indispensable; that under certain circumstances, soda may be eliminated without injury; that iron is essential to the formation of chlorophyll; that calcium performs a function somewhat similar to that of the potash; that it may to some

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extent replace it, and that it is possibly connected with the formation of tissues ; that chlorine, and in some cases, sulphuric acid, is essential to the proper transfer of the substances digested in the leaves, to the parts where required by growth ; that magnesium is an element of uncertain value in the internal physiological process, but that it has a definite value in the soil, where it aids in the distribution, and thus in the more complete appropriation of potash ; that silica cannot be eliminated without materially affecting the strength of the plant, and that phosphorus bears an important relation to the various processes of ripening in the fruit.

Another very important lesson to be derived from such special cultures, especially when combined with chemical analysis, is the fact that plants exercise a selective power with reference to the food supply ; that is to say, if a plant were grown in a solution containing exactly the same proportions of all the elements entering into its composition, it would be found not to absorb them all in the same quantity, but some would be used much more largely than others. This becomes more obvious if we inspect the composition of the ash of different plants, or even of the same plant under different conditions or at different stages of growth.

It thus appears that some plants are special potash feeders, others use more lime, yet others an excess of soda, and this fact constitutes the foundation on which the well known system of rotation of crops is based. This briefly stated, is as follows :—When plants are grown continuously upon the same piece of land for a number of years, those elements upon which that particular class most largely feeds, will be withdrawn in excess of the ability of the soil and the natural chemical processes there taking place, to restore them. The soil is therefore said to suffer special exhaustion, because it is deficient in one or two elements required for a particular crop, but contains an abundance of other elements required by other crops. If these latter are now planted, the soil, in course of time, suffers special exhaustion with reference to their requirements, while it regains its ability to produce the crop of the first kind. Thus, by a judicious system of rotation, land may be kept in a constant state of productiveness. It is only when food elements are so completely withdrawn that no one class of plants can be brought to perfection, that the soil is said to be generally exhausted. Therefore, when we speak of the fertility of a soil, or the exhausted condition of a soil, it must always be with direct reference to the particular requirements of the plants we wish to cultivate. And I cannot let this part of my subject pass without pointing out that a large part of the difficulty in successfully combating some of the most destructive diseases of the orchard and garden, arises from a failure to properly appreciate and apply the principles stated.

It is impossible to give more detailed consideration to these aspects of our subject in the brief space allotted to us, important though they are. There are

nevertheless, two features of this question to which I would particularly draw your attention, and from their very important bearing upon the economic side of horticulture, I feel that their somewhat detailed statement will not be out of place. I refer, in the first place, to the relation of nutrition to conditions of health and disease; and in the second place, to the relation of nutrition to improved qualities of fruits.

For many years, the Germans have been among the foremost investigators in efforts to determine the special functional value of the various food elements of plants. The method usually selected has been that water culture already described, through the medium of which the effect of eliminating any given element, or of varying its proportion and particular chemical combination in the food supply, could be accurately ascertained. From a series of such experiments made as long ago as 1871, in which buckwheat was the particular plant employed, it was observed that in those plants from which potash was eliminated, there was a most marked deficiency in growth. This was traceable to the fact that in the absence of potash, the plant was incapable of fixing carbon, and therefore unable to produce the ordinary products of digestion, such as starch, sugar and oils, and hence was practically in a condition of starvation. In a second series of experiments, potash was supplied in the requisite quantity, but chlorine was eliminated from the food supply. A most curious result was found. While an abundance of starch was produced in the first instance, it was unable to reach those parts where growth was most active, and thus became accumulated in unusual quantity in the leaves and other green tissues where formed. A secondary effect of this was a change of color from green to yellow, whereby the further formation of starch was arrested, and the final result was a general arrest of growth. So that there was established the anomalous condition of a plant containing an excess of tissue-forming material, but unable to use it for want of a certain element in the food supply, which would effect a transfer of that material to the centres of active growth. Further observations confirmed the view that chlorine was the particular element needed for this purpose.

Acting upon the suggestions contained in these results, Dr. Goessmann, the foremost agricultural chemist in the United States, and Director of the Massachusetts Experiment Station, a few years since, in company with other investigators, undertook to apply these principles of nutrition to the treatment of certain diseases of plants, which, up to that time, had baffled all attempts at control, and which, in the seriousness of their operations, threatened to destroy some of the most important fruit interests of the country.

It was found, in the first place, that in the common and destructive disease known as Peach Yellows, there were conditions of growth in all essential respects the same as those artificially produced in buckwheat by elimination of

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chlorine. It was therefore assumed for the purposes of experiment, that this element was exhausted from the soil and that potash might also be supplied in insufficient quantity. A number of trees were therefore carefully pruned to remove as much as possible of the diseased structure, and muriate or chloride of potassium was supplied to the trees as a special food, together with other elements to make a complete fertilizer. It was now found that the new growth was of a totally different character, and, so far as could be determined from mere external inspection, perfectly healthy. But more than this, the fruit, instead of being utterly worthless, as before, now became of high quality, and the life of the tree was so far prolonged that, instead of dying at the end of nine years, as was usually the case, the identical trees thus restored to health are bearing first quality fruit to this day, or twenty years after their period of first treatment.

But this result alone, important as it is, does not fully answer the question from a scientific point of view, and we are therefore called upon to see what changes, if any, were effected in the chemical constitution of the ash, and also in the cellular structure and distribution of the digested products. With reference to the first, the results are most significant, and tend to indicate that the supply of potash bears a direct relation to the normal condition. Thus Goessmann found the ashes to be constituted as follows :

	FRUIT.		WOOD.	
	Diseased.	Healthy.	Diseased.	(Restored) Healthy.
Fe ₂ O ₃	0.46	0.58	1.45	0.52
CaO.....	4.68	2.64	64.23	54.52
MgO ₂	5.49	6.29	10.28	7.58
P ₂ O ₅	18.07	16.02	8.37	11.37
K ₂ O.....	71.30	74.46	15.67	26.01

From this it also appears that, with a deficiency of potash, lime increases, but does not replace it in functional value.

Referring now to the internal structure, we also find most important changes accomplished. In the diseased tree, the general structure of the bark becomes altered in a conspicuous manner, while in both bark and leaves, the accumulation of starch is most unusual. These features are so characteristic of the disease,

and appear so early in its development, that a correct diagnosis may be made through the aid of the microscope, even before the external evidences of disease are pronounced. In the new wood formed after treatment, the bark presents all the features of normal structure, both with reference to tissue and distribution of starch.

We thus note certain important facts as the result of these experiments ;

- 1st. That a specific disease is cured by a certain course of treatment.
- 2nd. That potash and chlorine are essential to restored functional activity.
- 3rd. The disease may be regarded as primarily due to deficiency of these elements in the food supply.

But we should also point out that for this disease, any salt of potash will not answer, *i. e.* the sulphate or the phosphate will not be equally efficacious with the muriate, but that does not permit us to infer that diseases of other plants may be similarly cured by the same salt of potash, for on the contrary, the same investigations have shown that for different plants, different salts of potash must be used, so that while in some cases the chloride is best, in others it is the sulphate or nitrate.

We have here, however, a definite fact established, namely, that the nutrition of the plant bears a most important relation to its normal condition, and while we do not wish to rashly assert that all diseases to which plants are subject may be cured in this way, yet we do feel confident that, when the bacteria craze has passed its fever heat, and the pulse of the investigator has once more returned to a normal rate, he will turn his attention more fully to the question of nutrition as affording a rational explanation of many of the vexed problems which now confront him.

Before taking final leave of this part of our subject, I will point the general principles indicated by one more fact. The ravages of the Phylloxera have for many years proved a most serious obstacle to the successful cultivation of the vine in many parts of Europe, and the French Government have at various times had their attention seriously drawn to the devastations of this insect ; but the efforts thus far made, appear to have led to no very substantial results. In the course of investigations relative to the nutrition of the grape, Dr. Goessmann found that an abundant supply of food of an available form, served in a most marked degree to overcome the ravages of the Phylloxera. The results were of so striking a character as to attract the attention of the French Commissioner then inspecting the vineyards of the United States, and he freely expressed the opinion that, although the vines were fairly over-run with the pest, he had never seen more healthy looking foliage, better growth or finer looking fruit. The whole principle under-lying this result is that, if we can feed the plant, and at the same

time provide the plant with the means to suffer.

In connection with these aspects will be found a list of improvements — those published in the articles of

We can do so in doing so for different species. The plant has been in the wild change, unless slow process of quality and nutrition. The beet, the plant, the question of judicious changes in plants, and results so but before and non- all plants extension period in of success the Germ and Gilb been made condition in which and tend foods in tation, in bly many vigorous and how

time provide an abundance of food for the parasite in excess of what the plant needs for its own growth, the latter will be much less liable to suffer.

In conclusion, I would direct attention to one more of the many interesting aspects which this subject presents, and that is the relation of nutrition to improvements in plants, and more particularly of their fruits or seed-bearing parts—those products of the vegetable world which are of the highest value to man as articles of diet.

We commonly speak of plants as cultivated and uncultivated or wild, and in doing so we make a broad distinction even between plants of exactly the same species. This distinction is that, under certain improved conditions of life, the plant has become so modified as to present peculiarities which it did not possess in the wild state, while it also has an increased capacity as a food producer. Such a change, under the ordinary conditions of cultivation, is in most cases a very slow process, but as an essential factor, we recognize the supply of food of better quality and in more available form—in general terms, improved conditions of nutrition. Science has repeatedly shown that an increase of sugar percentage in the beet, or of starch in the potato, is directly related to the supply of potash to the plant and the condition of availability in which that element is presented, and the question has therefore more than once been asked,—is it not possible by a judicious control of the food supply, to bring about, more quickly, those changes which are known to have taken place between the wild and cultivated plants, and in the latter to still farther improve their qualities? I think the results so far obtained justify us in answering this question in the affirmative, but before so doing, I must briefly refer to the relative value of nitrogenous and non-nitrogenous food substances in the two phases of growth through which all plants pass, namely, the purely vegetative, or that period during which mere extension of parts, as stem and leaves, takes place; and the reproductive, or that period in which the flowers are produced and the seed is formed for the growth of succeeding generations. The elaborate series of investigations conducted by the Germans for many years, as well as the very notable investigations of Lawes and Gilbert at Rothamstead, England, in which continuous observations have been made upon various field crops grown on the same land and under the same conditions since 1835—all these results establish the general law that those foods in which nitrogen is in relative excess, promote the mere extension of structure and tend to retard the reproductive function. While on the other hand, those foods in which the mineral substances are in relative excess, tend to retard vegetation, induce an earlier maturity, and thus hasten the formation of seed. Probably many of you have observed how a plant fed with ammonia makes a most vigorous growth of leaf and branch, and acquires a deeper and richer hue, and how also, trees are similarly influenced when located in exceptionally rich

places. A notable illustration of this was brought to my notice a few years since. The ground in a small peach orchard was utilized as a kitchen garden, and for this purpose annually received a heavy dressing with nitrogenous manures. The effect upon the trees was most marked. The leaves were of an unusual size and depth of color, and the growth of each year was far in excess of any other trees. But, although twelve years old at the date of last observation, and thus nine years older than the age at which fruit should be formed, they had not produced a single peach, nor did there appear to be any likelihood of their doing so. In other words, under the special conditions of growth established, the fruit producing function had been wholly arrested, and the trees were therefore worthless. A remedy for this would be found in a reduction of the nitrogenous foods, and a greater supply of mineral foods. A still further application of this principle will probably permit us to bring fruits to maturity more perfectly than now and also enable us to overcome the disastrous effects of early frost where trees tend to continue their growth too late in the season. These facts therefore suggest one important direction in which these laws of nutrition may be applied.

We will now turn our attention more particularly to a consideration of improved varieties and the relation of such improvement to the composition of the ash, and in doing so we shall make use of results obtained by the investigator already quoted. The fruit of the wild strawberry (*Fragaria vesca*) contains, according to the analysis of Richardson, 0.41 per cent. of ash. In this we find

Potash.....	22.06
Soda.....	29.79
Lime.....	14.88
Magnesia.....	traces.
Iron.....	6.07
Phosphoric acid.....	14.47
Silica.....	12.62

this calculation being made after deducting sulphuric acid and chlorine, for reasons which need not be specified at the present time.

As determined by Goessmann, the fruit of the cultivated strawberry contains from 0.41—0.63 per cent of ash, and this includes

Potash.....	40.24
Soda.....	3.23
Lime.....	13.47
Magnesia.....	8.12
Iron.....	1.74
Phos acid.....	18.50
Silica.....	5.66

A comparison of these figures shows that under the ordinary conditions of cultivation, the plant utilizes much less silica, iron and soda, but makes greatly increased demands upon potash, magnesia, and phosphoric acid. In view of these facts, it can hardly be doubted that these elements are essential to a higher state of development, more especially as we observe that when the conditions of cultivation are reduced and the supply of these elements is diminished, the plant reverts to its original condition, both with reference to its general characteristics and the chemical constitution of its ash. These changes may be regarded as effected slowly, as in the ordinary transition from the wild to the cultivated forms. Let us now see how the special application of food will influence a similar result. An exhaustive statement of the result obtained by Goessmann cannot be made here, but the following are the essential facts.

Observations were made upon the Concord Grape as a cultivated variety, and upon the *Vitis labrusca* as the wild species from which the Concord originated. In each case certain plants were grown without special fertilizers, while others were treated with fertilizers of three separate combinations. With these latter we will not deal separately, as we desire now to discuss only the general results.

The ash of the Concord Grape was found to contain when unfertilized.

	Sept 13.
Potash.....	57.15
Soda.....	4.17
Lime.....	11.30
Magnesia.....	3.10
Iron.....	0.40
Phos. acid.....	12.47
Silica.....	11.83

In the ash of the fertilized grape there were

	Oct 3.
Potash.....	64.65
Soda.....	4.42
Lime.....	9.13
Magnesia.....	3.63
Iron.....	0.50
Phos. acid.....	14.87
Silica.....	5.80

But these changes in ash composition are found to be directly associated with an increase of sugar, a decrease of free acid and a general improvement in quality of the berry.

Turning now to the wild grape, we find at the end of four years growth

that changes in the ash, were accomplished as indicated by a comparison with the ash constituents of the uncultivated wild grape:—

	Unfertilized.	Fertilized
Potash.....	50.93	62.65
Soda.....	0.15	0.85
Lime.....	22.23	14.24
Magnesia.....	5.59	3.92
Iron.....	0.79	0.53
Phos. Acid.....	17.40	13.18
Silica.....	2.93	4.63

While the organic matter stood in the following relation :

Organic matter	16.31	19.55
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and this striking increase was found to relate chiefly to an increased percentage of sugar and reduction of acid in the juice as follows:—

Sugar.....	8.22	13.510
Acid	9.84	1.149

Thus as the direct result of special feeding, the sugar percentage of the wild fruit is increased from eight to thirteen per cent., a quantity nearly as great as that found in the cultivated Concord Grape at the same season.

The significance of these results must be apparent to every intelligent cultivator, and to quote the words of the investigator above cited, "The ability to effect such decided changes in the composition of our fruits, cannot but be of the greatest importance to horticulturists in improving the quality of the new cultivated varieties and producing new varieties of a desired quality. If we can change the composition of our fruits in one or two elements, by the application of the proper food, why cannot we change the proportion of any element? In the seed is stored up the element of the new plant, and the varied compositions may be accompanied by certain physiological changes which shall determine the character of the variety."

My object for presenting the facts to which I have called your attention this evening has been, not to bring forward any detailed exposition of scientific observations, but rather to draw your attention more prominently to the general principles underlying the laws of growth and nutrition, and to show that our modern horticulture has entered upon an entirely new phase, in which scientific observation is the basis; and he who wishes to reap the large benefits to be derived from the intelligent pursuit of horticulture in any one of its important branches, must recognize the necessity of securing for himself, as a necessary preliminary to his work, an accurate, though general scientific culture. If my object in this respect be gained, even in a remote degree, the law of compensation may be considered as having found its application.

OUR FRUITS, PAST AND PRESENT.

BY CHARLES GIBB, ABBOTSFORD, QUE.

Fruit growing has attained enormous dimensions.

Canada imported in 1883, 2,516, 446 lbs of plums and prunes, 7,435,801 lbs of raisins, 1,300,000 lbs of dates, 1,100,000 of figs, 53,414 bunches of bananas, 250,229 pine-apples. Canada exported 467,544 barrels of apples valued at \$862,993 and of these 264,113 were sent from the port of Montreal.

The United-States imported 8,700,000 lbs of figs, 92,000,000 lbs of prunes, 40,673,000 lbs of raisins. The total fruit export of U. S. in 1888 was valued at \$3,510,203, and the total import (including nuts) \$20,502,203,

Great Britain imported in 1887 4,807,360, bushels of oranges and lemons. 653,138 cwt of raisins 1,100,730 cwt of currants, 1,944,460 bushels of apples. The total value of fruits imported by Great Britain in 1883 was £7,741,000.

These figures were, most of them, obtained through the kindness of Mr. A. W. Hadrill Secretary of our Board of Trade.

Has man always used so large a proportion of fruits in his daily food? We shall see as we go on.

"The origin, the first home of the plants most useful to man and which have accompanied him from the remotest epochs, is a secret as impenetrable as the dwelling of all our domestic animals." So said Humboldt in 1807. How rapid has been the advance of science since then. Of the 247 species of cultivated plants studied by Alphonse Decandolle, most have been traced to their original homes, and only 3 belong to species which are entirely uncertain or unknown

Plants become distributed in many ways; by winds, by currents. The seeds of many kinds grow readily after passing through the digestive organs of birds or of ruminant animals. Birds may even do something in the selection and propagation of the best varieties, as they prefer a good to a bad flavored fruit, and thus scatter more widely the seeds of the best. Then man comes in as a most important factor in plant distribution. He gathers the best wild fruit, and throws away the seeds around his camp. He cultivates what does not grow wild. He wanders from place to place and carries his favorite food plants with him, and leaves them growing around the camps he has left.

The Banana has been grown as a food plant from very early times. Not only has it a name in Sanskrit, the language of Ancient India, but its different cultivated forms, have names in Sanskrit, in Ancient Chinese, and in Malay. To

have been cultivated, improved, and carried to widely separated countries at so early a period shows culture of great antiquity, besides this its propagation from suckers in its seedless form, both in the Old and New World show that it has been cultivated from the remote past.

The Mango has a Sanskrit name and yet possibly may not be a native of India. If so it must have been introduced soon after the Aryan invasion.

The Pomegranate has both Sanskrit and Pelasgic names, and therefore seems to have been grown in the neighborhood of Greece before the arrival of the Greeks.

The Orange has a Sanskrit name, but this may apply only to the bitter orange. The sweet orange seems to be a native of Southern China and may not have been known in India at that early date.

The Coconut Palm has a Sanskrit name, and if it originated in the East Indian Archipelago, its extension towards India and China may not have been, says Decandolle, more than 3000 or 4000 years ago, but its arrival on the west coast of Central America, occurred in the remote past, yet after the physical condition of our planet had assumed its present shape.

A vessel laden with coconuts is wrecked and goes to pieces. The natives of the adjoining shores pick up the nuts and plant them. In this way began the coconut groves of Lake Worth in Southern Florida but it is easily possible for a coconut to drop its fruit in the sea, and for it to be drifted and plant itself on distant shores. In such ways as these are plants distributed.

The pre-historic area of the Fig extended from Syria to the Canary Islands. In *strata* near Paris leaves of the wild fig are found along with teeth of the Mastodon.

Horticulture deals with the culture of plants by the hand of man, their variations, and improvements. Botany deals with species, in their wild forms. Horticulture is as it were a scion grafted upon the science of Botany. The distribution of plants in pre-human periods we must leave to the Botanist and the Geologist.

In a hasty way I showed you how very ancient was the distribution of food plants in the tropics. In later times 200 and even 300 years ago, when the Dutch, Spanish and Portuguese were founding their first colonies, this interchange received a new impetus. It was the custom of these Colonists to establish testing grounds for the trial of food plants. The British and French colonies also pushed this good work. Thus began a *systematic* gathering and scattering of these old world fruits. A few of them had found their way to the new world in the long long ago; but in 1782 a French vessel from the Isle of Bourbon laden

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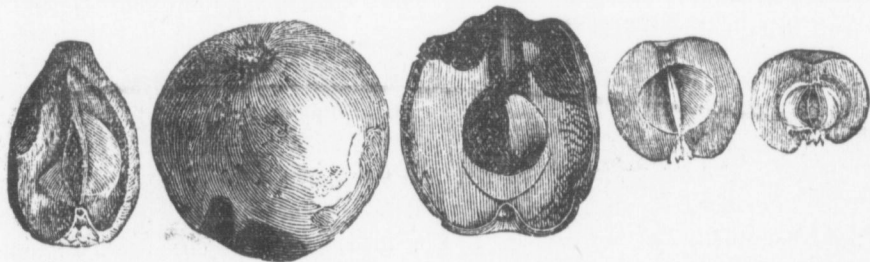
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with plants for St. Domingo, was captured by the British and taken to Jamaica, It was indeed a prize to the whole West Indies. A general interchange between the old world and the new, soon sprang up. So much so that the Banana, Mango and other old world fruits are the common food of the people of Tropical America.

These testing grounds were doing too much good to be given up. They became propagating and distributing centres and finally merged into the wonderful tropical Botanic Gardens of the present day. The present enormous export fruit trade of the tropics is wholly the result of this botanic interchange.

The apple has existed in Europe, both wild and cultivated, from pre-historic times. The Lake dwellers, of Switzerland and Lombardy, men who belonged to the polished stone age had two kinds of apples, and they collected them in fair quantity, for the charred remains of 300 have been found in one pile. Let us bear in mind however that this is not the man of the unpolished stone age, the paleolithic man, the cave man who hunted the Mammoth, the woolly Rhinoceros, the cave Bear and the Reindeer in England and in Western Europe, at a time so remote that England was perhaps part of the main land of Europe. No, these Neolithic lake dwellers lived long after this and yet before and after the arrival of the Celts, who were perhaps the first of the Aryan races in Europe.



Decandolle says these apples may have been the wild apples growing there, yet these men were not nomad hunters like the earlier races, but were agriculturists. They had 4 kinds of wheat and 2 kinds of barley, and possessed many plants not natives of Switzerland. They had communication with the South and East, and some think that their domestic animals were of Asiatic origin.

I mention these things because it would be interesting to know whether the apples grown in Western Europe were descended from their native stock or from the wild apple of Asia Minor and Northern Persia.

Where was the old home of the Calvilles, where apart from other types, they were enabled to grow generation after generation until they formed a more or

less fixed type. In Russia the Anis, the Borovinkas and Aports have formed families, but from the wild stock of what region I cannot say.

The apple has names of like derivation in the ancient languages of Northern Europe. Afal in Erse, afallir the Cymric of Wales, aval in the Armorican of Brittany, obolys in Lithuanian and yabluko in Ancient Slav. as though it were known among these early Northern people. Here and there we can trace apple growing to early times.

The Volga in Russia is a very old apple growing region. I am told that old poems written about the time of Rurik, over 1000 years ago, allude to this. The maiden whose neck was like a swan and whose lips were like cherries, had cheeks like a Volga apple. The dry climate produces fruit of high color. It has been supposed that the growing of apples in England dates from the Roman occupation. However the Saxon word aepl or aepel may imply its use in Britain previous to the conquest, and it is said that the names of Applegarth, Appleby, Applethwait date from before the conquest. In Kent the family name of Appleton, whose crest is an apple bough, dates from the time of William the Conqueror. (See Fruits and Fruit trees by Geo. H. Grindon.)

Evelyn says that it was to the industry of one Harris, fruiterer to Henry VIII that the fields and environs of 30 towns in Kent were planted with fruit from Flanders. Such statements as this, and history is full of them, show continued importations from the continent; that is continued improvements upon the fruit Britain already had.

We now come to the time of the greatest botanical horticultural interchange which the mild temperate regions have ever seen; I mean the work of the Royal Horticultural Society of England in the early part of this century under Knight, Lindley, and Loudon. They sent Robert Fortune to China to collect plants, they interchanged with the botanic gardens of the tropics, they tested all European and other fruits they could get. They made horticulture fashionable among the gentry of England. Their 2nd catalogue published in 1831 contained 1400 varieties of apples! This great work greatly advanced the horticulture of Western Europe, in fact of the western temperate world. We here on this continent are indebted in part for our fruits, in part for the ancestors of our fruits.

The pear also dates from early times. It has been found in the deposits of the Lake dwellers in Switzerland, and has names in many ancient European languages. It seems to be found wild from Northern Persia to Western Europe. It was much grown by the Romans who had at any rate 36 varieties. Pliny however says that "pears are but an unwholesome meat unless well boiled or well baked." I give this oft quoted saying of his to show that their quality at this period was not high. It was to Van Mons and his associates in Belgium that

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we are so largely indebted for the good pears of the present day. Van Mons idea was to sow the seeds of some wilding, which was an improvement of its kind, keep under high cultivation, aim at early fruiting, and sow the seeds of the first fruits for several generations. His idea was "to sow, to re-sow, to sow again perpetually." Van Mons was not aware, at first, at least, of the crossing of varieties. His theory was at fault, but his practice worked wonders. The catalogue of the Horticultural Society of England in 1831 contained 677 varieties. Henceforth the pear took rank with the first and most luscious fruits of temperate regions.

The prune plum of Europe seems to be a native of Asia Minor and Northern Persia, on the other hand the ordinary plum and the sloe are natives of Europe, and have been found among the remains of the Lake dwellers. Plums in great quantity and variety were grown by the Romans and sowing and re-sowing have produced the luscious fruit we have to-day.

The sweet cherry (*prunus avium*) has been found in early times in Switzerland and Italy; in early times but not before the advent of the Aryan races. It may have been grown in Greece before the arrival of the Greeks. It is often stated that the Roman General Lucullus brought the cherry into Italy from Pontus; but he seems merely to have introduced some new and good varieties. The sour cherry (*prunus cerasus*) seems to be a native of Asia Minor. These two types I believe to have been crossed and re-crossed in many of the varieties now grown in Europe.

There is a district in Russia where cherry growing is the industry of the population. It is in the province of Vladimir, between Moscow and Nijni Novgorod, where the winter temperature is about 3 degrees colder than in the City of Quebec. The little trees only grow 3 feet high. So largely are they grown that they are shipped by the car load, in all directions, and I am told that entire trains have been loaded with this one product. Our Government coaxes us to develop our native industries, then why should we not have our Canadian Vladimirs with their millions of cherry trees, their canning and drying establishments. Such labor would develop more bright eyes and rosy cheeks than a cotton factory or a paper mill.

The history of the grape I shall review from the stand point of our own needs in this part of the continent.

In 1564 wine was made from the native grapes in Florida and in 1769, the French at Kaskaskia, Ill., made 110 hogs-heads of strong wine from wild grapes, but the quality was not considered good.

In 1630 a London company sent French vigneron to the Virginia colony, to plant grape vines, imported for the purpose. The enterprise failed; so did

a Swiss Colony from Geneva; so did attempts made with German and Spanish vines. Thousands of failures are recorded and not one durable success.

The verdict of the horticultural press of the Atlantic and Middle States is that the European grape is generally unsuccessful; only exceptionally is it a success. Attention was now turned to the American vine. The Isabella from South Carolina was brought to notice in 1818, and the Catawba from North Carolina somewhere about 1830. Delaware first appeared in the catalogue of Am. Pom. Soc., in 1855. To Mr. E. W. Bull of Concord Mass. we are indebted for those years of patient labor which resulted in the Concord. Mr. Bull sowed the seeds of the best wild grapes, again sowed the seeds of the best and among 2900 seedlings obtained the Concord.

It had been held that one species of grape could not be crossed with another and produce fertile offspring. Some began to doubt this. Mr. J. F. Allen crossed Isabella with Golden Chasselas and produced Allen's Hybrid which he exhibited in 1854, but our botanists were cautious and considered the case not proven. Its seeds were sown and some partook of the American and some took after the European. This was considered clear proof. Engelman divided the American grape into 13 species, but each species has been crossed with some other, even the peculiar Scuppernong of the South has yielded by buds. It was at this time that E. J. Rogers of Salem, Mass., set to work and crossed a native fox grape with Black Hamburg and Rose Chasselas. This resulted in the well known Rogers Hybrids of which hundreds of tons are now grown. The vines had the thick leaf and rapid growth of the female parent, the American vines; while the fruit was finer than from any native fox grape.

Now we come to crosses with these hybrids. Brighton is from Concord and Diana Hamburg, and Diana Hamburg is from Diana and Black Hamburg and Diana is from Catawba. It is but $\frac{1}{4}$ European, and a grape of remarkably fine quality. But in an unhoped for way we have obtained fine quality. Jefferson is from Concord and Iona which is from Catawba. So it would seem that we now have grapes of good size and of high excellence grown from grapes of American origin.

It was necessary that these varieties should be tested in our own climate, and many willing hands have done their share of this work. I have exhibited as many as 47 varieties, but it is to Mr. W. M. Pattison of Clarenceville, to whom we are indebted for systematically obtaining every new grape of promise. He has had on trial over 130 varieties and each year reports upon their goodness or good-for-nothingness.

I spoke of those patient years of labor by Mr. Bull which resulted in the Concord. Let us not underrate its value. It was the grape that started the great

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grape industry to the South of us and caused our early grape fever here, and must be held in grateful memory for its offspring, Martha, Eva, Pocklington, Cottage, Lady Washington, Worden, Moores Early, Duchess, Niagara, Brighton, Jefferson. "Had it not been neither would they have been." To Mr. Bull we are indebted not merely for the Concord, but for those of its offspring which shall be our favorite grapes in the near and distant future; and while the public may appreciate the tempting collections which appear at our exhibitions, still let them remember that this success is not owing to our little labor in planting and gathering, but to the life long labors of Messrs. Bull, Rogers, Rickett, Caywood and others who have produced these grapes which we now so enjoy.

Of other fruits I must say a few words. The North American Strawberry was introduced into England in 1629. In 1818 the Chili Strawberry was imported into England. The berry was much sweeter than the American and crosses between the two produced Victoria, Jucunda, Triomphe de Gand, etc. The Chili plant however was more tender than the American and these crosses in this country have come in more as amateur berries of fine quality than as market fruits. The American wild Strawberry has been so improved that some good market varieties are probably of purely American descent, and the crosses with the Chili born on this continent seem to thrive better than those produced in Europe.

Raspberries both red and white were known to the Greeks and Romans, and both are mentioned by early English writers.

The Romans had both hard and thin shelled walnuts, 6 kinds of chestnuts, (one with a red skin), and almonds both sweet and bitter. Until about 303 B. C., Italy was covered by forests, more impassable than the Romans had to penetrate in Germany afterwards, but after this instead of the flesh and pulse diet the fruits of Asia Minor were cultivated by Asiatics and a high degree of skill in gardening was attained.

Did it ever occur to you how few "tree fruits," that is, fruit bearing trees we have, that are *natives* of this continent? We have no apple, except the sweet scented crab of the South and West. No pear. In plums we are better off; we have the wild plums of Canada and North-Western States, the Chickasaws of the West and South, and the Beech Plum of the coast. Of cherries, we have the Choke Cherry, Bird Cherry and the Wild Black. We have mulberries, but no approach in quality to those of the old world. Persimmons, but not equal to the Kaki of Japan. We have no orange, no fig, pomegranate, peach, nectarine, quince nor apricot. While the Chinese and Japanese and the Romans and other early peoples in the old world were slowly developing these fruits from their wild forms, we had an Indian population who lived by fishing and hunting. Had there been an aboriginal population like the Chinese or Japanese, horticult

tural in their tastes, then our wild grapes would have been tully equal to any in the world; our crab apple at least better than it is; our haws the size of small apples; our choke cherry free from astringency; butternuts with thin shells hickorynuts of large size and with thin shell, wild black cherries perhaps equal to the Black Tartarian, and wild plums fully equal to the Washington and the Green Gage.

Where did our Canadian fruits come from?

Let us go back to the time when the peasants of Normandy and Brittany were gathering the seeds and perhaps the scions of the fruits they loved most in their native land before embarking on their long and perilous journey to New France. Later on the Englishman introduced his favorite fruits, the Scotchman his, and we soon had in New England and in Canada the fruits of the *mild moist* portion of Western Europe.

The early colonists brought with them the seeds of their favorite apples. As early as 1770 in an old deed, a farmer in the county of L'Islet, 50 miles below Quebec, agrees to pay 200 bushels of apples per annum, and these were not to be seedlings but were to be Calvilles or Reinettes. These Calvilles were not those of old France. The apples we find in the old French fruit growing districts are not the varieties of old France, but their offspring born on this continent.

The Fameuse, is it a native of Canada? I cannot tell you. It is an old variety. It had become known and had become famous, had been sent to England and fruited there, and its fruit exhibited before the Horticultural Society of England as early as 1818, and soon after the names snow apple and pomme de neiges are given up and the name Fameuse adopted. The Pomme Grise had been taken to England from Canada and fruited there as early as 1803.

In the colonies to the South of us fruit culture began early. Its early history has been traced with great care by Mr. Robert Manning in his History of the Massachusetts Horticultural Society. The book is brim full of facts such as those which follow: "The first apple tree that we know of was planted about 1648 by the first Englishman born in New England. This tree was still bearing fruit in 1846. A pear tree imported from England by Gov. Prence about 1840 and planted on Cape Cod was still bearing 9 years ago. The pilgrim fathers brought with them the seeds of the Kenish Cherry and the Damson plum. Up to 1750 very few apples were cultivated which had not been grown from seed. The pilgrim fathers have recorded their opinions of the wild fruits of their new home, and seeds of all sorts of English fruits were soon planted."

In 1773, apples were exported to England from Massachusetts as the crop of 1772 in England had failed. The flavor was said to be superior to anything that could be produced in England, and they were sold from 2d. 3d. and 4d. each.

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The common apple was grown on wild stocks in Virginia in 1647. The pioneer pomologist of America was William Coxe of Burlington New Jersey. He began work in 1794 and in his pomology published in 1817, he describes 133 varieties of apples and 65 of pears, tested by himself, and which he considers of greater or less value.

In 1818 every good pear that had appeared in France, had been tried in New England.

The French settled in Illinois about 1685 and there are grand old French pear trees now growing on the sites of their settlements, and on the Detroit river there are pear trees 8 or 9 feet in girth, and 70 to 80 feet high. The old tradition there is that they were brought from Montreal, from which place they were brought from Normandy or Provence. The decaying orchards of the Detroit river settlements have the White and Red Calville, Fameuse and Pomme Grise. Tradition there says that French missionaries brought seeds and scions from Normandy as early as 1749.

Those who are well up in Canadian history do not seem able to give me any light upon the introduction of fruits by the early French colonists. However this much is plain enough. The French in their early journeys, brought with them the seeds of the best apples they had, and by sowing and re-sowing, selecting the best, have produced a race of apple trees very fairly adapted to a part of this province. Orchards were protected by forests in old times and these varieties may not be equally hardy in bleak open exposure.

Montreal has done something in the way of producing new varieties.

The late Mr. Henry Corse, between 1810 and 1830, in his garden on College street, sowed the seeds of the best plums he could, sowing them direct from the pulp. If the leaf was large and of fine texture it was allowed to fruit. The result of this was Corse's Dictator, Admiral, Nota Bene, and Great Bearer, but as these fine fruits are not hardy enough for exposed hill-sides like Abbotsford, and as Montreal takes so little interest in such fruits, they may yet be lost. It was Mr. Corse who sent to the Massachusetts Horticultural Society, scions of Fameuse, Pomme Grise and Bourassa in 1832.

There were and perhaps still are thorn apples, on the ground of McGill College, of remarkable size and good flavor. The Yellow choke cherry, a very pretty tree, used to be seen in Montreal gardens and now may be lost. Such things should not be lost. They may be the parents of fruits to come.

The late Mr. Robert Cleghom, who lived in Blinkbonny garden, Sherbrooke street was a diligent seed sower. The Blinkbonny he stated was grown from seed of Fameuse. His Montreal Waxen has been extensively propagated as the Montreal Beauty in U. S. and Ontario and as Queen's Choice in Northern New

England. Mr. Cleghorn is forgotten by many, though not by all, but the fruit of his labor has been enjoyed by thousands.

Two others workers I must here refer to, they are however not originators of new fruits, but importers of new varieties. I refer to the late Jas. H. Springle who tested something like 300 varieties of pears, and Capt. Raynes, our largest introducer of English and Scotch apples. Capt. Raynes has had 100 varieties on exhibition.

The result of such work we are apt to appropriate with unrecorded thanks.

The climates of Western Europe where our fruits came from is very different from ours. Climates of greater mildness and moisture. England is a land of verdure, her lawns are like velvet, her thatched roofs covered with moss. Here we often suffer from drought and yet the annual rain fall of London is one third less than that of Montreal. It is from rapid evaporation we suffer.

Europe is under a combination of modifying influences. Atlantic ocean, Gulf stream, Mediterranean, Baltic, and Black seas and Sahara Desert all have their influence. In Sussex, in England there are large numbers of fig trees over 100 years old, and yet this is 60 miles farther north than Winnipeg. On some of the Lofoden Islands, within the arctic circle, sheep pasture all winter. This we all know: but what we are apt to overlook is the distance these influences extend Eastward. St. Petersburg in latitude 60°, the latitude of Cape Farewell in Greenland, so far north that the stars cease to be visible for a month during summer, has a winter temperature only 1° colder than Montreal, and Kazan the coldest profitable orchard region of the old world, which is about 475 miles farther north than Winnipeg, has a winter temperature 7° milder. Yet if we compare the temperatures of towns on the Volga, with similar latitudes in the central parts of this continent we are compelled to admit that the influences which modify Europe extend to the Mal Mountains.

A hardy race of fruit trees was needed for the colder parts of this continent, for regions too cold for the fruits of the temperate climate of Western Europe. The Siberian Crab was adapted to cold climates so Minnesota planted orchards of Transcendent and Hyslop Crabs. Crab seed was sown from trees surrounded by apple trees, and hence arose a race of crosses.

If you can retain the thinness of skin of the Siberian and its brisk sprightly flavor, and get rid of its astringent or puckery flavor, you get a good fruit. The Early Strawlerry crab which ripens with Red Astrachan is better in flavor than any apple I have of its season. Whitey, No. 20 is surpassed in quality only by such apples as St. Lawrence. It is far better than our average summer apples. Brier's Sweet is the best sweet apple I have of its season. Gibb is my best can-

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ning crab and good as the Germans say "for raw enjoyment." I wonder whether it is possible that I over-rate its quality because it was named after myself.

But my friends become enthusiastic over it. Well it may be that my friends like it because they like me or because they catch my enthusiasm. We are continually mistaking the dictates of one sense for those of another.

We admire a singer and think the song well sung. A man comes home, he is so glad to see his wife that he thinks his dinner well cooked. Such want of accuracy is a broad human failing. Yet call it not a failing. It is a heaven-sent blessing. It rubs off the hard edges of facts, and renders happiness widely possible in this world of imperfection.

Of 29 varieties of these hybrid Siberian apples which I fruited for a number of years, I have had a better percentage of success than in other departments of my experimental work.

The Russian apple now appeared as a fruit for cold climates. The United-States Department of Agriculture at Washington, in 1870, imported from St. Petersburg 252 varieties. These were fruited on the department grounds at Washington, but owing to the long summer heat they all proved summer apples, and the latest of them dropped from the tree by August 4th, and yet these same varieties sent to Wisconsin and fruited there, were improved in size and color, and kept till February or March.

Then in 1879 the Iowa Agricultural College imported 73 varieties from Dr Regel of St. Petersburg, and about 154 varieties from Mr. Schroder of the Agricultural Academy of Petrovskoe Rasumonovskoe near Moscow, also a number of Russian pears. But what was the record of these varieties in Russia and in what climates? This we did not know and it seemed could not know unless some one went. It is said that patience is a virtue. I tell you impatience is sometimes a virtue, and over-contentment, to remain content with things as they should not be is a wide spread evil. The fruit regions of the colder parts of this continent were all looking anxiously to the Russian fruits. Here was work that had to be done, and at once. This resulted in the journey of Prof. Budd and myself, to Russia. We did not get the information we needed at St. Petersburg and Moscow and therefore hastened into the fruit growing regions of the upper Volga. We roamed about in a tarantass, a basket on wheels without springs, drawn by 3 horses abreast, with a cow bell over the middle horse; and sometimes lived on black bread and slept on a bundle of hay. We were in the coldest orchard region of the old world at the time that the fruit was ripe on the trees. The winter temperature at Kazan is 3° colder than Chicoutimi, which is the coldest part of the Province of Quebec where we are likely to try apple growing. In Minnesota they can test the hardiness of a tree more severely than I can at

Abbotsford. A trial of a large number in bleak open prairie exposure at the State Agricultural College resulted in a verdict of 16 varieties hardier than the Duchess of Oldenburg. I have planted into orchard over 100 varieties of Russian and German apples, and have the same variety from several sources in Russia planted side-by-side to prove their identity or otherwise. We find among them hardy trees and remarkably young bearers, fruit sometimes large and showy and sometimes of fine quality. But will we find late keepers among them. Remember that these apples were from the colder districts, of Russia, from latitude 51° to latitude 60°, from regions where the summer heat is less than Montreal, regions mainly north of the limits of grape growing. No doubt L'Islet County below Quebec will find late keepers, and we here will find late keepers for home use, but that we shall find an apple of the character of the Baldwin, or the King I very much doubt. There were many drawhacks attending the importing of these fruits, many especially in the importation of 1870, were not true to name. They were propagated by Russian names spelled in all sorts of queer ways or by translation often unmusical or wholly wrong. These names sometimes written merely from hastily written labels had to be traced to authentic Russian sources, and English names, names such as our farmers could spell and pronounce added, for use in this county. This was the most tedious piece of work I ever undertook. It has all appeared in the last report of the American Pomological Society, our authority in these matters, and in the last report of the United States Department of Agriculture. These lists may now be considered fixed and unchangeable, as no change would be made except for some glaring mistake.

One by one we overcome the difficulties that surround us.

I shall now say something of our future fruits. What part do we intend to take in their development?

We have seen how our fruits have improved generation by generation since the wild forms were gathered by early man. We have seen how the pear improved by seed sowing under Van Mons and his associates. The production of new varieties from seed is better understood now.

A wild fruit reproduces its exact self from seed. This is as true as that the fixed stars are fixed. What appears to be a fixed star may be a pair of double stars revolving around some point between them in a million of years. Yet this star seems to the unaided eye of man fixed and immovable. So these primitive forms vary so little that man looking on declares them unchangeable.

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seeds for a few generations and you will find variation. Some vary readily, others cling tenaciously to their old habits.

The prune plum of Germany is grown mostly by sowing the seeds, whereas the finer prunes of France are grafted. Some varieties of the peach have shown strong tendency to reproduce themselves from seed, and so of the orange. Very fine oranges are grown on the Indian River, in Florida, from carefully selected seed.

The seedlings of cultivated fruits have a certain tendency to take after their less improved parents; yet some few out of the many will be improvements.

But let an apple become crossed with a variety very unlike itself, or with another variety, and re crossed, and its offspring will vary widely.

The way to cross varieties is this: As the flower is expanding, take away the stamens, the male part of the blossom, and apply the pollen of the other variety you intend to use. Then cover with gauze to keep off the bees, and sow the seeds when they ripen. Or it may be done by merely dusting the blossoms of a certain variety with the pollen from another. Or a branch may be grafted into a tree of another variety so as to be fertilized by it.

Andrew Knight crossed the Chasselas and Black Cluster grapes in 1818, and produced the Siberian Harvey from the Golden Harvey and Siberian crab, in 1811, and there have been a host of good workers since then.

It is found that the hardiness and bearing of the tree and the size of the fruit, take after the female parents; the quality and season of the fruit after the male. There is something over 50 per cent of truth in this. The knowledge of this is of great value, if we make use of it.

Mr. G. B. Peffer, of Pewaukee, Wis., crossed Duchess of Oldenburg with Jonathan, so as to try to get the fine quality and long keeping of the male (Jonathan) with the size of fruit and hardiness of tree of the female, the Oldenburg. The Pewaukee apple is a fair representation of the theory.

Mr Peffer crossed the yellow cherry crab of Siberia, with Fall Greening apple. The result was the crab which he named Gibb. (If ever I produce a good fruit I should name it Peffer). This was the first cross from a primitive form, yet a primitive form under cultivation. From a fruit $\frac{3}{4}$ of an inch in diameter, we have one which is sometimes over $2\frac{1}{2}$ inches. Such a variation in the first generation from a wild form is unusual; but it shows possibilities.

Some years ago I went to the orchard of Mr. Chas. Arnold, of Paris, Ont. Mr. Arnold led me to an apple tree and asked me if I knew what it was. I said, I did

not, but that it suggested Northern Spy and Wagener and he questioned me as to the points that suggested Wagener. He then told me that it was a cross between Northern Spy and Wagener.

Mr. Arnold afterwards sent to our exhibition, at Abbotsford, 7 varieties, grown from the 7 seeds of one Northern Spy apple, fertilized by Wagener and Spitzenburg. Two were of Northern Spy type, one had the form of Spitzenburg, one was a tough elastic Russet.

I said before that the French Colonists by seed sowing produced here a useful race of apples. A race of apples of real value when this country was well sheltered by forests. They perhaps have given us the Fameuse, Pomme Grise and Bourassa. They have given us the St. Lawrence, Canada Baldwin, Décarie Fameuse sucrée and others. This work has now ceased. Seedlings are no longer planted. They no longer pay.

On the other hand we have among our best commercial apples, some which originated in distant lands. Duchess of Oldenburg, Red Astrachan, Alexander and Wealthy. This work of introducing new varieties is being pushed with a good deal of energy by individual effort and by the Local Horticultural Societies.

But we need both branches pushed; both importation and seedling production.

To the Ladies, I must say a few words, for there is a work which needs their help. Who will cross our common wild plum with the finer plums of European origin and thus give us a fruit like the Jefferson or the Greengage, growing upon a tree as hardy as our native plum. Who will give some odd moment of time to the fertilization of our native riparia grape with the large fruited labruscas and thus give us a race of grape vines which will fruit without winter protection. Who will cross the Red Cherry crab of Siberia, with the hardiest Russian apples and give us trees hardy enough for Manitoba. Who will cross the hardy Russian pears with the Beurres of Belgium? Such work may be done by men and has been done by clumsy handed men yet it needs the delicate hand, the care and the patience of woman. What work can be more fascinating, producing we know not what, perhaps untold blessings over large areas of our country, and I am almost sorry that I am not speaking to the poor instead of those well off, for there is another side to this question. Several of the new grapes have been sold, I am told, for \$4,000 each, (perhaps some luck money may have been paid back, I cannot say); but Peter Gideon who produced the Wealthy apple receives from the government of the state of Minnesota \$1,000 per annum for life, and there was no luck money to be returned out of that, but as a rule these men do not make money or rather they do make it in the sense of

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manufacturing it, but in the sense of merely getting it out of other pockets into theirs, they do not always make it. It is better work than is usually paid for in this world.

It is often said that the Fameuse is dying out because it is an old variety, just as the Pomme Grise is doing. There is but a small percentage of truth in this.

The Pomme Grise is not as hardy a tree nor as good bearer as the Golden Russet and our markets value a really good apple so a little that they will give about as much for a barrel of Russets as a barrel of Grise.

The Ribston Pippin, produced from seed from Normandy about 1638, is yet a favorite apple in Nova Scotia, and is grown to a fair extent in Ontario. The Gravenstein originated about the middle of last century in Germany, and is widely grown in these milder parts of Canada. The Alexander is said to be a native of Southern Russia. It was received from Riga by the Horticultural Society of England, and fruited in England as early as 1816. (See the reports of the Horticultural Society of England in the library of the Montreal Horticultural Society.) The Baldwin fruited for the first time about the middle of last century. The Rhode Island Greening was introduced about 1765. The Roxbury Russet originated at Stonington, Connecticut, and appears to have been brought from there in 1649. (See Mannings History of Massachusetts Horticultural Society.) So we have apples in their prime which originated over two and a half centuries ago.

There is a great charm in fruiting varieties from distant lands, especially when you feel that some of them will be widely useful, some day. Look at the descriptions of new fruit by those who have been the first to fruit them. There is not much truth in what they say. I do not mean to say they lie, oh no! but their enthusiasm prevents, their seeing correctly. Do not think I have no enthusiasm, there are times when I cannot see accurately, if able to see at all; but when I am judging an apple my thoughts and my emotions flow in two different channels. In fact I suffer from impartiality, and my caution, my wish to give no false hopes at times causes me to withhold true hopes.

The past year was an unfortunate one for the apple grower. Here, in Ontario, and in Liverpool the markets were overstocked. Such things happen now and then. In 1837 or 1838, Fameuse only brought \$1 per barrel, on the wharf at Quebec. These little clouds are by no means welcome, yet they prevent our suffering from the monotony of prosperity. Cheap fruit however, is always followed by increased demand; its cheapness widens future markets. Yet how many there are in this Province who scarcely use apples.

I see that the College de Montreal and the Ville-Marie Convent, have planted enormous orchards; but why have not all our nunneries, boarding schools, lunatic asylums and orphan asylums got orchards; and the ailing and the young taught to tend and care for them. It is simply this, human beings are like horses with blinkers on, they see only in one direction at one time, and the most truly earnest souls are the most blind to side issues, that is while looking to humanity's needs in one direction we overlook its needs in another.

We forget that "houses were made for shelter in case of storms," rather than to be lived in. Humanity suffers less from exposure than from being continually caged. The hard-worked business man must have his playground as well as his work-shop. The country is the place to grow boys and girls.

I usually have a number of French children working for me during the apple harvest. Their work during fine weather for 3 or 4 weeks is eating and picking apples. How they improve! The girls are ever so much prettier when they leave than when they first come, apples produce a better complexion than pork.

As a people, our food lacks vegetable acid and the apple is our best and cheapest supply.

We live in days of rapid communication between distant lands. Perishable fruit may be sent safely for thousands of miles. At the Colonial and Indian Exhibition in London, in 1886, the fruits of British Columbia, Ontario, Quebec, New-Brunswick and Nova-Scotia were placed side by side in the large hall of the Royal Horticultural Society. Such high color, variety and extent astonished the British public. Their fine quality impressed most favorably the fruit committees of the Horticultural Society. These perishable fruits could not have been sent but for cold storage. Our Montreal melons made a most favorable impression. One old gentleman, a special melon fancier, jumped up and declared he had never tasted a melon in his life before. I suppose he meant to say that all those he had been growing and testing were pumpkins in comparison. Our Fameuse will some day be sent to England in cold storage and will be appreciated as were those sent in 1836. In London I tasted apples grown in Australia and shipped through the tropics in cold storage. They were crisp, spicy and in fine condition. So were the pears. Some of these days the Mango, the Custard apple and the Sour Sop, the three most delicious tropical fruits I know of, will be for sale here. Cold storage opens great possibilities.

The care of plant life has been the enjoyment as well as the employment of millions in all ages. What we take care of we become fond of; for our cares are our joys; and in higher things, our chief care and joy become their comfort and enjoyment. It is not those who have the finest garden to promenade in, who feel

this most; but those who form an intimate acquaintance with plant life. Talk to your plants and try and get into their confidence and their secrets, and they will open their little hearts to you and show you in silent words their little troubles, and thank you visibly for every kind act you do for them.

A child should love its rose bush or favorite plant next to its doll, as a something undefinably nice, nice without knowing why. Such a feeling in a child will keep blossoming out into little happinesses all through life.

It is this feeling in the human heart, a feeling deep and wide spread from early ages, which has made horticulture a science, and made it beloved instead of a toilsome search after something to eat.

Early man sought fruit before he hunted for gold. For ages before man knew the use of metals, he cultivated his food plants. They became improved and widely distributed, ages before the dawn of history. This improvement went on generation after generation.

Peace-loving horticultural peoples were continually conquered by barbarian hordes but the fruits were apt to survive, and these conquered races became the slaves and gardeners of their conquerors.

We who live in temperate regions owe much to the Romans. Not that they were a horticultural people, but they wheeled humanity into line, found out what a man was good for and made him work "for all he was worth."

The Roman pro-consul who had served his time in the East, built his villa in Italy and attempted to surround it with a Persian "paradisos." He brought with him the fruits of Asia Minor and Persia, and the Asiatics to cultivate them. These fruits found their way into Gaul and Britain and were the ancestors of the fruits we have here to-day.

Thus have our fruits been improved, under a kind providence, by the hand of man. Each generation has done its work. Let us do ours.

FORESTRY FOR CANADA.

BY H. G. JOLY DE LOTBINIÈRE.

The forest does not only supply the invaluable commodities of fuel and lumber it exercises a great influence on the climate, and on agriculture. If science has not yet admitted that the presence of forests increases the rainfall (by condensation of vapour held in the atmosphere, owing to the lower temperature of the forest land, or by other means), it is universally admitted that the forest regulates, throughout the year, the distribution of water in our streams, contributes to retain the moisture favourable to vegetation, retards evaporation and checks the effects of drying winds.

Unfortunately, it is only after the forest is gone, that its value is truly appreciated, as in the South of France, Spain, Italy, Greece, and many other countries, once fertile, now barren and unproductive. The two great extremes, long drought and disastrous inundations, are due to the same cause, viz; the wholesale destruction of the forests, especially on the mountains, the birthplace of the streams. The soil of many a fertile valley is now hidden under a thick bed of sand, gravel and boulders (as we often see in Switzerland) brought down by torrents from the mountain slopes, where the trees which once retained the ground with their roots, have been destroyed. The rain, instead of soaking gradually through the moss, vegetable mould and roots, and feeding, by degrees, the springs and streams, as it did, while the forest lived, rushes down to the valleys below, as it falls, as from the sides of a roof, in irresistible torrents, carrying with it the ground that nothing now retains on the steep mountain side.

It is most interesting to follow the work of re-forestation carried on, principally in France, on the Landes for nearly a century, and on the barren mountain slopes, and to notice their beneficial results. The efforts of the "Ligue du Reboisement de l'Algerie" to repair the harm done in Algeria, by the burning of the forests on the slopes of the Atlas, deserve the warm sympathy of all those who can appreciate perseverance and devotion to the public good.

But the subject before us to day, is "Forestry for Canada." It is difficult to awaken any interest in the question among us. We are apt to consider Forestry as a superfluity, here, as if our forests were inexhaustible. They would be so (saving accidents by fire) with judicious management and sufficient protection. The aim of Forestry is not, as many believe, to preserve trees for ever, or until they decay and fall. Quite the reverse, it is to select and cut down every tree ripe for the axe, making room for the young growth, and thereby insuring a con-

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tinued reproduction and a steady revenue. As it is, we are not only spending our revenue, we are drawing largely every year, upon our capital.

The pride of the Canadian forest, the white pine, is getting very scarce; the proportion of first-class wood is decreasing year by year, while the distance from which it is brought is increasing. How many mill owners, who would have scorned sawing spruce logs a few years ago, are only too glad to get them now, and though spruce reproduces itself much more readily than pine, we can foresee the time when it will get very scarce, at the present rate of cutting.

The late James Little, of Montreal, who was the first to sound the alarm, deserves to be gratefully remembered by Canada. When every one treated our pine as if the supply were inexhaustible, he was the first to call attention to its rapid disappearance. His warnings were met, not only with indifference, but with ridicule. Now, the eyes of the most sceptical are opened, and they must admit that he was right; but it is sad to see them turn round now and affirm that it is no use devising means for the protection of our forests, because there is nothing left in them worth protecting. There is still a great deal left worth caring for and improving. It is late, but not too late.

The great American forester, F. B. Hough, in his Report to Congress, draws attention to the fact that: "although the system of management of the Canadian forests is crude in its provisions, and destitute of any policy tending to secure the growth of new forests, *it has one redeeming feature*, as the title to the land itself remains vested in the Government, and, after the expiration of the first temporary leases, under which the native timber is cut, it will be available for any course of management that experience may suggest. This last consideration prepares the way for any system of Forestry that the wants and resources of the country may, in future, demand, and, even without a system, the natural growth of a new forest, where the old one has been cut away, especially where the spruce timber prevailed, is in many places, bringing forward a supply for future use, although much less effectually than under proper care would be obtained."

Mr. Hough was right to assume that the forests of Canada belong to the Crown, as the proportion in private hands is comparatively insignificant. The Government holds them in trust for the people and is answerable for their good management.

It is a good sign to find in the Dominion Statute Book, 47 Vict., cap. 25, sect 5, proof that the importance of preserving the forests on the Rocky Mountains is well understood. The Governor-General-in-Council is empowered to make provisions "for the preservation of forest trees on the crests and slopes of the Rocky Mountains, and for the proper maintenance, throughout the year, of the *volume*

“of water in the rivers and streams which have their sources in such mountains.”

In the absence of a regular system of Forestry there are practical means of protecting our public forests which I will now review as briefly as possible.

FIRST, and most important—A careful *classification* of Public Lands, under two heads: Lands fit for agriculture, which alone ought to be opened to settlement—lands unfit for agriculture, which ought to be carefully closed against settlement and kept in forest. The best timber lands, especially the pineries, are generally totally unfit for agriculture, it is a cruelty to decoy settlers there. How many hard working men have wasted the best part of their lives in trying to get a living out of such poor soil, and are tied down to it, for want of means to move away with their families; the only result of their work being the ruin of a fine forest and their own ruin. The Quebec Legislature had enacted a wise law in 1883, the Timber Reserve Act, which, I regret to see, is on the point of being repealed. As to the relations between the settler and the lumberman, where there is good faith on both sides, those relations ought to be of the most friendly nature.

SECONDLY.—The Government ought not to force, every year, thousands of square miles of timber limits on the market in advance of the legitimate requirements of the trade, and with the unavoidable result of glutting the European market. The Province is interested in the successful carrying on of the timber trade as it provides the whole of the raw material which keeps the trade going and ought to get returns for the value of that raw material, proportionate to the earnings of the trade. It will not come amiss here, to quote John Stuart Mill's opinion of the status of our timber trade, from his Principles of Political Economy; “The timber trade of Canada is one example of an employment of capital, partaking so much of the nature of a lottery, as to make it an accredited opinion that, taking the adventurers in the aggregate, there is more money lost by the trade than gained by it, in other words, that the average rate of profits is less than nothing.” Even supposing the timber trade firmer now than when John Stuart Mill wrote, the Government is not justifiable in encouraging over production, as it does, and it would appear wiser, not only for the sake of the forest, but for that of the Exchequer, if the Government kept the limits not actually required for the reasonable wants of the trade, so that the Province might hereafter benefit by the unavoidable rise in the price of those limits.

THIRDLY.—Strict regulations as to the *minimum size* of logs allowed to be cut and encouragement to convert trees into saw logs, instead of square timber, which wastes one-third of the tree in the squaring.

FOURTHLY.—Protection against fire which destroys more trees than the axe

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precautions in lighting fires in the woods and in clearing lands by fire, for settlement; this last subject is closely connected with the question of the *classification* of lands and the keeping of settlers from lands unfit for agriculture. Fires are more to be apprehended in pineries and among resinous trees, where the soil is very often unfit for agriculture, than among hardwood trees where the quality of the soil is much better as a rule. Our Provincial Legislature is now considering a good measure calling on the lessees of timber limits to contribute one half of the costs of protecting their limits against fires, the Province paying the other half. It is, I think, the law in Ontario.

FIFTHLY.—Export duty on saw logs, a most important question. Sir John Macdonald was asked, a few weeks ago, by an influential deputation of lumbermen to repeal the export duty on round logs. He reminded them that in 1886 that export duty had actually been increased at their own request, and told them that the Government would consider before all, the good of the country at large.

We are striving to increase the numbers of our people; we deplore the large emigration from Canada to the United States. Shall we encourage that emigration, by sending away the logs which feed our saw-mills, so that they may get sawn by our neighbours? The sawyer will follow the logs, and we shall drive away thousands of industrious men who will follow the raw material in which they find their work. True, we are offered by the United States free entry for our sawn lumber (or rather there is a talk of its being offered) if we repeal our export duty on logs. On the other side, we are threatened with an addition to the present import duty on sawn lumber, equal to the amount of our export duty on logs, if we persist in retaining it.

Very likely that threat will not be carried out; but whatever happens, unless we give up forever all consideration for the welfare of our own country, we must retain our export duty on logs, thereby protecting our forests and securing work for our own people.

CREATION OF NEW FORESTS.

It is difficult to compress within the narrow limits of one lecture all the branches of Forestry. After considering the preservation of existing forests, we cannot ignore the necessity for creating new ones, on the prairies of the North-West and our old settlements, denuded of trees, in the East.

As for the North-West, what we want, first of all, is *practical experience*. Many theories have been propounded to explain the absence of trees on the prairies, and Mr. A. T. Drummond, of Montreal, a zealous worker in the cause of Forestry, has written some very interesting essays, on that subject.

No use dwelling on the benefits to accrue from the planting of trees on the North-West prairies. Let the Government make a beginning, by starting experimental Forestry stations, nurseries and plantations of trees, under the care of the Mounted Police, at every one of their permanent headquarters. It will be an example to the settlers; the young trees from seed, at a nominal cost in the nurseries, can be given to them. The work will not interfere with the duties of the Mounted Police, and it will interest and improve the men, in every way. *Practical experience* will soon indicate what trees to select, where and how to sow and plant.

I would recommend the *Ash-leaved Maple*, (*Acer negundo*) to start with. The rapidity of its growth, its resistance to the drought, the value of its sap for sugar, which has been scientifically demonstrated by Doctor B. J. Harrington, in a series of experiments, the results of which have been communicated by him to the Royal Society of Canada, in a most interesting paper; all these recommend its culture as a starting point. With that tree, plant cotton-wood, poplar, willow, every kind of fast-growing tree, however inferior in quality, so as to start wind screens, behind which slower growing but more valuable trees can be cultivated, and fields of grain sheltered from the baneful effects of the drying winds.

If, in the absence of any serious attempts at forest tree culture in the North-West, we are still puzzled how to proceed there, here, in the East, we know beforehand that we are bound to succeed, with proper judgment and care. We know that every soil here, whatever its nature, can grow some kind or other of tree, and that, in many instances, the intrinsic value of the tree is quite out of proportion with the value of the soil: pines on sandy soil; sugar maples on rocky hill sides; ash, on cold, wet soil; tamarac and cedar in swamps; white birch on the worst soil and under most unfavourable climate, and, of course, oak, elm, butternut, black birch, &c., &c., in good soil.

It appears logical to choose the most valuable of trees for a new plantation, when the nature of the soil admits of it, though we often see valueless willows and poplars planted on the best soil and even in gardens. I have tried the black walnut, which sells for a dollar a cubic foot, in Quebec—nearly the price of mahogany. Trees raised from the nut have given me nuts after twelve years growth, but, as my experiments do not extend over fourteen years, however satisfactory to myself, I cannot yet assert that the success is complete. Certainly it is very encouraging, and, I hope, will lead others to try the experiment, which is not an expensive one.

It is impossible to enter into the details of tree planting now, but there are two points which ought not to be overlooked: in our climate, experience shows that it is better to plant trees in the Spring, especially if the soil is in the slightest

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degree wet or even retentive of humidity, and, secondly, it is useless to attempt tree culture *without good fences*, as cattle will destroy all the young trees. In fact, there are thousands of spots where the cultivation of the soil has been given up, which, in a few years, would be covered with a growth of self sown trees, if the cattle were only kept out by fences.

The results of Forestry are so far removed, and, at the same time, of such national importance, as to make it incumbent on the Government to encourage it by every means: experimental stations, especially in the North-West, in charge of the Mounted Police and the Indian Agents and teachers, nurseries of forest trees and gratuitous distribution of the same, rewards in land grants or exemption from taxation, encouraging the observance of Arbor Day, a School of Forestry, or, until that point can be reached, sending some well qualified young men to study Forestry in the French and German schools, and last, but not least, educating the people, beginning with the children.

Teach, in all the schools, the elements of tree culture, joining practice with theory, whenever possible. No better way to develop in the child the qualities necessary to his success as a man. He will learn forethought, in choosing the proper season, the soil, the tree; care and patience, in digging up and transplanting that tree; perseverance in watching over it, watering it, supporting it, pruning it, cultivating the ground round it; unselfishness, in feeling that he works not only for himself, but that others will enjoy the fruits of his labour.

SUGAR PRODUCING PLANTS.

BY WILFRID SKAIFE, B. A. SC.

I have to speak of the manufacture of sugar and the plants from which it is extracted. Of all the chemical industries properly so called, this is probably the oldest and it is now the greatest, both as regards the capital involved and the general importance to all classes of mankind. It is said that the march of civilisation in a country is marked by an increase in the consumption of sugar and of soap, and this is certainly supported by present statistics. The world seems to have got on very well with little or no sugar until the 16th century of our era, when the introduction of tea and coffee into Europe increased the demand an hundred-fold and more, and refineries were established in Holland and England.

The origin of the sugar industry is naturally shrouded in the darkness of a time very far past. We consider the word sugar to be derived from the Persian *shukkar* which, with the Arabic name of the same pronunciation, comes from the

Sanskrit *sarkara*. It is, however, impossible to tell from ancient writers whether the substance frequently alluded to as resembling honey and used in medicine was sugar or not. Most probably it was, but in the form of syrup and not at first in crystals.

Galen and Pliny, in the beginning of our era, spoke of a substance called *saccharum* found in Arabia Felix, and only used in medicine, and in the Bible we all know of the mention of sweet calamus and cinnamon in Solomon's song, and of sweet cane in Isaiah and Jeremiah. Herodotus speaks of manufactured honey, and Nearchus, one of Alexander's admirals, tells of a reed which gave honey without bees.

Moses Chorenensis, however, is the first writer to mention the boiling of plants, in this case sugar canes, for the extraction of sugar, and the first European home of the sugar industry was in Sicily where Frederick Barbarossa found many factories when he invaded Italy in 1121. From Sicily the culture of the cane gradually spread into Spain, and from thence was carried by the Spaniards into the West India Islands and Brazil. Here it found a congenial climate similar to the Indian one, from whence it came, and soon it became a source of great wealth, there being no less than twenty-eight sugar factories in San Domingo in 1518. It became apparent that the cane was meant to flourish in tropical countries and the cultivation in Europe died out, so that for over 300 years sugar came to Europe over the sea from equatorial countries and was produced almost entirely from the sugar cane, which had come to be looked upon as the only practical source of sugar.

In the year 1747, however, a German chemist named Markgraf announced the discovery of 1 per cent. of sugar in certain sorts of roots which grew in northern Europe. This was looked upon as a botanical fact of small value to the world at large, until another German named Achard erected a little factory on his farm at Cubern near Breslau, and began actually to produce fine white sugar from Markgraf's roots. Furthermore, he made money at the same time, which was vastly more important, and drew the attention of all thinking men to the fact that a new source of wealth had arisen in Europe. From that moment, in fact, a mighty rival to the veteran sugar cane appeared. It might have been long, however, before it could have coped successfully with foreign sugar, had not the first Napoleon, whose eye was as keen in peace as it was in war, lent his mighty help to the struggling industry in France, where Crespel Delisse and a few others, recognizing the value of Achard's results, were striving to establish the new industry on a firm footing. The result was in accordance with the Emperor's favorite maxim that God favours the heaviest battalions, other things being equal, and beet sugar rose steadily in France. Germany followed the good example, and then Holland, Belgium, Austria and Russia took it up. To-day out

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of five million tons of sugar consumed in the world per annum, more than half is made from the sugar beet. The rest is made from the sugar-cane principally, and some from the date palm, the sugar-maple with which we are familiar, and the sorghum or bastard sugar-cane. The only plants which deserve any extended notice are the cane and the beet, for they alone are of commercial importance. The sorghum is capable doubtless of great things, although, up to now the costly and valuable experiments of the United States Government with it, have not resulted in much progress among the growers of the plant.

I will speak first of the sugar-beet, as it now occupies first place as a sugar producing plant in the world, and bids fair to hold its own against all comers.

The sugar beet is a hardy biennial plant, indigenous to the south of Europe. We are all familiar with the shape of the ordinary mangel wurzel, and it resembles this more than any other, being white in the flesh and not *red* as many suppose. It is smaller than the mangel and much heavier in proportion. When from good seed and properly cultivated, it grows entirely beneath the ground, only the collar, from which the leaves spring, showing. Extensive experiments and cultivation have produced an immense number of varieties, but the origin of the rich sugar beet is the old root known to botanists as the *Beta alba*. Only the part which grows below the ground is valuable to the sugarmaker, but the leaves and collars make first rate cattle food. Sugar beets are propagated from seed entirely, which is produced by the plant in the second year of its growth. The seed is sown early in the spring, in long drills, and now almost entirely by machinery. The drills are usually about eighteen inches apart and every year efforts are made to sow them closer, for the farmer as well as the manufacturer likes small and heavy beets rather than large and porous ones.

In about a week's time the small plants show themselves above the ground and all attention is paid to the thinning out. This is a delicate process which must be done by hand and on the proper performance of it everything depends. The plants are taken out so as to leave only one by itself, every eight or nine inches in the row, and children are found to be best adapted for the work. In the beet districts there is a continual struggle between the school authorities and the farmers as to who shall have the children in the spring time, and the school inspector usually has a hard time, for he has to contend with the parents and the children themselves, as well. I have seen as many as fifty boys and girls working slowly across the fields in a long row, and in Bohemia often three times as many, all of whom ought by law to have been in school. And often have I seen a sudden stampede from the fields, led by the overseer himself, at the sight of a gendarme in the distance. In fact in my apprenticeship days, I have several times found it very advisable to depart from the fields with more rapidity than dignity and to let the youngsters take care of themselves, which Bohemian chil-

dren are well qualified to do. After the beets are thinned out the fields are left alone for a few days to allow the young plants to gather strength, and then the weeding and hoeing begin. This is done now almost entirely with machines drawn by horses, which keep turning up the ground and destroying the weeds between the rows, until the leaves of the beets get to be large and begin to cover the ground completely. Then they are left to themselves till the fall, when in the latter end of September they are taken out. At this time the leaves are yellowish and the roots firm and heavy, the growth being ended for the first year, while in the root is a store of sugar, which it has accumulated for further use, as bees do honey. But before it can get a chance to use the sugar in the second year's growth, the manufacturer takes it out of the ground and carries it off to the factory. The harvesting is done either by hand, loosening the roots with a narrow spade and then pulling them out, or by special plows for the purpose. The leaves and heads are cut off on the field and the roots transported to the factory for immediate use, or put into what are called *silos*. These are large piles of beets covered over with eight or ten inches of earth to keep out the frost. It is a simple and good way of keeping any roots, and now universally adopted instead of the costly buildings or cellars of former years. In these the beets may be kept safely until they begin to grow again, which time depends much on the weather and the country. In France it is difficult to keep them after New Year's day, while in Germany they may still be in good condition in February. In Russia and Canada they are perfectly inactive as late as the end of April, owing to the continuous cold. Once the sprouting begins, a series of chemical changes take place in the root, the principal one being the transformation of the crystallizable sugar into another form which is useless to the manufacturer. On the other hand the beets may be frozen without damage, always supposing that they are worked up while still frozen, for, inasmuch as the freezing kills them, they rot as soon as they thaw, and the process of putrefaction partially destroys the sugar as well as makes the work in the factory well nigh impossible.

In the culture of the sugar beet, the two primary considerations are, first the seed and then the soil. On the kind of seed depends, entirely, the richness of the beet and, the soils being the same, the size of the beet. Small beets are usually rich, large ones poor in sugar, and the great object of the manufacturer is to get as much sugar as possible per acre. The different kinds of beets are crossed and re-crossed until finally the proper beet for the particular country is got at. It is remarkable, indeed, to note how the roots have increased in richness in the past twenty years. Then six to eight per cent was common in Germany, but now they will not have anything under 15 per cent with an ordinary crop, and plant seed beets which contain over 20 per cent. The man to whom the honour of this improvement is due is Vilmorin, of Paris. He took the old Sile-

sian beet a great deal of Russian seed improving time the F. nued to gro exported s their eyes bad seed.

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sian beet and by long and careful cultivation produced a small beet containing a great deal of sugar, and also very pure. Every year the German, Austrian and Russian seed growers buy from him at whatever price he likes to ask, and keep improving their stock until now they export seed back to France, for all this time the Frenchman could not appreciate their countryman's efforts, and continued to grow the old cattle beet until the Germans got so far ahead that they exported sugar into France. In 1884 came a terrible crisis, and all turned their eyes to Germany to find that they were far behind, and all on account of bad seed.

The nature of the soil has a double effect on the beet. It affects the size of the crop and also its quality. Beets may be considered as consisting of five or six per cent, of what is called *mark* or insoluble fibrous matter, and 94 to 95 per cent of juice. In this juice the sugar is dissolved and also, unfortunately, a number of other substances, which are salts of lime and potash joined to organic acids, and various complicated gummy matters. The presence of these is the cause of molasses, and the less pure sugar results from the process of manufacture. It is, therefore, of great importance that there be as little as possible of them, and their presence is determined greatly by the nature of the soil and the manure which is used. It is practically true that the only substances a plant derives from the soil, are phosphoric acid, nitrogen, and potash, and therefore, manures are only of value inasmuch as they contain these substances. Of these, the one we wish most to avoid is potash, and it is a fact that this is a substance for which a beet has a most unreasonable fondness. It will absorb potash just as a child will eat candy, and grow large and coarse, yielding an impure salty juice of small value. Wherefore potash is used very sparingly, only in fact, where the absence of it in the original soil is so marked as to render an addition absolutely necessary for the life of the plant. Again nitrogen is an element to be avoided in excess, for its use results in large spongy beets, which will not keep and yield impure juices which are very difficult to handle. The chemically inclined readers of this paper will be interested in hearing that a strong odour of nitrogen peroxide is frequently observed in the factory where the beets are obtained from dark rich soils, or those on which a Chili saltpetre is used in excess. And when such beets are decomposed by heating in the silos, they give out in the process of manufacture, inflammable gases which often cause violent explosions.

The remaining element of nutrition which the plant requires, phosphoric acid, is the greatest friend the sugar-maker has. It counteracts the alkalies in the juice, forming a harmless combination, and has also a ripening action which is most valuable in backward seasons. Therefore, when manuring, we add to the soil plenty of phosphoric acid and a little nitrogen, while potash is generally forbidden; and in selecting a soil we avoid very rich ones, or alkaline ones, and

select a light, warm one if possible. But really, the only way to tell whether a certain soil is fitted for the culture of the beet as a general rule, is to sow some seed and see what will come of it. Chemical and physical considerations are wonderfully helpful in agriculture and have revolutionized that science, but up to now no chemist can tell what a given soil is best adapted for by analysing it, unless of course there be certain very marked characteristics. As a rule, however, beets will stand more rough usage from the weather than any other crop. Their greatest enemy is water in the subsoil, which kills the young roots as soon as they reach it. Deep and thorough cultivation with plow and grubber is absolutely necessary, and this fact, and the one that nothing repays care so well as a beet, have caused a revolution in the state of agriculture wherever beets are grown in any quantity. It is the only crop grown by man on whose quality everything depends, and the only one which is subject to severe scrutiny. It is true that barley is also carefully examined by the malsters, but we do not hear of careful chemical analysis of barley or hundreds of thousands of dollars spent in the mere propagation of the seed. When a farmer grows a crop of beets and knows that the more sugar they contain the better for him, he takes care to find out the best way to manage his soil. And this care produces a great effect on all other crops. Instead of ploughing three or four inches deep, he goes down to fourteen inches, and he keeps his land clean. He also begins to understand about manures. In this country, for instance, the farmer will buy anything that looks black and smells bad, or will take any artificial manure you may offer him on trust. But the best grower calmly offers so much per pound for potash or nitrogen or phosphoric acid, and cares not a bit whether these elements are in guano, or Chili saltpetre, or sulphate of ammonia, or anything else. Of course there are enlightened farmers in all countries, but in beet districts such accurate knowledge is universal.

Beets are most extensively cultivated now in the tract of land extending from Paris and Prague on the south, to the Baltic Sea on the north, and between the German Ocean on the west and the Russian boundary on the east. In Russia the beet fields extend from Kiew to Moscow principally. Several attempts have been made in Italy without success, and in Spain as well; the ignorance and backwardness of the farmers in these countries was the greatest difficulty. In California, beets are now grown extensively, but experts seem agreed that, of all countries Canada is the best adapted to this industry. Let us hope that this opinion will be justified in time to come.

So much for the beet. Now let us turn to the sugar-cane, the other great source of sugar to the world. It is still, I may say, looked upon by many as the only source, so little do we often know about the commonest things in life. The cane has now been cultivated for nearly a thousand years, but almost entirely in tropical countries, and, therefore, under the management of tropical peoples

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Genius, we are told, lights the lamp in northern latitudes, and the way in which northern nations have succeeded in competing in the sugar markets of the world through the sugar beet with the sugar-cane, is certainly a most pointed instance of the truth of the old proverb. For it is only in the last few years that intelligent work is being done in cane sugar countries, and that under the stimulus of German and English engineers. But even yet, the waste on a cane sugar estate is appalling to the scientific sugarmaker of Europe, and things are altogether in a backward and inefficient state. In consequence, we have not the same accurate knowledge concerning the cane as a plant that we have about the beet.

The sugar-cane is a sort of enormous grass belonging to the genus *Saccharum*, and known as the *Saccharum officinarum*. There are an immense number of kinds, but probably all are from a single species of which they are varieties, the differences being induced by cultivation in different soils and countries, and, indeed, consisting often in only a different name. The vast area over which the cane is grown has resulted, indeed, in a greater number of names. We have, for instance, the Bourbon cane, the Otaheite cane, the Batavian cane, the large red cane of Assam, the black and yellow Nepaul cane, the Chinese cane, the Seelangore cane, the last named being, perhaps, the finest kind known. The South Pacific islands, probably the original home of the cane, produce many varieties with unpronounceable names.

The principal differences are in the colors of the leaves and stalks, which range from black or purple to green or red. The yield per acre and the percentage of sugar is also most variable, and has hitherto been a matter more of accident than anything else, owing to the backward state of the whole industry which I have mentioned above.

In appearance, the cane is a plant with a knotty stalk surmounted by a bunch of leaves, and from six to ten feet high. At each joint or knot, there is a leaf and an inner joint. The number of joints in the stalk varies from forty to eighty, and these joints are peculiar structures which it is difficult to describe clearly without proper diagrams. They are the parts in which the juice is perfected, and each encloses the germ of a new cane. The cane is propagated in the same way as potatoes, by means of these eyes or joints, as up to now no sugar cane has been known to perfect its own seed. The cuttings are taken from the most healthy canes and usually from near the top. They are planted very carefully in straight rows some two or three feet apart, and begin to sprout in about a fortnight. They are then carefully banked with earth from time to time as they grow, until there is a little hill all round the cane very much like the way our own Indian coon is treated. At the same time the weeding and trashing is car-

ried on, the latter operation being the removal of all dead leaves and suckers—a most important point.

There is another method of propagation which ought to be mentioned, namely *rattooning*. This is merely allowing the new cane to sprout up from the old root or stool as it is called. It is remarkable that in some countries as in Bengal, good rattoons are never seen, while in Jamaica all canes are reproduced in this way. It entails a smaller yield but a surer crop. In harvesting, the canes are cut as close to the stool as possible, the leaves and tops discarded, the rat-eaten canes put aside, and the sound ones transported to the mill. This is done, usually, by horses or mules but often wire tramways stretch across the plantations, or navigable trenches are laid out on which flat boats are propelled and the cane conveyed on them.

The yield per acre of cane, varies a good deal in different countries. About 25 tons in Louisiana is a good crop, while in Barbadoes 30 tons is common.

Canes contain all the way from six to twenty-four per cent. of sugar and may be said to be richer as a rule than sugar beets.

What has been said concerning the effects of soil and manure on the sugar beet applies, in a general way, to the cane. Plenty of phosphoric acid and a little nitrogen and potash as possible is the general law to be guided by, although the number of empirical rules about the best manures for canes, is large and confusing. The kind of climate is a more important consideration with the cane than the beet. It is not a hardy plant and needs great heat and considerable moisture. Thus it is that canes grow best on tropical islands or on the coast. Warm inland countries, even where irrigation can be practiced, are not nearly so well suited. As in the beet, the development of the sugar in the cane is greatly helped by warmth towards the end of its period of growth, and altogether it may be said that the cane wants just what the beet does, to manufacture its sugar, but wants the conditions intensified. The fight between the cane and the beet is now a bitter one. It will probably continue for all time, but the beet will get the upper hand gradually, indirectly, that is to say, otherwise than as a sugar producing plant. The refuse of a beet factory ranks among the finest cattle foods in the world, while that from the cane is good only as fuel. The culture of the beet raises the general state of agriculture to the highest pitch of perfection, while that of the cane excludes other crops.

Let us now see what becomes of the ripe cane and beet after it arrives at the factory. These are very large buildings nowadays, filled with expensive machinery and not insignificant little places as many people suppose. To be sure there are still a few which are not extensive, and the most primitive and curious one is probably that now working on the banks of the Ganges. It consists of the stump

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of a tree with a hole in it, in which is a conical crusher driven by an ox at the end of a long beam. Two or three canes are squeezed in it at a time and the resulting liquor boiled in an iron pot alongside.

Then in China and Manilla the cane is grown in small patches and by poor people, and the canes crushed anyhow and the liquor boiled down to a thick mass without any purification. Much of this sugar is refined in Montreal to day, and it resembles earth in appearance. Sugar is also made, as we know, from the maple by simple concentration of the sap, which, however, is so pure that the product is very fine. That made from the date palm and called jaggery, is also merely juice boiled down in any kind of a pot, but in countries where a great deal of sugar is produced, as in Cuba or Java or Germany and France, things are carried on in a different way, factories work all the way from 200 to 2,000 tons of raw material in twenty four hours, and are worth anywhere from \$200,000 to \$500,000 a piece.

I will give a general description of a beet sugar factory, inasmuch as it is much the more perfect and extensive and will include nearly all that may be said about a cane sugar one.

On approaching the factory, the beets are seen in great heaps outside in process of delivery by the growers. From these heaps they are carried by various appliances to the first step in the process of manufacture, that is the washing.

The conveyance of these beets was long a puzzle to manufacturers until a German named Riedinger, a few years ago hit upon water sluices as the best means, and now they are everywhere adopted. The beets are tossed into the sluice which carries them along to an elevator. This lifts them up a certain distance and throws them into the first washer, which is a drum revolving in a tank of water. They are next thrown into a second washer which consists of a water tank in which great arms revolve and throw the roots about, carrying them forward at the same time and throwing them on to an elevator which lifts them up to the top of the building. If the washing has been properly done, the beets are now quite clean and ready to be cut up.

The form into which the roots are now reduced depends entirely on the method of extraction to be subsequently followed. In former times they were rasped up into an almost impalpable pulp and afterwards the liquor was pressed out by hydraulic presses of great power, or by roller presses of various kinds and shapes. This was always a most unsatisfactory way, and has been entirely superseded by what is called diffusion. Wherefore, instead of being rasped, the roots are sliced up into long, narrow slices and run by suitable means into an apparatus called a diffusion battery. This consists of a number of cylindrical iron vessels

holding each about one ton of cut beets and communicating with each other by means of valves and piping. In it the slices are, so to speak, soaked out with hot water, passing from one to the other. It is not, however, a mere solution that takes place but a curious phenomenon known to chemists as osmosis.

This may be described as follows: If you have a vessel divided into two parts by a porous membrane such as parchment, and in one part water, while in the other there is a solution of crystallizable and the uncrystallizable salts together, the crystallizable ones will pass through the membrane into the water on the other side, while the others, or colloid ones, as they are called, will not. This is what takes place in the battery. The long, thin slices of beet are placed in water of a particular temperature, and the cell walls of the root act as the membrane, allowing the sugar, which is crystallizable, to pass through into the water while other matters remain behind. Unfortunately there are other crystallizable matters besides sugar, and these go through also, and the broken cells of course give up all their contents to the water. So the resulting solution is still impure enough, but it is much purer than the liquor obtained in the old way and the process is more rapid. The process is a continuous one, the liquor being passed from one cell to another until it has passed through ten or eleven when it is drawn off. One end of the battery is continually discharging the liquor and the other the exhausted slices, which latter are pressed and sold for cattle food while the liquor is further treated. It is very thin, black in color, and quite opaque. It would be quite possible to boil it down now to a thick syrup and let it crystallize out, but the result would be black sugar, and very little of it, so it must be first clarified. This is done in what are called defecation tanks, and by means of a peculiar application of lime and carbonic acid. As both these substances are used in large quantities, there is a lime kiln always attached to the factory, in which lime-stone or carbonate of lime is burnt and the resulting gas and quicklime collected.

The defecating pans are wrought-iron tanks holding about 700 gallons each, and provided with steam coils for heating, and perforated coils for the injection of the gas, which is sucked from the kiln by means of a large pump, and forced into them and up through the liquor.

The operation is as follows:—The tank is filled about three-quarters full of the black liquor from the battery, which has previously been heated to boiling point, and a certain quantity of lime is added (usually about 2 per cent. on the weight of the beets) in the form of lime milk. This causes an immediate partial clarification, and the whole is a gummy mixture, light in color. Then the gas if pumped through until, by a simple test, we know that it has precipitated very nearly all the lime that was put in. This precipitation completes the clarification begun by the lime, as it seems to drag down small sus-

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pended particles and coloring matters with it, to the bottom of the tank. The action is not very well understood, but the result is a very bright, clear liquor of increased purity.

We now have the defecator filled with a nearly boiling mixture of lime and sugar-liquor, and the question is to separate the one from the other. This is done in what are called filter-presses, which are machines so constructed that the mass is forced into spaces between coarse cloths held in iron frames, so that the liquor runs out clear through the cloths, and leaves a thick, nearly dry, cake behind. The cake is thrown outside, to be used as manure, and the liquor passes into the next stage, which is a simple repetition of the defecation, in which a little lime only is added and the gas passed through until there is but a trace of lime left. It is necessary to repeat the operation in this way to get a really good clarification. It is again filtered, and is now very thin still, but perfectly bright and clear, and is ready for concentration. This is done in two stages: first, it is thickened to a syrup, containing 50 per cent. of sugar, in what is known as a double or triple effect. This is a peculiar and ingenious apparatus constructed first by a Frenchman named Rillieux, and consists of two or three cylinders about ten feet in height and six feet in diameter. They each contain a series of vertical or horizontal, steam pipes for boiling the liquor, and communicate with each other, so that the vapor from the boiling liquor in the first boils the liquor in the second, and that from the second boils the liquor in the third. In this way we greatly economise the heat.

There is a further peculiarity about the machine, and that is, that to the third cylinder is attached an air pump, which sucks all the hot vapor from it as the sugar boils, and draws it through a stream of cold water, thus producing a vacuum. The object of this is to evaporate the water in the liquor at a low temperature, for, by the well-known law of physics, the less the pressure on the surface of a liquid the less heat it takes to cause it to boil—that is, to evaporate. We do not do this to save fuel, for we have to use more than we gain in driving the pump, but we do it to save the sugar, for if sugar-liquor is boiled at the pressure of the atmosphere, it becomes partially destroyed by the heat and gets quite dark in color. The boiling of liquor in a vacuum is the greatest advance made yet in sugar-making, and was known long before the principle of the multiple evaporator. In fact, the vacuum pan, which is the next piece of apparatus we have to consider, was long the great centre of the sugar factory, and the most difficult and important process was the boiling of sugar. We do not look on the matter now with the same awe that our progenitors did, but consider it still a most important station.

The syrup on leaving the evaporator is now quite thick and is dark brown in color. It is customary now, in the best factories, to boil it up at once in the

vacuum pan, but many still adhere to an older process, that of bleaching by animal charcoal or by sulphurous acid gas. This will produce brighter sugar, but we do not value this much as the refiner, to whom the raw product is sold, buys it by its analysis and does not care much about a small difference in color

The pan is an iron or copper cylinder, furnished with a great number of steam coils and an air pump and condenser. It may be any size almost, but usually is about nine feet in diameter and ten feet high.

It is not an easy matter to boil sugar well if it be of a low grade, and long experience is valuable. In refineries, good boilers get high wages, for the yield depends much on them; but they are commoner now than they used to be. The general operation is this. The pan is partially filled with liquor, and the steam turned on the lower coils so that the liquor is gradually boiled down till quite thick. Then the boiler opens the valve suddenly and takes in a small charge shutting again quickly. The result is usually that crystals begin to form in the pan, and after a little he takes in another charge. Sometimes, however, there is great trouble in forming the grain as we say, and charge after charge is taken in, and the amount carefully varied until at last we do get some grain. Then the panman proceeds cautiously to nourish the grain which is at first very small, by carefully regulated charges. This done the operation proceeds more rapidly and all the panman has to do, usually, is to watch his vacuum guage and thermometer and keep taking regular charges till the pan is sufficiently full. Then it is concentrated a little more and the work is done. The liquor has now become a thick sticky mass of syrup and sugar crystals of the consistency of putty, and brown in color. Had the syrup been boiled in the open air, it would have been nearly black, but by reason of the vacuum, the temperature has been kept down to 150, and may be kept as low as 110, and it has merely got browned a little. The panman tests his pan by taking out little samples, and examining them on a piece of glass, or by feeling them and as soon as he is satisfied, he shuts off the steam, lets in the air to destroy the vacuum and opens the pan below, dropping the contents into a long receiver, which is placed over the centrifugal machines.

Centrifugals are vertical drums whose periphery is made of perforated brass plate or brass wire gauze. A portion of the *masse cuite*, as it is termed, is let into them from the receiver, and they are then set in rapid motion, making 1,500 turns per minute. The *masse cuite* is thrown violently against the perforated plate and the syrup finds its way through the holes and into the outer casing from which it runs to the tanks below. In the centrifugal, the sugar is left in a nearly dry state. It is light yellow in color, of a well-defined grain and has a salty taste. It is quite easy now to make it white by throwing a little water on it, while the centrifugal is in motion, or sending a jet of steam through it, but as

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this melts so much of it, and besides has only a partial whitening effect, it is now abandoned in most places, and yellow raw sugar is produced.

This is called the first product and amounts to from six to thirteen or more per cent. on the weight of the beets according to their quality.

The syrup which runs off, is still of considerable value as it contains fully two per cent. of sugar on the weight of the beets. It is utilized by boiling it up again and then letting it stand in a hot room until the sugar gradually settles out of itself. Then it is again put into the centrifugals and a second product is the result, which is darker and less pure than the first product.

The resulting syrup now will hardly crystallise any more, by reason of its impurity, and so special means are taken to get rid of the impurities, which have gradually increased in proportion as the sugar has been extracted, until they now form a great percentage. It is found by practical experiment that if the sugar in a liquor does not represent more than 60 per cent. of the total solids dissolved in that liquor, some special purification is needed. When the liquor left the clarifiers it had 85 per cent. of the total solids, as sugar now there is only 60 per cent. This has been a fruitful field of investigation for chemists for many years, and all efforts have been made to combine the sugar with some substance and so separate it from its impurities.

This can be done by forming what are called saccharates of lime, or barium, or strontium which are decomposed afterwards by means of carbonic acid or of heat.

The factories erected for the strontium process are much larger and more complicated than the original sugar factories and would entail too long a description. The lime processes are simple ones, but scarcely of general interest, so I will dismiss them at once.

There is another and peculiar process which is older than the others and still a good deal used, depending on the principle of osmosis which I mentioned before in connection with the diffusion. It is cheap but slow. Any one of these processes may be used to get at the last of the sugar in the molasses, but also the molasses may be distilled and the sugar turned into alcohol. This used to be the universal custom, but now it is found to pay better to extract the sugar.

This ends the manufacture of the raw beet sugar. It is put into bags and sold to refiners. Very few factories turn out refined sugar, that is, combine the two processes, for, as a rule, it does not pay.

I will now briefly point out the differences between a cane and a beet sugar factory. The processes are either very similar or identical. The liquor is, however, extracted almost universally by crushing under immense rollers in-

stead of diffusing, which latter process is but of doubtful value where cane is concerned. The clarification is made by means of lime alone without carbonic acid, and in a crude way enough as a rule. The evaporation and concentration in the multiple effect and vacuum pan are the same, but these are only to be seen in the more advanced districts.

Centrifugals are also used now in many places and, in fact, the cane sugar men are copying closely beet sugar methods. The products of a cane sugar factory are divided into several classes like that from a beet sugar one, the chief difference being that the molasses are either sold for direct consumption or distilled, the saccharate processes not being applicable for the extraction of sugar.

Crude or raw sugar from a factory is now almost always sold to a refiner to be turned into white or yellow sugar. Refineries resemble raw sugar factories in a few points only. They are very large places containing storehouses and cooperages as well as the machinery. A fair sized refinery will work 200 tons of raw sugar in twenty-four hours and the general process, I will briefly describe. On arriving, the raw sugar is melted in a large cistern of hot water in which arms revolve. Sugar is put into the water until the contents of the cistern are half water and half sugar. This liquor is then pumped up to the top of the building and heated boiling hot. Next it is filtered through cloth bags from which it runs very clear and limpid. After this it goes to the char tanks. These are immense cylindrical iron vessels containing about 25 tons of charred bones or animal charcoal as it is called.

This substance has the peculiar property of dechlorising liquor. A dark brown syrup often being in contact with it for a short time will become as clear as water. After passing through these it is collected in cisterns, concentrated in vacuum pans and the masse cuite worked off in centrifugals. Owing to the action of the char, the sugar is white or light yellow according to how much charcoal has been used in proportion to sugar melted. The syrups that run from the centrifugals are boiled up again and allowed to crystallise out, or are sold for consumption according to their strength. On the whole, the process is much simpler than that used in a raw sugar factory, but everything is on a much greater scale. A very important part of a refinery is the char house, this is a place where the char is reburnt after having been used in order to serve again, which it is made to do many times, until finally being exhausted it is sold for artificial manure.

Concerning the chemistry of sugar, I can say but little as it is too extensive and complicated a subject to be dealt with in a paper of this sort, however, I may say that the sugars belong to the great chemical division called the hydrocar-

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bons and are divided into two great groups, called the glucose group whose formula is $C_6 H_{12} O_6$ and the cane sugar group whose formula is $C_{12} H_{22} O_{11}$. Of the first named group, the principal member is common glucose, a widely distributed substance in nature, which is usually artificially prepared by treating starch with sulphuric acid. It is often considered as a deleterious substance and used to adulterate sugar, but, although it is my natural enemy, as a sugar maker, I must admit that it is just as harmless and wholesome as the best of sugar, and its only fault is that it is not over one-third as sweet. It may be produced in many curious ways, for instance in the human body by the irritation of the medulla oblongata, or from this very desk by means of sulphuric acid. To this group belong also levulose, inverted sugar, sorbin, inosit, and many rarer kinds.

The chief member of the second group is cane sugar or saccharose, which we have been discussing. It is called cane sugar, but occurs in many plants as the sugar beet, the maple, etc., as we have seen. To this group belong milk-sugar, maltose, and many others.

Strange as it may seem, no chemist has ever been able to make sugar from a foreign substance. The plants know how to do it, but we cannot. Nor has anybody ever been able to turn glucose into cane sugar, although the difference in their formulae is but a molecule of water. Could this be done easily, no more sugar-canes nor beets would be grown, but we would use up old rags, sawdust and all sorts of detritus. Every year somebody reports success in this quarter, but no results are forthcoming. The sugar world is used so such scares, but it got a bad one a little while ago when Prof. Remson, of Johns Hopkins' University made from one of the derivatives of coal-tar, toluene, a substance called benzoyl sulphonic amide, or as it is now termed, saccharine. This is one of the chemical curiosities of the present day. It is a white powder, slightly soluble in water, and 280 times as sweet as sugar, that is, one pound of saccharine will sweeten as much water as a barrel of sugar.

All sugar makers felt very uneasy when this came to light, but now it is known that it is harmful in its properties and valuable only as a medicine, those who own the five hundred million dollars invested in sugar in this world breathe again.

PRIZES AWARDED.

FALL EXHIBITION HELD 17TH, 18TH AND 19TH SEPTEMBER 1889.

Class A.

Collection of decorative and flowering plants; table of 125 square feet—1, W. Wilshire, gardener to Hon. J. J. C. Abbott; 2, S. Ward, gardener to C. E. Levey; 3, W. B. Davidson, Cote St. Paul. \$30, \$25, \$20.

Collection of decorative and flowering plants; table of 60 square feet—1, J. Stanford gardener to Sir G. Stephen; 2, W. Sprigings, Mount Royal cemetery; 3, W. McMillan, gardener to A. A. Ayer, \$20, \$15, \$10.

Adiantums, collection—1, W. Wilshire; 2, W. Sprigings. \$5, \$3.

Adiantums, single plant—1, S. Ward; 2, J. Stanford. \$2, \$1.

Asparagus, climbing, single plant—1, S. Ward; 2, W. R. Sprigings.

Begonias, foliage, 6 distinct varieties—1, W. Sprigings; 2, S. Ward. \$4, \$3.

Begonias, tuberous, 6 distinct varieties, in bloom—1, F. L. Girdwood, Ste. Annes; 2, W. Sprigings. \$4, \$3.

Begonias, 4 distinct varieties in bloom—1, John Walsh, gardener to W. W. Ogilvie; 2, S. Ward. \$4, \$3.

Caladiums, 12 fancy—1, J. Stanford. \$4.

Caladiums, 6 fancy—1, J. Stanford; 2, S. Ward. \$2, \$1.

Carrations, 6 pots, distinct varieties in bloom—1, Geo. Trussell, gardener to J. H. R. Molson. \$3.

Coleus, 10 pots, distinct varieties—1, J. Stanford; 2, J. Bland. \$4, \$2.

Crotons, 6 dissimilar—1, J. Stanford. \$3.

Dracaenas, 6 dissimilar—1, J. Stanford; 2, W. Wilshire. \$4, \$3.

Ferns, 12 distinct species—1, J. Bland; 2, J. Stanford. \$7, \$5.

Ferns, 6 distinct species—1, J. Stanford; 2, W. Bell. \$3, \$2.

Ferns, tree, best specimen—1, S. Ward. \$2.

Fuchsias, 4 distinct varieties, in bloom—1, J. Bland; 2, G. Trussell. \$3, \$2.

Geraniums, Zonal, 9 distinct varieties, in bloom—1, J. Bland; 2, G. Trussell. \$4, \$3.

Geraniums, double, 9 distinct varieties, in bloom—1, G. Trussell. \$4.

Geraniums, bronze and tricolor, 6 distinct varieties, in bloom.—1, G. Trussell. \$3.

Gloxinias, 6 varieties, in bloom—1, W. B. Davidson; 2, J. Walsh. \$2, \$1.

Hanging b
Lygodium
Nepenthes
Palms, 10
Plants, vas
ings. \$3, \$2.
Plants for
W. Wilshire.
Selaginella
\$3 \$2.
Stove and
Wilshire. \$6

Annuals, 1
Asters, 24
Asters, 12
Dahlias, d
\$3.
Dahlias, do
Dahlias, pe
Dahlias, sin
Dianthus, 4
Gladioli, 2
Pansies, 1
Trussell; 2, T.
Pansies, 24
Trussell; 2, F.
Petunias, s
Petunias, c
Phlox, dru
Roses, Hyl
Verbenas.
Zinnias, co
Growing m
to Jas. Burnett

Vase or ep

- Hanging basket of plant—1, W. Sprigings; 2, W. B. Davidson. \$4, \$2.
- Lygodium scandens, best specimens—1, John Walsh. \$3.
- Nepenthes, collection—1, W. Wilshire. \$4
- Palms, 10 distinct varieties—1, W. Wilshire; 2, J. Walsh. \$8, \$5.
- Plant, vase of, not more than 16 inches in diameter—1, W. B. Davidson, 2, W. Sprigings. \$3, \$2.
- Plants for table decoration, 6, ferns and soft woiled plants excluded—1, J. Walsh; 2, W. Wilshire. \$4 \$3.
- Selaginella (Lycopodium) 4 pots, distinct varieties—1, W. Sprigings, 2, J. Hockey. \$3 \$2.
- Stove and greenhouse plants, best 6 distinct species 3 in bloom—, J. Stanford; 2, W. Wilshire. \$6 \$4.

CUT BLOOM.

- Annuals, best collection—1, W. B. Davidson; 2, G. Trussell. \$3 \$2.
- Asters, 24 blooms, dissimilar—1, J. B. Goode, Cote St. Antoine; 2, G. Trussell. \$3, \$2
- Asters, 12 blooms, dissimilar—1, F. L. Girdwood; 2, J. B. Goode. \$2, \$1.
- Dahlias, double, 24 distinct varieties—1, D. F. Bell, Quebec; 2, W. Bell, Quebec. \$4 \$3.
- Dahlias, double, 12 distinct varieties—1, W. Bell; 2, D. F. Bell. \$2, \$1.
- Dahlias, pompom, 12 distinct varieties—1, W. Bell; 2, D. F. Bell. \$2, \$1.
- Dahlias, single, 12 distinct varieties—1, D. F. Bell; 2, W. Bell. \$2, \$1.
- Dianthus, collection of 24 blooms—1, G. Trussell; 2, Jno. Eddy. \$3, \$2.
- Gladioli, 24 spikes, distinct varieties—1, R. Hamilton, Grenville. \$4.
- Pansies, 12, dissimilar, (quality) form substance, distinct marking and color—1, G. Trussell; 2, T. W. Burdon. \$2, 1\$.
- Pansies, 24, dissimilar, (qualities) form substance, distinct marking and color—1, G. Trussell; 2, F. L. Girdwood. \$3, \$2.
- Petunias, single, best display of 24 blooms—1, John Eddy; 2, F. L. Girdwood. \$2, \$1.
- Petunias, double, best collection—1, W. Sprigings; 2, F. L. Girdwood. \$2, \$1.
- Phlox, Drummondii collection, 24 spikes—2, W. Sprigings. \$1.
- Roses, Hybrid perpetual, 6 dissimilar, named, 2—R. Jack. \$2.
- Verbenas, collection—1, W. Sprigings; 2, W. Bell. \$2, \$1.
- Zinnia, collection—1, W. Sprigings; 2, D. F. Bell. \$1. 75cts.
- Growing model of a flower bed, not to exceed 4½ feet in diameter—1, J. Bland, gardener to Jas. Burnett; 2, J. Hockey, gardener to John Molson. \$5, \$3.

BOUQUETS AND CUT FLOWERS.

- Vase or epergne, with cut flowers—1, W. B. Davidson. \$4.

Bouquet, hand—1, John Kirkwood, gardener to R. B. Angus; 2, P. A. Somerville. \$4 \$2.

Class B.

PLANTS.

Collection of decorative and flowering plants, 15 sq. feet of table—1, T. Gardiner, St. Paul's church; 2, T. W. Burdon. \$6, \$4.

- Abutilon, in bloom—1, T. W. Burdon; 2, T. Gardiner. \$1, 75cts.
 Begonias, 2, in bloom—1, T. W. Burdon; 2, T. Gardiner. \$2, \$1.
 Begonias, 1, in bloom—1, T. W. Burdon; 2, T. Gardiner. \$1, 50cts.
 Begonias, rex—1, T. Gardiner; 2, T. W. Burdon. \$1, 50cts.
 Carnations, 3 in pots, in bloom—1, T. W. Burdon; 2, T. Gardiner. \$2, \$1.
 Cockscombs, 3, in pots,—1, T. Gardiner; 2, T. W. Burdon. \$1.50, \$1.
 Coleus, 2, in pots, (pots not over 8 in diameter)—1, T. Gardiner. \$2.
 Ferns, 6, foreign distinct—1, T. Gardiner, 2, T. W. Burdon. \$2, \$1.
 Foliage plants, 4, dissimilar (Coleus excluded)—1, T. Gardiner; 2, T. W. Burdon \$3, \$2.
 Fuchsias, 3, in bloom, dissimilar—1, T. Gardiner; 2, T. W. Burdon. \$3, \$1.50.
 Fuchsias, 1, in bloom—1, T. W. Burdon; 2, T. Gardiner. \$1, 75cts.
 Geraniums, double, 2, in bloom, dissimilar—1, T. Gardiner; 2, T. W. Burdon. \$2, \$1.
 Geraniums, single, 2, in bloom, dissimilar—1, T. W. Burdon; 2, T. Gardiner. \$1, 50cts.
 Hanging basket, frame not to exceed 13 inches in diameter—1, T. W. Burdon; 2, P. A. Somerville. \$2, \$1.
 Heliotrope, in bloom—1, T. W. Burdon; 2, T. Gardiner. \$1, 75cts.
 Hydrangea, in bloom—1, T. Gardiner; 2, P. A. Somerville. \$2, \$1.
 Ivy—1, T. Gardiner; 2, P. A. Somerville. \$2, \$1.
 Petunias, double, 2 pots, in bloom—1, T. W. Burdon. \$1.50.
 Plants, vase of—1, T. W. Burdon. \$2.
 Selaginella (Lycopodium), 2—1, T. Gardiner; 2, P. A. Somerville. \$1.50, \$1.
 Tuberoses, 3 pots, in bloom—1, P. A. Somerville. \$1.50.

CUT FLOWER BOUQUETS.

- Asters, collections—1, J. B. Goode; 2, D. F. Bell. \$1.50, \$1.
 Bouquet, hand—1, P. A. Somerville; 2, R. Jack. \$2, \$1.
 Cut flowers, vase or epergne—1, T. W. Burdon. \$3.
 Cut flowers, collection of,— J. B. Goode; 2, R. Jack. \$3, \$2.
 Dahlias, 6, blooms dissimilar—1, W. Bell; 2, D. F. Bell. \$2, \$1.
 Gladioli, 6, spikes—1, T. Irving, Jr.; 2, J. B. Goode. \$2, \$1.
 Pansies, 12, blooms dissimilar—1, T. W. Burdon; 2, J. F. Smith. \$2, \$1.
 Pansies, 6, blooms dissimilar—1, J. F. Smith; 2, T. W. Burdon. \$1, 50cts.

Petunias
 Petunias,
 Phlox, Dr
 Stocks, 6
 Sunflower
 Verbenas,
 Zinnias, 1

For the b
 ty, competing
 2, R. Brodie, I
 Apples, b
 growers, 5 s
 \$12, \$8.

Apples, 1
 R. W. Shephe

Apples, 6
 Shepherd, jr.

Apples, 5

Alexande
 \$1, 75cts.

Ben Davi
 son. \$1.50, \$1.

Blue Pea
 \$1, 75 cts.

Canada I
 \$1.50, \$1, 75 c

Duchess,
 \$1.50, \$1, 75 c

Fameuse
 — Fameuse

\$1, 75 cts.

Golden I
 \$1.50, \$1, 75

Peach (o
 \$1.50, \$1, 75

- Petunias, double, 6, blooms dissimilar—1, T. W. Burdon; 2, D. F. Bell. \$1.50, \$1.
 Petunias, single, 6, bloom dissimilar—1, W. Bell; 2, D. F. Bell, \$1, 75 cts.
 Phlox, Drummond, 12 bottles—1, J. B. Goode. \$1.
 Stocks, 6 spikes, dissimilar—1, W. Bell; 2, D. F. Bell. \$2, \$1.
 Sunflowers, collection—1, J. N. Drummond. \$2.
 Verbenas, 12 blooms, dissimilar—1, J. B. Goode; 2, T. W. Burdon. \$2, \$1.
 Zinnias, 12 blooms, dissimilar—1, W. Bell; 2, D. F. Bell. \$1, 75 cts.

Class C.

FRUITS.

For the best collection of apples, exhibited by and grown within the limits of the county, competing, 5 specimens of each variety.—1, J. M. Fisk, president, Abbotsford, F. G. A.; 2, R. Brodie, Hochelaga county; 3, R. Jack, Chateaugay. \$40, \$30, \$20.

Apples, best collection, open to the province of Québec; must be exhibited by the growers, 5 specimens of each variety—1, R. W. Shepherd, jr., Como; 2, G. E. Roach. \$12, \$8.

Apples, 12 varieties, 3 summer, 3 fall, 3 early winter, 3 late winter, 5 of each—1, R. W. Shepherd, jr.; 2, G. E. Roach; 3, J. M. Harrigan, Outremont. \$6, \$4, \$3.

Apples, 6 varieties, 5 of each named, for commercial purposes—1, J. Robson; 2, R. W. Shepherd, jr.; 3, G. E. Roach. \$4, \$3, \$2.

Apples, 5 heaviest, one of a kind—1, J. M. Harrigan; 2, Jas. Morgan, Jr. \$2, \$1.50.

Alexander, 5 specimens—1, J. M. Harrigan; 2, W. B. Davidson; 3, J. Robson. \$1.50, \$1, 75 cts.

Ben Davis, 5 specimens—1, G. E. Roach; 2, O. Crossfield, Abbotsford; 3, W. B. Davidson. \$1.50, \$1, 75 cts.

Blue Pearmain, 5 specimens—1, J. M. Fisk; 2, Jas. Morgan, jr.; 3, G. E. Roach. \$1.50, \$1, 75 cts.

Canada Baldwin, 5 specimens, 1, R. W. Shepherd, jr.; 2, O. Crossfield; 3, G. E. Roach. \$1.50, \$1, 75 cts.

Duchess, 5 specimens—1, G. E. Roach; 2, R. W. Shepherd, jr.; 3, J. Morgan, jr. \$1.50, \$1, 75 cts.

Fameuse, 5 specimens—1, J. M. Harrigan; 2, P. Clarke; 3, R. Jack. \$1.50, \$1, 75 cts.

Fameuse Sucrée, five specimens—1, J. M. Fisk; 2, R. Jack; 3, O. Crossfield. \$1.50, \$1, 75 cts.

Golden Russet, five specimens—1, R. W. Shepherd, jr.; 2, R. Jack; 3, O. Crossfield. \$1.50, \$1, 75 cts.

Peach (of Montreal), five specimens—1, J. M. Harrigan; 2, J. Robson; 3, G. Trussel. \$1.50, \$1, 75 cts.

Pomme Grise, five specimens—1, G. E. Roach; 2, J. M. Fisk; 3, R. W. Shepherd, jr. \$1.50, \$1, 75 cts.

St. Lawrence, five specimens—1, J. M. Harrigan; 2, J. Robson; 3, R. W. Shepherd, jr. \$1.50, \$1, 75 cts.

Scott's Winter, five specimens—1, R. W. Shepherd. \$1.50,

Strawberry (of Montreal), five specimens—1, J. M. Harrigan; 2, J. A. Drummond; 3, J. Morgan, jr. \$1.00, \$1, 75 cts.

Wealthy, five specimens—1, J. Walsh; 2, J. Robson; 3, J. M. Fisk. \$1.50, \$1.00 75 cts.

Winter St. Lawrence, five specimens—1, R. W. Shepherd, jr.; 2, O. Crossfield; 3, G. E. Roach. \$1.50, \$1, 75 cts.

New-Russian—1, J. M. Fisk; 2, R. W. Shepherd, jr. \$1.50, \$1.

Crab apple, collection, 5 of each, named—1, J. M. Fisk; 2, J. Robson; 3, R. W. Shepherd, jr. \$4, \$3, \$2.

Crab apples, 5 varieties, 10 of each, named—1, J. M. Fisk; 2, J. Robson. \$2, \$1.

Crab apples, 1 variety, 10 specimens—1, J. M. Harrigan; 2, J. M. Fisk; 3, T. Irving, jr. \$1.50, \$1, 75 cts.

Cranberries, 1 gallon, domestic—1, J. M. Fisk. \$2.

Pears, 6 varieties, 5 of each, named—1, Jules Betrix, gardener to Andrew Allan; 2, John Eddy; 3, G. Trussell. \$5, \$3, \$2.

Pears, 3 varieties, five of each, named—1, Jules Betrix; 2, W. Bell; 3, G. Trussell. \$3 \$2, \$1.

Pears, 1 variety, 5 specimens—1, John Eddy; 2, W. Bell; 3, J. Bland. \$2, \$1.50, \$1.

Plums, collection, 6 specimens of each—1, D. Dunn; 2, W. B. Davidson. \$4, \$3.

Plums, 2 varieties, 6 specimens of each—1, D. Dunn. \$2.

Plums, plate of 1 variety only, 10 specimens—1, J. Betrix; 2, R. Harvie; 3, J. Landers, \$2, \$1, 50 cts.

Plums, wild, of P. Q., 10 specimens—1, D. Dunn. \$1.50.

Plums, wild, of Northwestern States, 10 specimens—1, J. M. Fisk; 2, R. W. Shepherd jr. \$1.50, \$1.

BASKETS OF FRUIT.

For the best and the most, tastefully arranged basket of fruit for dessert, size of basket not to be less than one foot and not to exceed two feet in any part—1, J. Betrix; 2, R. Jack. \$5, \$4.

For the best and most tastefully arranged basket of outdoor grown fruits, size of basket to be not less than one foot, and, not to exceed two feet in any part—1, G. Trussell; 2, R. Jack. \$3, \$2.

OUTDOOR GRAAES.

Grapes, collection, named, 2 bunches of each—1, W. Mead Pattison, Clarenceville, Que.—\$10.

Grapes,
bunches of

Grapes,
ders. \$3, \$

Grapes,
Morgan, jr.

Grapes,
Grapes

\$1, 75 cts.

Grapes
Jack. \$15

Grapes

Grapes

Grapes
J. Betrix.

Grapes
\$4, \$2.

Grapes
\$6, \$4, \$2.

Grapes
\$4, \$3, \$2.

Peach

Peach

Grapes
\$3.

Melon

Melon

Melon
Harrigan \$

Artich
75 cts, 50 cts

Beets,
\$1, 50 cts.

Beets,

Grapes, 12 varieties, preference for good ripening varieties, best collection, named, 2, bunches of each—1, W. Mead Pattison; 2, R. Jack. \$5, \$4.

Grapes, 3 varieties, white 2 bunches of each—1, W. M. Pattison; 2, R. Jack; 3, J. Landers. \$3, \$2, \$1.

Grapes, 3 varieties, black, 2 bunches of each—1, W. M. Pattison; 2, R. Jack; 3, James Morgan, jr. \$3, \$2, \$1.

Grapes, 3 varieties, red, 2 bunches of each—1, W. M. Pattison; 2, R. Jack. \$3, \$2.

Grapes, heaviest single bunch, white—1, R. Jack; 2, J. Landers; 3, W. M. Pattison. \$1.50 \$1, 75cts.

Grapes, heaviest single bunch, black—1, Jas. Morgan, jr.; 2, J. N. Drummond; 3, R. Jack. \$1.50, \$1, 75cts.

Grapes, heaviest single bunch, red—1, J. Landers; 2, W. M. Pattison. \$1.50, \$1.

GRAPES GROWN UNDER GLASS.

Grapes, best and heaviest bunch—1, W. Penney, gardener to T. Beckett, Quebec. \$8,

Grapes, collection 1 bunch of each—1, W. Penney; 2, J. Stanford; 3, J. Kirkwood; 4, J. Betrix. \$10, \$7, \$5, \$3.

Grapes, 5 varieties, 1 bunch of each—1, J. Kirkwood; 2, J. McGuire; 3, J. Bland. \$6, \$4, \$2.

Grapes, 4 varieties, 2 white and 2 black—1, J. Kirkwood; 2, J. Bland; 3, J. McGuire. \$6, \$4, \$2.

Grapes, 2 bunches Black Hamburg—1, J. Stanford; 2, W. McMillan; 3, J. Kirkwood. \$4, \$3, \$2.

NECTARINES AND OTHER FRUITS.

Peaches, collection—1, J. Betrix. \$3.

Peaches, best plate of—1, J. Betrix. \$2.

Grapes, bearing vine, grown at least one year, in pot—1, J. Betrix; 2, J. McGuire. \$4, \$3.

Melon, water—1, F. L. Girdwood; 2, College Notre Dame. \$2, \$1.50.

Melon, musk—1, W. Ross; 2, T. Hall; 3, T. Irving, jr.; 4, J. M. Harrigan. \$4, \$3, \$2, \$1.

Melon, best new variety musk—1, College Notre-Dame; 2, W. B. Davidson; 3, J. M. Harrigan \$3, \$2, \$1.

VEGETABLES.

Artichokes, Jerusalem, best plate—1, J. M. Harrigan; 2, W. O'Hara; 3, P. Clarke. \$1, 75cts, 50cts.

Beets, turnip, blood, 6, for table—1, W. Ross; 2, R. Jack; 3, College Notre-Dame. \$2, \$1, 50 cts.

Beets, long, blood, 6, for table—1, P. Clarke; 2, T. Hall; 3, W. McMillan. \$2, \$1, 50 cts

- Borçecole (kale), 2 stalks—1, College Notre-Dame; 2, W. B. Davidson; 3, W. McMillan. \$1.50, 75 cts., 50 cts.
- Brussels sprouts, 2—1, W. O'Hara; 2, W. Ross; 3, College Notre-Dame. \$1.50; 75 cts., 50 cts.
- Cabbage, winter, 3—1, P. Clarke; 2, W. Ross; 3, W. McMillan. \$1.50, 75 cts., 50 cts.
- Cabbage, red, 3—1, J. M. Harrigan; 2, W. Ross; 3, T. Irving, jr. \$1.50, 75 cts., 50 cts.
- Cabbage, savoy, 3—1, W. McMillan; 2, W. Ross; 3, J. M. Harrigan. \$1.50, 75 cts., 50 cts.
- Cabbage, summer, 3—1, P. Clarke; 2, T. Hall; 3, College Notre-Dame. \$1.50, 75 cts., 50 cts.
- Carrots, early, 6, for table—1, College Notre-Dame; 2, W. Ross; 3, T. Irving, jr. \$2, \$1, 50 cts.
- Carrots, late, 6, for table—1, D. F. Bell; 2, W. McMillan; 3, T. Irving, jr. \$2, \$1, 50 cts.
- Cauliflower, 3—1, J. M. Harrigan; 2, W. B. Davidson; 3, T. Irving, jr. \$3, \$2, \$1.
- Cauliflower, best head—1, J. M. Harrigan; 2, W. B. Davidson; 3, T. Irving, jr. \$1.50 \$1, 75 cts.
- Celery, white, 6 heads—1, College Notre-Dame; 2, T. Hall; 3, P. Clarke. \$2.50, \$2, \$1.
- Celery, red, 6 heads—1, College Notre-Dame; 2, J. Bland; 3, J. Landers. \$2.50, \$2, \$1.
- Corn, sweet, collection, 6 ears of each, named—1, G. Trussell. \$3.
- Corn, sweet, 12 ears, named—1, G. Trussell; 2, F. L. Girdwood; 3, College Notre Dame, \$1.50, \$1, 75 cts.
- Cucumbers, collection, 2 of each—1, College Notre-Dame. \$2.
- Egg plants, collection, assorted—1, G. Trussell; 2, W. O'Hara. \$2, \$1.
- Egg plants, 3, purple—1, G. Trussell; 2, P. A. Somerville. \$1, 50 cts.
- Egg plants, 3, white—1, W. O'Hara; 2, G. Trussell. \$1, 50 cts.
- Leeks, bunch of 1 dozen—1, College Notre-Dame; 2, W. McMillan; 3, W. Ross. \$1, 75 cts., 50 cts.
- Onions, collection, 6 of each—1, T. Hall; 2, G. Trussell; 3, College Notre-Dame. \$4, \$3, \$2.
- Onions, white, 6—1, College Notre-Dame; 2, T. Hall; 3, W. Ross. \$1.50, 75 cts., 50 cts.
- Onions, red, 6—1, W. Ross; 2, T. Hall; 3, T. Irving, jr. \$1.50, 75 cts., 50 cts.
- Onions, yellow, 6—1, T. Hall; 2, W. Ross; 3, G. Trussell. \$1.50, 75 cts., 50 cts.
- Parsnips, 6, for table—1, W. McMillan; 2, J. Nesbitt; 3, College Notre-Dame. \$2, \$1, 50 cts.
- Peppers, collection—1, G. Trussell; 2, T. Irving, jr.; 3, College Notre-Dame. \$2, \$1, 50 cts.
- Potatoes, collection, not less than 6 of each, named—1, G. Trussell. \$5.
- Potatoes, 4 varieties, named—1, T. Hall; 2, J. Nesbitt; 3, G. Trussell. \$2, \$1, 50 cts.
- Potatoes, red, 1 peck—1, T. Hall; 2, G. Trussell; 3, J. Morgan, jr. \$1, 75 cts., 50 cts.

Potatoe
Pot and
\$3, \$2, \$1.
Saisify,
Tomato
wood; 3, J.
Tomato
\$1.50, \$1, 50
Tomato
Turnips
Turnips
75 cts.
Squash
\$1, 50 cts.
Squash
\$2, \$1, 50 ct
Squash
\$2, \$1.
Squash
Vegetal
Davidson;

Apples
\$3, \$2, \$1.
Grapes
Grapes
Pears,
Plums,
Tomato

- Millan. Potatoes, white, 1 peck—1, G. Trussell; 2, J. Nesbitt; 3, T. Hall. \$1, 75 cts., 50 cts.
 Pot and sweet herbs, collection, named—1, W. B. Davidson; 2, W. Ross; 3, P. Clarke.
 \$3, \$2, \$1.
- 75 cts., Saisify, 12 roots—1, G. Trussell. 2, College Notre-Dame; 3, J. Black. \$1, 75 cts., 50 cts.
- cts. Tomatoes, 3 varieties, 6 specimens of each, named—1, W. B. Davidson; 2, F. L. Gird-
 50 cts. wood; 3, J. Robson. \$3, \$2, \$1,
 75 cts., Tomatoes, red, 6 specimens of each, named—1, J. Kirkwood; 2, T. Hall; 3, J. Robson.
 \$1.50, \$1, 50 cts.
- 75 cts., Tomatoes, yellow, 6 specimens of each, named—1, T. Hall. \$1.
- \$2, \$1, Turnips, white, 6, for table—1, College Notre-Dame; 2, T. Irving, jr. \$2, \$1.
- 50 cts. Turnips, yellow, 6, for table—1, J. Nesbitt; 2, College Notre-Dame; 3, T. Hall. \$2, \$1,
 75 cts.
1. Squashes, table, Vegetable Marrows—1, T. Hall; 2, J. M. Harrigan; 3, P. Clarke. \$2,
 \$1, 50 cts.
- \$1.50 Squashes, table, Hubbard—1, W. B. Davidson; 2, College Natre-Dame; 3, G. Trussell.
 \$2, \$1, 50 cts.
- \$2, \$1. Squashes, table, other variety—1, W. Ross; 2, College Notre-Dame; 3, G. Trussell. \$3,
 \$2, \$1.
- \$2, \$1. Squashes, mammoth, best specimens—1, College Notre-Dame. \$1.
- Dame, Vegetables, best collection displayed on table of not less than 40 feet area—1, W. B.
 Davidson; 2, College Notre-Dame. \$8, \$5.

Class D.

FRUITS AND VEGETABLES.

- s. \$1, Apples, 3 varieties, desert, 5 of each—1, J. C. Baker; 2, R. Harvie; 3, Dr. J. A. Bazin.
 \$3, \$2, \$1.
- e. \$4, Grapes, 3 varieties, out-door, 2 bunches each—1, P. A. Somerville. \$4
- 50 cts. Grapes, 2 bunches of any kind—1, P. A. Somerville. \$2.
- \$2, \$1. Pears, plate of 6 specimens—1, R. Harvie; 2, J. C. Ansley. \$2, \$1.
- Plums, plate of 6 specimens 1 variety—1, R. Harvie. \$2.
- Tomatoes, plate of 6 specimens named—1, R. Harvie. \$1.

\$2, \$1,

\$2, \$1.

50 cts.

cts,

REPORTS OF LOCAL SOCIETIES.

FRUIT GROWERS ASSOCIATION OF ABBOTSFORD.

J. M. FISK, President.

A. M. FISK, Sec.-Treas.

This Association distributed last May to its members 33 varieties of Russian and North German pear, plum and cherry, as follows, 75 pear, 244 plum and 206 cherry making a total of 525 trees.

This distribution is to a great extent the outcome of the society's importation from Moscow in 1884, from which scions were cut and sent to Ames, Iowa to be root grafted, and re-shipped to Abbotsford where they were placed in nursery and cared for until of sufficient size to plant into orchard.

The society also shipped last spring to the Central Experimental Farm, at Ottawa, 50 of these pear, plum and cherry trees and have still in hand more of these varieties for its members, to be distributed next spring.

The apple crop was lighter with us than it has been for several years, resulting from two causes. First from its being the "off year," and secondly, from the depredations of the caterpillar, several orchards being completely defoliated by them.

Three varieties of these pests were quite numerous. The Tent Caterpillar, Measuring Worm and Bud Moth or Leaf Roller.

These latter are the most difficult to contend with, as they commence before the tree is fairly in leaf eating into the buds, and as soon as the leaf is sufficiently large rolling themselves up in such a manner as to be almost impossible reach them even with poison, which is the only remedy to be applied.

This is done by means of a force pump using London Purple, one pound to 100 gallons of water, and should be applied early.

Spraying twice in the early part of the season will destroy most of the insects that feed on the leaf, also the Codling Moth which feeds on the apple.

This operation is not so expensive as one would imagine. After the first cost for outfit, (about \$20) it will not exceed five cents per tree of ordinary size for the season. Two men with a team will spray 800 trees in a day.

There were four pumps in use in this place last season with good results, for where used fair crops were obtained.

The annual exhibition was held at Abbotsford on the 26th September, and like many of our sister societies we were unfortunate in our choice of day, for the weather was most unfavorable. So wet, that few from a distance had the courage to turn out, and many were prevented from bringing their exhibits.

Although the elements were against us, and this was the "off year" for fruit, while many of our members had already contributed largely from their stock of fruit in exhibiting at Sherbrooke, Granby and Montreal, taking many first prizes.

The exhibits though not as numerous as at some of our former exhibitions, (especially in grapes) the display of fruits and flowers was well selected and a surprise to many who saw them. The apples and pears for color and size being unusually fine.

There were on exhibition 371 plates of apples, 82 of grapes, 15 of pears, and 7 of plums.

These were grown at Abbotsford, excepting a few plates of apples from Rougemont.

Never since our first exhibition has outside competition been so limited. This was owing largely to the unfavorable state of the weather, which also affected the exhibits in vegetables, though those shown being choice, indicated a marked improvement in the selection of varieties.

Our annual meeting was held on the 23th of October. The financial statement was satisfactory, showing that prizes had been paid amounting to \$126.25 and all other expenses for the year met, leaving a balance in hand of \$135.60 for the incoming year.

The result of ballot for officers for 1890, was as follows:

CHAS. GIBB, President.
J. M. FISK, Vice-President.
A. M. FISK, Sec.-Treasurer.

DIRECTORS:

A. BROSSEAU.
W. J. GIBB.
J. DONAHUE.
W. R. HONEY.

COUNTY OF L'ISLET HORTICULTURAL SOCIETY.

The Society held its annual exhibition on the 28th September at St. Jean Port Joli.

The membership of the society decreased in 1888, we ascribe the cause to the delay in paying the exhibition prizes, the government grant being handed to the Secretary-Treasurer over six months after the exhibition. This fall we had the satisfaction to receive the grant in time. Honorable Colonel Rhodes our distinguished Commissioner of Agriculture has put a stop to the old state of things: we now anticipate an increase in the membership.

We have to record the death of two of the most prominent members of the Society, whose efforts for its foundation and success were much appreciated, these members were Rev. J. Lagueux, of St. Jean Port Joli and J. B. Dupuis, ex-M. P. P., of village des Aulnaies, both had been Presidents of the Society.

Fruit growing, this year, was a failure in the eastern part of the Province and it was with great difficulty that specimens of apples and plums could be gathered in our orchards for the exhibition. As usual the display of Duchess of Oldenburg was the largest and finest. Red Astrachan were the second best Maiden's Blush and Wealthy were fine. Fameuse and St. Lawrence were not as large and fine as usual. The show of Crab apples was large; among the new varieties exhibited for the first time was the Whitney a very large and beautiful crab apple.

Apples had to be imported from Ontario for consumption and many car loads were distributed in the parishes on the Intercolonial Railroad. We remarked that these apples, mostly Baldwin and King's, were very wormy.

The crop of Blue Orleans, Damson, Reine Claude (yellow native) plums was a total failure, most members had only just the quantity required for exhibition. The foreign varieties were more plentiful, such as Lombard, Bradshaw, Washington, Duane Purple, Fellenberg, Imperial Gage. The show of these fine varieties was splendid, the plums were as large and as highly colored as the best specimens grown in the Niagara District.

Parties who had a few dozen baskets for sale realized \$1.50 per gallon, delivered at Quebec, in October.

Grape culture is in its infancy here, the most successful growers residing at L'Islet, had on exhibition plates of very large bunches of blue grapes well ripened.

The display of bee hives, honey, jellies, grape and currant wines, was as large as usual.

The flower show was one of the best we ever had, rare and beautiful plants were exhibited for the first time.

Vegetables were plentiful and well grown.

The collections of insects injurious to trees, fruits and plants were well labelled and many good directions for their destruction accompanied the collections.

Among the prizes offered were four liberal ones for the largest collections of branches of cherry and plums infected with black Knot, to be burned in presence of the public on the exhibition grounds, in order to draw the attention of the farmers to the great danger which menaces their plum and cherry orchards.

The two largest collections brought were one of 1440 and another of 600 branches, there were five other collections of 200 to 300 branches.

To entitle a member to compete for a prize, it is not necessary for him, to cut the branches in his own orchard, he can collect as many as he can in neighbor's orchards, and the Society expect by this permission to instruct more people of the necessity of destroying the black knot before it spreads.

The collector of 1440 branches took them out of 9 orchards. The Hon. Colonel Rhodes being aware that our Horticultural Society annually distributed new and hardy varieties of fruit trees from here to the Labrador coast for trial, has authorized the President of the Society to distribute this fall, one hundred dollars worth of hardy trees, to farmers and others of Magdalen Islands. A choice collection was made of our hardiest trees, a good report of their growth and suitableness to the climate is anticipated from the Islands.

Our Society being the most North Eastern of the Province (70 miles below Quebec) you cannot expect rose colored reports from it, you have nothing to learn from it, but you know that we are doing our best to *combat* the disadvantage of our position, soil, climate, big snow drifts, etc. Our Society needs more help than the others, and we look to the Provincial Society for help and information. Send as many copies of the next report as possible—please send French copies.

Believe me Mr. Secretary,

Your obedient servant,

The President,

County of L'Islet Horticultural Society.

Village des Aulnaies, P. Q., December 20 1889.

FRUIT GROWERS' ASSOCIATION, OF THE COUNTY OF SHEFFORD.

I have pleasure in submitting the annual report of the Fruit Growers Association of the County of Shefford for the year 1889. The annual exhibition of the Association was held on the 11th and 12th of September last, and notwithstanding the unfavorable season for the maturing and ripening of fruits, the show was in many respects one of unusual interest.

The exhibits of apples and other fruits though not so numerous as in former years were of superior quality, while the display of pot-plants and flowers surpassed anything before placed on exhibition. In the Vegetable Department there was a fair exhibit and more exhibitors than usual, a fact which shows the interest in Horticulture is increasing and spreading among our farming community. Below I give a summary of the various exhibits. In fruit there were 186 entries and 397 plates on exhibition. Plants 128 entries and 235 specimens exhibited. Vegetables 256 entries and over 700 exhibits. Prizes were paid to the amount of \$229.50.

The thanks of the Association are due and hereby respectfully tendered to the Department of Agriculture for a supplementary grant of \$75 over the usual annual grant. This sum has been largely augmented by the generosity of our citizens, showing that they take an active interest in the success and progress of our Association and by their assistance and support have put our society on a sound financial basis.

I have the honor to remain,

Yours respectfully,

J. A. TOMKINS

Secretary-Treasurer.

MISSISQUOI HORTICULTURAL AND FRUIT GROWERS ASSOCIATION.

In making our annual report it will perhaps not be out of place to remark that it is many years since we had a more complete failure of fruits of all kinds than this. Berries and small fruits scarce and small—not a plum, or cherry, and, in orchards usually yielding two and three hundred bushels, scarce twenty were gathered. Happily this scarcity does not seem to have prevailed over the whole province, and market prices are little if any higher than usual.

Our annual exhibition held on 19th and 20th September in the midst of a "rainy season" was as usual a success, and if inclement weather be taken into account more so than some previous. 316 plates of apples, 60 of grapes, 30 of pears, and 40 of crab apples, together with fine exhibits of honey, extracted, and in-

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comb, maple sugar and syrup, and a large display of plants and flowers covered the tables in the upper room of the spacious Town Hall. Several plates of the New Russian varieties were shown and though large and rather taking in appearance, the same cannot be said as to their flavour. As yet only two of the twenty sorts distributed by the society can lay claim to any good qualities, apart from hardiness. The Yellow Transparent, a very early, and the Long field, an early winter, both early and prolific bearers. From the delicate color of the fruit neither are adapted to shipping and the Longfield inclined to be undersized.

The lower room of the Hall was devoted to vegetables and it was generally conceded that a better display had never been brought together since the organization of the association, now completing its eleventh year.

Financially the society has a small balance to its credit. Our list of members averages from fifty to sixty-five. An admission fee of fifteen cents is charged to new members—this together with the Government grant making sufficient to pay all prizes and expenses.

Efforts were made during the last winter to hold meetings for the discussion of fruits, and indeed meetings were appointed, but from inclement weather, attendance at Farmers Institutes etc., not enough attended to make a report of them at present.

HON. THOS. WOOD, President.

DAVID WESTOVER, Sec.-Treasurer.

*BROME COUNTY FRUIT GROWERS ASSOCIATION.

Another year having elapsed since the last annual meeting of the members of this Association we beg to submit the following report for the past year.

It is with much pleasure that we are able to report the continued prosperity of this Association and to state that our membership has increased about fifty per cent within the past year.

The exhibit of fruit was not quite as large as last year, but the show of vegetables was far in excess of any previous exhibit in this County, and was said by some who had attended Sherbrooke and other horticultural shows to have been the best in the Eastern Townships.

The exhibit of apples was five hundred and two plates. Also a fine show of out-door grapes, cut flowers and floral designs were very large and attractive.

The amount paid out in prizes for fruit was fifty-three dollars.

For vegetables.....	\$56 50
“ flowers.....	12 00
“ bread.....	4 50
Special prizes.....	26 75
Fruit trees for members.....	60 00

The hearty thanks of this Association are hereby tendered to the Council of Agriculture for their grant which has enabled the free distribution of four hundred New Russian apple trees to members, which we trust will greatly encourage and improve fruit growing in this section.

We have been able to increase our prize list 25% which has resulted in a much larger exhibit, and we expect to increase our membership one hundred per cent in the coming year.

In conclusion we trust that the council will continue the grant of one hundred dollars, that we may be able to keep up the good work and the interest which has been awakened among our fruit growing community.

Respectfully,

H. ERNEST WILLIAMS, President.

J. H. BRASSARD, Sec.-Treasurer.

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 ADDITIONS TO THE LIBRARY.

The following donations and exchanges have been received.

D. H. Knowlton, Secretary, Farmington, Me.:—Transactions of the Maine State Pomological Society for 1887.

G. Van Houten, Secretary, Lenox Iowa:—Transactions of the Iowa Horticultural Society for 1887.

Z. A. Gilbert, Secretary, Augusta, Me.:—Agriculture of Maine 1887.

R. Manning, Secretary, Boston, Mass.:—Transactions of the Massachusetts Horticultural Society 1887.

S. D. Hillman, Secretary, Minneapolis, Minn.:—Reports Minnesota State Horticultural Society, 1888, 1889.

W. R. Sessions, Secretary, Boston, Mass.:—Agriculture of Massachusetts 1887.

B. E. Fernow, Chief of Forestry Division, Washington:—Annual Report of the Division of Forestry for 1887, Report of the Forest Conditions of the Rocky Mountains.

B. M. Lelong, Secretary, San Francisco, Cal.:—A Treatise on Citrus Culture in California 1888, Reports of the Tenth and Eleventh Fruit Growers Conventions of the State of California 1888, 1889:—Biennial report of the State Board of Horticulture 1887—1888.

H. D. Battle, Director, Raleigh, N. C.:—Tenth Annual Report of the North Carolina Agricultural Experiment Station for 1887.

Dr. A. R. C. Selwyn, Director, Ottawa:—Catalogue of Canadian Plants, Par IV, Endogens, by John Macoun Naturalist to the Geological and Natural History Survey of Canada, Ottawa.

G. H. Paul, Director, Milwaukee, Wis.:—Fifth Annual Report of the Agricultural Experiment Station of the University of Wisconsin 1888.

Alvan Barrus, Secretary, Amherst, Mass.:—Fifth Annual report of the Massachusetts Experiment Station.

P. C. Reynolds, Secretary, Rochester, N. Y.:—Reports of the Western New York Horticultural Society for 1888, 1889.

S. C. Stevenson, Montreal:—The Railway difficulty in relation to Fruit London 1888:—Practical Fruit Growers Association, London 1888, (pamphlets)

W. H. Robinson, Huntingdon, P. Q.:—Journal of American Agricultural Association, Vol., 1, parts 1, 3 and 4:—Agricultural Review Vol., 11, No. 1, January, 1882:—Supplement, May, November, 1882, February, March, 1883.

G. W. Campbell, Secretary, Delaware, Ohio:—Twenty first Annual Report Ohio State Horticultural Society 1887—88.

W. H. Morrison, Superintendent, Madison, Wis.:—Wisconsin Farmers Institutes Bulletin, No. 2, 1888.

L. Woolverton, Secretary, Grimsby, Ont.:—Reports of the Ontario Fruit Growers Association for 1885, 1888.

Henry Wade, Secretary, Toronto, Ont.:—Reports of the Council of the Agriculture and Arts Association of Ontario for 1886, 1887, 1888.

J. S. Woodward, Secretary, Niagara, N. Y.:—Transactions of the New York State Agricultural Society 1883 to 1886.

C. W. Garfield, Grand Rapids, Mich.:—Report of the Michigan Forestry Commission 1888.

E. Williams, Secretary, Montclair, N. J.:—Report of the New Jersey State Horticultural Society 1888.

B. G. Smith, Treasurer, Cambridge, Mass.:—Report of the American Pomological Society 1887.

C. R. H. Starr, Secretary, Wolfville, N. S.:—Reports of the Nova Scotia Fruit Growers Association 1883 to 1887, inclusive.

E. A. Barnard, Secretary, Council of Agriculture Quebec:—Report of the Commissioner of Agriculture and of Public Works for 1887.

N. J. Bachelder, Secretary, Concord, N. H.:—Agriculture of New Hampshire 1885-6, 1887.

George Lawson, Secretary, Halifax, N. S.:—Report of the Secretary for Agriculture Nova Scotia 1888.

E. F. Smith, Secretary, Sacramento, Cal.:—Transactions of the California State Agricultural Society 1884, 1885, 1886, 1887.

The Smithsonian Institution, Washington:—Report of the Michigan State Board of Agriculture 1888.

F. N. Menzies, Secretary, Edinburgh, Scotland:—Transactions of the Highland and Agricultural Societies of Scotland, Fifth series, Vol. 1.

Adolph Leue, Secretary, Columbus, Ohio:—Ohio Forestry Report 1887.

J. M. Rusk, Secretary, Washington:—Reports Dept., of Agriculture, U. S., 1888:—Bulletin No. 4, The English Sparrow.

B. S. Hoxie, Secretary, Evansville, Wis.:—Transactions of the Wisconsin State Horticultural Society for 1888.

ANNUAL MEETING.

The annual meeting was held in the Fraser Institute Hall Montreal on Friday the sixth day of December, 1889 at 8 p. m. Prof. D. P. Penhallow, the President, occupied the chair.

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There were present Mess., E. J. Maxwell, A. Joyce, J. McGregor, J. B. Goode, R. W. Shepherd, jr., R. Jack, W. B. Davidson, G. Trussell, J. Ainslie, John Doyle, Rev., R. Hamilton, F. Emberson, T. W. Burdon, W. Bell, J. Kirkwood, S. S. Bain, Jas. Johnson and others.

The minutes of the last annual meeting were read and confirmed.

The Secretary read the following report for the year ending 30th November 1889.

SECRETARY'S REPORT.

The following report of the operations of the Society for the past year is respectfully submitted.

The fourth Annual Convention of fruit growers was held in this City on the 2nd and 3rd, February. These meetings were well attended and a large and excellent exhibit of fruit was an interesting feature of the meeting.

Conspicuous among the apples were some Alexanders and St. Lawrence in a perfect state of preservation although they had only been kept in an ordinary cellar. Their fresh state was attributed to the peculiarity of the season which was not favourable to early maturity of fruit.

A full account of the proceedings of this meeting has been prepared for publication and will appear in our next report.

The Annual prizes for Conservatories were awarded on the 5th of March as follows.

CLASS A.

1. W. J. Wilshir, gardener to Hon. J. J. C. Abbott.
2. J. Stanford, do do Sir George Stephen

CLASS B

1. S. Ward, gardener to Mr. C. E. Levey.
2. J. Eddy, do Mrs. Redpath.

A larger number of Conservatories than usual were opened to our members last winter. Those who kindly granted us this privilege were Sir George Stephen, Mr. Andrew Allan, Mr. H. Montagu Allan, Mr. Mackay, Kildonan Hall, Hon. J. J. C. Abbott, Mr. R. B. Angus, Mr. John Molson, Mr. James Burnett, Mrs. Redpath, Mr. W. McGibbon, Mr. C. E. Levey and Mr. W. B. Davidson.

The opportunity of visiting these fine collections of plants in mid-winter is looked forward to with a great amount of pleasure by our members and the Association is greatly indebted to those who have so kindly conceded to it this privilege.

The Annual exhibition was held on the 17th, 18th and 19th, September. In apples the exhibits were not so numerous as last year, this not being the bearing year in most orchards. There was a large display of out-door and hot-house grapes some exhibits of the latter being particularly fine.

The display of plants was fully up to the average, but there was a marked falling off in cut bloom, the heavy rains preceding the exhibition having destroyed most of the bloom and rendered it impossible to procure specimens for exhibition.

The weather was wet and stormy during the three days of the exhibition and in consequence the attendance and receipts small.

There has been a slight decrease of membership during the year as you will see by the financial statement which is as follows.

Financial statement of the Montreal Horticultural Society and Fruit Growers Association of the Province of Quebec for the year ending 30th, Nov., 1889.

RECEIPTS.

Cash on hand 1st December 1888.		49 63
Dividends Bank Stock.....		40 00
Proceeds Sale of 2 shares Bank of Montreal Stock.....		912 00
Exhibitions		182 93
Special prizes		4 00
Subscriptions for 1888 received after close of year.....		2 00
Members subscriptions, 520 at \$2	1040	
" " 21 at \$1.....	21	
" " Life, 2 at \$20.....	40	1101 00
W. W. Dunlop, Sec.-Treas		139 15
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EXPENDITURE.

Rent... ..		100 00
Library account binding, etc.....		32 58
Advertising and printing.....		63 08
Insurance.....		8 90
Postage stamps.....		30 00
Commission on collections		88 00
Prizes... ..	1058 75	
Winter fruit meeting.....		85 60
Plant, plates.....		15 00
Sundry accounts.....		366 15
W. W. Dunlop loan returned.....		500 00

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Sundry petty expenses.....	23 00
Dominion Convention	33 60
Balance deposited in Merchants Bank.....	27 05
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At the close of the last financial year there was a balance of \$500 due to us by the Provincial Government. This amount has not yet been paid nor have we received our grant of \$1000 for the current year, although repeated applications have been made for both amounts. In order to provide for the current expenses we have disposed of our Bank Stock, and with the proceeds have paid the prizes awarded at September exhibition. Liabilities amounting to \$880.79 still remain to be provided for as by following statement.

Montreal, November, 30th 1889.

Statement of amounts due by the Montreal Horticultural Society and Fruit Growers Association of the Province of Quebec.

La Presse.....	\$ 9 00
La Patrie.....	9 00
The Star.....	31 57
The Gazette Printing Co.....	4 63
A. McArthur and Co.....	3 64
D. Bentley and Co.....	13 50
Herald Printing Co.....	9 00
John Dougall and Son.....	78 00
D. Rutherford and Co.....	21 00
A. Joyce.....	40 00
Morton Phillips and Bulmer.....	15 80
J. Grace.....	6 50
W. W. Dunlop, Sec.-Treas.....	639 10
	880 79
Amount due by Provincial Government.....	\$1500
" paid by Montreal Horticultural Society on account	
Dominion Convention to be refused.....	\$33 60 1533 60
	\$652 81

The receipt of the amount due by the Provincial Government will enable us to pay all outstanding accounts and leave a surplus of \$652 81, and a deficit of \$259.19 on the transactions of the year.

In explanation of this deficit I may state that our income from exhibition receipts is not a fixed one being more or less governed by the weather and other causes, thus, our receipts this year were \$282.62 less than last year—a sum greater than our deficit.

I regret to have to announce that our annual report, for 1888 has not yet been published owing to the Government not having issued the order for its publication. It is expected that it will be issued in January next.

During the year our Association, in connection with the Fruit Growers Associations of the other Provinces, has made an application to the Dominion Government for a grant in aid of a Convention of fruit growers of the Dominion.

This application has been favourably considered and an appropriation of \$2000 has been granted.

The organization of this meeting has devolved upon this Society and is now in progress.

The meeting will be held in the City of Ottawa on the 18th, 19th, 20th, February next.

The accounts of the Society have been duly audited and found correct by Messrs., J. M. M. Duff, and George Cooke.

W. W. DUNLOP, Sec. Treas.

Moved by Mr. J. B. Goode seconded by R. W. Shepherd, jr. That the Secretary's report and financial statement be adopted. Carried.

The following report by the library committee was then read and on motion by Mr. J. B. Goode seconded by Mr. R. W. Shepherd, jr., adopted.

REPORT OF LIBRARY COMMITTEE.

The library committee beg to report as follows.

The additions to the library during the year have been 47 volumes all of which were received in exchange for our reports.

The library now contains about 1050 bound volumes and 127 unbound, a total of 1177 volumes.

No books have been purchased during the year. The sum of \$23.88 has been expended for binding and \$7.90 for horticultural papers, total \$31.78.

The President addressed the meeting with reference to the progress made in connection with the Dominion Convention of Fruit Growers to be held at Ottawa in February next, and explained the steps taken by the Directors with regard to the amounts due by the Provincial Government.

Moved by Rev., R. Hamilton, seconded by Mr. Robert Jack. That the correspondence relating to these grants be read. Carried.

The correspondence was then read by the Secretary.

Mr. Thos. W. Burdon suggested that the City members of the Provincial Parliament be waited upon and requested to use their influence in the matter.

Mr. James McGregor asked if in any previous year the grant to the Association had not been paid during the year.

The Secretary replied that the grant for 1879 had not been paid until February of the following year.

Messrs. J. B. Goode and W. B. Davidson were appointed Scrutineers and the balloting for Directors proceeded with.

The Scrutineers reported the following Directors elected. Prof., D. P. Penhallow, Charles Gibb, E. J. Maxwell, A. Joyce, R. Brodie, R. W. Shepherd, jr., William Evans, W. J. Wilshire and that the same number of votes had been recorded for Messrs. John Doyle and Robert Jack.

Upon a second ballot being taken Mr. Robert Jack was declared elected.

The meeting then adjourned.

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188 METEOROLOGICAL ABSTRACT FOR THE YEAR 1888

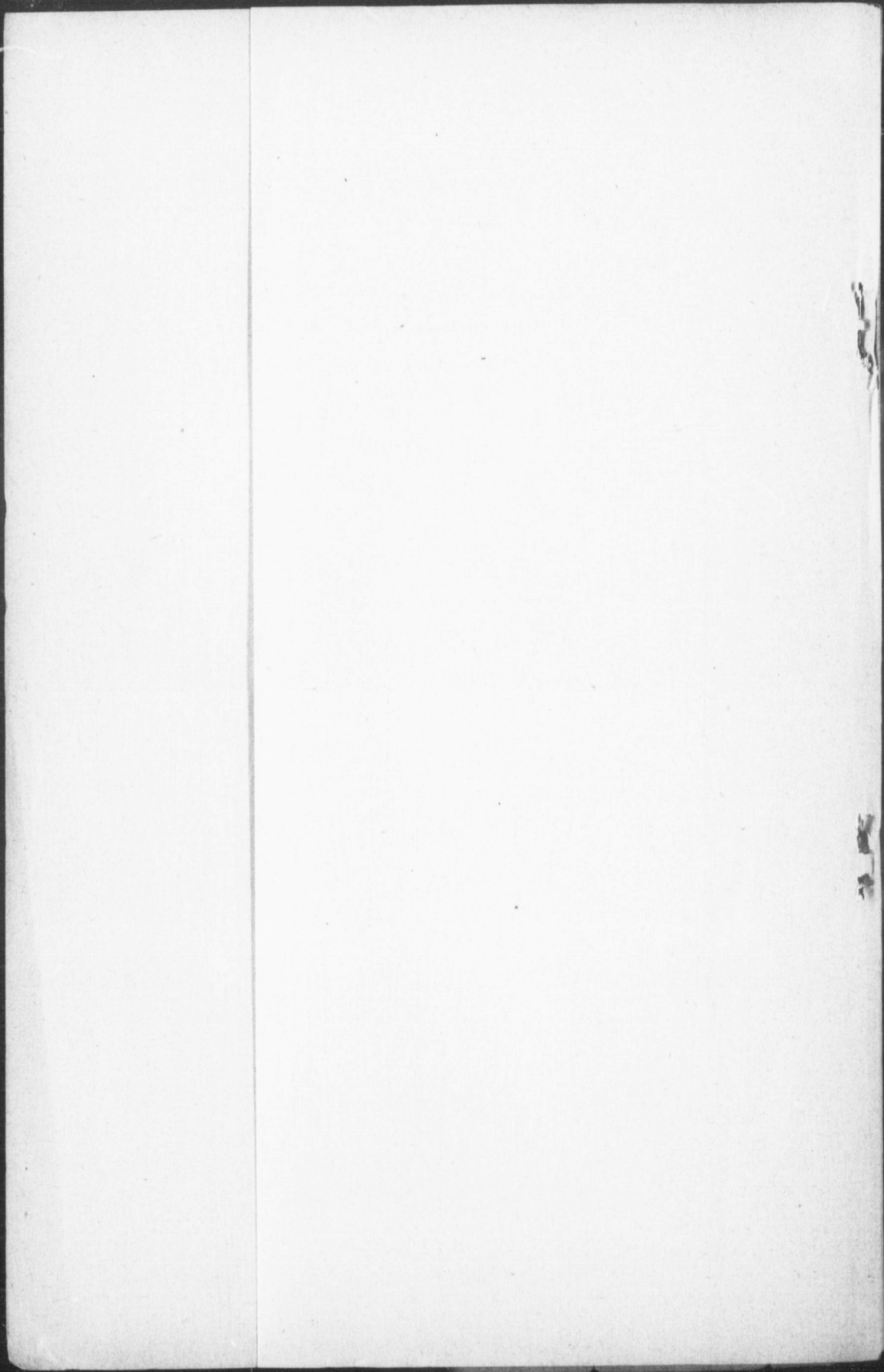
	0.80	7.1	12	1.54	6	17
May	13.24	67.8	16	1.97	1	16
June	13.47	58.9	19	3.12	1	19
July	13.31	52.1	13	1.32	...	13
August	12.54	65.4	19	7.89	...	19
September	11.46	60.8	16	3.69	...	16
October	15.85	69.8	22	4.55	2	23
November	17.65	74.0	16	6.40	4	22
December	18.33	74.4	8	3.12	2	23
Sums for 1888	15.85	64.1	150	42.57	22	220
Means for 1888	.....	44.3	.....	3.55	*	18.3
Means for 14 years ending } Dec. 31, 1888.	.....	6.2	132	39.66	15	202

* Barometer readings reduced to 32° F., and to sea level. † Inches of mercury. ‡ Saturation, 100. § For 7 years only. ¶ "X" indicates that the temperature has been higher; "—" that it is less than the average for 14 years, inclusive of 1888. The monthly means are derived from readings taken every 4th hour, beginning with 3rd 0m, Eastern Standard time. The anemometer and wind vane are on the summit of Mount Koyai, 57 feet above the ground, and 810 feet above the sea level. The greatest heat was 88.1 on June 22nd; greatest cold 24.4 below zero on February 10th; extreme range of temperature was therefore 112.5. Greatest range of the thermometer in one day was 50.1 on January 13th; least range was 2.3 on November 28th. The warmest day was June 22nd, when the mean temperature was 77.52. The coldest was February 10th, when the mean temperature was 15.90 below zero. The highest barometer reading was 30.865 on January 16th, the lowest was 29.173 on March 21st, giving a range of 1.692 for the year. The lowest relative humidity was 23 on May 26th. The greatest mileage of wind recorded in one hour was 62 on November 26th, and the greatest velocity in gusts was at the rate of 90 m. p. h. for 3 miles, and 110 m. p. h. for one mile, on March 18th. The total mileage of wind for the year is 139,303. The resultant direction of the wind for the year is S 74° W., and the resultant mileage 60,750. Auroras were observed on 21 nights. Fogs on 31 days. Hoar frost on 15 days. Thunder storms on 20 days, and lightning without thunder on 8 days. Lunar halos on 9 nights. Lunar coronas on 7 nights. The sleighing of the winter closed, in the city on April 7th. The first appreciable snowfall of the autumn was on October 3rd. The first sleighing of the winter was on December 18th. The mean temperatures for January and December are the lowest on the records for the 14 years over which the present series of observations extends. The rainfall for August is the greatest recorded in 14 years. There was an earthquake rumble on July 1st.

MONTH.	WIND.		Sky clouded per cent.	Bright sunshine.	Inches of rain.	Number of days on which rain fell.	Inches of snow.	Number of days on which snow fell.	Inches of rain and snow melted.	No. of days on which rain and snow fell.	No. of days on which rain or snow fell.
	Resultant direction.	Mean velocity in miles per hour.									
January.....	S. 77° W.	18.63	50.4	41.2	0.08	2	33.6	17	2.81	2	17
February.....	S. 44° W.	17.19	54.2	45.3	0.55	2	30.0	16	2.71	2	16
March.....	S. 64° W.	22.26	79.6	31.4	1.17	6	25.2	14	3.45	3	17
April.....	S. 81° W.	16.28	63.6	54.1	0.80	11	7.1	12	1.54	6	17
May.....	S. 46° W.	13.24	67.8	45.0	1.97	16	Inapp	1	1.97	1	16
June.....	S. 59° W.	13.47	59.6	58.9	3.12	19	.....	.....	3.12	.....	19
July.....	S. 73° W.	13.31	52.1	69.2	1.32	13	.....	.....	1.32	.....	13
August.....	S. 70° W.	12.54	65.4	43.4	7.89	19	.....	.....	7.89	.....	19
September.....	S. 66° W.	11.46	60.8	48.2	3.69	16	.....	.....	3.69	.....	16
October.....	W.	15.85	69.8	36.3	3.82	22	.....	.....	3.82	.....	22
November.....	N. 66° W.	17.65	74.0	33.2	5.10	16	7.8	5	4.55	2	25
December.....	N. 81° W.	18.33	74.4	25.1	1.57	8	11.0	10	6.40	4	22
.....	.....	.....	.....	.....	.....	.....	17.6	17	3.12	2	23
Sums for 1888.....	.....	.....	64.1	.....	31.68	150	132.3	92	42.57	22	220
Means for 1888.....	S. 74° W.	15.85	.....	44.3	.....	.....	.....	.....	3.55	*	18.3
Means for 14 years ending } Dec. 31, 1888. }	.....	.....	6.2	246.4	27.20	132	125.8	85	39.66	15	202

* Barometer readings reduced to 32° Fah., and to sea level. † Inches of mercury. ‡ Saturation, 100. § For 7 years only. ¶ "X" indicates that the temperature has been higher; "—" that it is less than the average for 14 years, inclusive of 1888. The monthly means are derived from readings taken every 4th hour, beginning with 3rd On, Eastern Standard time. The anemometer and wind vane are on the summit of Mount Royal, 57 feet above the ground, and 810 feet above the sea level. The greatest heat was 88.1 on June 22nd; greatest cold 24.4 below zero on February 10th; extreme range of temperature was therefore 112.5. Greatest range of the thermometer in one day was 50.1 on January 13th; least range was 2.3 on November 28th. The warmest day was June 22nd, when the mean temperature was 80.865 on January 16th, the lowest was 29.173 on March 21st, giving a range of 1.692 for the year. The lowest relative humidity was 23 on May 26th. The greatest mileage of wind recorded in one hour was 62 on November 26th, and the greatest velocity in gusts was at the rate of 90 m. p. h. for 3 miles, and 110 m. p. h. for one mile, on March 13th. The total mileage of wind was 139,303. The resultant direction of the wind for the year is S 7° W., and the resultant mileage 60,750. Auroras were observed on 21 nights. Hoar frost on 15 days. Thunder storms on 20 days, and lightning without thunder on 8 days. Lunar halos on 9 nights. Lunar coronas on 7 nights. The sleighing of the winter closed, in the city on April 7th. The first appreciable snowfall of the autumn was on October 3rd. The first sleighing of the winter was on December 18th.

The mean temperatures for January and December are the lowest on the records for the 14 years over which the present series of observations extends. The rain fall for August is the greatest recorded in 14 years. There was an earthquake rumble on July 1st.



...	12.0	09.0	...	...	...	2.73	...	13
...	...	...	...	...	...	2.40	...	14

METEOROLOGICAL ABSTRACT FOR THE YEAR 1889.

Observations made at McGill College Observatory, Montreal, Canada. $\bar{}$ Height above sea level 187 ft. Latitude N. $45^{\circ} 36' 17''$. Longitude $4^{\text{h}} 54^{\text{m}} 18^{\text{s}} 55^{\text{W}}$.
C. H. McLEOD, Superintendent.

MONTH.	THERMOMETER.				* BAROMETER.				Mean relative humidity. †	Mean pressure of vapour. †	Mean dew point.	
	Mean.	Deviation from 15 year means.	Max.	Min.	Mean daily range.	Mean.	Max.	M.				Mean daily range.
January	21.23	× 9.64	44.0	-6.5	11.9	29.9560	30.708	29.064	.298	.1038	82.5	16.6
February	10.59	-4.65	39.5	-22.6	17.5	30.0410	30.885	29.222	.287	.0638	80.9	5.6
March	28.70	× 5.01	43.9	7.8	12.2	29.8885	30.503	28.982	.178	.1224	75.3	21.6
April	43.34	× 3.76	73.6	23.8	16.8	29.9554	30.499	29.277	.179	.1916	65.0	31.3
May	56.95	× 2.17	88.0	35.3	17.7	29.8839	30.216	29.531	.146	.3338	69.5	46.3
June	62.91	-1.55	84.9	45.1	16.1	29.9194	30.423	29.488	.180	.4286	73.9	53.8
July	67.97	-1.65	87.5	52.3	16.0	29.9286	30.347	29.582	.131	.5165	74.9	59.2
August	64.97	-1.33	81.1	50.1	14.8	30.0049	30.329	29.668	.118	.4681	75.8	56.7
September	59.93	× 1.37	82.1	37.7	15.6	29.9585	30.370	29.281	.142	.4197	79.2	52.9
October	44.15	-4.85	61.1	21.8	11.6	30.0384	30.605	29.393	.182	.1888	74.3	32.0
November	34.21	× 2.21	55.0	13.7	10.1	30.0118	30.611	29.315	.244	.1686	81.2	28.9
December	23.76	× 4.76	31.5	16.1	15.4	30.1133	30.389	29.036	.322	.1159	80.2	18.5
Means for 1889	42.90	× 1.22	.....	.....	14.6	29.9657	.....	.....	.201	.2671	76.1	35.3
Means for 15 year ending } Dec. 31, 1889.	41.67	.....	.....	.....	.....	29.9756	.....	.....	.....	.2497	74.4	.....

MONTH.	Wind.		Sky clouded per cent.	Per cent. possible bright sunshine.	Inches of rain.	Number of days on which rain fell.	Inches of snow.	Number of days on which snow fell.	Inches of rain and snow melted.	No. of days on which rain and snow fell.	No. of days on which rain or snow fell.
	Resultant direction.	Means velocity in miles per hour.									
January	S. 70° W.	18.5	67.3	30.5	1.88	7	40.5	19	4.67	4	22
February	S. 65° W.	18.9	64.5	43.6	0.30	2	32.2	16	3.33	0	15
March	S. 85° W.	17.4	63.2	40.0	0.62	9	12.3	12	2.11	6	15
April	S. 72° W.	14.5	54.8	53.0	2.14	11	0.1	2	2.15	0	13
May	S. 43° W.	15.8	65.2	54.1	2.97	16	.....	.....	2.97	.....	16
June	S. 57° W.	13.8	71.1	45.5	4.73	20	.....	.....	4.73	.....	20
July	S. 51° W.	12.5	63.6	50.3	7.16	20	.....	.....	7.16	.....	20
August	S. 54° W.	12.4	59.6	59.0	2.73	13	.....	.....	2.73	.....	13
September	S. 39° W.	12.4	62.1	45.0	4.63	14	.....	.....	4.63	.....	14
October	N. 17° W.	13.7	63.1	36.6	3.34	12	0.8	1	3.42	1	12
November	N. 76° W.	16.7	76.1	30.5	1.68	14	15.6	6	3.29	2	18
December	.....	18.2	68.8	30.1	3.19	11	13.2	14	4.39	3	22
Sums for 1889	.....	.....	.....	.....	35.37	149	117.7	70	45.58	16	203
Means for 1889	S. 69° W.	15.39	65.0	43.2	.....	.....	.....	.....	3.80	.....	16.9
Means for 15 years ending } Dec. 31, 1889	.....	.....	61.4	46.0	27.74	133	125.3	84	40.05	15	202

* Barometer readings reduced to 32° Fah., and to sea level. † Saturation, 100. ‡ For 8 years only. ¶ "X" indicates that the temperature has been higher; "..." that it has been lower than the average for 15 years, inclusive of 1889. The monthly means are derived from readings taken from 4th hour, beginning with 3h. 0m. Eastern Standard time. The anemometer and wind vane are on the summit of Mount Royal, 57 feet above the ground, and 810 feet above sea level.
The greatest heat was 88.0 on May 18th; greatest cold 22.6 below zero on February 4th; extreme range of temperature was therefore 110° 6. Greatest range of thermometer in one day 39.8, on January 30th; least range was 3.4 on January 7th. The warmest day was May 18th, when the mean temperature was 30.889 on December 31st, the lowest was 25.981 on March 7th, giving a range of below zero. The lowest relative humidity was 77.82. The coldest day was February 23rd, when the mean temperature was 10.73 on December 30th., and the greatest velocity in gusts was at the rate of 150 m. p. h. for 5 miles on December 30; this is the greatest velocity on our records. The total mileage of the wind was 134,823. The resultant direction of the wind for the year was S. 69° W., and the resultant mileage 47,950. Auroras were observed on 16 nights. Fog on 42 days. Hoar-frost on 30 days. Thunder storms on 17 days. Lunar halos on 8 nights. Lunar coronas on 5 nights. Solar halos on 8 days and contact are on one day. The heaviest of the winter was November 28th. The first appreciable snowfall of the autumn was on October 28th. The yearly means above are the averages of the monthly means, except for the velocity of the wind.