



31ST ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

NOVA SCOTIA.

1895.

S. C. PARKER, Secretary,
Berwick, N. S.

Published by Order of the Government of Nova Scotia.

KENTVILLE.

ADVERTISER OFFICE, WEBSTER ST.

1895.

Berwick, N. S., Feb. 10th., 1895.

TO THE FRUIT GROWERS OF NOVA SCOTIA.

The Fruit Growers' Association is entering upon a new and advanced era. At no time in its history has there been so much enthusiasm and interest in the work of the Society. We conceive it to be the duty as well as privilege of every person interested in the advancement of fruit culture to become a member of the Association. This report will be forwarded to many persons whose names have at some time been on the books, but whose fees for the present year are not paid. Any such are cordially invited to forward \$1.00 membership fee to the Secretary which will be promptly acknowledged.*

The School of Horticulture is now on a firm basis. A Conservatory and Laboratory have been provided, and the School now has every facility for thorough and progressive work.

The Director has proved himself to be the right man for the work. This is the first time in the history of Canada, when a school is provided to teach theoretical and practical Horticulture. Send a card to Prof. Faville, Wolfville, and you will receive all possible information.

Yours truly,

S. C. PARKER,

Sec.

FRUIT GROWERS' ASSOCIATION

OF

NOVA SCOTIA.

Patron.

HIS HONOR THE HON. M. B. DALY, LIEUTENANT-GOVERNOR.

OFFICERS FOR 1895.

President.

J. W. BIGELOW, Wolfville, N. S.

Senior Vice-President.

C. R. H. STARR, Wolfville, N. S.

County Vice-President.

ANNAPOLIS COUNTY	REV. H. HOW	.....	Annapolis.
KINGS	T. H. PARKER	.....	Berwick,
HANTS	STEWART DIMOCK	.....	Windsor
HALIFAX	PROFESSOR LAWSON	.....	Halifax
LUNENBURG	JUDGE DESBRISAY	.....	Bridgewater
DIGBY	CHAS. BURRILL	.....	Weymouth
YARMOUTH	C. E. BROWN,	.....	Yarmouth
SHELburne	R. W. FREEMAN	.....	Jordan River.
QUEENS	J. M. FREEMAN	.....	Pleasant River
COLCHESTER	A. J. WALKER	.....	Truro
PICTOU	W. O. CREIGHTON	.....	West River
CUMBERLAND	HON. H. BLACK	.....	Amherst
ANTIGONISH	J. G. CUNNINGHAM	.....	Antigonish
GUYSBORO'	H. L. MORROW, M. P. P.	.....	Guysboro'
VICTORIA	W. F. McCURDY	.....	Baddeck
CAPE BRETON	WILLIAM PURVIS	.....	Sydney
INVERNESS	JOHN McKEEN	.....	Port Hood
RICHMOND	HON. ISIDOR LEBLANC, M.L.C.	.....	Arichat

Secretary.

S. C. PARKER, Berwick, N. S.

Assistant Secretary.

R. W. STARR Wolfville, N. S.

Treasurer.

GEO. W. MUNRO Wolfville, N. S.

Auditors.

J. W. CALDWELL

GEO. H. WALLACE

Executive Board.

THE PRESIDENT,
SENIOR VICE-PRESIDENT,
SECRETARY,
TREASURER,

} *Ex officio.*

DR. H. CHIPMAN,
J. E. STARR,
A. McN. PATTERSON,
DR. G. E. DEWITT.

Fruit Committee.

R. W. STARR,
ISAAC SHAW,
COL. S. SPURR,
B. STARRATT,
N. H. REID,
W. A. WEBB,

MRS. OLIVIA JOHNSON
J. E. SCHAFNER,
C. E. BROWN,
R. E. HARRIS,
A. WHITMAN,
T. R. JONES,

Small Fruit Committee.

G. C. MILLER,
T. H. PARKER,
GEO. B. MCGILL,

JOHN L. SHAW,
L. D. ROBINSON,

Publication Committee.

THE PRESIDENT,
THE SECRETARY,

} *Ex officio.*

W. C. ARCHIBALD,
R. W. STARR,
PROFESSOR FAVILLE.

Nova Scotia Fruit Growers' Association,

1894	To Horticultural School for books, apparatus, &c.....	\$ 538.78
	“ Professor E. Faville Salary	1,400.00
	“ “ “ travelling expenses.....	131.30
	“ S. C. Parker, Secretary salary.....	100.00
	“ Huggins for reporting	30.00
	“ Rent of Hall, for meetings.....	32.00
	“ Paid for printing	154.63
	“ Sundry charges per Secretary's memo	82.20
	“ Dep. receipts, \$500-\$1300	1,800.00
	“ Balance to new acct.	537.59
		\$4,806.50

E. & O. E.

Wolfville, 31st Dec., 1894.

G. W. THOMSON, Treasurer.

In acct. with G. Thomson, Treasurer.

1894	By balance from 1893.....	\$ 365.72
	“ subscriptions and donations	435.50
	“ Prov. Govt. grant for 1894.....	300.00
	“ “ “ “ for School of Horticulture	1,650.00
	“ Dep. Receipts and int. \$700-\$1300-\$55.28.....	2,055.28

\$4,806.50

We have examined the foregoing accounts of the Treasurer for 1894—have compared the entries with the vouchers therefor and found the same to be correct. The Pass Book of the Bank shows that the balance of \$537.59 was, on 31st December last at the credit of the Association. We have also seen the deposit receipt No. 2744—for \$1300—drawn in favor of this Association.

J. W. CALDWELL, }
G. H. WALLACE. } Auditors.

THIRTY-FIRST ANNUAL MEETING.

(Stenographic Report by W. H. Huggins.)

HELD AT WITTER'S HALL, WOLFVILLE, JANUARY 29, 30 and 31st, 1895.

The meeting opened at 2 o'clock, p. m., with President Bigelow in the chair.

The Secretary read the minutes of the preceding meeting, and on motion the same were approved.

President Bigelow presented his Annual Address as follows :

In reviewing the history of this Association for the past year we have great reason for thanksgiving to Divine Providence for an abundant crop of superior fruit, and a great advance in scientific fruit culture in this province. The apple crop may be safely estimated at over 300,000 barrels of the best marketable fruit ever grown in N. S. We shall ship to London alone, over 200,000 barrels, and with an abundant crop of plums, small fruit and berries, the cash value of the fruit crop of 1894 in N. S. may be safely estimated at \$1,000,000, and as there is no outlay for raw material or plant-power or machinery in this product, the revenue is a direct gain to the Fruit Growers and an immense benefit to the Province.

The School of Horticulture established by this Association last year has been very successful, the details of which our energetic Professor, E. E. Faville, and the indefatigable promoter W. C. Archibald will explain to you. I wish to mention the fact that of the sixty-two students enrolled, thirty-three were returned to the N. S. Government as regular attendants in accordance with the terms of the Act, and we drew \$50 for each student, \$1650, which sum, together with donations from members, has paid the expenses of the school and furnished a laboratory, library and green house. So important and necessary is some experimental work to insure the success of the school that

your Executive have leased a lot of land for \$25 a year, and aided by public subscription, have erected a greenhouse and laboratory at a cost of about \$600. I would take this opportunity of urging on the people of this Province the necessity of giving this school their support and patronage by sending their sons and daughters to the school, where they can obtain practical information which cannot fail to be of the greatest advantage to them; and since the N. S. Government has made it possible for us to have the the only school of Horticulture in Canada, we should not fail to avail ourselves of its advantages.

As practical experimental work is indispensable for the success of the school and to promote fruit culture throughout the province, a petition signed by over one thousand of the most influential men and women representing every county of the Province, was forwarded to the Minister of Agriculture at Ottawa, asking for a grant of two thousand dollars a year for an experiment fruit station in connection with this school, to which I received the following reply :

“Extract from a Report of the Committee of the Honorable the Privy Council, approved by His Excellency on the 1st Aug., 1894.

On a Report, dated 16th July, 1894, from the Minister of Agriculture, stating that he has had under consideration a communication, hereto attached, signed by J. W. Bigelow, President of the Nova Scotia Fruit Growers' Association, and six other members, and covering a petition pointing out that an effort is being made by the said Association to establish a Horticultural School with an Experimental Fruit Station in the province, and the desirability of having a Meteorological Station established in connection therewith.

The Minister observes that it is requested in this correspondence that the Government aid in the undertaking by granting an annual subsidy of \$2000, and on consideration of the several statements in this correspondence, he (the Minister) is of opinion, that however generally valuable the successful carrying out of the views therein set forth might be, the undertaking is purely Provincial, and there-

fore not of a nature to enable him to recommend that Government aid be granted.

The Minister therefore recommends that an answer in the sense of the minute be forwarded to Mr. J. W. Bigelow, President of the N. S. F. G. A.

All which is respectfully submitted for Your Excellency's approval.

JOHN J. MCGEE,
Clerk of the Privy Council."

It is deeply regretted that the Dominion Government did not see fit to aid this most important industry, and we hope our petition will be favorably reconsidered.

It was deemed most important for the Association to make an artistic exhibit of fruit at the Provincial Exhibition, Halifax. Space was secured and a donation of fruit was solicited from every county, and under the management of our practical lady Horticulturist, Mrs. Olivia Johnson, assisted by our worthy Secretary, an exhibit was staged which received universal commendation and won a silver medal for merit from the Exhibition commission. I wish here to thank the fruit growers who contributed the best of their product, and especially Mr. Harris, of the Nova Scotia Nursery, of Halifax, who donated a valuable and beautiful display of plants and flowers. I expended \$101.10 on the exhibit and received \$50 from the commission, and have much pleasure in donating the balance. By this exhibit we were enabled to demonstrate the importance and profit of fruit culture, to distribute our reports and the school catalogue, and solicit membership, which added considerably to our funds and secured many valuable members, whose interest in our work is of great importance.

On the occasion of the visit of His Excellency the Governor General and Lady Aberdeen to the western part of the province, they requested the special train to be detained at Wolfville, to receive an address of welcome and an invitation to visit our orchards, from this Association, which address was fittingly responded to and the invitation accepted.

Owing to delay of the officials, the medals awarded at the World's Fair have not yet been received.

While this Association is to be congratulated on doing so much to promote the fruit industry, it is to be regretted that many counties in the Province, capable of raising fruit most profitably, do not take sufficient interest in the work to give it a fair trial. And I would suggest that county Associations be formed in every county, to work along the lines of this industry and send at least one delegate to our Annual meeting to report progress. I hope our Vice Presidents in each county will be induced to make the attempt. We know that fruits and berries of some kind can be grown profitably in every county in the Province, and the material wealth of the Province be largely increased. If we now add the annually increasing value of young orchards (which can be safely estimated at over a million dollars a year) to the annual yield, we can form some idea of the substantial permanent wealth which the fruit industry adds to the province, and its capabilities of increase are almost unlimited by increasing the value of land from \$20 to \$500 per acre in addition to the yearly income.

To form some idea of the growing importance of fruit culture in N. S., I have compiled the following synopsis from the most reliable sources:

1. Annual value of fruit crop, above \$1,000,000.
2. Annual additional value to the permanent wealth of the Province by young orchards, 5000 acres at \$200 per acre, \$1,000,000.
3. Value of orchards now bearing, 7500 acres over \$500 per acre, \$3,750,000.
4. No. of men employed in fruit culture, 6000.
5. No. of men employed in barrel and box factories, nurseries, fertilizers and other industries required by fruit culture, 3000.
6. Freight paid for fruit to Railroads, \$60,000.
7. Freight paid steamboats, \$200,000.

While fruit growers are making a marked improvement in all departments of practical fruit culture, we are laboring under many disadvantages which it should be the

duty of this Association to remedy, or vigorously protest against; notably, the exorbitant freight rates for fruit, both by rail and steamer, and the inefficient and altogether unsatisfactory service and means of transport by both rail and steamer, as compared with other lines; the want of united action and Government aid in destroying insect pests and fungi injurious to fruit, and many other important subjects which will, I hope, receive your serious consideration during this session.

My report would be incomplete if I did not bear testimony to the fact that our work has succeeded so far owing to the ability, energy and cordial co-operation of our officers and members during the four years you have honored me with the office of President, and I shall now be pleased to welcome the man of your choice to succeed me in that honorable and important office.

POSSIBILITIES OF PEACH CULTURE IN NOVA SCOTIA.

PAPER READ BY C. A. PATRIQUIN, WOLFVILLE, AT THE ANNUAL
MEETING OF THE N. S. F. G. A.

It is all very well to talk about having our hills, plains, and vales covered with trees yielding rich and luscious Peaches, but the general opinion is that it cannot be done. They say that we here in N. S. will have to content ourselves with the fruits we now raise, and leave the cultivation of the peach to those climes which do not have severe winters, late spring frosts and short summers.

But before we say this cannot be done we should make careful consideration, investigation and trial.

To do anything successfully we first have to learn how to do it. To grow apples, plums, pears, strawberries profitably we have to be thoroughly acquainted with the business. So with the cultivation of the peach. We must learn how

to grow, cultivate and prune them before we can expect to produce them successfully. Allow me first to tell something of the history of this beautiful fruit.

The peach belongs to the family of prunes (*Amygdalus Persica*.) It is claimed that it originated either in Persia or China. There is no question but that it came from Persia as its botanical name refers to that origin. It is known to have flourished in both Persia and China at a very early date and is mentioned by Pliny and other classical writers. It is not mentioned in the Bible but its congener the Almond is mentioned several times, as early as the days of Jacob, for we find that when Jacob was preparing presents for the Governor of Egypt he commanded his sons to take myrrh nuts and almonds as a gift, thus showing the esteem in which it was then held.

The peach, like civilization itself has travelled westward. We find it mentioned in Roman history in the reign of the Emperor Claudius, and it is still a standard tree in Italy. It was introduced into England from Italy about 1550, from there introduced into the U. S. when first colonized.

To the last named country is due the credit of producing peaches in sufficient quantities to allow them to become a common marketable commodity.

While the peach can be grown and successfully cultivated in the U.S. anywhere south of 42 degrees north latitude and under an altitude of 9000 ft. it is not so sure a crop north of 40 degrees. Still there are some localities and sections so situated as to be much better suited to the fruit than others. In no part of the world perhaps is the beneficial influence of large bodies of water on temperature more distinctly marked than in Michigan.

This state lies north of 42 degrees N. latitude yet notwithstanding this, she stands in the front rank of fruit growing states, and competes with Ohio and California in the production of peaches. Her success in the cultivation of this fruit has been wonderful.

A satisfactory explanation is found in her happy Geographical position. The state is almost surrounded by

water. The Great Lakes soften the dry piercing winds of that region and make them moist. Hence it is, that Michigan lying between 42 degrees and 46 degrees ranks high as a fruit producing state and can successfully compete with states in warmer latitudes, in the production of peaches.

Travelling eastward, we come to the wonderful fruit producing peninsula of Ontario, and take a look at its Geographical position. Lying between the parallels of 42 dgs. and 45 dgs. north latitude, and surrounded like Michigan with large bodies of water which kill the piercing hard frosts that would prevail in the latitude were it not for its encompassing waters, we find the peach growing abundantly and competing in the markets with the same fruit from its southern neighbors. Taking a step or two further east we will look at the geographical position of our own Province and see if it does not compare favorably in latitude and surroundings with Ontario and Michigan. We are situated between the parallels 42 dgs. and 46 dgs. N. latitude and surrounded on all sides by water. Having the same latitude, the same influences to modify our less severe and shorter winters, the same amount of sun, the same length of summer, and growing apples, pears, plums, grapes, etc., of as good quality, beauty, flavor, as Ontario and Michigan, why is it that we cannot grow the peach? I think we may safely say that it is because we have not made the trial. We have never grown them, and that is sufficient reason for many why we cannot.

People said to Columbus, you can never find a country across the water; no one ever has discovered the unknown world and therefore you never will. But Columbus saw enough evidence of another land to give him faith to make a start, and we know the result. So I think that when we look at our situation, consider the climate, think of the great success that has been attained through our experiments with other fruit, and the successful trials that have been made in growing the peach in our own valley, we may conclude that there is no reason why we should not raise this fruit and that like Columbus, all we need is faith and work.

In fact peaches have been grown on a small scale in the valley successfully for the last 70 years. They were grown by a Mr. Prescott of Town Plot as far back as 1820, and have also been grown at Kentville, Wolfville, Wallbrook, and different parts of the valley. The trees have attained the age of 35 and 40 years, and have been bearing fruit a great part of that time and no doubt would have been fruitful all those years, had they been given proper cultivation and pruning. Recently quite an advance has been made in this line, and we now have thousands of trees planted throughout the valley and in quite a number of instances bearing fruit abundantly. If you will bear with me I will give you a history of my experience in growing this fruit :

In the Fall of '86 I ordered 12 Apricot trees to be delivered in the Spring of '87 to cost \$9.00. In the Spring they arrived as per order. I sold 3 of them to my neighbor and planted the other 9 trees. I treated them in the same manner as plum trees, cutting back two-thirds the last year's growth and trimming off the broken roots. I then planted them in mellow sandy loam, beside plum and apple trees. Since then they have had the same treatment with the exception of cutting back last year's growth. The first year some told me they thought that they were peach trees instead of apricot. The next season quite a number informed me they were peaches, and on making inquiry I came to the same conclusion myself. The 3rd season they bore a few peaches, the 4th year I had about 5 bus., and since then I have had an average yield of 6 bushels per year, one of the trees averaging $1\frac{1}{2}$ bushels per year. They have made a good spreading top and a height of about 15 feet with diameter of 8 in. Since then I have set about 2 doz. peach trees which have made good healthy growth, but I have been unable to get any fruit from them owing, I think to the variety. In the Spring there would be a few blossoms but very few would set. I have the last two years been budding them out, and budding in the variety that I have in bearing, which, as nearly as I can find out is the Early Alexander. The reason I call them this is from the description I found in Downing, and I have

on two occasions sent a specimen of the fruit, one to Mr. Willard and another to Chicago, and have on both occasions got the name of Early Alexander. I have tried the Early Rivers, Early Canada, and Heales' Early, but so far have been unable to find anything that will bear equal to the Alexander.

Last summer I made considerable enquiry and nearly all the bearing trees I saw or heard of have been Early Alexander. This variety is grown successfully in Grand Pre, Berwick, Kentville, Waterville, Bridgetown, Town Plot, and by quite a number in Wolfville.

The peach does best in a light sandy loam, a quick growth and rapid maturity both for trees and fruit, being the best conditions. As the young wood and fruit buds often both suffer from the piercing blasts of winter, a spot that is sheltered from these is much desired.

About the cultivation of the peach I will say little, as I know but little. The trees are set about 12 ft. apart or 300 to the acre.

Half a bushel to a tree is an average yield in peach growing localities, this at a price of 50 cts. to \$1.00 per basket would give profitable results. After the trees are set the soil should be kept mellow. In the fall, after the leaves drop, or at any convenient time through the winter, a portion of the last season's growth should be cut off, the amount depending on the condition or maturity of the wood.

In conclusion I would say that when we consider the reasons already mentioned with the adaptability of our soil the high natural wind breaks, and the success that has attended our attempts at growing the fruit without a theoretical or practical knowledge of how to cultivate it, I think we can safely conclude that we have a great future in the cultivation of the peach.

DISCUSSION.

PROF. FAVILLE.—I have listened with great attention to Mr. Patriquin's paper because he has cultivated the Peach to some extent. There are several diseases liable to attack the peach, and which would of course interest the peach grower. You will find such pests as "borers," "curculio," and some other insects like the "peach aphid," which affect the peach and also the peach yellows. In the case of the peach yellows I would suggest that it be cut down and burnt up; that is the best method of getting rid of the peach yellows. If they come once they will come again.

With regard to borers the best remedy is to dig them out and apply caustic applications.

In spraying for curculio with Paris Green you should have in your solution 2 ozs. of Paris Green for every 50 gallons of water. The trees should be sprayed when the bloom is on the leaf—that is when the leaves have a shiny glossy appearance. I would like very much to hear the paper discussed because I appreciate it.

RALPH EATON.—I was much pleased to see Mr. Patriquin's paper on the programme. I knew he had some experience, and I think it is a subject, at this stage of our fruit-growing industry, worthy of taking up. I have been interested in peach culture for a year or two and consequently have studied and observed something on peach growing. I have 900 trees planted and shall plant 600 more next spring. I have observed in reading on the subject of peach growing that the principal difficulty met with in the growing of peaches is the matter of low temperature in the winter. Occasionally also, very severe north-westerly gales, in the Spring when the temperature is not low, will affect the peach buds. It is the prevalent opinion that it is too cold here, but as Mr. Patriquin has said, it has not been tried. I have ascertained the temperature which they have at numerous places where they grow peaches successfully. In the Ontario peach districts they do not attempt to select the hardy varieties and the temperature I have learned is often as low

as 10 deg. below zero ; and it sometimes goes to 15 deg. You can all compare that temperature with ours. At Geneva, New York, it goes to 15 deg. below ; and occasionally as low as 20 deg. Still there they grow Early Crawford, Early Rivers, and Early Canada.

Where Mr. Hale lives, he writes me that the temperature often goes to 15 deg. below zero, and quite recently it went down to 20 deg.—they expect it to go down to 20 below every winter. Still he grows hardy varieties and I think also the more tender varieties. Speaking of the varieties of peaches there seemed to be more distinction than in any other fruit in the way of families. There is a family of hardy peaches and one that is not so hardy, the fruit buds being the test. The Alexander, which Mr. Patriquin has spoken of, is of a hardy family. And Mr. Hale says that the hardiest peach that he has cultivated is the "Crosby".

With regard to the diseases that the peach is subject to, as far as I have observed, there seems to be only one that peach growers seem to be afraid of. The curculio they can handle. Borers are quite easily handled ; the only disease they have not control of is the "Yellows". There was a bulletin published last Autumn by Prof. Bailey of Cornell, treating peach yellows, in which he stated that the yellows came on the peach trees slowly, it was often from three to four years from the time it made its appearance until it would kill the tree. It is described so fully that anyone can detect the disease when it first makes its appearance ; and it can be cut off and burnt as easily as the black knot on the plum tree. Prof. Bailey says it can be checked if it has not gone too far.

Very few persons would think it profitable to go largely into peach growing here. While visiting Halifax and St. John I made inquiries of the fruit dealers as to where they got their peaches—and as to the quantity consumed—and almost invariably the reply was, if you will grow good peaches for us we will guarantee you a good market. They intimated that if peaches could be grown in Nova Scotia and put upon the market fresh and in fine condition that enormous quantities would be sold. And

from what I have learned about the peach industry I think there is no risk whatever, and there is no reason why every farmer should not have a few trees in his garden even if he thinks it inadvisable or unprofitable to go into it as a business.

REV. A. MARTELL said that peach growing in the United States is confined to the eastern shore of Lake Michigan. In 1886 the yellows were very prevalent. They said that the cutting down plan was the only plan to save your trees. As to the climate, the peach growers were of the opinion there that when the thermometer sank below 15 deg. there was a poor prospect for very much fruit in the following summer.

T. E. SMITH said that he thought "Hill's Chili," "Brigdon," and "Early Crosby," good varieties for this climate.

PROF. FAVILLE.—In conversation with Mr. Willard he said that the three best varieties were Early Rivers, Haine's Surprise, and Hill's Chili, for this country. They begin to form bud early, but not so early as to be injured by the climate of this country. He recommended these three varieties.

C. A. PATRIQUIN.—When the Secretary asked me to write a paper on the possibility of peach culture, I was somewhat puzzled as to the scope I should take. I consulted a fruit grower on the subject and he said "do not try to cover too much ground and make it practical." And so I accordingly wrote on these lines for the purpose of opening up a discussion.

DR. DEWITT said that peach culture was very discouraging in this country. Within a short distance there were trees seven or eight years old, which had not grown a peach, but he said he did not know how well they had been cultivated.

There is a tree in Bear River that is known to be from 60 to 70 years old that raises from one to one and a half bushels every year. This peach tree bears every year.

The variety that will give us an average crop is the one we should venture. The questions we should consider are whether they could grow on our slopes? And whether they would survive the high winds and storms and the low temperature of our winters? He said that it must be remembered that Mr. Patriquin has a sly little nook which is almost equal to a tropical climate, and it is scarcely a parallel case with respect to the cultivation of peaches broadcast in our soil. He referred to the fact that a great deal would depend upon acclimatizing the peach—the vegetable kingdom was analogous to the animal kingdom—and there was no doubt in his mind that by acclimatizing it, it would prove beneficial.

A. H. JOHNSON said he had had an experience in fruit growing of 40 years. That no fruit grower need be afraid of cultivating any fruit if he stops soon enough. If he stops the 1st of August and lets his wood ripen, he would have more fruit and better trees.

REV. WM. BROWN said he would like to know what varieties were recommended for this climate?

RALPH EATON.—I want it understood that I have not grown any peaches. I have studied the subject a little and any information I may give is entirely second hand. The Crosby which Mr. Willard, of Geneva, has recommended to us, has been mentioned several times here. I think that it is the hardiest fruit known; and although Mr. Willard only propagated that variety for the first time last season, yet he thinks well of it, as it has far the best fruit buds. Next to the Crosby comes the Alexander, Red Check, Haines' Surprise, Early Rivers and Hill's Chili. A good canning peach is Jacques' Rare-ripe. The Hurlburt is one which is growing very much in favor and I think ranks next to the Crosby, perhaps a little superior in quality, and almost equal to it in hardness of fruit bud.

DR. CHIPMAN.—I would like to say for the benefit of Mr. Brown the peach grown most successfully here is the Alexander.

CRANBERRIES AND HOW TO GROW THEM.

BY HENRY SHAW, BERWICK.

MR. PRESIDENT, LADIES AND GENTLEMEN :—

Your secretary, Mr. Parker, asked me to come here and tell you how I raise cranberries. You are all acquainted with the natural habits of the wild cranberry. I commenced experimenting with cranberries in the year 1877. I had a wet sandy piece of land between sand hills on which originally soft wood timber grew. It is a white sandy piece with a little black mud. I cleared it up the same as you would clear your land for oats—and I may state right here that my first attempt was a failure; and I have always claimed that persons will always learn more by a failure than by success. Having heard they grew well I cut the vines up with a straw cutter and sowed them broadcast and harrowed them in. The result was that the vines came up thin, and the weeds thick; this was failure number one. 2nd. The next year I plowed it up and furrowed it out, set vines and covered them with a hoe. The ground was solid enough and I laid the vines out eight inches apart and in the fall they looked very fine. I had neglected to make a dam to flood it, and in the following Spring I found the vines were very nearly all thrown out; that was failure number two. I again set the vines the best I could with a spade and then I built a dam and flooded the ground. Now, what was the result? The fourth year I had five barrels and the next year ten barrels and the next year 20 barrels and the next year 24. I had four good crops in succession, then the frost for two or three years did considerable damage and destroyed the crops occasionally. The first time that I commenced to make a living out of this business was in the winter of 1881. I had a worthless swamp that was of no earthly use for anything. It may have been a shallow lake at one time and possibly through the course of ages it may have been drained off; it was covered with spruce and also had mud over it to the depth of from two or three inches to three feet. I dished the mud out in June, I chopped the

wood down, and burned the stumps up, and with very little expense I had it fitted for the plow. This was in the fall. In the next Spring I constructed a dam, and made connections with a brook so that I could flood it, two feet deep, when occasion required. In the month of June I went to the head of the Four Mile Lake, and got my vines—wild stock. And I may say here, do not import any vines from the United States, for they are infested with all sorts of worms and insects.

I ploughed two acres; on one acre the plough brought the sand to the surface; on the other acre the mud was too deep to reach the sand.

Well, in the following Spring I set vines out, in the months of June and July and I had no further work to do for about four years after.

They grew finely on both for four years, and I had no further work to do. In the fourth year I had a fine crop on that part which was sanded; on that part which had no sand, but was mud, the vines grew enormously, but there were no berries on them. I waited year after year for seven years and got nothing. I found they would not grow on the mud. The winter before last I sanded one quarter of an acre, and in the following spring I drew the water off and I found the sand had settled down out of sight. Last winter I gave it another coat and when I drew the water off some parts were covered too deep with sand but much of it was all right.

Gentlemen, I need not tell you that the cranberries were piled tier on top of tier; on that one quarter of an acre we gathered 27 bbls. of cranberries. Fortunately the fall frost did not touch that spot. In respect to the size of them, they were small; if they had been of the usual size they would have brought me one dollar a barrel more. I have got the evidence here and will compel you to believe it. This quarter of an acre produced 27 barrels. This quarter of an acre heretofore had never raised anything and it was like walking over a hay mow the vines were so thick. The three quarters that I did not sand, which had two or three feet of mud, did not bear anything. We got 108 bbls. to the acre and to get on the inside of

all possibilities we will get 100 bbls. to the acre. We sold these to the Montreal market for \$7.34 per bbl. net. Let us strike off \$1.34, and that will more than pay for barreling and hauling to the station, which will give us \$6.00 per bbl. net; and one hundred barrels to the acre will give us the sum of \$600, which at 5 per cent. will be the interest of \$12,000. Let us reduce the number from 100 bbls. down to 50 and at the rate of 5 per cent. this will give us the interest on \$6000.

Supposing we reduce the price per barrel from \$6.00 down to \$3.00, and that is a very low figure, that would leave us \$150 net; that would be at 5 per cent. the interest on \$3000. We will now reduce the quantity from 50 bbls. down to 25, which will give \$75.00 per acre net.

Now I suppose a good many gentlemen here will tell us what an acre of dyked land will net. What will an acre of grass sell for on the dyke?

A Voice.—\$12.00 clear of all expenses.

Now let me ask you how many acres will it take to produce the sum of \$75.00?

It will take six. To produce \$600 it will take 50 acres.

There is another way to put it. I maintain that the ordinary cranberry lands can be put under cultivation for \$75.00 an acre. And it will cost us no more for labor to fit an acre of land for cranberries, except the construction of the dam. And if a farmer can plow up his own sand it will cost him nothing for sand. If a man therefore invests \$75.00 in this industry of cultivating cranberries, he will make 100 per cent. for his trouble. And at \$600 per acre it will be 800 per cent.

There are millions of dollars lying in the Savings Banks drawing from 3 to 4 per cent. interest, which, if invested in an enterprise of this kind would bring a valuable return for the investors. Look at the amount of money invested in shipping, railroads, steamships, mines, manufactures and fishing throughout the country; is there one of these industries will net you 800 per cent.? Will it net 100 per cent.? Will it net 10 per cent.? Look at the

great investments of the world. The British money-lenders will lend their money for $3\frac{1}{2}$ per cent. and even for 2 per cent., and will take as security for the loan no better security than a cranberry bog. Take most of the worthless land in the country that is fit for nothing and by putting on it \$75.00 worth of labor you will get 100 to 800 per cent. for your trouble.

A Voice.—Supposing it fails one year in three?

My own failed one year in four which might reduce the profits.

Now, what about the markets? I need not tell you that we have the best markets for cranberries there are. There are not enough cranberries cultivated to supply the markets of the Dominion of Canada to-day.

A Voice.—What is the duty on them?

The duty amounts to about \$1.00 per barrel, and Mr. President, you will excuse me if I tell you that I have got a clinch on the National Policy for once. The gentlemen present know me well enough to know that I cannot let the National Policy go by without giving it a kick, but gentlemen, in this case I will make a polite bow to it, and I am sorry some of you are not as fortunate in that respect as I am.

A gentleman named Clogg, in Montreal, to whom I made a shipment sometime ago, wrote me that my berries were small and would not bring as high a price as others and he also said, "I cannot see the reason why you people cannot hold the Canadian trade for cranberries. * * Mr. Bishop's berries were equal to anything that ever came from Cape Cod." And I may say that mine would have been as good as Mr. Bishop's if the summer had not been so dry.

(The Secretary here read several letters with respect to Mr. Shaw's cranberries.)

Now, gentlemen, the returns from one barrel of cranberries in the city of Montreal to-day will enable you to purchase four barrels of flour. And a barrel of cranberries can be raised on a piece of land that would not raise wheat enough to keep a hen and a flock of chickens alive for 20 minutes. (Laughter).

Go and try a couple of square rods and see for yourself.

Now what about the future? We have got just the conditions here to make this valley renowned for cranberries as have made it renowned and famous for apple growing. And when the time comes when we overstock the market with cranberries we can do with our cranberries the same as we are now doing with our apples and shortly will do with our plums—get a market outside.

And the great advantage of cranberry growing over all other berries is that when they are ripe they may remain, uninjured, if not picked for four or five weeks; and then again they will keep and carry in good condition, and ship as far as the Baldwin apple. That, gentlemen, is the advantage of growing cranberries.

To go into the business the conditions are as favorable as they can be. We have the capital here. There are tens and thousands of dollars here, lying in the Savings Banks, which if invested would bring brilliant results and be far more safely invested; for no bank director can take up a cranberry bog and stuff it into his coat pocket and step out. The security for the outlay is good. We have thousands of acres of land fit for this purpose, now used for nothing, but which is simply holding the county together. Then we have the labor for hundreds of young men. We also have the wild vines in the greatest abundance. We are also free from the insect pests for the present. If you want to get the information write to Orange Judd & Co., New York city, and get J. J. White's work on cranberry culture. The only thing you want is determination—and that you cannot borrow or beg—and, gentlemen, there are only two things in this world you can grow without determination,—grow old and grow poor.

Nine or ten of my neighbors went into the business during the past few years successfully. They all sung out "minks" when I started, but when the conditions were as good as mine they were equally successful.

Twining Lyons cultivated a quarter of an acre of low wet sandy land and he has raised a good crop every year. He had 22 barrels of fine cranberries one year, but he did not flood it and last summer the drought affected it.

Richardson Chute put out an acre in poor sandy soil and last year he had the finest crop of berries I ever saw. He took first class prizes and one second prize at the exhibition in Halifax. His great success was attributed to his flooding; he flooded his ground three times.

Now, with respect to Mr. James Hurd, North Mountain, he cultivated an acre or so—a mere swamp—and he has beat the whole of us. Last year he had 40 barrels. He does not use sand. His best success has been on blue clay; it is low, wet, sandy land. Some seven or eight have tried it and have not been as successful as he has, conditions not being as good. The best soil for cranberries is the deep black mud swamp covered with sand; and flood it if you can. J. J. White says they will not grow on clay, loam or drift formation. (Applause).

MR. SHAW said that whenever you get an alluvial formation of the ground it is good cranberry ground. Flood it if you can. The pests which the cranberry had to combat with were the Tip Worm and the Gall Gnat—they infest the cranberry vine. There are none of these pests in this country yet. I have never been on the Atlantic coast to see the boys there. There are three distinctly different kinds of berries—the Neville berry, Cherry berry and the Bell berry. The Neville berry is fine and ripens early and is of a very dark color, but is not a good keeper. The Cherry berry is large and dark colored, and is a fine keeper, —the Bell is smaller—pink in color, and has good keeping qualities.

I have never grown the Cod berries.

THE PRESIDENT.—I am familiar with the coast bog—there is a small berry called the Spy cranberry.

SHAW—You cannot grow them except on moss. We have tried them year after year but could not do anything with them.

J. E. STARR—Asked the expense of harvesting the cranberry?

SHAW—I allowed \$1.34 for picking, barrelling, price of the barrels and hauling to the station. They are put up

in a proper sized imperial barrel. They are picked for one cent a quart. The price of the barrel is 20 cents. We commence to pick about the 10th, 12th or 15th of September.

J. E. STARR—Supposing you had ten times as many to pick then how would you get the proceeds? How would you manage?

SHAW—I suppose you could flood the bogs and drive them off by “stream driving.” (Laughter and applause.) There is one thing I forgot to tell you: you require no manures if your conditions are all right; they will bear for years and years. In the United States they have taken to fertilizing them with commercial manures. Where you have a swamp covered with mud you have it there for a long time. Flood it in the fall and draw it off in the spring—and then go and pick your berries. The wild vines are the best and can be easily obtained. There are scores of acres of vines, and all you have to do is to go and pull them up.

I read an account of a harvesting apparatus which is used at Cape Cod, in which they can take up 4-5—or in other words one man can do the work of ten.

M. G. DEWOLFE—As I understand it, the great trouble in cranberry culture is frost?

SHAW—Yes, sir.

M. G. DEWOLFE—Has it ever been tried, or is it feasible to have smudge fires during the frost season?

SHAW—It was tried in Kirkpatrick’s time and proved a failure.

HOW FAR APART SHALL WE PLANT OUR TREES?

BY R. S. EATON.

MR. PRESIDENT,—When asked by the Secretary for a paper this year I replied that I feared the Association would think I had taken the contract for a yearly contribution. I afterwards consented to open a discussion on this

subject for I am interested in close planting and should like to hear all good, sound reasons which can be advanced against the system which I will propose.

The question is, "How close shall we plant our fruit trees?" I think that the orthodox rule of 33 feet apart, or 40 trees to the acre, has been so long in practice in our valley that a suggestion, even, that a closer system might be more profitable, would at once meet with disapproval, and I feel quite alone in arguing for this closer planting. It seems difficult for us to make a change from a practice that is so long established. While we should be conservative about changing well tried methods, and slow about adopting new theories, which are of doubtful practical value, yet in this age where new systems in science and agriculture are yearly supplanting old ones, and where different crops have different values now from what they had 30 years ago, should we not hold ourselves open to conviction, if practical changes are suggested, and not allow prejudice to prevent us from seeing merits in any scheme or system, different from that we have always held as the best ones?

My remarks on this subject will have reference more especially to the planting of apple trees. The distance apart of our plantings of recent years has been influenced largely by what we have observed, in our standard or well known, popular varieties, as to the size of the trees when they come into bearing. Now we all know that even these popular varieties, can, with extra good care, be made to bear sufficiently early so that should the trees be set half the usual distance apart they would pay for themselves many times over before they would suffer from the interference of their branches. But we have lately discovered a few excellent market varieties which have been sufficiently tested in this province and in similar climates, to prove that they are naturally disposed to be very early and heavy bearers. This disposition is as distinctly marked in some varieties of fruit trees as early maturing is in some grades of stock, the Jersey for instance.

I take it for granted that in any business it is desirable to get the largest amount of profit for our labor. Why do people plant orchards? Is it not because they believe

they can get larger yearly net returns from a given acreage of bearing fruit trees than they can from the same acreage in potatoes, grain or grass. We know that a bushel of apples is almost always worth two bushels of potatoes. Is it not a pertinent question then,—how can we obtain the largest number of bushels of apples from a given acreage? Is this question not worthy of consideration? Is it not just the question for us to think about? Shall we be satisfied with from 75 to 100 bbls of apples per acre (representing \$150 to \$200.) after an orchard is fifteen years planted, or it is possible for us to get from 100 to 150 bbls. per acre by the tenth year, and from 150 to 250 bbls per acre from the tenth to the fifteenth years. Or again, if we want 100 bbls. of apples from an acre as soon as possible, would we be as likely to get it from 40 trees as we would from 130?

As this is a discussion I would take the stand that I think it feasible and practical to plant our ordinary and popular varieties 33ft. apart as usual, and then plant half way between them, each way, making them 16½ft. apart (except on every third space) such early bearing varieties as Wealthy, Wagner or Ben Davis. This would give about 130 trees to the acre and leave a good cart way, in every third space, 33ft. wide. Experience has shown that those varieties I have named, and especially the Wealthy will, if well cared for give an appreciable quantity of fruit the fourth and fifth year and will bear annually. When these trees have grown to such a size that they would interfere in a few years with the standard varieties, there would be no difficulty in checking their growth and inducing heavy fruiting by either heading in, in summer, girdling or root pruning. Many of the largest and most advanced fruit growers in the United States and in England have every faith in their ability to govern fruit trees in this way. Thus they could be made to give good returns for a number of years without increasing their superficial area. When it was seen that every part of the orchard would actually be more profitable with some of these trees removed, they could be taken out, one by one, where deemed most desirable. With the proper management of all the trees I would anticipate that no removals need be made till from the fifteenth to the twen-

tieth year from planting. During the most of this time the product per tree could be multiplied by 130 instead of 40 to find the total yield per acre. You can easily estimate how appreciable this difference would be in the increase from one acre if the trees were giving from one to two barrels per tree, and the contrast between the totals would be much more marked in figuring on ten or twenty acre orchards. In due time all trees, unprofitable for any reason, could be removed and the number of trees per acre reduced to any desired quantity.

I would now anticipate a few objections which would be most naturally made to this system. One would say the ground would get too full of roots. In answering this I would suggest first that we give the roots two feet of mellow soil by thorough sub-soiling every year or two before the roots cover the ground, thus giving about 18 inches in depth instead of six, as is usual, for the roots to feed in. Second, that we consider the thrifty condition of our forest trees where they are growing six to ten feet from one another, with butts eight to twelve inches in diameter, and running up thirty to forty feet high.

Another will say that the soil where the roots of the early bearing varieties have fed will not be as good for the trees that are to be left permanently. I would answer that these roots have taken nothing but nitrogen, phosphoric acid and potash and these can be easily supplied by our fertilizers in the proportion and quantity that the tree wants them.

Some one will argue that the ground will be too much shaded by so many trees, at the same time they do not seem to think that potatoes or corn shade the ground and these two crops are always considered most desirable for orchards. Further, it is a question whether or not the ground is not more moist and the better for being shaded.

Another will say, "my bearing orchard of thirty to forty years of age are far too close. The trees should have been 40 feet apart instead of 33 feet. I can scarcely get a team around among the trees." I have stated that the number of trees per acre could be reduced as desired after

the first 20 years. But should we adopt a system of planting to-day that will just suit the circumstances of 40 years hence, 1935. Do we want to wait forty years for largest profits from our orchards?

Again, those who look at orchards to-day that were planted 20 to 25 feet apart 50 years ago, and see their long bare trunks and their small crowded tops almost sky high, will say "oh this will never do! this is abominable!" and so it is abominable. But have these trees not been allowed to grow at their own sweet will? No heading in, no trees taken out, and this is not what we are advocating. Have we got to let trees grow just as they like, or has man not the power to make them grow as he wishes, or to stop them from growing in any direction he chooses?

And now some one will ask, "has planting as close as this ever been tried, and does it work! Yes, and it works. Mr. Sharp of Woodstock, N. B., has a seventy-five acre block, mostly Wealthys, planted about 12 by 20 feet. and though the trees are very young, and perhaps would not average more than a half bushel to a tree, yet there being so many trees to the acre, the total product is a handsome thing.

The largest orchard perhaps in Kansas, one owned by Mr. Wellhouse containing 437 acres, is planted 12 by 32 and it has been a very paying orchard. A prominent writer before the Missouri Horticultural Society states: "Persons buying orchards are apt to want those just coming into bearing and as many trees to the acre as can well be, never less than 100. It is immediate fruit and lots of it that they want. The most certain and most profitable orchard within my knowledge contains 160 trees to the acre, only one rod apart each way."

There are, besides, two practical advantages in this close system of planting, and with alternate varieties, viz: economy in cultivation, it taking no longer to cultivate 130 on an acre than it would 40; and in alternating the varieties it increases the chances for the better fertilization of the pollen. No one who believes in plum culture objects to planting plums in between the apple trees at the

distance I have suggested for the early bearing varieties of apple. Our plum market is much more limited and uncertain than our apple and the chances are, I think, that a Wealthy or Wagner apple tree will give far more bushels of fruit up to the fifteenth from planting than a plum tree.

Regarding the three varieties I have mentioned, Wealthy, Wagner and Ben Davis, the last is quite well and favorably known by most of us. The Wagner, where grown is remarkable for early and heavy bearing, often commencing the second and third year from planting. The Wealthy is increasing in popularity each year in Canada and the United States. It is grown quite largely in the northern part of New Brunswick and in a few parts of N. S. It is particularly hardy. Prof. Craig says, "there is money in it. You cannot plant too many of them. The only faults are its heavy bearing and short life" faults very desirable for the use I have suggested.

Now if fruits other than the apple were desired, I think that many early bearing varieties of plum, as Moore's Artic, Burbank and Abundance could be planted with profit between these apple trees to the number of 160 to the acre. Where the acreage was small and the maximum amount of profit was desired, and first class care could be given, I think the number of plums, peaches or dwarf pears could be increased till the sum total trees per acre would be as much as 500 and the chance of getting an annual income, after a few years, of \$500 per acre would be better. If an income like this can be obtained, and I do not think it is at all impossible, what better outlook is there in any other line of business for a young man with limited capital. I believe that ten acres, perhaps less, are sufficient, if thickly set with fruit trees, to give a family a handsome living. But these must be well cared for and by a man who loves his trees. There is no lack of good orchard land at from \$20 to \$30 per acre and first class trees can be got from reliable American nurserymen, direct, for very low figures. Thick planting would not in the least interfere with growing potatoes for the first four years and perhaps potatoes are the next best paying crop to fruit. If any preferred gooseberries, currants, strawberries, etc., early returns can

also be obtained but probably these fruits would be more injurious to the trees than potatoes and require more care. One of the most profit giving farms in this valley is a ten acre fruit farm, and a portion of the first planted has paid at the rate of more than \$1000 per acre. One of the best proofs of thick planting, as far as thick planting simply versus thin planting, can be seen right in our midst in the gardens of Mr. Archibald. We have not, in Nova Scotia perhaps, an example of ten acres all planted at the one time as thickly as I have suggested but is it absurd to suppose that 10 acres, with 500 trees to the acre, or 5000 trees, can be made to average from fifty cents to one dollar per tree? And what does this represent? Is it not possible that there are a few things in fruit growing that will bear a closer examination than we have heretofore given them? Have we seen all around and all through the subject? Let us get to the bottom of it and see if there is not more in it than we have yet dreamed of.

DR. CHIPMAN said that Judge Weatherbe had been acting on this principle of close planting for a number of years. Judge Weatherbe had the largest orchard in the Maritime Provinces, it consisted of 7550 trees. He used, between the standard trees, dwarf sorts, and these dwarf trees began to bear the second year.

DR. DEWITT said the planting of trees so close together seemed to him novel. The trees each must have a certain amount of potash, phosphoric acid and soda. He said he would like to know how many barrels of apples Judge Weatherbe raised on those 7550 trees last year.

R. W. STARR.—If you want to grow timber you go into the woods where the timber is the only product and that is where the timber grows the finest. In growing fruit you have to go out into the air and sunlight and put food in the soil for the growing of fruit, then you will get fruit in a disproportionate ratio to the timber and the foliage. I believe after all in close planting if proper means are taken not to plant all of the ordinary kinds of large growing trees.

RALPH EATON.—I would not propose to leave apple trees, 120 trees to the acre in an orchard, when they become unprofitable. I would advise planting 40 trees to the acre of our popular varieties, and I would set between them the other varieties that come into early bearing, they having the advantage of fertilizing, the Wealthy, Wagner and for instance.

DR. BORDEN.—Will the Ben Davis and the other two varieties you mentioned produce fruit as early as the dwarf tree?

R. EATON.—In Woodstock a gentleman showed me a row of Wealthys $1\frac{1}{2}$ doz. trees in the garden 5 years old. with $1\frac{1}{2}$ bushels on each of them.

T. H. PARKER said that the distance apart you may plant trees depends largely on your method of pruning. You must aim to get your foliage as near as possible to the ground when pruning.

A. B. PARKER said that from 20 to 24 feet was the proper width between the trees to plant a standard orchard.

RALPH EATON said the best argument on behalf of his contention was Mr. Archibald's orchard in Wolfville. It could hold good equally with apples as it does with plums.

THE MARKETING OF OUR FRUIT.

BY A. MC N. PATTERSON.

MR. PRESIDENT, LADIES AND GENTLEMEN,—I am appearing before you this afternoon without a paper to read, and I have a good excuse for it. I am so busy with my own work at home that I had no time to put my thoughts in writing. With regard to this subject: "The marketing of our fruit," I am reminded of what was said by Mrs. Partington—"she seldom opened her mouth but she put her foot in it."

I remember a few years ago reading a paper here

but when I got through I seemed all alone. It did not seem to take.

I am very much pleased to see so many influential gentlemen present, and I am glad to know that you are interested in this apple culture, and apple marketing. I am glad that we have such a climate, and such a soil that we can produce the best apples in America, and the apple industry is the industry which will make this Valley what it should be.

I saw in a paper that Colonel Starrat realized from three consecutive trees \$70, and these were all different varieties. Multiply this by 13 and that is about 40 trees to the acre placed two rods apart and you have over \$900 for an acre of apples. Now there is nothing like our apple culture, and there is nothing like taking hold of it and working at it until you make something out of it. I am almost afraid of our F. G. A. I am almost afraid it has gone into horticulture. I would like to see it go in the direction of the apple industry.

According to the President's address we are paying now \$200,000 for freight. The cultivation of apples must certainly be on the increase. I wonder if we are taking proper care with regard to putting up our apples, and to placing them properly upon the English market? I say we are not doing so, and I feel sure you gentlemen will bear me out, that it was done as carelessly in 1894 as it was years and years ago. As conducted now it seems the only idea is to get the apple picked, get it away and get something for it.

A few years ago I read a paper here on the marketing of our apples. At that time I made the statement, that all we knew about our apples was, that we put them on board of the cars, and at length we get an account of sales—and a little enclosed cheque that belonged to the grower,—that is all we knew of it. We did not know how they were put on board the steamer—we knew nothing of the freight—we did not know about the ventilation—how they were handled on the other side. We did not know with absolute certainty, what they sold for. I do not thin k

it is an offensive thing to say—it is not the way we do business in other respects—but every man should have the business he is connected with investigated. We place auditors on our public affairs, and we should know what is done with the fruit from the time we barrel it to the time it is sold to the consumer. Why? It is just this—If our apples do not get into London in good condition, what are we to expect? We cannot expect the proper price. And again we are also suffering a great loss by the freights. Are we sending them across at a cheaper rate now than before. Not at all. It costs you \$1.50 on every barrel you send. Suppose you reduce the expenses of putting your fruit on the London market—who would get the benefit of it? The grower would, certainly. Everything we can do in lessening the expenses of putting our apples on the London market, and the increase upon the sales, will all go into the producers' pockets. Now there should be something done with regard to this. Now, I am going to ask are we to leave this unsatisfactory state of things alone. We want to act like men who see the evil and are determined to mend it.

Shall we expect an improvement in this matter from the speculator? No! Why? Because it does not interest him. He has got the inside track already. Because it is not so much what the fruit brings; if he sells cheap he will buy cheap. The more ignorant the producer is, the more he is at the mercy of the middleman. He is absolutely at the mercy of the buyer.

Is the agent in London interested enough to mend this matter with regard to our fruit? No. Why? He is paid his commissions. And there is another little charge which goes on there. I have been looking over the matter. I sent across about 25 bbls. and compared the accounts of sales, and I observed this: that the expense upon our apples is about equal to the net proceeds, and I also observed that after the freight is paid there is an additional charge equal to that, and we cannot tell what it means there are so many items mentioned. We are completely unable to discern whether it is correct or not from the account of sales. The agent here who has no interest in the matter and adds

nothing to his pocket, is not going to deal with it. If ever our fruit is going to be put in the London market in a proper state and with lower rates, the producers have got to get it done themselves. Now, is it not an astonishing thing that we producers sit quietly and walk around contented, and allow ourselves to be robbed year after year, and feel satisfied about it? I hardly think we live in Nova Scotia. It is more like Bermuda, or the Torrid Zone, where a man never thinks of opening his mouth until his elbow bends. (Laughter).

Look at the Antipodes; the New Zealanders are putting their mutton on the London market and driving all other mutton out of it. They start away down in the temperate zone, they send their mutton across the torrid zone into the temperate zone, and it is preferred to the English mutton, and they are shipping it to their profit, and we who are in the same latitude cannot send our apples across the North Atlantic without having them arrive in bad condition. We could put a lot of schooners on the route which would convey our apples cheaper and much better. The steamer charges what freight it likes, and the agents simply run around to this steamer or that, and they are not interested in the slightest degree what we get for our apples. I am glad I did not die last year. I would be ashamed to live in such a condition of things and hand it down to my children and grand children. I would say let us bind ourselves together and remedy this state of affairs. We once got a steamer—we were on the right track; directly runners connected with these steamers came along and made offers for freight, etc.—divided us—and the consequence was we had to load her with lumber. We see some shippers sending potatoes to Cuba and Jamaica, shipping them in steamers at a cost of forty cents per barrel. I would like to know how much it would cost to get a steamer that would carry 8000 or 9000 barrels of apples; have our apples stored with proper ventilation flues and every provision made, and not hammered around on the wharves at Halifax; how much more would it cost than to take a barrel to Cuba? We have our orchards and let us look to them sharply until we

get out of them all that is in them. The fault in the combination established some time ago was this: If one man forfeited his part of the contract, the other man had to pay for his negligence—that was the fault. What do we want? We simply want a combination to form a company that each man shall be obliged to do just what he contracted to do. If he says I will put 500 barrels of apples on your list for export he must be answerable for supplying the 500 barrels. Your working committee hire your steamers and see how the apples are carried across, see to the ventilation of the steamers, and when they get at the other side, see how they are handled there. Let them send a steamer to Manchester, or to Bristol, or any place where apples may be sold.

With these few remarks I hope you will see to it and have the matter remedied. I hope you will move, that on a certain day a meeting of fruit growers will be called to form a company, in some form, to attend to the shipping of our fruit.

Thanking you, Mr. President, I will now take my seat. (Applause).

DISCUSSION.

J. E STARR complimented Mr. A. McN. Patterson on his very able remarks. He thought pressure should be brought upon the Government with reference to the subsidy and prevent the subsidy being granted to a company which acts so badly.

THE PRESIDENT said the company had a bigger pull with the Dominion Government than they had.

A. McN. PATTERSON said it was worth while starting a company again. Let the farmers bind themselves each to supply so many barrels of apples for freight, then let a committee charter a steamer.

J. E. STARR said that when a company undertook to bind men securely to fulfill their engagements and presented them with a legal document to sign they would not sign it.

REV. MR. BROWN said the fruit growers would have to stand by one another to remedy the matter. If the farmers would not stand by one another it would be impossible to do anything.

THE PRESIDENT.—Experience has proved that they will not stand by one another.

MR. JOHNSON—What proportion of apples grown in this Valley is shipped by fruit growers—and what proportion is shipped by speculators?

THE PRESIDENT.—It differs very largely. The number who invariably ship their own apples, I think may be fairly estimated as representing one-half the crop, taking one year with another.



FREIGHT AND FREIGHT RATES.

W. H. CHASE

It has occurred to me that a fruit growers' association is scarcely the place where a subject of this kind should be discussed, yet the bond between growing and shipping is considered by many almost inseparable—and probably there is no better place for discussing this subject than before an association of this kind. The only market in Great Britain where our apples as yet are known to any degree, is London; and the only regular service we have from Halifax to London, as no doubt you are all aware, is the Furness Line. And since two years ago, when this subject came before the association, I am very glad to say there have been added to this line two first class steamers—the Halifax City and the St. John City, the latter a new boat and only now due at Halifax on her first voyage. The class of boat to which I have just referred I think well adapted for the transportation of our apples to London; the only trouble in this line is the company have not added a sufficient number of these boats to their line to meet the requirements of the trade, when our valley produces such a crop as it has the past season. What we require, a season like this, is at least two more boats similar to the two already mentioned, they with the Damara, of the same line, and the Ulunda of the Canada Atlantic Co., properly arranged, would give us a regular weekly service; and this is what the trade requires, and more, demands, to be successfully carried on.

I would suggest that a motion be made by some one of this association, and if passed unanimously, that same be forwarded to agents of Furness Line, showing that as growers we are awake to the necessity of better and more regular transportation.

I need not refer to the dissatisfaction and uncertainty arising from the chartering of outside boats; some of these may be good, others quite unfit for the business. We require boats to make the passage from Halifax to London in ten or twelve days then we are assured with proper venti-

lation that apples will be delivered in good condition if properly shipped.

This season our exports from say Sept. 20th to Feb. 15th will reach about 210,000 bbls., or say 20 weeks, drop two weeks 8th to 22nd Dec. when but little fruit should be shipped, we have in eighteen weeks nearly 12000 bbls. weekly, and to this you can add 35,000 bbls. which will probably go forward in smaller quantities. This makes a total of some 250,000 barrels for the season and we are only on the threshold I believe of this great industry for which this valley is so well adapted.

Now regarding rates of freight. I have always contended, first, get the proper boats for carrying apples, the laws of commerce will regulate the rates.

No company in the transportation business can afford to charge exorbitant rates in these times; as by so doing they only invite opposition, but so soon as we can show annually an export of not less than 250,000 barrels apples regularly, then to my mind will we be assured of more regular sailings and better freight rates.

You are all aware that our shipments to England this year will exceed by 100,000 barrels any previous year, yet we cannot expect to reach the same quantity the coming year; but in the near future we will, I believe, surpass this year's exports as far as we this year have exceeded any previous year, and for this reason, the time is opportune to move in the direction of a more regular service of boats well adapted for the business.

And now, before closing my few remarks, as I was warned to be brief, I cannot but congratulate this association on the great assistance it has been in nurturing this great natural industry, if I may so style it, and bringing it to its present efficiency. Yet do not lose sight of the fact, that there is much yet to be done in various modes of cultivation and contending with all manner of enemies which beset this as well as every other industry of a similar nature.

T. H. PARKER said that he always had some hope that when the F. G. A. had reached such a position as it is

now in that something would be done, but the matter was just as bad as ever it was.

M.G. DEWOLFE said that this thing had been discussed for the past 18 years. That they could not expect to accomplish anything unless it was conducted on business principles. If each one would put up \$2.00 that would make the sum of \$1000 which would make a nucleus fund to charter a steamer, or to send a man across to the London market to see that the fruit is properly cared for and properly placed upon the market and to see that the proper returns are made for the fruit. He further said that the speculators were as much interested in having the fruit go into the British market in first class order as we were. He also said that the railway authorities should be approached in order to obtain proper platforms at stations and for better means of transportation.

J. B. MILLS, M. P., said: To say that I have been deeply interested in your meetings would be hardly giving you my appreciation. To direct a stream, a dam is necessary. In order to regulate the tariff of rates from here to London with reference to your apples you must have influence. You may be weak in not owning your steamers, or chartering your steamers—and just here I believe in subsidizing steamship lines—I believe in subsidizing the Furness Line. I believe in a fast line. But you have influence, and if exerted properly, the proper freight rates can be obtained. Someone said here to-day that we have not the influence; I am somewhat of a farmer myself; that we have not enough influence with the Government to get what we require; not as much influence as the merchants have. I say you have. You tell me that you have not—an intelligent people—that you have not influence with the Government. I say no to a proposition of that kind. The influence can be made. I consider the whole thing with reference to the freight rates in a nutshell. If you are not strong enough to own your own steamers; if you are not strong enough to run your own line of steamers you are strong enough to get the freight rates fixed, and that is to be done by the Government of our country. (Applause.) That is the only way. This is not new to me, but I have

had my ideas exceedingly brightened by the discussions here to-day. You are going in the right direction. Go on in the course in which you have been doing for the last 20 years, and it will not be very long before the fruit growers of this valley will be large enough and important enough to regulate their own steamers, and own the boats in this valley. Go on in that course and you will soon be in a position to be independent of any Government, or of any influence in that way. (Applause).

JOHN DONALDSON—said he had been talking with Dr. Borden, M.P. who said that it would be much harder to have the subsidy taken away than put on.

J. B. MILLS, M. P.—We have no desire to take it off, but it can be so regulated as to give the farmers of this Valley a benefit so far as their freight rates are concerned.

A VOICE—How?

J. B. MILLS, M. P.—That is a question that will have to be decided by the Minister of Trade and Commerce, and I shall take particular pains that his attention shall be called to that.

W. H. CHASE—Said that two shillings a barrel on steamers was the average rate. The railways allow 20 cents from the different stations to Halifax, that makes 70 cents. You cannot expect to get as low rates as from Boston and Montreal, for the simple reason there is nothing else for the boats to carry. The boats require large consignments of from 5,000 to 10,000 guaranteed, and they require them to be ready to be shipped within 48 hours. Your railway is not prepared to carry them forward in sufficient quantities to meet these steamers. The whole thing is not done on a business basis. The thing is to try and get better boats and more boats, like the "Halifax City" and "St. John City," on this route so you will not require to charter tramp steamers.

T. H. PARKER—Could you tell us anything of the ventilation of those two steamers?

W. H. CHASE—The ventilation I have been told is good. I have not personally inspected it. As far as I

have been able to learn from a shipper in the Halifax City the fruit is invariably delivered in a first class condition.

R. S. EATON suggested that a committee be appointed to take transportation matters into consideration. A committee was accordingly appointed, composed of W. H. Chase, J. E. Starr and T. H. Parker.

SUGGESTIVE SPROUTS IN PREVENTIVE HORTICULTURE.

BY DR. G. E. DE WITT.

Those who have given time and consideration to the study of Horticulture realize that it is a science, a profession of itself. The study of how to care for, improve and promote vegetable life, is akin to the study of the structure, the development, and fostering of animal life and the cure of its diseases; while the plant has not a mind to think, a soul to be lost or saved, it certainly has in it the elements of life and death and is the material on which man who has a mind to think and act, depends for his subsistence. How important then that we should know all we possibly can of that kingdom which is so essential to our earthly existence.

The agricultural classes are waking up to the importance of becoming more interested and equipped with the knowledge of its different branches than ever before. The world is acknowledging more than ever before that brain as well as brawn is needed in all agricultural pursuits, in order to make them a success.

The Fruit Growers' Association, of this province, has given a stimulus and impetus to the development of agriculture which it would not have attained, had it not been for its support.

The dissemination of knowledge in Horticultural and Agricultural magazines is doing much to improve and develop these branches and we trust and believe that the Horticultural school of Wolfville will become no mean

factor in engaging the attention of the farmers of the Province in such a way as to make their pursuits appear to them what they really are, more interesting, honorable and profitable.

The science of Horticulture is progressive, as are all other sciences. The farmer who thinks he has no more to learn; that he cannot be taught anything; that the earth that brings forth life has no significance or mystery to solve in it, is a retrogressive man.

The only way such an individual can be taught, is by bitter experience. After living out a great part of his early existence, it dawns upon him that his neighbor, who has kept abreast of the times, is reaping a rich reward from his scientifically cultivated and well kept orchards and fields.

There is a consolation, however, that if the careless and retrogressive farmer does not live long enough, after he is convinced that his neighbors way is the best, to reap the results of his dearly bought experience, that the sons will see the error of the father's way, which will be an incentive to them to obtain the knowledge that will make their labor result to the best advantage.

"Suggestive Sprouts in Preventive Horticulture," is the title of my paper. In fact, I am but a sprout in the science myself. None of us have attained to the full stature of a tree. While we watch its development and learn of the influences in air and soil that govern it, and wonder at the things unfolded to us in its life, we are constrained to acknowledge there are things we have not yet solved in this ennobling occupation. Much less, will we, while on this terrestrial sphere, ever divine all the mysteries hidden in the "Tree of Knowledge!"

The man who practices the principles of hygiene, who obeys the principles that govern the laws of health, who looks well after his digestion, knows how to eat, what to eat, what to wear; who looks well after his sanitary environment, knowing that the animal kingdom is materially affected by bad ventilation and undrained soil; that contaminations and emanations from whatever source are the harbingers of disease; who undertakes by the most enlightened

modes to adhere to and remedy them, is practicing preventive medicine. They who do this, do more for the preservation of their own health and the health of others, than the physician, who treats and undertakes to cure diseases.

The horticulturist who selects healthy stock and plants it intelligently, in soil adapted to the growth of the plant; who cultivates and prunes scientifically; who successfully keeps away insect life, destructive of the plant, realizing that the saying, credited to John Wesley, "Cleanliness is nigh unto Godliness," is as applicable to the welfare of the vegetable as to the animal world, is practicing preventive horticulture, and does far more to make the profession of horticulture successful, than the curing of its diseases.

What will produce poor fruit? Wet soil, undrained land. The wetter the season, the poorer is the quality of the fruit. Authorities say, place a tin can pierced with small holes alongside of a strawberry plant so that a constant dripping is kept up and there will be larger berries on that plant than on the surrounding plants, but the quality and flavor of the watered berry will not be so good.

In the Western States, where irrigation is employed and where apples are grown to a large size, the flavor and texture is not equal to our own. Irrigation is a sort of drenching process, and, unless it is skillfully done, it is apt to injure the fruit on account of an excess of water. In a dry season, other things being equal, the fruit is benefitted by capillarity.

Every dry season, such as the one just passed, when the fruit, especially the apples, was of the most delicious flavor and quality, this process, called capillarity, went on to a great extent. In seasons when rains are frequent, the water finds its way to the roots of plants by the process of percolation, and while this process carries with it all the moisture and, frequently more than the plant needs, it does not supply the sap of the tree, or the plant, with the mineral material necessary to improve the quality of the fruit, as does capillarity. The reserve force in nature's storehouse not only affords a supply of moisture, but a mineral supply as well, which latter improves the quality of the fruit.

The crowding of orchards is a very effective way to produce poor fruit.

The animal, whether man or beast, that lives constantly in a dark room, will become anæmic weak and pale. The air he breathes is not sufficiently oxygenated to keep his blood in a normal condition. The want of air and light in an orchard produces much the same effect upon the fruit. If an orchard is kept dark and cool by the crowding of trees together, the fruit will become more acid and will not color, for the reason that light and temperature are essential to the formation of sugar and the sunlight highly essential to the development of the chloroplastids, which make the coloring matter in the fruit. An orchard may be so crowded as to produce an imperfect circulation of air.

I, with due respect to the opinion of many of the farmers of the Annapolis Valley, venture to say that the majority of orchards have been planted too closely. Two trees growing where one ought to grow, requires twice the nourishment to support them and will not grow as many shipping apples as the one would have matured; besides there is double the labour expended in planting, pruning and gathering of the fruit. It has been observed by orchardists, that, where orchards have been planted in solid blocks that the trees in the outside row have borne more fruit of an increased size and color, than the trees in the centre rows. Why? Because they have more pure air and sunlight, and their roots and rootlets, reach out into a space in the soil not encroached upon by the other trees. When the trees become old in an overcrowded orchard, as the tree ascends, its lower branches, which have been deprived of sunlight and pure air, die and have to be lopped off. The trees bear only on their tops and require a thirty-foot ladder to reach them.

The alternate bearing of apple trees and how to make them bear every year, is an interesting question to solve. A man writing in the *American Gardening* says: "When I bought my place, I found that all my Baldwins bore on the even year. My neighbor had a tree that bore uniformly on the odd year. Upon a thrifty young tree,

which I valued, I set scions from my neighbor's tree, on the north side. This was on the odd year. They bore on the third or odd year, and have been bearing ever since. This feat is certainly worth trying. Some here may have tried it already."

Commercial fertilizers are preventives of insect life. The nitrate of soda, the muriate of potash, and phosphoric acid are to some extent at least, insecticides; while stable manure fosters and develops insect life. All stable manures must ferment and decompose before being digested by the soil. This process does not annihilate the ova of insects, but fosters them.

Potash and sulphuric, phosphoric and nitric acid, have a slight caustic effect on the soil and a tendency to purify it of noxious substances and disease germs. The commercial fertilizers, to a great extent, take the place in the soil that the digestive ferments take in the stomach of the animal. As these artificial foods stimulate the mucous membrane of the animal's stomach and have a certain acetic action and excite the gastric juice to perform its functions more effectually and rapidly, so do the commercial fertilizers, if they are genuine, excite the soil by giving that which it has been deprived of and excite it to perform its functions.

The science of Bacteriology is one that Horticulturists cannot afford to ignore. The development of this science, largely brought about within the last decade by such men, as Klebs, Leoffler, Kolb and Pasteur, has already shown, that these low organisms are the ancestors of infectious diseases in the Animal Kingdom and of parasitic life and growth, in the Vegetable Kingdom. This knowledge has accomplished wonders in preventive medicine, and a more intimate knowledge of disease germs, obtained by the Horticulturist, will do much to develop preventive Horticulture. The sooner the Horticulturist realizes that decaying material, whether the carcass of an animal, decaying wood or a bushel of cabbages, when exposed to the atmosphere may be the *nidus* to hold the micro-organisms which latter, will propagate their species, and use the proper means for their prevention, the sooner will he con

fer an untold benefit upon himself, his neighbor and the community.

Time will not permit me to speak longer on this important subject. Indeed, the object of my paper is to touch upon a few practical points in preventive horticulture and leave them to the practical experience and intelligence of the members of the Association, to sift and analyze.

WHAT IS REQUIRED TO MAKE FRUIT CULTURE A LARGER INDUSTRY.

BY GEO. THOMPSON.

I assume that the idea, a larger industry, implies a larger Nova Scotian industry, and on that line contemplate it. Now-a-days, the world over, capital is seeking investment in something that will pay; prove that fruit producing in Nova Scotia will be profitable and there is no doubt that fruit growing will increase.

It does not strike me that there can be much increase, to be profitable, in the production of quick ripening fruits, such as the berries and plums and pears, because our local markets, which only they can reach, are limited—witness last year in the sale of plums and strawberries. The only hope for this line is the establishment of canneries, or some factories for the preservation of these fruits, so that they may reach distant markets.

A more satisfactory reply, however, comes from apples, and may be stated thus: Produce first class apples, deliver these in distant markets well sorted and in perfect condition at such prices as will give a good profit to the grower, and fruit culture in this line will rapidly become a larger industry.

The first query is: Can we produce apples which will rank as first class in the markets of the world. The long list of prizes awarded to this Association in numerous great exhibitions in Europe and America, warrant us in believing that we can grow first class apples. There may be finer fruit grown on the western slopes of the Rockies

as stated by Colonel Starratt last year, but the great distance from European markets effectually prevents any supply coming into British markets from there. With other Canadian and American growers we can compete successfully in quality, and should have an advantage in being nearer to the great British market. In mid-winter our shorter distance to a shipping port should give us a greater advantage. To derive the best results from our soil and climate, much will depend upon the skill and industry of apple growers. This skill must be the product of scientific training; haphazard methods will not do, in these days of keen competition. Hence the need of a well equipped Horticultural school and Experiment Station here in our midst. These Horticultural schools teach what science has discovered of the laws of nature in that department, and unless the next generation of our fruit growers avail themselves of this knowledge, they will work at a great disadvantage; they will be brought into competition with our neighbors over the border who are now fully alive to the importance of such scientific knowledge and to the dissemination of it. When well directed skill and industry on the part of the fruit grower have produced the desired quality of fruit, the next important question for consideration is that of the best method of sorting and packing the fruit. There are, no doubt, many opinions on this subject; mine is, that if we could establish an association, having trained sorters and packers, to put up the greater part of the fruit of the valley and mark with the company's brand, it would greatly benefit the fruit growers. When it was settled in distant markets, that apples so branded could be relied upon, their market value would advance and sales be quick. The larger the number of barrels so branded the quicker the brand would become known.

Having now first class fruit, carefully and honestly sorted and packed, the next point to be considered is the conveyance of it to market. Notwithstanding that we are several hundred miles nearer to the British market than our neighbors, we have to pay more for carriage than they. We should try to remove this unfair burden borne by our

shippers. We want also, more rapid movement of our fruit to Halifax; it seems that the rolling stock of the D. A. R'y is insufficient for the traffic. Would it not be in order, to ask that Company to give us better accommodation.

If extensive factories for the drying or preserving of the apples unfit for shipping, were in operation, fruit growing would be greatly benefitted.

In conclusion then—our position on the world's map, combined with a peculiarly favorable soil and climate for apple culture, count for much in the race, and if the other points mentioned can be attained, apple raising will pay, and as a consequence will become a larger industry in Nova Scotia.

R. W. STARR.—The paper which has just been read has taken the ground that there is a necessity for more knowledge of the fruit business. There was one point the speaker did not touch that is of great importance and that is with reference to the storage of our fruit when it comes from the trees and before it leaves the farm. How many fruit growers in this valley have a store house for their fruit? In a great many cases it is piled on barn floors on which feed, stock and other farm produce may have been. It is not kept in a cool atmosphere as it should be; it is in a position to ripen too quickly and in a condition which will unfit it for long carriage in steamers. After the fruit is plucked from the trees it should be placed in cool cellars or cool buildings, kept open to the cold air at night and closed up in the morning. If we did this we would find that the season of shipment for our Gravensteins might be increased for several weeks. Take for instance, last year: the second shipment of Gravensteins was in October; they were packed in warm weather, shipped in warm weather, and rushed on board steamers without having been cooled off—and of course they arrived on the other side slack, wasting and wet—and the consequence was that one cargo of fruit, was sold at a very low figure. It was not the fault of the fruit but the way it was handled from the time it left the trees until it got into the markets. We should have the fruit placed in cold storage when it leaves the trees. We want frost proof store

houses at every station. We want cars that are made as nearly frost proof as possible, and when they arrive in Halifax they should be run into sheds and not left, as the cars frequently are left, in the open yard at Richmond. If this was the case there would be no danger of frost. Freight could be shipped from here in very cold weather if the cars and warehouses were such as they ought to be and such as they could be. This year the industry was double that of any previous year, and there is no reason why in five years time it should not be double this year's output.

DR. BORDEN.—This certainly is a most important question: "What is required to make fruit growing a larger industry?" I understood Mr. Thompson's answer to the question to be, "Increased knowledge." Scientific knowledge in reference to the proper way to grow fruit, the kinds of fruit to grow, improvement in the method of putting it up, and the cheapening of freight rates to get it to its destination. Perhaps almost in one word that question might be answered; fruit growing can be made a larger industry by cheapening the cost of production—cheapening the cost of production, and you may add to that cheapening the cost of putting it on the market where you have got to sell it. We must cheapen production if we are to maintain fruit growing as a profitable industry, and in order to cheapen production we must learn all that there is to know about fruit; that is the only way you can cheapen production. So far as that is possible it is the duty of governments and railways to relieve a people, struggling to lighten the burden upon themselves, and as far as possible enable them to have their products produced and marketed as cheaply as possible.

Now in reference to getting our fruit to market, and that is a most important question. We have got fruit enough now to ship to make Halifax a competing point. Halifax would be sought by different lines of steamers to get the large quantity of fruit which we have got to send from this valley, if it were not for the fact that competition is interfered with because a particular line of steamers is in receipt of a subsidy, and the moment an outside

line comes in and undertakes to get part of the traffic, drops rate for a time freeze out new competition and then puts it up again, and thereby monopolizes the traffic. The rate from 1200 miles west of the city of Montreal to Liverpool for carrying barrels of fruit is actually lower than from this point. A friend of mine interested in a line of steamers running between Boston and Great Britain told me that he was carrying fruit from Boston at two shillings a barrel to London. Now, surely we should get as advantageous rates from Halifax as they get from Boston. Allow Halifax to be what it ought to be, a competing point, and we will have the rates from Halifax as low as from any other point and as low as they ought to be. Now in reference to the packing of fruit. I have not much faith in trying to make people honest by act of parliament, but still I think something might be done in that direction; and I think that some stringent system of legislation might be passed requiring every man who exported a barrel of apples to put his name on it so that he could be detected; some mark by which a fraudulent packer of fruit can be prosecuted. I am of the opinion that some day we must bring some kind of pressure to bear upon dishonest packers of fruit, and enact legislation which will stamp that kind of thing out. It is too bad that a great industry like this should be injured, and this is a most material injury. I had the pleasure last summer of meeting a gentleman who represented the "London Times" at the Intercolonial Conference held at Ottawa, and he talked to me particularly about this matter of packing fruit. He has been living in London and he has visited the English markets and has been taking a special interest in Canadian fruit, and he told me that our reputation is suffering very considerably there. But of course there is nobody here who packs fruit dishonestly. (Laughter). Of course we are always talking to the wrong people. (Laughter). All I am saying is wasted. But, gentlemen, in conclusion, I would say that I do not know how we are to get at this question unless we get at it through the law.

GEO. THOMPSON—Now in reference to sorting and packing, I do not think any better way can be adopted than

that mentioned in the paper I have just read. A man may be perfectly honest in his intention to put up his apples, and he may put them up in the way he thinks best, but still they may not be put up to suit the market. One of our dealers said he sold a large quantity of apples to a man from the Upper Provinces and this man brought with him two trained packers and in two days he said he learned more from that man than he ever learned before in his life. He knew exactly how to put apples up. Some apples require different packing from others. I see no reason why men could not be taught, and who could be available for putting apples up when required. We should also have a common brand, on which you could also have the initial of the man who put up the apples, so any brand could be traced to him, And I believe that trained packers would be better for putting up the fruit to go abroad.

JOHN E. STARR—This is an old story. We get sick of hearing of it. The man I would like to talk to is the man who purchases the fruit. That is where the fault is. I would not have the initials of the man who grows it, but his name in full. A man buys them because he bought them cheap—he hoped to get a first class fruit, for a second class price. You cannot make people honest by act of Parliament. We do not intend to try it. I say that if a man buys a barrel of apples without anybody's name on it he is either a simpleton, or he does not know his business.

A. H. JOHNSON—The man that grows an inferior fruit cannot pack a first class article.

J. S. DODD—The active use of capital in connection with development of orcharding is an important matter. If Mr. Thompson's view of the matter is right,—he says: "fruit extension will follow as a matter of course,"—and he says: "given a profitable industry, that there is plenty of money looking for investment." I think that is not a safe position to take. It is incumbent upon us to impress upon those who have capital, the importance of this industry. It has been proved time and time again that fruit growing is profitable in this valley, and capital should be employed on a more liberal scale than it has been hitherto.

DR. BORDEN said that he was simply standing on ground with regard to freight rates which he had stood upon, without regard to party politics, for the past ten years. With respect to fraudulent packing he was glad to know that it was not a reality, or practiced to the extent it was alleged. And he further concurred in the remarks of Mr. John Starr, that the man is a fool who buys a barrel of apples on which the seller does not put his name in full. There may have been mistakes in the past with regard to packing, but it may have been due to lack of knowledge.

M. G. DeWOLFE said that if the people would approach the Dominion Atlantic Railway and present their grievances in a proper light they would provide proper cars; that the railway authorities had never been approached with respect to refrigerator cars, and he thought the same thing with respect to the steamship lines too. He advocated smaller societies in each of the counties as feeders of this Association. He referred to the medals which the Society has; like the medals on the breast of a British soldier, they were the outcome of years and years of hard work. That our standing at the World's Fair was something to make any Nova Scotian proud of this Association. That a man should love his orchard next to his wife. He was glad to hear of the large number of places in Nova Scotia doing so well in cultivating fruit, spoken of by Prof. Faville. He said that the sending of inferior fruit to the markets prevented capital from being invested in this valley.

W. H. HARDWICKE.—He thought there was a good deal in the suggestion of Mr. R. W. Starr of proper care being taken of the fruit after it was picked. And he concurred in the remarks made by Mr. Johnson, that in order to have good fruit they should take pains to grow it. He also referred to the fine condition of the American fruit at the World's Fair. It had been kept in cold storage until the first of May and came out in beautiful order. Cold storage will lengthen the life of the apple double or treble its natural life. The time is not far distant when cold storage will be necessary to keep our Gravensteins.

THE NEED OF AN EXPERIMENTAL STATION.

BY DR. H. CHIPMAN, GRAND PRE.

MR. PRESIDENT, LADIES AND GENTLEMEN :

In the dawn of the last decade of this nineteenth century civilization—the highest the world has ever reached—argument is unnecessary to convince an audience of the N. S. F. G. A., convened in this collegiate town of Wolfville, of the need and value of a liberal education and the broadest culture, for everyone who is either ambitious to take his place in the front rank of the world's workers and hold his own in the midst of the closest competition and keenest rivalry, or whose aspirations lead him to look beyond and above the rank and file to that place at the top where there is always room and honor and enrolment in every profession and calling.

This is the true foundation on which to build life's special work—"the house built upon a rock" which shall not be moved.

But this thorough education is beyond the reach of the masses, even in this land of colleges and free schools. Want of talent, or time, or means, or inclination, or all of these, are obstacles in the way of the great majority. Our young people must engage in the practical work of life the earning a living at an early age—especially those who work on the farm. Their mental training is therefore limited to the public school. The curriculum is a hard one including many subjects, and it is still being enlarged to include something in agriculture. All this may be in the right direction if the "powers that be" are careful to guard against forcing and cramming the young brain beyond its capacity. It seems to me the public schools should aim to teach reading, writing, arithmetic and English composition as thoroughly as possible, with geography and history, especially of Canada; then music, drawing and nature lessons as a recreation. There is little room for more and that is what very many farmers' sons and daughters must be satisfied with. Scientific agriculture and horticulture has

hitherto been beyond their reach either at school or later in life, hence our farmers and orchardists have been handicapped in the race, and progress has been slow.

Now, in every work and industry of mankind, there are certain scientific principles involved that must be studied and known for the most economical and convenient performance of the work. This is more especially true of farm work and the arrangement of it. There are so many apparently small things to be done that lead to large results, and done so quickly, that unless the principles at the bottom of the work are thoroughly appreciated a mistake is almost sure to be made, and it is too late to rectify it. For this reason a farmer's education should be varied and thorough, and he will work to more or less disadvantage unless he has some acquaintance at least with almost every science, natural and mechanical. At the mention of the word science many people who pride themselves on being thoroughly practical, grow suspicious and are prepared to shy off at once, because they do not know the exact meaning of the word. They seem to think it is something opposed to practice; a set of opinions or theories held by persons who have no practical knowledge of what they are talking about. What is meant by this work is the very reverse of this. It is derived from the Latin word *scire*—to know. We mean by science, then, accurate knowledge instead of guess work. But it is more than to know what anything is and what it does.

It is the work of science to ascertain the truth about everything by observation, experiment and induction; to organize the relations of things and the properties belonging to them; to discover the reason for things, and the rule of action for everything done. Having gained this complete knowledge in this way our science will carry us onward another step. Knowing the character and the conditions of the things we are working with, and the behavior of them under these conditions, we can establish rules for the guidance of ourselves and others, as well, in working with them, which if always observed will give invariably the same result without fear of failure. This is science. The man who does things because he has seen

them done in a certain way again and again, and has no knowledge of the underlying principles and rules that govern his actions, is an imitator only. He may, and does succeed, but he can never have the same satisfaction and complete success in his work as the scientist.

Now this Association has been at work for 30 years, educating the people in fruit growing. It has helped this important industry grow from a few hundred barrels for home consumption, to a half million barrels in '94,—250,000 of which were exported to England, with a cash return of about a half million dollars. The membership was small and the work too circumscribed, and a few leading spirits set out in '93 put the F. G. A. into a position to do higher and better work, more far reaching in its influence and results. It was resolved to establish a School of Horticulture and the immediate outcome of this resolve was an increase in the membership from 100 to 500, comprising representative men in every County in the Province. Aided by a subsidy from the local government of \$50 per each N. S. pupil enrolled for six months, the whole amount paid, however, not to exceed \$2000, a Horticultural school was established here in the town of Wolfville.

The school is under the control and management of this Association. First year only some \$1,600 of the grant was drawn, owing to a lack of pupils. This year the full \$2,000 will be earned by a large increase in the number of the pupils, due largely to the popularity, energy, and ability of Prof. Faville.

Tuition is free. It has entered on the second year with some 60 pupils, and is a great boon to farmers and farmers' sons. A Nova Scotian resident in Boston has sent his son to this school with a view to locating him in this valley as a fruit grower. Here perhaps is the beginning of the solution of the much talked of "exodus" problem in these Maritime Provinces.

Right here, the Association finds an Experimental Fruit Station an absolute necessity for the success of the school. Scholars must be taught orcharding by actual practice in the field, sowing the seeds, growing the trees

for nursery stock, root and top grafting, growth of trees, destroying insect pests, experimenting along the lines of the influence of scion on stalk and stalk on scion, cross fertilization, kinds of trees best adapted to this locality, why some choice varieties do not produce well in some orchards, cultivation of soil and fertilization.

We need an experimental Station in this valley because this is the fruit belt, the native home of the apple. Soil, climate, shelter on the north from the fogs and cold of the Atlantic, make of it the ideal spot for all the observations and experiments of the scientist, assuring him of the most perfect conditions for the most satisfactory and profitable results. This is not the case in any other part of the province, and, indeed, in no other locality in the whole Dominion can we obtain results exactly suited to our purposes.

Neither the station at Ottawa nor farm at Nappan can supply the wants of our orchardists. The former in climate, soil, exposure, etc., is entirely different. Questions are constantly arising in connection with our orchards down here which can only be satisfactorily settled by actual trial on the spot. Experienced orchardists and scientists readily admit this. The orchard at Nappan is only an experiment, and will be useless to the rest of the province for ten years at least, and may never be a success. This is too long to wait. In another decade under favorable circumstances, among which the school and station at Wolfville stand first, our fruit industry in Nova Scotia should reach one million barrels for export, making it an industry of national importance.

While there is a wide knowledge of fruit growing in our Association and among the orchardists of this valley there is much to be learned. Problems are constantly arising which require research and experiment which are beyond the time and means and knowledge of ordinary farmers and can only be solved by the scientists in the school and on the experimental station. In this age of close competition and rapid advancement in every walk of life, farmers' sons are eager for the means of acquiring in their calling, scientific principles and practical knowledge as rapidly and

accurately as possible so that they may begin their life work as early as possible and fortified with a knowledge which shall give them success in the orchard and on equality with all competitors. This can only be done in the school and on the station.

While the soil of this valley and its peculiarly favorable situation for the growth of fruit, together with the wide knowledge of our fruit growers and their deep interest in it, has made a grand success of it, the entire export of the province is done by the three Counties of Kings Annapolis and Hants. It is a fact that certain varieties of apples can be and are grown in almost every County in the province; and in many Counties with the requisite knowledge and interest in the matter, the farmers might undoubtedly raise not only sufficient fruit for home use, but a considerable quantity for export.

It is the object of our Association to give to the farmers and their sons throughout the whole Province the advantage of a Horticulture school and station, which shall cost them no more than the payment of board. The F. G. A. has established the only free Horticultural school in the Maritime Provinces, and we believe the only one in Canada. Land for a suitable site for a building and for the station has been obtained on a long lease from the governors of Acadia College; a green house has been erected with the necessary plant and the most improved heating apparatus. Now, at this stage, we need funds to complete the work and place it on a solid foundation. We have, therefore, petitioned the Dominion Government for a grant to the station equal to that received from the Provincial government for the school.

Again we need this station because there are stations established in almost every state in the Union, either in connection with Universities or separate, and we must prepare our orchardists to meet all competitors on an equal footing. We must keep abreast of the times, or lose ground in the race. The world to-day is diligently searching into the deepest secrets of nature, that they may be turned to account in the service of men.

If our modern civilization has one distinctive feature,

it appears in the manner in which the world has set itself to appropriate, and to control in its own service, the great forces of nature. To win success on the farm in this age, it is necessary to practice sound economics, conservative methods of business, the utilization of inventions, and to possess an individual self equipment for the task that one attempts. In brief—what is necessary for the success of all industries, is a more economical production of a first class article and fuller utilization of all resources. There is no doubt in my mind that this school and station if fully and generally utilized by our young people will very materially help to bring about this “consummation so devoutly to be wished.” If this association succeeds, and I believe it will, in establishing this Horticultural School and Experimental Station on a sure foundation, then its life work will have been perfected if it should never draw another breath, and the monument left behind it, “more to be desired than gold, yea, than much fine gold.”

W. S. BLAIR.—I am one of the younger members of the association. I would ask you to bear with me for a few moments on this subject, while I say a few words with reference to the proposed Fruit Experimental Station. I am interested greatly in this matter. When I hear this subject discussed I feel in duty to myself, and in behalf of the Experimental Farm at Nappan, to advocate its establishment. There is no doubt at all that it should be established here. If an institution of this kind were inaugurated in this valley it would be of immense benefit to fruit growers. During the course of your discussion here to-night it was stated that fruit has not been grown successfully at Nappan. I am here to refute that statement. I have no hesitation in saying that fruit has been grown there, and fine fruit too. Now, gentlemen, let me tell you that since the establishment of the Experimental Farm at Nappan, 81 varieties of apples have been planted and out of these only four have died. There have been in all 240 trees planted, of which 200 are living and doing well.

Now with reference to the varieties of apples that have succeeded the best. Among those that are doing well

are Baldwin, Spy, Aport, Newton, Red Butigheimer, Ribston Pippin, 20 oz. Pippin and Longfield. The Wealthy has made good growth and so has the Wagner. These are the varieties as we consider them in the order of their value.

Now with reference to plums. In the fall of 1889 thirty trees were planted, and eighteen died before spring. Since then only ten in 100 have died. Twenty-five varieties were planted in 1891. Out of 79 trees planted 71 are alive and doing well. They have made in growth from 12 to 27 inches. Those that are doing the best are the Princess, Yellow Gage, Moer's Arctic, Reine Claude, Washington and Dawson. All the varieties are doing well and are making rapid growth.

There were in all 20 varieties of pears planted. Of the 67 trees planted 46 are now alive. They have made a yearly growth of from 10 to 27 inches.

We had 29 varieties of cherries, six died, and of 97 trees planted 59 are alive. They have made from 12 to 27 inches growth annually. The following varieties have done well : English Morello, Napoleon, Late Duke, Wragg, Windsor, Early Richmond, Transparent, Montmorency. There seems to be an idea in this valley that fruit cannot be grown in the County of Cumberland, and other counties throughout the Province. I contend that fruit can be grown in many of these places as successfully as through your valley. I do not see how it is possible to maintain the statement that fruit cannot be grown at Nappan, after considering the facts I have presented to you, and I ask you for sympathy and encouragement in our work. It has been discouraging and uphill work. I am pleased to be able to attend the Horticultural School, for I feel that I need the instruction which can be obtained at this institution. If you wish us to try any experiments for you at any time I am sure we will be very pleased to comply with your request. We want your assistance. We will assist you all we can, but you must not forget us. (Applause).

DR. CHIPMAN said he was pleased with the remarks of Mr. Blair. He was also pleased to know that fruit could be grown in Cumberland County.

PROF. FAVILLE spoke very highly of the Experimental Station at Nappan and the good work it is doing.

R. W. STARR said they could grow fruit in many parts of Cumberland County to profit. He made this statement from his own observation and knowledge.

S. P. BENJAMIN said he was born in Cumberland County and had seen excellent apples raised on his father's farm.

PROF. CRAIG said he was pleased to learn of the excellent work done at Nappan in the way of fruit, pears, plums, etc.

T. H. PARKER said that he had been under the impression for years that fruit could be raised in any county in the Province.

MERITS AND USES OF AMERICAN PLUMS.

BY PROF. CRAIG, OTTAWA.

MR. PRESIDENT, LADIES AND GENTLEMEN,—I am very glad to be here again with you. My last visit here was very pleasant, the remembrance of it has been with me ever since—and I need not tell you that it was with great pleasure that I accepted your kind invitation through your Secretary to come back again. I regret very much that it was entirely impossible for me to be with you yesterday. The meeting began so early in the week, that unless I started on Sunday—and you know what good people we are in Ottawa—I could not have been here yesterday afternoon. I just came in, in time to hear part of the very interesting discussion opened by Mr. Archibald on this subject of plums. I had in mind, when your Secretary wrote me asking what I should like to bring before your meeting, the same subject. My idea was to simply bring before you some of the merits as well as demerits of the American plums which, however, may not be suited to your locality, but which may prove stepping stones to something better, especially as you have a School of Horticulture and I un-

derstand are going to have an Experimental Fruit Station, stepping stones by means of crossing and hybridization.

ORIGIN OF CULTIVATED PLUMS.

We might consider for a moment the origin of our cultivated plums. We find in Canada that they have come to us mainly from two sources; first, the plum which was cultivated by our forefathers, the blue, yellow and white plums known as *Prunus domestica*. These came to us from Europe with the early settlers of this country.

GOOD POINTS.

They possess many good points both in regard to quality of fruit and character of tree. The amount of money which it is possible to make out of the plum industry has been demonstrated to you in your own vicinity. The pits of European plum being introduced with the early settler have been cultivated in this country a great number of years. The quality of the fruit is usually excellent, and in this respect it is ahead of our native American plums. Then they have also a carrying quality, having usually firmness and solidity of flesh which enables them to be brought from the orchard to the marketing point in good condition.

WEAK POINTS.

Then, if we look at their weak points we find that in the colder districts many of them are non-productive because their fruit buds are tender. Their fruit buds being sensitive they are likely to be injured during intervals of cold weather. This injury of course affects the productiveness of the tree. During a mild winter such as we are having this year we will secure a good crop of fruit, but following a winter of unusual severity they are affected to a great extent. I am speaking now of the colder sections of the country. Then a good many of them have a serious predilection to the disease known as black knot, and the soft rot, also attacks the fruit; these affect the tree and the fruit very seriously, but the latter consideration is not so weighty as formerly, now that we can control it by timely and proper application of Bordeaux mixture. I hope to

be able to relate to you before our meeting closes some results of the experiments carried on last session in treating this disease.

By American Plums I mean those which are natives of this continent. They are divided into three principal classes. The first one is what is called the *Prunus Americana*. One of the most familiar examples of this type is De Soto. The range of this species is quite extended, running as it does across the northern part of the continent. It reached its greatest development in the North Western States from whence have come our best cultivated varieties.

Another class may be brought to your mind by the name of the wild goose. This represents *P. Hortulana Bailey*. I am not sure that this plum is grown in your vicinity, but it is grown considerably in the West. It is a round, bright red, softfleshed, early plum, grown to a considerable extent in the state of Illinois. The third type of American plums is known under the name of *Prunus Chicasa*. This type has its natural range south of the middle states and is found abundantly in Texas.

Considering the first type (*P. Americana*) to sum up its good points: The trees are perfectly hardy. But this is a matter of somewhat minor importance with you. They are tremendous bearers. The trees are adapted to a wide range of soil and climate. I have known trees of this type to succeed equally well on gravel, loam and clay soils. Then again they are as a rule not affected to the same extent by black knot as the *Prunus Domestica* or European plum. This is a very important point.

The weak points are as follows: The fruit is apt to be soft and juicy, and the pit frequently is large. The quality of the fruit does not compare favorably with the European plums on account of its astringency. With regard to the growth of the tree they have a straggling habit as a rule, sending out long branches horizontally, which are easily broken and split from the main stem by storms and winds. Then again the fact of the lateness of the fruit in ripening is a serious drawback.

Of this type I would like to mention one or two out

of a large number of varieties which I have tested at Ottawa. The first one I would mention is the De Soto. I dare say it has been fruited here, as it is quite widely cultivated. The tree has all the good points I have mentioned and bears fruit of very good quality. I think there is money in this variety wherever planted. I do not think that if I was planting a plum orchard in the Province of Quebec that a better variety than the De Soto could be selected on account of the hardiness of tree, its productiveness and the excellent quality of its fruit.

Another variety which has done well at the Experimental farm is the Hawkeye. It is a larger plum than the De Soto and somewhat firmer in flesh. Its color is dark red covered with a purplish bloom. In this respect it resembles the European plum. I may say it is larger than the Lombard and is handsomer. The Hawk Eye is rather later than the De Soto, and ripens with us about the first week in September.

Wolf I have also found to be a profitable variety. It is earlier than the other two varieties, very handsome and of fair quality. These are all cling stones.

The next one I shall mention is almost free stone. It is called the Wyant. It is a large yellowish red plum with the flesh comparatively free from the stone. The flesh is quite firm which will admit of it being cut in two as peaches are served, although it will not prove a rival of the peach in regard to quality.

A Voice.—Is it a plum without a pit?

No, we have not got to that point yet. The millennium in horticulture has not yet arrived. (Laughter).

The next class is that of one belonging to the wild goose type. These trees are tender at Ottawa, but I do not think they would be injured here. The great trouble is that it is one of those varieties which is not fertile with its own pollen. With another variety, blossoming at the same time, wild goose is productive and in this connection I think its blossoms might be affected in a favorable manner by the pollen of peaches and cherries. This is principally assumption, however, such evidence as we have

been able to collect, points to the conclusion, viz.: that the pollen of the cherry will assist the fertilization of the wild goose type of plums. The wild goose has been grown in Illinois for a number of years and when the blossoms are properly fertilized it has proved most profitable in that plum growing region. Coming to the last group and this is the Chickasams, our plums of the south and west.

They are natives of Kansas and run as far south as Texas. The two principal examples of this type are the Newman and the Pottawatamie which takes its name from an Indian river of that name. These are both of good quality and very productive. The trees are not much hardier than the peach and will only succeed where peaches can be grown.

There is another type of plum which you may know under the name of the Mariana which is very largely grown in the Central States where it is used as a propogating stock for the peach and European plum. In this respect it serves a very useful purpose. The plums are small, round, bright red and covered with small white dots. It is of fair quality and is very early. It ripens with us about the 25th July, which is very early for a plum in our district. I would draw your attention to this from a double standpoint of fruit stock and fruit bearing trees. I might mention before I leave the matter of the wild goose type that the Newman blossoms at the same time as the wild goose, and therefore would be a good variety to plant with it for the purpose of securing perfect pollenation. Where it was not desirable to plant trees you might top graft a few branches into the wild goose which would serve the same purpose. I would just say on the planting of all these that I would set them closely—they should not be planted at a distance greater than 15 feet—and care should be taken to see that the varieties were intermingled for the purpose of cross fertilization.

Another point in connection with their cultivation is the necessity of annual pruning, in consequence of their stragglng habit of growth. In practice we cut back one-third of the annual growth about the third week in June.

This has the effect of making the trees grow more stocky and makes the head compact, thus preventing the branches from breaking down.

In regard to picking, the fruit should not be left on the tree until ready to drop. At that time it is very ripe and being juicy and pulpy does not carry well. It should also be picked and marketed in small packages, either baskets or small boxes. In this they will make very attractive sample for the market.

The propagation of these varieties is very easy they are multiplied readily by root grafting and the method known as splice grafting can be practiced with these with almost as much success as in the case of the apple.

The Chicasa will do very well on a peach stock and the peach stock being non sprouting has an advantage. All of these varieties sprout more or less and therefore it is very desirable to graft them on the peach, wherever this is hardy.

I want to emphasize one or two remarks, that I do not bring these plums before you on the strength of their own intrinsic value at the present time, but on account of their potential value as a crossing and hybridizing stock. Those which I have mentioned are worthy of being planted to a limited degree. The outlook for new plums, produced by crossing these with the European varieties and especially with the Japanese plums, is one of the most promising fields in horticulture I know of. A cross between these and the Japanese plums will undoubtedly give us varieties which will be of great utility in the future. Here is a field for the students of your Horticultural school.

Q.—Have you tried the Japanese plum? A.—We have tried a great number but they have not proved hardy at Ottawa.

A. B. PARKER.—Where does the Grand Duke come in? Do you know him?

PROF. CRAIG.—I have met this Royal Highness. In Western Ontario this variety is very well thought of for a late sort, but it has not been so productive there as the Bradshaw or the Lombard.

W. C. ARCHIBALD.—Did you not omit our wild Canadian plum?

PROF. CRAIG.—I do not think that Dr. Sturtevant, who is an authority on American Plums, has given the Canadian form of *Prunus Americana* a separate place as a species. I did not intend to omit it, I think it is a good stalk, I have used it with very fair success.

RALPH EATON.—How do you regard the quality of the Botan compared with the Lombard and the Washington?

PROF. CRAIG.—If I contrasted Botan with the Lombard I would say that the Botan is the better plum, but I do not think it is equal to the Washington. The Botan will altogether outsell the Lombard in the market, both in quality and appearance and will keep much longer. I had some samples of Lombard sent me last year by Mr. Willard of Geneva, and I had no difficulty in keeping them for ten days.

W. C. ARCHIBALD.—We find here that the Japanese plums as far as I have been able to observe blossom too early in the Spring. How can we correct this habit of early blooming. If we fail to do that, I fail to see a profit in the tree.

PROF. CRAIG.—I do not think you could correct the habit of early blooming. I do not think it could be corrected by any system of mulching or anything of that sort.

W. C. ARCHIBALD.—How long a term of years will it take for a tree to change its native habits in coming to a new climate, so that it will adapt itself to new conditions?

PROF. CRAIG.—I do not think we have any actual facts bearing upon this, and anything we have on it would be merely theoretical and presumptive. No change takes place in the constitution of a plant unless it is reproduced from the seed. It could only be by completing the cycle of a plants life, that is by creating a new plant from the old one grown in its new home and that new plant might be influenced by climatic conditions existing when it was

brought into the world, but such changes do not usually occur unless influenced by a long period of years, through seed production.

R. E. HARRIS.—By grafting an early bearing fruit on a late bearing fruit will the early bearing fruit be retarded in bloom? For instance to graft the Gravenstein on to the Nonpareil stock will the influence of that stock retard the Gravenstein?

PROF. CRAIG.—I am inclined to place such changes on the basis of accidental variation. I do not think we can count on it constantly.

THE MOVEMENT OF PLANT JUICES.

BY WILLIAM RAND.

In looking into the higher forms of vegetable life one is impressed with the complexity of what at first appears a simple organic structure.

Pursuing investigation further we find not only a complication of mechanical, but of hydrostatic, chemical and optical phenomena.

In every cell is wonderful activity, dissolution and chrysalization; secretion and depletion, expansion and contraction, union and division, action and reaction, making a creation in miniature.

No cell and no particle which the microscope reveals within it, but possesses all the attributes of a world.

Within the stem of a tree is a variety of tissue each having its function to perform in the economy of the plant, and each adapted to its work, by its own peculiar shape and construction.

Taking up but one of these phases, the motion of the plant juices, it becomes necessary on account of the intimate relation and co-operation of the plant's various functions, to refrain from questions which present themselves. Incompleteness must therefore be characteristic of such discussions.

If nature is full of mystery she is also full of analogy. In the animal and vegetable kingdoms rising in the order of creation we first come into contact with life. Both possess an organized system. In both there is a limit to destruction or enquiry, beyond which, if we pass, we destroy or displace the vital principle of life. In both we find the digestive or assimilative power by which food is converted into living tissue. In both we find a circulation of the vital fluids. In both, more or less complete the organs of respiration. In fact if we deprive an animal of its nervous system and its instincts, we have only a vegetable left.

Reasoning from these similarities we were led to look into the motion of the plant's juices, and conducted the following experiment. We give the result only for what it is worth and making reserve for any element of chance or error which may have been present:

In the month of June I severed the root of a grape, about four feet from the trunk and where the diameter was about one-half inch. The outer part of the root was raised to the surface at the point of severance.

Over this end was put tightly a rubber tube, the other end of which was connected with a glass tube which passed into a rest tube set level with the ground.

From this test tube and passing through the hole for it in the cork of the test tube, went up another straight glass tube which was fixed to a plain perpendicular wood, resembling the tube on a thermometer. The apparatus was now filled with water to the bottom of the upright tube. The sap coming from the root displaced and forced upwards an equal quantity of water. At times this ascent was scarcely discernable by observation. At other times it was plainly so. Taking a time which appeared from observation to be the minimum of motion, a mark was made on the wood at that point. A watch was now brought and the time noted. Soon the rate of motion increased and continued for a time, when it appeared by observation to again diminish. Then another mark was made, and the time noted from the point of making the first mark, which was 30 minutes. This I called the amplitude of pulsation. At each interval of 30 minutes a mark was made at the

point where the sap stood in the glass, and upon these distances being carefully measured, it was found that they were alternately long and short, or that in a given space of 40 minutes, the flow of sap was alternately accelerated and diminished, the rate of motion upward in the given unit of time being three inches, two inches, etc.

As the vitality of the root became weakened the spaces became shorter, yet upon being measured it was found that their relative length was in some degree maintained. At the end, no definite proportions could be discovered. It is a well known fact in vegetable physiology that the rate of movement upward of the plant's juices is constantly varying with the condition of soil and atmosphere.

If the air be moisture-laden and the ground dry there is little movement upward, but if the air be dry and the ground moist, then the movement is rapid.

Whether during any or all of these conditions there is maintained a relatively and regularly intermittent motion we can find neither statement nor experiment, beyond our own, to determine. Taking into consideration the causes of motion of juices in the plant, and the apparent indifference to this motion which the plant exhibits by constant growth under both conditions of rapid, and almost suspended evaporation, it would seem that it varies with every change of temperature and moisture. The causes of circulation in plants are called osmose, capillary, and chemical affinity. Let it be understood that there is no return system of circulation as in the arterial and venous system. The same sap never passes through the plant. Every leaf is a pump, and through it water is constantly moving into the air. Fill a glass tube full of salt and tie tightly over the open end a piece of ox bladder and put into a basin of water. They will mix through the membrane. This is osmose.

If a tube of fine bore be held perpendicularly in water, the water within it will rise above the surrounding water. We have the same thing in the every-day occurrence of the oil ascending the wick of a lamp. This is capillary attraction. Chemical affinity causes the atoms of different

substances to combine forming a new substance of different characteristics.

The evaporation from the foliage of plants, having a tendency to produce a partial vacuum in the leaf cells, may also have an influence on the upward motion of sap, and these taken together may be said to constitute the forces of circulation. If we conceive the cells of the root to be made of porous membrane near the ends, we will understand the entrance of plant food into the plant, and once there, we can see how the force of capillarity in some degree continues the action.

But it must be remembered that the tissue of a tree is made up not of continuous tubes, save in the vascular tissue, but chiefly of an infinite number of cells, closed at both ends and piled one on top of another. Through these partitions the plant food passes in solution. It is not necessary however that the water of the cell be in motion, for by the process of diffusion the nutrient matters pass onward. It is interesting to note that, though, mechanically speaking, the cells of the root and the stem are the same, it is the office of the former to select, and the latter to transmit food.

It has been found that membrane has various affinities. An artificial membrane was made and placed between two substances in solution, the substance passed through it in one direction only. Another membrane of a different nature was substituted, and it passed in the opposite direction. In the one case it selected, in the other rejected. Now the root cells of different plants possess different affinities. The cell membrane is of different characters.

This is the power of food selection. These cells lie at the tips of the roots. The larger roots cannot feed to any extent. In planting a young tree we trim the head not to balance the wood, but to balance its organs of waste and supply. If there are enough leaves to evaporate water faster than the root can supply it, the tree dies. Cut down the head and you cut down the leaves. This is why a tree in full leaf cannot be moved; this process is at its height.

A field of grain which is wilted and drooped will be revived and invigorated by a shower which only penetrates

the soil one-quarter of an inch, no part of which has come in contact with the roots. This is due to the fact that a moisture-laden atmosphere will not evaporate water from the leaf surface. The osmotic and capillary forces gain upon the evaporating process, the cells become distended and the leaves stand erect. It is estimated that an indian corn plant evaporates two-fifths of its weight of water per day when growing.

The extraordinary yet popular notion that during winter the sap of a tree descends to the root is absurd. If the root cells are already charged with water, how can they still contain as much more? The sap never descends.

The fact is that at no time of the year does the tree contain as much sap as in winter. Whenever a leaf falls nature provides a healing process by which the openings which communicate with the stem of the leaf are closed and the sap cannot ooze out. But while this is the case osmose and capillarity are in a degree active. The result is that sap is forced into the tree with no outlet. The cells become surcharged with sap. This tension of the maple is relieved when the tree is tapped. Is the splitting of bark on fruit trees due to tension? In a tree which grows slowly, the cells are thick walled and small. In one which grows rapidly they are thin walled and large.

We think it will be found that these cases occur always in the rapidly growing trees or in those of thin cells.

Now the point of growth is between the bark and the wood. The bark upon young trees is thinnest, and therefore weakest.

It is clear that these characteristics attach themselves to trees which split their bark, and they must therefore be responsible factors.

We know of the following case: For two or three years a row of young trees seven or eight years old, received heavy applications of potash in the form of ashes and suds. The growth was very rapid. In the same winter every tree split. Those in the next row received no potash nor did they split. A rapid unhardened growth during our severe winter suffers. The Maryland and Delaware peach growers are aware of this. They give frequent and

thorough cultivation in early summer, but carefully avoid it in the autumn not even plowing the land.

It is probable that the sun's heat is a factor here, but it is effective because the above conditions pre-dispose the plant.

The following experiment was tried with a strong grape, growing in a green house during the winter. The stalk was passed out through a hole in the wall. Then it passed along for a few feet and was again brought in where it was trained.

The soil in the green house was in proper condition for growth. It was noted that the vine within, grew, but the buds on the outside part did not even swell. When it became very cold the leaves within drooped. When it moderated they revived.

It is evident that cold weather affects the motion of juices in this case, either by freezing them or suspending chemical action in the cell.

Through the cold section, in extreme weather, the root and leaves had no communication. The roots of trees being deep in the earth, are less susceptible to varying conditions of temperature, and are more uniform in action.

We have said there is no downward movement to sap, but there is a downward substance contained in solution. It is not till the food selected from the air by the leaves, and that selected from the earth by the roots, come into contact, that wood can be formed.

This point of contact is first in the twigs and buds and therefore growth begins here. When new layers of wood are formed they grow downward. If a limb be girdled a large ring or swelling of the wood, will appear on the upper side of the cut, but comparatively small on the lower. The downward movement of matter is arrested at the cut and the cells are distended.

In the grape this forces a larger growth of fruit.

In its normal flow, the motion of sap is in straight lines. There is little diffusion from the cells latterly. If a tree contains a dead branch it will be found on the same side of the tree, as that upon which the trunk is diseased. If a tree is attacked by borers, the branches on that side

of the tree will show the effects first, and their attack may often be located by tracing this line downwards.

In the case of injury, the cells seem to diffuse and grow in every direction to heal the wound, but it can not be said to be the normal state, and appears like a provision of Nature to aid recovery.

PROF. CRAIG.—This paper is a most interesting one from a scientific standpoint. There are also some practical points connected with the paper, which might be brought out. The whole subject is too extended to allow of an intelligent discussion of it in the few minutes at my disposal. There are some points in Mr. Rand's paper which it would be well to emphasize in discussing the physiology of plants and plant uses. He stated that the cells surrounding the root tips of the plant had certain functions to perform; that they were in a measure able to discriminate in regard to the quantity and character of the plant food offered to the plant, but at the same time being in a measure fixed, were after all dependent on the plant food provided. That point in itself is one that is of great value to us in studying the fertilization, and manuring of our orchards showing first that it is useless to apply large quantities of certain manures which may be incomplete and the surplus will only be wasted as it has been shown us the plant will only take up a sufficient quantity for its own use and any excess goes to waste. But that statement, in practice, must be modified and should be viewed from another aspect because if certain constituents are present in the soil, it is possible that we may cause the plant to give us an over production of wood to the detriment of the fruit. It points to the fact that we should give the plant such a well balanced food relation as will give it good health as well as keep it in a fruit producing condition. I do not feel capable of discussing this matter in all its bearings in its scientific and physiological aspects at such a short notice.

THE PRESIDENT.—Do I understand you to say that the sap in winter is simply stationary?

WM. RAND.—That I think, Mr. President, is the conclusion of the best men of to-day so far as I know.

PROF. CRAIG.—I also should have mentioned another important point brought out by Mr. Rand's paper, viz: That water is the vehicle which carries the plant food from the soil through the roots and tissues of the plants to the leaves. It is also the agent by which the plant food is dissolved. This emphasizes the value of cultivation in retaining the moisture of the soil.

HOW TO EDUCATE A FARMER'S SON.

BY W. C. ARCHIBALD.

I was never more conscious of my inability to write a paper of value with so little time at my disposal. I ask your kind indulgence to-night. In talks with representative men in the professions, mechanical and commercial trades, I gather that the vacancies are promptly filled—oftentimes to an over-crowding—while few of these or their sons ever become agriculturists. The question then comes with weighty import to us. Amid what surroundings and material influences shall we lead our boys?

The rounding out of accurate and useful knowledge is best obtained when objects awaken thought, quicken the perceptions and accelerate the movements. Seeing, hearing, tasting, touching, smelling, preceiving, comparing, reasoning, deciding, remembering, should be co-educative qualities to produce the ideal utilitarian man. Could our boys be taken to the soils, the grasses, the plants, the trees and each process of change in their whole life pointed out and observed in close connection with the theories explained—the enlarging wonderland would be continued and preserved into manhood years. The essential qualities of sturdy growth with pleasant memories are found in successful efforts with new and enlarging powers. The fruit grower or farmer has among all men the opportunities for assisting the schools in the unfolding of these nature hidden wonders.

Knowledge of soils with their strata depths and uses—the helpers in ice, frost and snow, rains, springs and moisture. The effects of heat and shade on and in the earth, the capacity of soil for products under different methods of culture are easy of illustration on the farm, if we but resolutely espouse the work. Suppose we set apart a small plot of ground, after consulting with the boys as to the best crops for us to grow in connection with his studies of the year. Deepen his interest by adding practical suggestions and give or share with him the profits of the crop. Encourage economy in work, skill in application, correct grading of crops and their sales on the crown of the market according to grade.

Agriculture as a profession, comprises a wide range of studies relating to itself. It is greatly to be desired, when the topmost rounds in life's ladder are reached by our sons, that pleasant memories of the home and of the farmer's life be still present and an eager willingness remaining to assist in removing the disabilities of our class in regard to taxation, revenue tariff or other questions affecting our business standing. We can afford to give the boys a free choice of life's work reared in the pleasant activities of farm life. The brainy boy farmers will seek the higher education for its own sake to be obtained in the technical schools and colleges, where wisdom, skill and strength will be stored to gather wealth. Money, inclination or taste, and respectability with money again added, determines largely the boys vocation. The farmers must receive larger profits from the farm. This will be brought about by applied economy in its management, prevention of waste, skillful labor, and unity in regulation of market prices.

There is money in fruit growing as most of us well know,—but the profits will be increased by applied knowledge, gained by intimate acquaintance with the nature and habits of the trees, as well as how, when and where to sell our fruits as business men. We cannot get too close to the lives of our trees. The trees are individuals, no two of them alike, although the resemblance is close. Yet their marked individualities supply us with reasons for understanding the laws of their being and practical

usefulness to ourselves. Let love, justice and equality supremely govern our boys on the farm. Annihilate drudgery in work, and weave in the rich delights to be found in honest toil with business profits. Visit with your sons the best farms and orchards and minutely enquire how success has been reached. Use team work always whenever possible.

Let the areas set apart for the boy be sufficiently large to insure returns fairly commensurate with his hopes and ambitions, and cheerfully accord the profits to him. Shorten the hours of the day's work and give room for rest and recreation. Furnish your sitting and dining rooms with the best rural pictures of your province and make the homestead worthy of a new view as often as you can. Take the farm and fruit papers published at home and add to the library such current literature as will awaken and sustain fresh interest and dignify your work. Again I repeat, make business men of your boys on the farm in a wide knowledge of every market available and expert method in reaching it. While you may have excellent land, use good varieties and care for the orchard, giving utmost care to assorting and packing and always use clean packages. The effect of your reputation and demand for your fruit will influence the boys. Education should be well laid in a full and extensive knowledge of all that relates to Agriculture. How plants live and grow, or the Evolution of plants, with the origin of varieties or the History of Soils; the Theory of Tillage and yield of crops, etc. Youth is the time to acquire familiar knowledge of details near and remote. A minute learning of that nearest in nature is potent for a broad usefulness whether the boy remains on the farm or enters the trades or professions. Further, teach the boy nothing valuable is ever obtained but by honest labor. Education on the farm out of the school is equally important and potential in the work of after life. The farmer is daily brought in contact with nature everywhere and that "Nature has her power, her beauty, her spring in God." "The drip of the rain and the hum of the bee have music for you, for they are working for you. The lowing of the herd and the neighing of the steed have charms for you."

I cannot close this paper without giving significance to the work of the Horticultural School now in the second year of its existence—under a progressive competent teacher. Prof. Faville is blending theory with practice. Send your sons and daughters to the school. It offers a good all-round practical education. Unshackle prejudice and treat the farm and farmer as their true worth demands.

PROGRESS IN SPRAYING.

BY PROF. JOHN CRAIG, OTTAWA.

MR. PRESIDENT, LADIES AND GENTLEMEN,—

I desire to call to your attention some of the results of the experimental work which I conducted last season in conjunction with the Ontario Fruit Growers Association of Ontario. There was a doubt in the minds of some members of that enlightened body of fruit growers in respect to the benefits arising from the practice I recommended for fungous diseases. In order to dispel this doubt a committee was appointed by the Association to co-operate with me in carrying out a comprehensive series of experiments spread over different parts of the Province, and covering the different classes of fruit growing in the Province of Ontario. I am now going to relate to you some of the leading features with the results of that experimental work. The meteorological conditions prevailing last season in the province of Ontario were more favorable for the development of fungous diseases of the apple and pear than in my experience ever before existed in that part of the Dominion. The early part of the summer, beginning about the first of June and continuing until the middle of July, was characterized by a heavy rainfall, following that period there was a period of warm muggy weather most favorable for the development of the fungous spores, and so severe was the attack of the "Apple Spot fungus," that the foliage of the trees, as well as the fruit, suffered severely. Its effect as you know is most apparent on the fruit in the form of the characteristic black spots. In this case it was so severe that it attacked the foliage causing it to curl up and assume

a brown color, making the trees look as if they had been attacked by fire blight or as if they were scorched by fire. This visitation had a striking effect on the results of my experiments; because in every case where the trees were untreated the foliage was badly affected, and the trees therefore lost a large portion of their fruit, making a marked difference between the trees which were sprayed and those which were unsprayed; the gain in every instance being in favor of the former. The trees which retained their foliage, naturally retained a larger proportion of fruit. In other words the spraying prevented the growth of the fungous disease on the leaves and they being healthy retained the fruit. The experiments were conducted in the treatment of peaches, cherries, plums and apples. I am not going to touch at length on peaches, and very briefly on plums and cherries, and will spend only a few minutes on apples. In conducting these experiments I attempted to bring the number of formulæ down as fine as possible. I used the same formula as heretofore, namely: Copper sulphate, 4 lbs.; lime, 4 lbs.; water, 50 gallons, or one kerosene barrel full. I added 4 ozs. of Paris Green when I desired to use an insecticide. In my experiments with peaches I did not use the insecticide throughout on account of the foliage being tender. I sprayed the trees before blossoming with the above mixture. I sprayed again after the blossoms had fallen and the fruit had formed, but noticing some injury to the foliage in making the next application I reduced the strength of the mixture to 3 lbs. copper sulphate, 3 lbs. lime, and added 3 ozs. of Paris Green to make it uniform.

In treating the peaches I wished to prevent the rot and also the curculio. I may say that the rot was not severe and the crop of peaches was immense in the Niagara district, the amount of damage done by the curculio and the effects of fungous disease was not therefore of any injurious importance, and it would really have been better for the trees if a larger quantity of fruit had fallen off, because fruit growers as a rule are too avaricious in regard to yields and it would be better in the long run if they thinned their trees during seasons of heavy yields. The sight of hun-

dreds and thousands of baskets of peaches, pears and grapes at each of the small railway stations in the fruit season is a scene that is most impressive. Last season during the hot weather immense quantities of early fruit had to be hurried out of the country. Our experiments showed that the rot was prevented, and the benefit of caring for the trees by spraying was shown by their having 3 per cent. to 5 per cent. less of rotten fruit. The curculio was deterred and prevented from injuring the fruit in about the same degree, so that while not very marked, our experiments showed the benefit of the treatment.

In the case of plums the results of spraying were very marked. The principal varieties treated were Munro, Bradshaw and Lombard. These were planted in blocks of four and five rows abreast of each other running across the orchard. The diseases treated were the Shot Hole Fungous and Monilia or fruit rot. You may have noted it in your own orchards. The foliage looks as if a charge of fine shot had been fired through it, being perforated with numerous round holes. Later on the whole leaf turns brown and drops off before the fruit ripens. The fruit consequently does not ripen thoroughly, nor color properly.

Another disease is the soft rot; attacking the fruit it turns it a brownish color inside, and on the outside it is coated with a grayish powder, the summer spores. This disease mainly attacks the plum. I used the same mixture and the results in the case of this disease were quite satisfactory, the fruit was larger and the rot was very much less in the case of the sprayed trees. To give you an idea of the actual results, from the sprayed trees, I may only say that 100 average plums of the Munro variety were picked and weighed three pounds and nine ounces. That 400 plums of the unsprayed trees of the same variety only weighed two pounds and one ounce, all the sprayed plums would easily sell for "firsts," while the unsprayed could not be sold for poor "seconds." Then the difference in the appearance of the trees was very marked; in one case the foliage was rich and luxuriant while in the other case the trees had lost much of their foliage and were in poor con-

dition generally. The cherries in that district were considerably affected by rot and also by the slit hole fungous. If you grow here the Black Tartarian and Yellow Spanish varieties, you may have noticed the presence of the disease I refer to. Just about ripening period the fruit turns brown and drops off. I treated a number of trees. These varieties named are subject to rot in that vicinity. I selected two average trees and picked the fruit from them, the fruit was sold and the result in one case was 30 pounds of fruit from the unsprayed, and 90 pounds from the sprayed tree. In another case an average unsprayed tree yielded 17 pounds of fruit which netted \$1.20 and one selected sprayed tree yielded 130 pounds of fruit which netted \$9.25. So that it made a most striking return, in fact almost too large to present to an audience as an average return in treating this disease. In case of cherries however, and with this particular variety, there is no doubt that it will pay to spray every year.

The leaf blight on the pear is a very serious disease. Cracking and spotting of the fruit is also one of the worst enemies of the pear. There are then, two diseases; one injures the tree and the other injures the fruit. The treatment was to prevent both diseases. Results in the case of the Flemish Beauty the yield was increased by 75 per cent of salable fruit. In the case of an early variety like the Beurre Giffard the results were still more marked and practically in line. On the untreated trees there was a very small amount of good fruit the larger share being entirely unsalable. I may say that in treating pears the best results were obtained from the early spraying. I sprayed twice before the blossoms opened, and once after. This gave better results than four treatments after the blossoms had fallen, demonstrating most conclusively that we want to get ahead of the enemy by early spraying.

To illustrate in a graphic manner some of the results I have obtained in spraying apples, I will give you the combined results of four of the leading varieties which are grown on a commercial scale in this province as obtained in several orchards. The percentage of No. 1 fruit gained by spraying the Golden Russett is about 38 per cent. The

fruit you understand was selected and graded, as is usually done before sending it to market, 32 per cent. of No. 2 and the balance No. 3. This is an average for this variety from all the experiments. Of the unsprayed we had 18 per cent. of No 1 fruit ; 44 per cent. of No. 2, and the balance of No. 3 quality.

In the case of the Baldwin the results are absolutely startling. We have about 75 per cent. of No. 1 ; about 20 per cent. of No. 2, and the balance No. 3. There being hardly any No. 3's. In the case of the unsprayed Baldwins we had 24 per cent. of No. 1's and all the rest were No. 2's.

The sprayed Greenings gave 62 per cent. of No. 1's and 20 per cent. of No. 2's and a small amount of No. 3's. The unsprayed yielded a considerably less percentage of No. 1's and a small amount of No. 2's and over 50 per cent. of No. 3's. Every practical fruit grower knows what that means when he comes to market his fruit.

In the Northern Spy the results were also very striking. I have a brief report in type of this in order to show the financial returns per acre. Allow me to read the following :

"The effect of this improvement *in quality alone* upon the gross receipts from an acre of bearing apple trees may be shown as follows:—Supposing the yield to be 50 barrels, we find according to results gained that spraying would give at ordinary market rates, \$2.50, \$1.75 and 0.75, for first, second and third class respectively, \$56.75 worth of No. I. fruit, \$31.50 worth of "seconds," and \$6.97 of "thirds," or a total of \$95.22. The same area unsprayed would give of No. I. fruit \$26.75, of No. II. \$37. and of third class \$13.64, or a total return of \$77.40. leaving a balance in favor of the sprayed acre of \$17.82. This is supposing that all the "seconds" and "thirds," which in the case of the unsprayed is very large, could be sold. The cost of spraying an acre of apple trees will vary according to the size of the trees ; using diluted Bordeaux mixture and making five applications, it need not exceed \$6 and may be under \$5. There would thus be a net profit of \$10 to \$12 on the basis of equal yields and improved quality. As a result of the experiments referred to, and looking at spraying as *affecting the yield* we find that the sprayed trees gave 74 per cent. of the total

yield. This return added to the improved quality gives a difference in the net receipts of \$51.53 in favor of the sprayed acre."

Such a result ought to be impressive and should bring the matter home to every fruit grower. The apples were sprayed four times; twice before blossoming and twice after, with Bordeaux mixture according to formula given.

The equipments for spraying on a large scale will depend upon the area to be sprayed. If you have a large area I would advise the purchase of a good horse power pump. I do not think they are made in Canada, but they could be obtained through your Canadian agents. I have used one made by the Field Force Pump Company; but for ordinary small areas I would buy a strong force pump, they are made by three or four firms in Canada. We have been hammering away at the manufacturers for the past three years endeavoring to show the necessity of giving Canadian farmers a good pump, and now I think you will find advertisements of them in the agricultural press, notably the *Canadian Horticulturist*. One of the principal points about them is to have a good agitator. The agitators which mix the liquid by a return pipe are usually satisfactory. They do not agitate enough, and if they get force enough to agitate the liquid, you do not usually get force enough to throw the liquid upon the trees. Pumps which are fitted with brass working parts will last longer than those with cast iron.

The nozzles which I have found most satisfactory were the Improved Vormorel and the McGowen. I used a pump with two discharge pipes, one of these fitted with the Vormorel gave a fine spray on the lower branches while the McGowen throws a coarser spray, reaching the upper branches, with these a side of trees was covered as fast as a horse could walk, so that two men—one driving and pumping, the other directing the spray—could go up on either side of a row of trees and cover them in a satisfactory manner.

In preparing the mixture I found it advantageous to prepare a stock mixture sufficient to last the whole summer.

"When a single barrelful of this is required, dissolve in the barrel 4 lbs. of copper sulphate (blue stone). Hot water facilitates the operation. To dissolve quickly, place the copper sulphate in a cotton bag or basket, and suspend this in the vessel containing the water so that it is entirely immersed. Solution rapidly takes place. In another vessel slake 4 lbs. of fresh lime with as many gallons of water. If the lime when slaked is lumpy or granular it should be strained through a fine sieve, or coarse sacking, into the barrel containing the copper sulphate now in solution, fill the barrel with water. It should be used soon after being prepared.

When a large amount of spraying is contemplated it is a good plan to make up a stock solution separately, each, of lime and blue stone, which can be diluted as needed:—Dissolve 100 lbs. of copper sulphate in 50 gallons of water; two gallons when dissolved will contain 4 lbs. of the salt. In another barrel slake 100 lbs. of lime and make up to a milk by adding 50 gallons of water; when well stirred two gallons should contain 4 lbs. of lime. When it is desired to make a barrel of Bordeaux Mixture take two gallons of the stock solution of copper sulphate and add the same quantity of the milk of lime; if the lime is of good quality it will be sufficient to neutralize it completely. If the lime is air slaked or impure, the right quantity can be ascertained by applying the ferrocyanide of potassium test. If the lime is deficient a drop of the ferrocyanide of potassium (yellow prussiate of Potash) added to the mixture will turn brown. Add lime water till the drop of ferrocyanide of potassium remains colorless."

Supposing you start with a barrel containing 100 pounds of copper sulphate dissolved in 50 gallons of water that would be one gallon of water to two pounds of copper sulphate. If you took two gallons of that and poured it into another barrel then you could add lime and put in an occasional drop of ferrocyanide of potassium, and when you had enough of your lime as shown by the test then fill the barrel with water and the preparation is ready. You could thus keep your copper sulphate always ready for use; and your lime slaked in another barrel and in a condition in which it will not deteriorate. Fresh lime should always be used, and the best way is to slake it in a barrel of water the water covering it will exclude the air and prevent change in its character.

To sum up, the work covering the season was success-

ful in proportion as it was carefully done. Aside from my own work I know of quite a number of people who experimented in spraying, and just in proportion as they were careful in making the applications so were they successful. Where the work was done in a slipshod manner then the beneficial results were placed in the doubtful plane. Where the instructions were carefully observed and carried out the results were most striking. And it is my opinion, based upon personal experience and observation, that wherever this apple spot and other fungous diseases prevail that spraying will pay just in proportion as the work is conscientiously and carefully done.

I have been interested in another subject during the past season about which I would like to make a few remarks and that is with reference to cold storage for the preservation of our perishable autumn fruits. In Chicago two years ago cold storage was used effectively and it struck me that useful experiments could be carried on with a view to find out the effect of cold storage in preserving the different classes of fruit. How the building should be constructed, and its effect on the commercial marketing of our great product are also collateral questions. During the last season with the co-operation of the Montreal cold storage company I have carried samples of the different fruits as they ripened for varying periods of time. Beginning with early apples and continuing with pears, plums, peaches and grapes the whole season was covered. I took out on Monday in coming through Montreal, this sample of Duchess. I may say that the apple was in perfect condition at that time. With us at Ottawa it is difficult to keep the Duchess under ordinary conditions until our exhibitions in September.

Bartlett pears placed in storage in September were in good condition for two months though some are still sound. In fact I ate some of these also on Monday. The peaches, and in fact all stone fruits, did not keep satisfactorily more than 15 to 20 days; after that they did not actually rot but a process of decay took place, beginning at the stone and working out until the whole fruit became black. Such fruit as the Flemish Beauty and Anjou pears kept very well.

The temperature at which fruits were stored remained uniformly at 34 degrees, possibly a degree lower would have been better. I also found fruit put up in wooden packages and each specimen wrapped in tissue paper kept better than those in baskets, either wrapped or unwrapped. Duplicate samples were put in. Samples were wrapped in tissue paper and others were not. The samples which were wrapped kept the best.

The length of time which they will keep after they come out of storage is a question I am not able to inform you fully upon at the present time. I just relate this because I know you would like to know the work we are doing in this line. The cold storage question is one of vital importance to us as fruit growers and while we may not be able to hold, without deterioration of quality, stone fruits for a period of more than two or three weeks, yet this may be long enough to tide over a critical period when the markets are glutted. The cold storage building which is helping us to carry out this work is entirely a separate institution in Montreal. I may say that I have grapes in there now in fine condition, just as nice as ever as regards flavor, firmness and clinging to the bunch and are in perfect condition at the present time. The question of the possibility of establishing a cold storage building in this district comes to your mind no doubt. The building in which these were stored is a large and very expensive one, and it would be too expensive for ordinary district warehouses; but I think a much cheaper building could be constructed which would serve the purpose; having the knowledge along the line of the effect of the cold storage on the different fruits will help us when we are ready to construct district warehouses, if such are thought desirable.

GEORGE THOMPSON—Does the Bordeaux Mixture protect the fruit from the Codling Moth?

PROF. CRAIG—We add Paris Green for insects—By adding the Paris Green which can be applied with perfect safety you have a protection from the Codling Moth.

T. H. PARKER—I would like to know if Prof. Craig has ever tried berries. I have not myself. But I had an

opportunity of observing them. I have seen blueberries carried the year around. Strawberries, where the atmosphere was moderately dry with a temperature of 34 deg. These conditions would suit raspberries—the atmosphere must be dry. But the contrary is true in the case of apples and pears—it should be slightly damp.

Returning to the spraying question. There is one point I would also like to make and that is: when purchasing a pump you should be sure to see that it is a brass lined pump, that the bearings and valves are of brass; because the ordinary cast iron pump will at best only last a season or two. The Toronto Pump Company and the Shapley Gould Company, of Brantford, and there is also a firm named Halliday & Mitchell, Clarksburg, Ontario, are all making good pumps. I have used samples of all three, and I think they all could be used with satisfaction by fruit growers. The last pump I named is the strongest pump.

A VOICE.—How high can you force a spray? Ans. It will depend on your nozzle, and the force put upon it. I have had no difficulty in covering trees twenty-five feet high when standing on a waggon on which was placed a platform and using ten feet of hose. The important point about nozzles is economy. There is no difficulty in getting a nozzle which will send a stream over the highest tree, the idea is to get a nozzle to throw the liquid in a misty form. The Vormorel and the McGowen are two of the best.

FORESTRY.

S. P. BENJAMIN, WOLFVILLE.

I will first call your attention to the farmer in entering on his lands in a forest state, or partially cleared. If he is industrious his chief ambition is to clear away the forests as fast as possible and get clear fields to provide bread for his family. He sees no beauty in trees unless dead ones. He becomes so intent in clearing that he makes no provision for his wood supply, even for fuel

purposes. The result has been that in the best farming sections of our country there is not an acre of the original forests left, hence the natural result—impoverished farms. Brooks and rivulets of water that once gave life and productiveness to the soil, now have dried up, and the farmer finds himself unable to procure sufficient manures to secure as good crops as formerly grew on the land, and in many cases gives up in despair and leaves his land and country to his country's loss. This is the natural consequence of not knowing the relationship between forest and farm. Had he known, he would have left a few acres in different sections of his farm of the natural forest which would not only act as a reservoir of moisture for his crops in other sections, but provide ample fuel by systematic cutting without reducing the forest acreage. Therefore our country has suffered to an enormous extent by this indiscriminate cutting of forests and as a speedy remedy is required, I would suggest as a commencement, to give the whole country an idea and arousing them to the great necessity of preserving the remaining forests and replanting on sections already destroyed; our government should take it in hand at once and engage a competent man who understands Arboriculture and Sylviculture, scientifically and experimentally, to address the people throughout the country and arouse them to a sense of the loss they are sustaining, individually, as well as the public at large. I would also suggest that arrangements should be made to enable our worthy Professor of Horticulture here to add Arboriculture and Sylviculture to his now progressive Horticulture class, and that this may be the pioneer society of Nova Scotia, in advancing the study and practice of forestry. Imagine what our country would have been had we been taught to know that blocks of trees were valuable and really an assistant to growth of our crops; and had we considered any spare time well spent planting trees or culling and caring for trees, instead of thinking that trees were next kin to an enemy. This has especially been the case in nearly all new sections; even on poor lands when no crops would pay, the forest has been cut down and burnt and often exposed the bare rocks which were especi-

ally adapted for trees and trees only. Now it might seem very wise in us to say how foolish those people were. Well our fathers did it, and yet we all consider our fathers about as good men as we are; but they never had been told or taught that there was much or any affinity between forest, farm and climate, therefore they never realized anything wrong; and our country is in about the same condition today; and this is why it is necessary to instruct our people, especially in back sections, in the great necessity of protecting our remaining forests.

Our forests are being badly destroyed by fires, in most cases, carelessly or wilfully set, and man will set fires, regardless whether it burns green forests or not, simply because it has never entered his mind that it is any injury to the country at large. He knows nothing about the connection between forest, farm and climate, he simply does not realize that there is any value in it except to the man who owns it, and it may be some satisfaction to a bad man to injure the owner, not realizing any public loss. Therefore, I think the case is urgent to send a lecturer to tell the people through all sections and explain the necessity of protecting remaining forests or patches of trees over the farm, and planting when the natural forests have been destroyed. I believe this would do more good than any stringent law against setting fires. Many people who do not understand the business, have an idea that lumbering destroys our forests. This is a mistake. Cutting timber for mill purposes never reduces the forest acreage, it simply cuts out grown timber, still leaving an unbroken forest with young growth to take the place of the larger timber cut.

Allow me to read the following extract from Blackwood's magazine :

“ Tree culture increases the fertility of the soil. It does so in more ways than one. Reference has already been made to the protection which the woods provide to the soil from the effects of extreme heat and extreme cold, as also to the shelter from the blasting influence of dry and arid winds. Woods, moreover, prevent the waste of soil by washing, in times of heavy rainfalls. But the influence of woods on soil is not merely negative, they break up and loosen the

lower layers by the operation of the tree roots. They add largely to the fertility of the surface soil by the great mass of vegetable matter which falls upon it from the trees and then turns into humus. The tendency of all this is to raise the temperature of the soil and to render it capable of maintaining higher forms of vegetable life than it produced before it grew a crop of trees: examples of the truth of this may be found in many parts of our country.

There is no need to enlarge upon the great advantage that is derived from the shelter that is provided by plantations. The agricultural value of the adjoining land is thereby increased substantially to greater extent indeed than would be readily believed by those who have not observed the matter narrowly. It may be doubted if land-owners and others in weighing the "pros" and "cons" of planting, attach sufficient value to the important consideration of the shelter provided by the woods. The agricultural value of large areas of land may be sensibly increased by the judicious formation of adjacent plantations. It is but fair that the plantations should be credited with the amount of this increase. It is more than probable that if this was universally and faithfully done, the woodlands would in many instances stand higher than they do in the estimation of their owners. It may be stated as a general rule, based on and verified by actual practical experience, both in England and Scotland, that land which is from various reasons unfit for arable occupation, will, if brought under sylvicultural crops and subjected to rational and careful management, at the end of seventy years pay the proprietor nearly three times the sum of money that he would have received from any other crop upon the same piece of ground."

PROF. CRAIG said this is a very important subject. We have a practical demonstration of the value of forest belts on the experimental farm in the North Western territories—forests are unknown on the North Western prairies. There was a most decided increase in the crops which grew next to the shelter belts—and this was on account of the fact that they hold a greater quantity of snow in winter, and therefore the soil is watered to a greater extent, than when the land is away from the sheltered belt. He would also urge upon the people the conservation of the forests from a financial standpoint.

DR. CHIPMAN—said that in the early history of this country it was necessary to hew down the forests to make the homestead and the farm. But at present the forest trees were largely cut down for manufacturing purposes,

and the product was exported. He thought some remedial steps should be taken on this question to save the trees as much as possible, and that the rate of denudation was increasing year by year.

S. P. BENJAMIN—said he thought Dr. Chipman was entirely mistaken, the lumbermen did not cut one tree in fifty. The damage was largely done by settlers. He said it would be well to show the settlers the advantage of preserving the forests—and that the country would thereby reap a great benefit.

AVAILABLE BUT UNUSED WARMTH.

BY A. P. REID.

The heat of the sun is not availed of as it might be. We all know how serviceable it is in the cold house (glass) and "cold frames," and yet this knowledge has not been made use of in the way that it would benefit us the most in cold weather. As an illustration of my idea I will detail a plan that I adopted last year and have been much pleased with the results. The residence at Nictaux was surrounded on the east and south by a verandah enclosed with glass, using ordinary 12 light sashes (10 x 14 inch panes) which are so arranged that they can slide past one another in summer while closing tight together in winter. There are 24 of those sashes enclosing a space about 12 feet beyond the house and surrounding it. On the west side I expect to put up the ordinary sloping conservatory roof running down nearly to the level of the ground.

The roof of the verandah is almost flat, as it is intended for a promenade, on level of second story, and is covered with hemp canvas, oiled and painted, and supported by $4\frac{1}{2}$ inch spruce sheathing on 2x6 inch joists. The windows do not come within three feet of the floor, which is raised above the ground and 6 inches below the level of the floor of the house. The space below the windows is boarded with inch lumber, plain jointed, with the joints covered by a batten or weather strip, so that it is tight as far as the

weather is concerned, and yet will allow shrinking of lumber, if such there be. The advantages are :

1st. The walls of the house are protected from the frost and cold winds, and the house cannot cool very rapidly, so that the internal heat is conserved.

2nd. The heat of the sun is utilized and to some extent stored, because, as has long been known, the heat rays direct from the sun pass through glass with but little hindrance, but the reflecting heat which radiates from other sources, finds its way very slowly through glass. Hence, the sun's rays pass through it and are absorbed by the walls of the building and other objects on the verandah and the heat retained there until it becomes slowly dissipated.

3rd. By a little attention, house and other plants can be kept green all the winter and the view from the windows includes something which is a contrast to the snow or bleak landscape.

4th. The verandah can be used in spring as a large "glass frame" for forcing early vegetables and thus enable us to counteract the disability we labor under owing to our late and cold springs.

5th. In the fall many vegetables such as tomatoes have not ripened, and it is very desirable to have some sheltered place where they can be exposed to the sun and as well be conveniently handled. Such an addition as I have described, fills the want.

6th. By the use of artificial heat in winter it can be converted into a veritable hot house with all the advantages of comfort, convenience and plant production which this addition implies.

7th. In summer, with the windows open, it is cool and creates a draught and thus while it shades it tempers the heat of the hot sun.

8th. Appearances and general convenience are items worth considering and it adds a large amount of valuable floor space where it is of the most service.

9th. To ladies who like a winter flower garden (and

who does not?) and a proper place to keep their plants with a sunny exposure, the mere mention of this adaptation is sufficient, not to speak of the educating and refining influences on the family who would be proud of such a home.

The taste and means of the individual can have much to do with the details. It might be preferable in the majority of cases to use the sloping conservatory roof altogether and so do away with roofing. The style of the residence would be the guide as to these details. Houses which face the north are under a disadvantage, but a clear idea of what is wanted would modify the plan to suit conditions.

I have added other constructions so as to carry out a new system of heating and ventilation. The interior of the house is also arranged in conformity therewith, and it is designed to distribute an abundance of warm air without the original house and within the enclosed area surrounded with glass. I have not yet had sufficient experience of the result to be able to speak confidently as to the new departure and I may give you the results at a future time. However, I have seen enough to show that we are neglecting a gratuitous supply of healthy and life-giving heat, while preventing the cold draughts in our houses in winter, with the other advantages above detailed, and I doubt not if they were sufficiently understood they would not only be appreciated but utilized.

Wednesday evening was devoted to a public meeting. The spacious College hall was filled with an enthusiastic and appreciative audience. On the platform were the members of the Executive Board and Council of the Horticultural School, J. B. Mills; M. P.; Dr. Borden, M. P.; B. Webster, Esq., and other gentlemen who have taken a deep interest in the affairs of the Association. Rev. A. Cohoon opened the meeting with prayer, and President Bigelow introduced Rev. E. M. Keirstead, of Acadia College, as the first speaker.

Professor Kierstead, on rising, was greeted with long, loud and enthusiastic applause :

MR. PRESIDENT AND MEMBERS OF THE FRUIT GROWERS' ASSOCIATION, LADIES AND GENTLEMEN,—During the meetings you have had the last two days, you have been discussing practical themes and I have no doubt the discussion will be of direct and practical advantage to the work, which you have in hand. No topic was assigned me, and so I have had to evolve one from the purpose that has brought you together.

I have, therefore, asked what might be suggested by the fact that you assemble here in the halls of the College and ask a Professor to address you ; from the fact that your meetings are of an educational character ; from the fact that you have with great courage, foresight and liberality, established a School of Horticulture here ; and from the fact, as I understand, that you are seeking to secure an experimental station in this vicinity as a further aid to the industry you represent, and I have thought that I should be in harmony with your purpose and these circumstances by speaking upon

THE EDUCATIONAL OPPORTUNITIES OF THE AGRICULTURIST AND FRUIT GROWER.

The value to the community of any profession depends in part upon the value it has in the minds of the members of that profession. If they see no power in their work, nothing in it which will expand their minds as men, they will be inclined to leave it or be inefficient in it ; but if they know that to practise their profession they must constantly study and grow there is given an assurance of the success of that profession. So if our young men are to be induced to take hold of the work of Agriculture for life they must see that it has opportunities for growth in knowledge, for genuine culture. If I can show you that your work admits or requires this development of mind I shall do something to make the work attractive to young men and so strengthen you.

Now it must be admitted at once that agriculture will require toil,—some drudgery, it may be. But so will any occupation or profession if you mean to do anything in it.

The able lawyer, physician or statesman must be a slave to his task in order to succeed. You will not escape toil by leaving the farm.

You must remember also that if you take any other occupation you will only get the culture of that occupation and not of all professions. Some young men seem to think that if they can get away from the farm they will get all the education of a lawyer, a physician and all the learned men. This is a mistake. You must take only one business. Then do not say that agriculture itself is degrading but that it has compensations; that you must work eleven months, but you will have a vacation of one month. That is not enough. We must find our work itself helpful to our manhood.

Now you ask: "How does the life of an agriculturist or of a fruit grower or of these combined afford an opportunity for educational growth to those engaged therein?"

Well, first, dismiss your prejudice against the occupation and look for the power and nobility in it. Whether we find culture or not, in our business, largely depends on ourselves, on the way in which we view our work. Two men engage in trade. One seeks only his own interest and he grows small in it; the other studies the relation of his trade to other trades and seeks to serve his fellow men and so is made a man as well as a tradesman. Two men engage in politics. One seeks only his own fame and gain and he in so doing loses his soul; the other looks into the meaning of a nation to humanity and seeking to serve his nation is made a broad, generous, noble man. So in agriculture, if you go to it assured that it holds culture for you, as the college does to the earnest student, you will not fail to find it.

Secondly, look at the nature of education and the nature of your work.

(a) The first step in education is to learn how to observe. Now, the farmer must be an observer. He must know how his land looks, how his crops flourish, how his trees are doing, how his animals thrive. He must use his eyes always. Your horticultural school helps this process greatly. Then when you have your facts you must com-

bine them ; first you analyze your soil ; then you bring soil and seed together, and so you get constructive power. This is education. And because you must test your mental work by experiments you are kept more closely to facts than others : you are nearer truth than in speculation. There is no teacher like mother nature.

(b) There is growth of judgment. Here you must act every day in several elements of knowledge ; you must keep your accounts, you must change methods, you must experiment, and so you grow in soundness of mind, in judgment. Agriculture is becoming a science and challenges study of all its followers. Their living is in their knowledge ; they must grow.

(c) He can grow in general knowledge. A farmer has more leisure time to read, than other men. Most of the winter and a part of the summer evenings, can be spent in literature, and the realms of the intellectual world are brought to his door. He has time for it, while those of us who are engaged in other professions, have to spend until midnight at our books. These men, who are so happily interested in their homes, enrich their minds with the great standard works of history, obtain a knowledge of municipal affairs, and of this great throbbing life, in the midst of which we live ; and so far as the intellectual training and enrichment of the mind, is concerned, the farmer has the advantage. His opportunity is there. Let him use it.

(d) The opportunities for æsthetic and moral culture are not wanting. A man goes abroad and witnesses state pageants and thinks he sees beauty ; but Solomon, in all his glory was not arrayed like the lilies in the midst of which the farmer always lives. If you study the masterpieces in the great galleries, what are they but an imitation of nature that is always before you ? Now you have landscape gardening, the adorning of the homestead with trees, and all devices for adding beauty to the country. No wonder poets like Goldsmith give such sweet pictures of rural life and show how it enters into the souls of men. There the moral training is superior. Nature is stern as well as gentle and you must obey her. This makes

moral men. Nowhere does home count for so much as in the country. The fellowship of parents and children is closer than elsewhere. If friends are fewer they are better known. Ambition that eats out the soul of nobility is reduced to a minimum. The associations of childhood are purest in the country. In a word, morality is itself an education, and the country is favorable to morality. Add to all this the power of religion as suggested by nature and provided for by the churches and you have the cup of life almost at its best. Where can you get a greater number of advantages for culture of the best kind? The three great subjects of study in all ages—the human soul, nature and God—are to you open books.

The third source of education to the agriculturist lies in the study of the relation of agriculture to the public weal, to the large life of the nation and to humanity itself. One's heart takes fire at the very thought of making a nation; for in modern times a nation is not merely a collection of provinces for cheap glory or illustrious achievements, but it is a place for making men of the noblest kind. For this the machinery of the nation is necessary—the production of material wealth, the foundation of homes by the thousand, the maintenance of law and order, the work of colleges and universities, of journalism and books, of the various philanthropic and religious organizations. That is a noble ideal; the thought of it is inspiring. If any of us can see that our business has a relation to this national growth, our labor will be changed into delight and be made to us an education. Now wealth must be accumulated by a nation as a condition of its advancement, and agriculture, you well know, is a large source of wealth. How large a part it is of our resources may be seen from official returns.

I read in the blue books which come from Ottawa—and some of you believe they never lie (laughter) that forty-five per cent of the population of Canada get the means of subsistence from agriculture; that its products constitute one-fourth of the freightage of our railways and one-third of that of our canals; that our mercantile marine depends largely upon the products of agriculture for freights, more than one-half of which are products of the farm. Thus the

life of our population depends upon you, the agriculturists and horticulturists, and the fact that you thus contribute so freely to the nation's activities ought to impart dignity and self-respect to every man engaged therein—a self-respect which is in itself educative. This Valley has received one million dollars out of horticulture for the past year's crops. You have added that much to the wealth of your country—one million dollars for the building up and development of your schools, colleges, newspapers, for the acquisition of more magazines, more teachers, more professors, and for all institutions of benevolent and charitable objects. It is something for the agriculturists and the horticulturists to rejoice in, if they can add one million dollars to the wealth of the country. It is manifestly worth more than a million to us in the development of our resources, for it is the seed-grain of the harvest of many millions yet to come. Therefore let us rejoice in the progress we have made. You are benefactors.

Take a farmer as he drives to the city on his load of produce. Why, he carries the staff of life. He raises the food for mankind, he is carrying something down to the city to feed the little children in their homes, that is to be the new life of the world. God's afflicted ones in the hospitals, that are to be strengthened and made healthy; for all the people. Why, he ought to be proud—and the driver of that team, should rejoice that he is permitted to carry this golden grain to the people. Do you suppose the disciples were ashamed, when Christ distributed the loaves to the five thousand? Do you suppose there was false humility on their part, when Christ took the loaves from their hands? Those who receive the loaf and give it to others, have they not a right to rejoice in their occupation?

Take a half dozen officers from the army, with their red coats and their bloody habiliments upon them, with their swords and daggers with them. Let them meet half a dozen farmers with their spades and their ploughs, and the military men will look down upon the farmers, but that does not matter so much. The trouble is that the farmers often look down upon themselves, and allow themselves to be considered lower in the work of humanity. Now, the

sword which the military man bears, may have some honor if it has been used in the defence of a righteous cause, but it is the means, sometimes, of an aggressive warfare, which deals out death and destruction to God's creatures, obliterating human life, and all the havoc of war—destroying property and all that is beautiful to behold, bringing death and destruction in its train. Look at the men with the spades, they are the objects of honor, they have been at war with the earth, to win thereout, bread for the children of men. Here is the sword that stands for destruction always, there stands the spade for everything, constructive, and that is best in human life. The man who bears the spade, should he not be honored? Which occupation is the most permanent? Is it the military man's or the farmer's? Is it the men of the spade and plough, or of the sword? "For the sword shall be bent into plough shares, and the spear into pruning hooks." The occupation of the agriculturist is continuous until the day the Lord shall come. It seems to me that if we only had titles of distinction to be conferred upon the farmers, who are truly worthy of them, they would gather around that work with confidence and dignity, glory and honor, that is commensurate with the life and business of the world (applause.)

Now, we have another aspect of the case. What is the best contribution, which the country makes to the city and world's life? There are some good people who are not farmers. There are some good merchants and lawyers, there are a great many good ministers, some good professors (applause), where did all those come from? Did you ever know any number of them who reached a degree of eminence, who were raised in a city? Did they not come from the farms and from the country? If you want good preachers you will have to go to the despised and neglected country. It is the boys and girls in your homes, who are being educated by this magical power, the magic word that rules in the Anglo Saxon, the power of associations in our home that make the best contributions to the world. You are raising boys and girls to make a better life than we have at present. (applause). You, who are in the country, have the intellect, and you will determine the

power and the future life of the country. You are the head of the nation, and have all the responsibilities belonging to those who initiate the movements of the nation. You can rejoice in it without fear or trembling. I would have the farmers see their relation to all other occupations, that they have energy for the maintenance and support of a free government, and the bringing to all people in our in our land, the truth that God has given to us, in order that the man himself may have the best culture in his generation.

In a word, gentlemen, let your sons see the facts; let them know that agriculture, the chief industry of Canada, demands vigor of intellect as well as of arm, that it provides for close study and constant increase of knowledge, that it cultivates the ethical nature and suggests religious aspirations, that it relates its followers in a helpful way to the nation and to humanity, and surely they will hesitate before selling their birthright for a precarious existence in less favorable conditions. Thus, illuminated by intelligence and elevated by motion, he will daily grow in the freedom the truth alone can give and in age will "go, not like the quarry slave, scourged to his dungeon; but like one who wraps the drapery of his couch about him and lies down to pleasant dreams."

Prof. Keirstead's address was heard with intense interest by the immense audience present, and will be long remembered as perhaps the most eloquent and scholarly oration ever delivered before the Association.

Prof. Craig was then introduced by the President and spoke as follows:

MR. CHAIRMAN, LADIES AND GENTLEMEN,—

The very flattering introductory remarks of your President increases the natural diffidence which I feel in appearing on the platform before an audience, so large, and composed of so many intellectual lights. It has been my privilege, and when I say privilege, I mean it, to have met

with the Horticulturists of the Province at more or less frequent intervals during the past four years, and it gives me pleasure to say that the recollection of these visits has always been of the most pleasing character. While they all have been enjoyable, I can honestly say that I have never attended one so full of interest and so instructive as that which has been held here this evening.

Mr. Bigelow referred very kindly to the efforts made by myself and the inconvenience experienced in travelling the long distance, necessitated in coming from Ottawa, but I can assure you ladies and gentlemen, that after listening to the eloquent, interesting, and withal instructive address, from your fellow resident, Prof. Kierstead, I can say with all honesty that I feel more than repaid for any trouble or inconvenience which I may have experienced in coming down to meet you. His address is full of inspiration and strength, and the words which he has uttered should inspire every fruit grower and farmer present with an ambition to go home and pursue his chosen calling with renewed energy and vigor. I think that the members of the Fruit Growers Association of Nova Scotia have excellent reasons for self-congratulation. As I have said before, it has been my privilege during the past three or four years to visit you at intervals and I have thus had an opportunity of watching the growth and development of the Association and the objects which it aims to promote.

In this connection, I am reminded of an old and somewhat pathetic story which has been staged in the interests of the temperance cause, entitled "Ten nights in a Bar-room." The story is told by a traveller who visited a bar-room on ten different occasions with long intervals between, and the story of these visits depict gradually the natural decadence and downfall of a man who left an honorable calling and fell into bad habits and finally into disgrace, by indulging in tippling and in selling strong drink. His progress was from the higher to the lower, and the similitude as applied to this Association is only true when looked upon from an opposite view.

I have been the visiting traveller and during the progress of my visit to the province it has been my pleasure

to observe the gradual, steady, but sure, upward progress of your Association in the lines calculated to advance the fruit-growing interest, and each visit confirms my opinion more than ever that the future success of this society, particularly now it has that valuable adjunct, the Horticultural School, is assured. It seems to me that the secret of your success is the same main-spring which leads to success in nearly all of life's callings; viz: perseverance. You have selected a line of work and you have strictly adhered to that line, and going straight along with a definite purpose in view, thus the object has been more easily obtained. Knowing what you wanted and working towards that end has been the great secret of your success. You have had presented to you in the scholarly address of Prof. Kierstead the æsthetic and ethical side of horticulture. I shall endeavor to interest you for a few moments along a somewhat allied line, and shall try to introduce in the course of my remarks, something of a practical nature.

The relationship of the plant to the animal, at first seems very distinct and to the ordinary observer the difference between the plant and the animal is so clear as to render any discussion on the subject almost absurd, but as we pass from the higher forms of the animal and the higher forms of the plant to the lower forms of each kingdom, we find that the lines gradually converge and when we reach the lowest and most poorly organized individual in each kingdom we find that the distinction is purely an arbitrary one, that is to say, it is impossible to say whether the individual be plant or animal. In looking at the plant kingdom one is impressed with the utter dependence of the animal kingdom upon it for its existence.

While the plants have the power of absorbing from the air and the soil and assimilating for themselves the nutrition stored up in crude form in these media, the animal is entirely unable to take from the soil or the air and assimilate food which is not already organized, so that in a broad way it is the function of the plant to assimilate and organize food for the animal, and in this respect the plant kingdom really stands between the animal kingdom and starvation. There are many interesting thoughts in con-

nection with the natural function of animals and plants which I would like to present to you, but time will not admit.

If you permit me, I shall endeavor to explain to you the most wonderful process in the plant kingdom by which the plant is able to reproduce its kind. This, as you know, is the first object in life of plants and of animals. To understand how reproduction takes place, I shall have to ask your attention for a few minutes while we hastily run over the parts of the flower, and learn the function of each part and the role which it plays in seed production.

Mr. Craig then gave a description of the parts of a typical blossom belonging to the rose family, and described the process of pollination, how the seed was formed and the relation perfect blossoms bore to the productiveness of an orchard.

Some of the practical points brought out in his remarks were : The necessity for intermingling varieties for the purpose of greater fertilization, especially in the case of hybrid grapes, and also in the case of a number of well-known varieties of apples and pears.

Prof. Craig's address was of much interest and was warmly received by the audience.

Short and stirring addresses were made by J. B. Mills M. P., Prof. Faville, B. Webster, Esq., Dr. H. Chipman, J. E. Starr, and G. B. McGill, all of which were filled with words of encouragement and good wishes for the Association. The music for the evening was furnished by Messrs E. H. and L. Bishop, Miss L. A. Bishop and Mrs. J. P. Bigelow. The quartette was well received and the appreciation of the audience was shown by frequent and enthusiastic encores.

THURSDAY.

A PROVINCIAL TOUR.

PROF. FAVILLE.

MR. PRESIDENT, LADIES AND GENTLEMEN:—

Attention to duty has made it impossible for me to prepare a paper on this subject, but I will make a few remarks which I trust will prove of interest. The memories of my pleasant tour of the province during the past summer will never be forgotten; I also cherish many pleasing remembrances of the hospitality extended to me by the Fruit Growers and people of Nova Scotia. For over two weeks my trip lay through parts of the province where the trees were laden with apple blossoms, all of which goes to show the diversity of climate, soils and locations, a large part of which proves of great worth to the development and advance of the fruit industry. My first call was at Annapolis; here I found considerable progress being made in spraying and combatting insect pests. The nursery of Mr. Clarke is a very valuable addition to that part of the valley. Digby County and Bear River, noted for its cherries, was at its best. The fruit was just forming; trees measuring from 2 to 3 feet in diameter may be found here. A few miles inland from the town of Weymouth are many fine young orchards of apples, plums, etc.; and orchards, where protected from winds by shelter belts, seemed to be doing well, even on the shores of St. Mary's Bay, although pruning and cultivation are sadly neglected. The striking feature of Yarmouth is its beautiful hedges. These hedges serve also as a protection for gardens and orchards. They are composed chiefly of Scotch Hawthorn, Native Spruce and a few Scotch Beech. At the time of my visit the hawthorn was in bloom making perhaps one of the finest hedges of our country. In winter, the spruce takes the lead. Over twenty graperies may be counted in Yarmouth, the principal varieties of grapes grown being Black Hamburg and Black Prince. Yarmouth is beset with fogs and needs protection in order to grow or-

chard fruits. Small fruits do comparatively well, but plums and cherries are not a success. A few miles inland a different aspect is presented, some varieties of plums and cherries were found doing well. Here they grow the Ben Davis, Baldwin, Gravenstein and Grimes' Golden. In the vicinity of Tusket and along the Clyde River numerous small orchards are found, and in instances where proper care has been taken of them, abundant crops have been produced.

The town of Shelburne, which a few years ago imported all its fruit, is now supplied by home production. The land along the Jordan River is proving its capability in the production of fruit. In this vicinity cranberries are grown with success. Mr. McGill in Shelburne County is perhaps the largest cranberry producer in the province, shipping over 200 barrels last year. There are hundreds of acres of land along the south shore as suitable for cranberry culture as any of the noted cranberry lands of the New England States. Not only in Shelburne County but in many other parts of the province are tracts of land adapted to this industry.

Little has been done in Liverpool in the line of fruit raising. At Milton, Mr. Freeman has a young fruit farm and at Caledonia hardy fruits of all kinds are grown. Bridgewater and its surrounding country, I am sure many of you will bear me out in saying, by climate and position, is naturally as well adapted to fruit growing as any part of Nova Scotia. Here we find peaches, apricots, plums, apples, etc., of the known commercial varieties, growing with success. Mr. Hebb's orchard during the last season produced over 800 barrels of apples. The Diana grape ripens here. The La Have valley is being slowly planted to trees. Progress is needed in spraying and care of orchards. A large quantity of vegetables is produced near Lunenburg and at New Germany fruit tracts are bearing well.

I next visited Pictou county. Here we find great possibilities for fruit growing. Many orchards have been allowed to run down but are still determined to produce fruit and where properly cared for are proving profitable. New orchards are being set out. Mr. Harris, a few miles from Pictou has quite a large orchard. I found among the vari-

eties of apples grown in his orchard, Alexander, Astracan, Duchess, Kings, Ribston and where the Gravenstein was properly worked on hardy stocks it also was thriving. This seems to be the proper way to grow tender varieties in these localities. In New Glasgow I visited the Shaw plum orchard now owned by Mr. Morrow. Over two-thirds of the trees were suffering with what is, commonly known as hide bound on the stock, that is the stock upon which the graft is made is much smaller and as the tree above develops, the stock below gradually becomes bark bound. This is remedied by slitting through the outer bark of the stock with a knife from graft to ground, thus loosening the bark and permitting growth to take place. From this orchard of ten acres, in ten years it is said Mr. Shaw cleared about \$10,000. In a portion of the orchard is an acre or so of gooseberries and currants.

Antigonish was the next place I visited, and here I found that the orchards were neglected to a large extent. The fruit is hardier but smaller than the fruit you have in the Annapolis Valley. Mr. Kirk has a good orchard and there are several others in the vicinity of the town.

Many of you have the idea that Cape Breton is very cold and bleak and nothing but a fishing country and will be surprised when I tell you that small fruits grow luxuriantly all over the Island. In Inverness county, fruit trees do not do well unless well protected. But in the vicinity of North Sydney and Sydney you find fruit trees flourishing. In North Sydney where the trees are protected, I found plums and apples doing well and at Point Aconi, seven miles from there I found several of the hardier varieties growing with success. I would like to mention a point with respect to Sydney in regard to the development of plums; the maturity of the fruit there is about three weeks later than here. Captain Morgan, from three plum trees received \$13, \$14 and \$15 respectively. And so you see Cape Breton in one sense is a fruit raising country. They are not troubled with the *Curculio* but some with the Black Knot.

In Guysboro intervale is especially adapted to fruit growing but thus far but little attention has been given to

this industry. Mr. McNutt of Truro, has demonstrated that plums can be grown successfully in Colchester County, and where trees were properly cared for in vicinity of Truro, they have been a success.

In Cumberland County I was accorded the warmest hospitality by Col. Blair at the Experimental Farm. And I would advise any of you, if you possibly can, to pay your experimental farm a visit and observe the many practical lessons exhibited there in drainage and cultivation. In the orchard there may be found some seventy varieties of apples, a large percentage of which are doing well. The high winds in the larger portions of the county are disastrous to the orchards. Windbreaks should be established to obtain best results. At West River, River Philip, and Pugwash, fruit growing is fast becoming a staple industry.

In conclusion I would say that great results are being attained throughout the Province in fruit growing. There is no part of the Province but that some fruit can be raised with profit. The large variety of soils makes the apple grow successfully. Peaches require a light soil, plums heavy soils, strawberries light, but moist. More attention to drainage is needed, and more of a thorough understanding of varieties of fruits best suited to climatic conditions. More attention should be given to cultivation of orchards and spraying for prevention and destruction of fungous attacks and insect pests. More thorough work all along this line is the means by which fruit growing will be raised to a higher standard.

Dr. Chipman said that in connection with the Horticultural School, Professor Faville had solved a question which they had had before them for years and that was how to get at the different counties of the Province—the question of bringing the people in the different parts of the Province in touch with the Fruit Growers' Association, and he thought the suggestion of establishing branch associations in each county was of paramount importance and each of the local associations could be connected with the Provincial.

Mr. McKeen of Halifax county was called on by the President for remarks along this line. Mr. McKeen said

he came to learn. In the County of Halifax there is not a great deal of fruit growing done. He felt that he had been more than repaid already by hearing the different addresses. He was very pleased that he had come and hoped to learn much more before the meeting closed.

FERTILIZERS FOR THE ORCHARDS.

BY FRANK T. SHUTT, M. A., CHIEF CHEMIST, DOMINION EXPERIMENTAL FARMS.

In common with other members of the plant world, orchard trees absorb and assimilate their food from the soil and from the atmosphere.

With the food taken from the air we need not, in this paper, concern ourselves. Its source is practically inexhaustible. Chemical investigation and carefully conducted field experiments, have conclusively shown, on the contrary, that the continued growth and removal of crops slowly but very surely exhausts the ground of those available elements of plant food present normally in fertile virgin soils.

Of these soil elements, practical experience has shown that generally it is only necessary to replace, by manures or fertilizers, three, viz: Nitrogen, Phosphoric acid and Potash. These are consequently known as the essential elements of fertility. Further, it has been proved that unless these materials are abundantly present in available forms in the soil, vigorous growth and lucrative yields of fruit and general farm produce cannot be obtained. These statements do not in any way conflict with what might be said regarding the necessity to plant and fruit development of a favorable climate, a sufficiency of soil moisture and the right mechanical condition or tilth of the soil.

Every year, therefore, that we market an apple crop, every year that the fallen leaves are allowed to be blown away and lost, so much Nitrogen, Phosphoric acid and Potash have been removed from their storehouse, the soil.

These must be returned if the original condition of fertility is to be maintained.

The fruit and the leaves are the chief products of the tree that make an annual demand upon the soil. Since their fertilizing constituents are, as a rule, lost largely to the soil, we may briefly consider the extent and character of this demand.

In the Chemical Laboratory of the Dominion Experimental Farms at Ottawa, we have analyzed both fruit and leaves of several of the leading varieties of apples grown in Canada. The analytical data and the deductions made therefrom are given in length in the reports for 1890 and 1894, to which volumes the members of this association are referred. It must suffice to state here one or two of the chief results of this work, and then proceed to a practical application of the truths they so plainly teach.

APPLES : THE LEAVES.

In 1,000 pounds of mature, though still green, apple leaves there are :

Nitrogen.....	8.87 lbs.
Phosphoric acid.....	1.94 "
Potash.....	3.92 "

If we assume the weight of the leaves produced by a full grown tree to be 50 lbs. (a merely approximate estimate), and that there are 40 trees to the acre, we obtain the following figures :

	Per acre.
Nitrogen.....	17.74 lbs.
Phosphoric acid.....	3.88 "
Potash.....	7.84 "

These therefore represent approximately the amounts of the chief fertilizing ingredients withdrawn per acre by the leaves from the soil.

It is quite within the power of every orchardist to say whether this fertilizing material shall be annually lost to his

orchard or not. By fermentation and decay this plant food may be made readily available, and hence the economy of using the leaves as absorbents for liquid manure in the compost heap or by ploughing them under, that they may decompose in the soil.

Since the leaves of the tree in addition to their principal role as carbonic acid assimilators, perform the very important functions of respiration and digestion, it is at once apparent that for a vigorous growth of the tree and an abundant development of its fruit, a large number of healthy leaves are required. For this, let me repeat, *readily available forms* of Nitrogen, Phosphoric Acid and Potash must be present in the soil.

Let us remember that leaves take a considerable amount of fertilizing material from the soil; secondly, that leaves are essential not only to the life of the tree, but to the production of its fruit; and lastly, that in feeding the leaves we are indirectly feeding the fruit.

APPLES : THE FRUIT.

We may now inquire briefly as to the quantities of these fertilizing constituents withdrawn from the soil by the fruit. Four varieties were analyzed, viz. : Duchess of Oldenburg, Wealthy, Fameuse and Northern Spy. As a result of these analyses we find on an average, that a barrel of apples approximately contains :

Nitrogen	0.9 ozs.
Phosphoric acid	0.5 "
Potash	3.5 "

Assuming that 40 trees per acre in an orchard of 25 years old, yield on an average 160 barrels, the following figures would represent the amounts of the chief elements of fertility that are taken from the soil by the crop in that area :—

Nitrogen	8.9 lbs.
Phosphoric acid	5.3 "
Potash	32.8 "

It is thus seen that the apple crop is not what might be termed an exhaustive one. These quantities are not ex-

cessive. Nevertheless, they are such that if no concomitant return of fertilizing material is made, their annual removal must in the course of years very effectively lessen the store of assimilable and available food in the soil. We recognize, therefore, that the fall and the loss of the leaves and the marketing of the crop depletes that store of plant nutrients in the soil which is essential to heavy yields of fruit. The necessity and profitableness of applying manures and fertilizers to orchards are consequently obvious.

In this connection, and before discussing the fertilizers in particular, it may be well to point out that the best and most profitable crops can only be obtained when the soil possesses what might be thought a large and, considering the demands of the tree, perhaps excessive amount of plant food; and further, that a great part of the food must be more or less readily assimilable. That such is necessary, is chiefly owing to the natural disposition of the roots and rootlets in the soil. No matter how good the tilth—and good tilth, among other advantages, tends to an extensive root development—there must be in every orchard much unoccupied soil, hence the importance of applying fertilizers liberally and in excess of that amount absolutely needed for a season's growth and fruit.

NITROGEN.

For orchards, an organic manure—such as barnyard manure and the turning under of a leguminous crop (clover, peas, &c.)—is to be recommended rather than those fertilizers containing an extremely soluble form of Nitrogen, such as Nitrate of Soda and Sulphate of Ammonia. Besides supplying Nitrogen the former class adds humus to the soil. This decaying vegetable matter improves the tilth, preserves the moisture, raises the soil's temperature and, by the carbonic acid set free in its decomposition, renders soluble locked up forms of plant food.

Barnyard manure is also valuable for the Potash and Phosphoric acid it contains. These three essential elements of fertility are not present in barnyard manure, however, in the relative proportions best suited to the requirements of the tree. Fertilizing with a sufficiency of this manure to

provide all the Potash and Phosphoric acid necessary, would lead, on many soils, to an excess of Nitrogen which later has the effect of stimulating leaf and wood growth to the detriment of fruit development. For this reason, and also that it is more economical, it is well to supplement barnyard manure by an occasional dressing of wood ashes or other form of Potash. The character of the soil and the frequency of the manuring must determine largely the amounts to be applied at any one time. Under ordinary circumstances 10 to 15 tons of good, well rotted manure and from 20 to 40 bushels of unleached ashes given (at one or more applications) every two to five years, would keep the soil in an excellent condition of fertility. Personally I am in favor of frequent and light applications of fertilizing materials, rather than heavier dressings at greater intervals.

GREEN MANURES : Clover, pease and other legumes are particularly rich in Nitrogen. This Nitrogen they procure in a large measure from the atmosphere, hence they are called "Nitrogen-collectors." When plowed under (preferably while in flower) they materially enrich the soil by adding a readily convertible supply of Nitrogen and humus. The chemical and physical benefits to an orchard soil by this method of manuring can scarcely be over-estimated. Green manures are to-day most probably the cheapest Nitrogen fertilizers in Canada and may be recommended for this and for other reasons as specially suitable for orchard soils. They should be supplemented by a dressing of, say, 25 bushels of unleached ashes to the acre and with an additional coating of lime, marl or gypsum, if the soil be deficient in lime.

SWAMP MUCK :—Is also another form in which Nitrogen and humus may be added to the soil. A ton of air dried muck will contain from 30 to 40 pounds of Nitrogen to the ton. To render this assimilable, the muck after piling should be subjected to disintegration by a winter's frost. It should then be used as an absorbent for liquid manure in and about the farm buildings and allowed to subsequently ferment in a heap. For an excellent compost, the weathered muck may be piled in alternate layers with barnyard manure. The heap should be kept moist and turned over

two or three times during the period of fermentation. Under ordinary circumstances six to nine months are required for this process. A compost may also be made with the aid of lime and wood ashes. This latter, with the addition of a small quantity of bone meal or superphosphate, would provide orchard soils with all the necessary constituents for tree growth. The application of crude unfermented swamp muck to soil is of little value. Its acidity and general condition renders it then all but useless and indeed sometimes positively harmful.

POTASH.

WOOD ASHES stand first in Canada as the cheapest and best means of furnishing Potash—the element most required by trees. Good unleached ashes contain, as a rule, 5 p. c. to 7 p. c. of Potash (which is present in an exceedingly soluble form) and about 2 p. c. of Phosphoric acid.

The relation of these two constituents in wood ashes is very similar to that required in the orchard. When using wood ashes liberally, therefore, it will not be necessary, under ordinary circumstances, to supplement with bone meal, superphosphate or other forms of phosphoric acid.

It may be necessary to add a word of caution respecting the preservation of ashes. They should be protected from rain and wash water. As already stated, their Potash is exceedingly soluble and therefore readily lost when the ashes are not kept under shelter. Leached ashes seldom contain more than 1 p. c. of Potash. Further, wood ashes should not be used as absorbents for manure, liquid or solid, nor in the manure pile, as thereby valuable Nitrogen in the form of ammonia is sure to escape.

KAINIT AND MURIATE OF POTASH may be used instead of wood ashes, if ashes cannot be procured at a reasonable figure. For orchard work, however, and the manuring of fruit trees in general, wood ashes appear to be the cheapest and best form in which to purchase Potash. Kainit contains about 13 p. c. of Potash, and the Muriate about 50 p. c.

A formula substituting these for wood ashes is as follows :

	Per acre.
1 Good rotted barnyard manure...	10-15 tons
2 Kainit	300-700 lbs.
or Muriate of Potash.....	100-200 lbs.
3 Bone Meal (fine ground).....	100-200 lbs.
or Superphosphate.....	125-250 lbs.

PHOSPHORIC ACID.

When wood ashes are substituted by other forms of potash, as in the above formula, phosphoric acid, either as bone meal or superphosphate should be added.

PURE BONE MEAL contains about 22 p. c. of phosphoric acid and from 2 to 3 p. c. of nitrogen. All these are in an insoluble condition. The bone meal should be purchased in a finely ground state. The subsequent fermentation in the soil then liberates more readily its nitrogen and phosphoric acid.

SUPERPHOSPHATE is the result of treating bones or mineral phosphate with sulphuric acid. Its quality or strength should be ascertained from the vendor. It usually possesses from 15 p. c. to 20 p. c. of phosphoric acid, of which the greater part should be soluble in water.

To those who are wishful, from one reason or another, to try chemical fertilizers alone, the following formulæ are suggested. In the orchard, however, such a practice will not usually prove as economical as any of those methods already outlined :

	Per acre.
(A) Nitrate of Soda.....	100 lbs.
Ground Bone (fine).....	100 "
Superphosphate	125 "
Muriate of Potash.....	150 "
(B) Nitrate of Soda.....	125 "
Superphosphate.....	200 "
Muriate of Potash.....	100 "

The remarks already made regarding the economy of frequent and light dressings are particularly applicable to chemical fertilizers.

It has been my purpose in this brief paper to outline

the principles of orchard manuring, and to give a few plain directions that may assist in putting them in practice. In closing, I wish to emphasize the necessity and the profitableness of orchard manuring. Apple trees, like all other farm crops, must be fed if they are to yield a profit. Of the necessary fertilizers, potash comes first. This is best supplied in the form of wood ashes, which also furnish phosphoric acid. According to the age of the orchard and the condition of the soil, from 20 to 40 bushels per acre may be used. For nitrogen and humus green manures, barnyard manure and composted muck have been recommended. For phosphoric acid, which is more particularly necessary when wood ashes are not used, bone meal and superphosphate are suggested. The former supplies in addition to phosphoric acid, some 2 p. c. of nitrogen, while the latter is characterized by furnishing phosphoric acid in an immediately available form.

The subject of cultivation is closely related to the one we have here discussed. The sciences of chemistry and physics underlie it. Space, however, will not allow us to consider it in the present paper. Its importance, however, demands a consideration no less careful and thorough than the subject we have here treated of.

PROF. CRAIG.—I would like to mention in this connection a particular plant which we have grown in Ottawa, viz., Crimson Clover. It is an annual plant there, but may prove to be an excellent cover plant for the orchard soil in winter. If we sow it in August it attains a fair size and the same season covers the soil and can be ploughed in the following spring; cultivation can then go on till August. In this way by using a leguminous plant we can restore the fertility to the soil with regard to nitrogen, and at the same time keep up cultivation.

BANKS.—Does the Crimson Clover winter well?

PROF. CRAIG.—The Crimson Clover has wintered very successfully in Western New York, as we have always an excellent covering of snow there; we expect it to succeed. As you have here more freezing and thawing during the winter you might possibly have more difficulty with it.

S. C. PARKER.—Would this clover succeed, sown in the latter part of June? In many of our bearing orchards by the middle of July the fruit crop has developed, so it is impossible to get in with a team.

PROF. CRAIG.—There is this objection to early sowing. I think all orchards ought to be cultivated in order to preserve the moisture of the soil up to mid-summer. I do not think I would recommend it to be sown as early as June. Again it might seed and die before winter if sown as early as June.

A. S. BANKS.—How early can we sow it without blossoming?

PROF. CRAIG.—That is a matter you would have to try for yourselves in this climate.

JOHN DONALDSON.—What is the price of wood ashes in Ontario?

PROF. CRAIG.—The price varies materially—depends exactly on the proportion of potash present—it usually varies from ten to fifteen cents per bushel.

JOHN DONALDSON.—The commercial price?

PROF. CRAIG.—I don't think there is a standard; suppose not more than ten cents, though twelve cents per bushel is paid for them sometimes.

W. E. WOODWORTH.—I would like to know how high we should pay for wood ashes as compared with commercial fertilizers.

PROF. CRAIG.—A good sample may be worth to you from 16 to 18 cents a bushel. Mr. Shutt says that wood ashes which contain from 5 to 7 per cent potash and 2 per cent of phosphoric acid, would have a value of about \$9.60 per ton.



BUSINESS MEETING

The session on Thursday morning was devoted to business matters.

The Secretary's Report was read and discussed. As much of it was composed of matters that have been discussed at other sessions, and as space is limited, it is not necessary to insert it here. The Treasurer, Geo. Thompson, Esq., read his financial statement. This report showed that the finances of the society were in a healthy condition. (see pages 6 and 7.)

The officers for the ensuing year were then elected. (see page 3.)

Dr. H. Chipman gave notice of motion at next annual meeting to amend section IV of the constitution, so that the secretary and treasurer may be the same person.

Prof. Faville gave notice of motion to amend section V of the bye-laws, so that the chairman of the Council of the School of Horticulture shall become a member of the Executive Committee.

A resolution was passed confirming the action of the executive in presenting certificates of honorary membership to their excellencies the Earl and Lady Aberdeen.

It was resolved that the Council Board of the Horticultural School as named at Middleton in the spring meeting (see report for '94 page 120) stand for the current year, and that R. W. Starr be added to executive of said board.

Also that Prof. Frank T. Shutt, M. A., Ottawa be an honorary member of the association. Mr. R. W. Starr for the fruit committee presented the following report.

REPORT OF FRUIT COMMITTEE.

MR. PRESIDENT,—We are thankful to have to record for the past year, one of the most successful of fruit seasons in the history of this society.

Notwithstanding the excessive drought of midsummer which injured the grain and root crops, and cut short the pasturage, the crops of apples, pears, plums and small

fruit, except perhaps cherries and raspberries, has never been more satisfactory, either in quality or quantity.

From our correspondents in almost every county in Nova Scotia we have the most encouraging reports of success in fruit growing, especially outside of what has heretofore been called the "fruit belt of the Province," showing an increasing and growing interest in the fruit industry and a demand for more knowledge of the subject.

We may here say that we cannot think of a better method of disseminating such knowledge than to send a practical fruit grower and horticulturist out among the different agricultural societies to lecture, answer questions and give practical lessons on the various subjects in connection with successful fruit culture which are every day puzzling the new beginner.

To do this requires the man and the money to pay his expenses. The man can be got, but where is the money to come from?

APPLES.

The apple crop of 1894 is by far the largest ever grown in the province. The number of barrels shipped from Halifax to London from Sept. to Dec. 31st was 144,003; since then to the present time, Jan. 30, 40,000 more have been shipped, leaving an estimated quantity of 65,000 barrels yet to go forward. Add to this the Gravensteins sent to the United States and we may safely place our export for the year to foreign markets at 250,000 barrels. This is beside supplying our own local markets, New Brunswick, P. E. Island and Newfoundland with a much better quality of fruit than is usually sent them.

Comparing this crop with that of 1886, which is the largest on record, when we exported 120,000 barrels, or that of 1892, the next largest, when the export was 117,500 barrels we find an enormous increase.

The prices, although not large, have been for the most part satisfactory to the grower and the net proceeds from the London market will, we think, average \$1.50 per barrel up to this date with a good prospect of a material rise in the near future.

The quality is good, full better than the average, not overgrown in size but bright, clear, well formed, well colored and highly flavored, very evenly grown, with but little refuse and with less than the usual amount of injury from the codlin worm and the black scab.

The Gravenstein as usual takes the lead for the greatest yield. The estimated quantity of this variety is not less than 50,000 barrels, of which 27,000 were sent to London. The red sports of this variety, of which there are several, besides that named Banks, are rapidly coming into favor and are thought to have better keeping and carrying qualities than the original. If this proves correct it will be a valuable addition to our varieties.

The Baldwin which seems to have redeemed its character for quality, will rank next in quantity, simply because of being so largely planted. Kings, Blenheims, Ribstons and Fallwaters have all given good yields, but where all varieties have done so well it is hard to say comparatively which is best.

PEARS.

The pear crop was a full average in quantity and the quality good, the fruit being more than usually free from knots, scab and crack, well formed, well colored, fair size and full flavored. The late and winter sorts as d'Anjou, Nellis and Vicar being better than usual.

The prices, for the most, ruled rather low because of the more than ordinary competition in our local markets with those from Ontario and Massachusetts, where they seemed to have more than they knew what to do with.

PLUMS.

The plum crop is reported good from the whole Province, but in eastern Kings it was simply enormous, almost every tree of bearing age being loaded with fruit.

The markets appeared to be filled full all the season, but sound, well ripened, honestly packed fruit in well made 10 lb. baskets seemed always to sell at fair prices even in competition with those from California and Ontario.

PEACHES

have been a great success this past year, wherever varieties suitable to the climate were grown. Alexander and Early Canada have so far given the best results. A number of others are being tried and probably another year may show other varieties equally prolific and hardy and perhaps of better quality.

QUINCES

are becoming quite plentiful in our markets and the crop was a full average one, but the Halifax market was fully supplied from Boston and Ontario and the price in consequence was lower than usual.

GRAPES

as a rule ripened remarkably well and most vines were well filled. The show at the Exhibition in Halifax, although too early for most growers to show in perfection, was much better than for many years. But it does not appear to be profitable for us to attempt to grow outdoor grapes to compete in the markets with the growers of the grape districts of Ontario. We must content ourselves with growing a few vines in sheltered places for family use, and leave to others the task of filling our markets at 3 cents per pound, baskets included, which was the ruling price in Halifax last fall.

CHERRIES

although they blossomed freely were a general failure, perhaps not more than one-fourth of an average crop, and those were grown on trees that were very favorably situated for protection, or else very hardy, late flowering varieties.

THE STRAWBERRY

crop in spite of the drought was very large and the export from this valley much larger than ever before. The plants came through the winter remarkably well and started strong, giving a magnificent show of blossom and setting large trusses of fruit, which, encouraged by the frequent showers of June, developed rapidly in both fruit and foliage, so that the dry weather at ripening season only seemed to

have power to shorten the crop at the last end, by preventing the development of the late berries.

RASPBERRIES

were an unusually short crop, the fruit being dried up on the canes before ripening. This fruit seems to have suffered more from drought than any other.

CURRANTS

wherever fairly well cared for were a fair crop and of good size. In some places there have been some complaints of injury to the crop by the larvæ of the saw-fly through neglect of well known precautions.

GOOSEBERRIES

were a large crop, although in some instances they were injured by the dry weather, so that they did not attain full size

CRANBERRIES

promised exceedingly well during the early part of the season. In many places they were very much injured by the severe frost in September, but nevertheless a very fine crop was harvested and is bringing very remunerative prices.

THE INSECTS.

These pests that in former years have been so troublesome in some localities appear to have been almost stamped out wherever the proper means have been used to subdue them, thus showing that with ordinary care in using well known preventives and insecticides they can be so destroyed as to prevent any serious injury to tree or crop; but it is a stain upon our boasted civilization that a few careless, indolent or ignorant persons are yet allowed to grow fruit trees for no other apparent object than as breeding places for the tent caterpillar, the canker worm and the curculio, the black scab and black knot and other fungoid growths from which are sent out new colonies every year to the great annoyance and injury of the careful cultivator. If sanitary laws are necessary for the repression of contagi-

ous diseases and noxious weeds, why not for the destruction of these pests of the fruit grower ?

The attention of our legislators should be called to this matter and legislation introduced to compel every man to destroy these pests when found on his trees or premises.

THE LESSONS OF THE YEAR.

Each year brings some new experience and develops some new want on the part of the Fruit Growers. These should be noted and efforts made to meet them.

This year more than ever was felt the great need of proper storage on the farms for the large crop of fruit, and we cannot too strongly impress upon all growers the importance of providing such storage as will insure the lowest possible temperature during the autumn with security from frost in winter, having good ventilation with pure air, free from taint of stables or root cellars.

The failure of many lots of Gravensteins, Ribstons and Blenheims to arrive in market in good condition may be traced to the storage, or want of storage, before shipment, the fruit having been kept too warm on the farm ; while there is seldom a year passes without more or less loss from frost in apples stored in barns and outhouses totally unfitted for the purpose.

Another great need is properly ventilated or cooled holds in all steamships carrying fruit across the Atlantic. The traffic has now become so large that there can be no excuse for the regular lines refusing to fit their ships for the trade.

On motion the foregoing comprehensive fruit report was received by the Association.

The report of the Council Board of the Horticultural School was submitted by W. C. Archibald, Chairman, as follows :—

REPORT OF HORTICULTURAL SCHOOL.

Since the formation of the Board, the Executive Council has held six regular meetings for the transaction of business relating directly to the School, in the matter of its

control, direction, etc. Various committees were appointed to carry forward the work, viz: Amending the course of study, closing exercises of the school year, preparation of a catalogue and publication. Two thousand copies of the catalogue have been judiciously distributed. A lecture tour was arranged and thirty lectures delivered by Prof. Faville in central points in every county of the Province. Arrangements were made for a new lecture room for the current year. A green house 20x40 with small class room and laboratory and root cellar has been built. The equipment consists of library, microscopes, charts, reading files for twenty-five fruit papers now on file, suitable desks and chairs, apparatus for grafting, budding, etc. There are fifty-five students now in attendance taking the first and second years work. Eight of these are taking the short course beginning Jan. 5, 1895. The students represent eleven counties of the Province.

The cost of the green house, laboratory, root cellar, etc., amounts to about \$800, as per bills herewith submitted; of this the people of the town of Wolfville have generously contributed over \$500. The Council Board recommend that the Association ask the Provincial Govt. to modify the H. S. Act, so as to read *average attendance* of students as a basis of grant. Your Board further recommend that the Treas. open a separate acct. with the Horticultural School and that all monies paid in for the support of the School be placed in the fund and that bills against the School be passed by the executive of the Council Board and paid from this fund upon order of the Secretary.

President Bigelow spoke of the progress made by this Association. The amount of work accomplished has been very large. The salary of the Professor of Horticulture has been paid, and a green-house built and equipped and to-day the Association has its original capital unimpaired.

After some further discussion the report was unanimously adopted by the Association.

The Committee on Transportation reported, recommending that the Association communicate with Furness &

Co., of London, congratulating them on the advent of two new steamers, the Halifax City and St. John City, and also to urge upon them the importance of providing two more equally good steamers to constitute a regular weekly sailing from Halifax to London during the fruit season.

The Committee also recommended the appointment of a standing committee on transportation. Report adopted. Transportation committee appointed, W. H. Chase, C. R. H. Starr and President Bigelow.

AFTERNOON SESSION.

Mr. W. M. Manning gave an address on the financial side of Horticulture. In this well thought out address Mr. Manning gave some very interesting facts regarding Horticulture as practised in England. He also advocated the revision of the pamphlet on Fruit Growing in N. S. published by the Association, contending that some of the figures given then were misleading. He suggested another edition of this pamphlet revised and enlarged to be published for distribution in other countries.

The President in reply to Mr. Manning's criticism said that the pamphlet had been compiled from the best data available; and although estimated on the production of small orchards, with proper management the results could be duplicated on a large scale.

The following paper was then presented :—

FACTS AND FANCIES IN HORTICULTURE.

BY J. H. HARRIS, HALIFAX.

MR CHAIRMAN, LADIES AND GENTLEMEN,—

There are Horticultural Gamaliels present at whose feet we should prefer to sit and learn—but we consider it a privilege and duty to help advance whatever will promote the happiness of mankind or foster a love for the

beautiful. Therefore in the words of Hannah More :

“Perish discretion when it interferes with duty.”

By your permission we propose to consider Horticulture as a profession, and Horticulture in the community.

If our popular Governor General was right when he styled agriculture a profession and claimed consideration for it as such, we are well within the mark when, in consideration of its antiquity and literature or its pleasures and profits, we claim that Horticulture is not behind any profession in its appeal for the loyal service of the youth and manhood of our land.

Choice of occupation is one of the most important questions that can confront a young man. His choice of a wife may be of greater importance, but his ability to provide for others and meet life's obligations will be largely determined by his choice of employment.

Too often it is done carelessly and many a good blacksmith has been spoiled by making him a poor doctor. Having received a common school education and standing where he must choose his life's work, he anxiously asks: Shall I by seeking further knowledge fill myself for the ranks of the brain working professions, have I a mechanical turn and therefore likely to become successful in manufacturing pursuits, or shall I engage in an occupation requiring a thorough knowledge of nature's laws and the constant application of mind and muscle to its prosecution, something that will contribute to the wealth and happiness of the community and give me a fair return for my labor? Presuming he chooses the latter course, the next question is: How shall he attain the special training necessary for success in Horticulture? This will be dealt with in another paper, and I need only say that we are highly favored in having such excellent institutions as the Experimental Farm at Nappan, the Model Farm at Truro and your own School of Horticulture where at slight cost a practical and theoretical Agricultural or Horticultural education may be attained.

A great advantage possessed by Horticulture over other professions is, that it is not likely to become over-

crowded. People must eat in order to live and so long as fruit and vegetables are grown there will be employment for expert labor. Nor need we fear over-crowding so long as we cannot fully supply our own market which according to the Blue Book for 1893, imported fruit to the value of \$88,370 not including tomatoes which amounted to \$27,000. Doubtless some of the foregoing was early fruit, but the greater part ought to have been home-grown. The highest prices are paid for early and late vegetables and fruits which with the aid of glass may be aided or retarded at will. And if by the use of glass we produce more than our home market will give a paying price for, I think we would get a fair price for them in the Boston market, judging from retail quotations in the Florist's Exchange.

In the neighborhood of our large towns there is a chance for profitable market gardening, especially if attention be paid to the production of fruits or vegetables, which though well known have not been grown to any great extent. We might instance asparagus, which in sandy, alluvial soil, enriched with sea mud, will produce a paying crop in four years from seed sowing, or sea kale which Mr. Patch of Liverpool has proved to be perfectly hardy. It is a most delicious vegetable when well blanched, and if taken in hand might prove profitable. Tomatoes might also be forced under glass. Besides these also there is considerable demand during the winter months for celery, and we have often wondered why more attention has not been given this popular vegetable.

But horticulture, while affording honorable and profitable employment, is without a doubt one of the most important factors in the adornment of our homes and cities. It is altogether unnecessary to urge upon those who dwell in the Garden of Nova Scotia a love for the beautiful. How often we of the dusty, dirty city envy you when you are rolling in blossoms and fruit. Strange it seems that our young men should seek other lands in which to carve their fortunes, when apparently as good returns for well directed labor may be obtained at home. How to keep our young men home? is often asked, and among other answers may be given—encourage their love of nature; get them inter-

ested in insect, bird, beast or flower. Give each child that shows a taste for it a few seeds, teaching him how to care for them, also a fruit tree or plant as his sole property. Encourage the young members of the family to provide the flowers for the dining table. No matter how common, they will give an air of refinement when tastefully arranged. Some of the most effective flowers we have are boughs of apple blossoms, the field daisies arranged with grasses, dandelions, buttercups, mayflowers and the innumerable garden flowers that may be had from April to October. Confine yourself to one or at least harmonising colors and let them be long stalked and naturally arranged. Do not imagine that flowers are solely for the rich, and that only they can enjoy their fragrant beauty. No home is complete without music and flowers, but too often the mistake is made of attempting too much. I have known some ladies boast of having over one hundred window plants, altogether too many. Better far, a few well grown perfect specimens than a mass of long and almost leafless spindle shanks struggling for existence.

To grow a plant successfully requires time, patience and close observation. What to grow will depend upon your tastes and the room at your command. Having sunny bay windows, which are best for window gardening, you may indulge in flowers such as roses, fuchsias, abutilons and bulbous plants, lilies, etc., in their season. But if your windows are nearly sunless then palms, begonias, ferns, hydrangias, etc., ought to be among your selections.

If your house is heated by hot water you may at comparatively slight cost indulge in the luxury of a greenhouse or vinery which will afford you much healthy recreation during our long winters, or even a cold grapery which planted with Black Hamburg vines will give a profitable crop of grapes and will also be useful in raising early vegetables, plants or something for your flower beds.

Should you decide upon a greenhouse, do not attempt to grow everything. Let quality rather than quantity govern your ideas.

Beautiful as your orchards and meadows are in their seasons, yet much may be done to beautify home surround-

ings. Wherever possible use curved walks and roads, but always arranged so that an apparent cause for the deflection is seen—a large tree or stone, etc. Plant groups of shrubs and tall growing hardy plants to conceal the boundary lines or unsightly objects. Let your stone or brick walls be planted with Boston Ivy which has proved perfectly hardy and is our best substitute for English Ivy. Some people have an idea that this ivy injures stone work by holding moisture, but this will prove fallacious if we observe the peculiar way in which the leaves overlap each other, making it almost impossible for moisture to lodge beneath. The State Legislature of New York recently passed a law enacting that all state buildings should be planted with this beautiful climber. On your woodwork plant hardy grapevines, climbing vines, clematis, etc.

Have a good lawn with a few beds of hardy plants, not forgetting roses and lilies, to which you may add each summer tender plants to brighten them up and give additional variety.

It is conceded that a good hedge costs less than fencing and there can be no question as to its superior beauty. Among evergreens, Norway spruce and hemlock make beautiful hedges. Perhaps the secret of success with these is to give plenty of ground space to each and keep them well topped so as to develop dense undergrowth. While they are getting headway protection may be had by running a wire fence alongside or through them. If a deciduous hedge is preferred, thorn, berberry and sweet briar may be used, the latter being very beautiful when in bloom.

This concise and practical address was followed by a general discussion in which many topics, briefly touched upon by Mr. Harris, were elaborated at greater length.



SPRING MEETING.

HELD AT ANNAPOLIS ON MARCH 11TH, 1895.

It has been about ten years since a meeting of the Association was held in Annapolis Royal. At that time scarcely a dozen people were in attendance, but on this occasion the Court house was well filled with an attentive and intelligent concourse of fruit growers from the County of Annapolis.

The first on the programme was an address by Mr. W. S. Blair. Subject: "Horticultural Education." His address was a well digested resume of the object and work of the school, together with some practical illustrations of a few of the important points taken up from time to time in the course of study.

The cause and remedy of the Canker spot on the apple tree was introduced by John Lacy and a lengthy discussion ensued. Considerable information was elicited, but no person present was able to present an assured remedy.

B. Starrat introduced the topic: "Non-uniformity of growth and production of fruit trees," and discussed the question in an instructive and interesting manner. Mr. S. was followed by a number of other gentlemen on this point.

Prof. Frank T. Shutt of the Central Experimental Farm, Ottawa, spoke at some length on "Fertilizers." Mr. Shutt's address was a very practical and exhaustive discussion of this most important factor of farm economy. It was bristling with information and filled with facts and figures of much interest to all progressive farmers. It was illustrated with charts and analyses of all the important fertilizing materials in use or for sale. The entire address was listened to with profound attention and a vote of thanks from the audience was tendered to the Professor at the close.

At the evening session Mr. E. R. Clarke spoke on "Nursery Stock, how to grow it and where to get it." Mr.

Clarke is a practical nursery man and the Association received much information from his interesting address.

At this session a very spirited discussion on apple transportation was held. It had been announced that the London agent of the Furness Steamship Co. would be present at the meeting, but he failed to connect, although he passed through Annapolis during the meeting. As one representative of the Association said, it was fortunate for the gentleman that he was associated with the "Furnace" Line and probably used to high temperatures, as judging from the warmth of the meeting he was liable to be exposed to severe heat in the future. This much discussed question of transportation was spoken to by T.S. Whitman, Col. Spurr, T. R. Jones, President Bigelow, and others. This very interesting meeting closed at a late hour in the evening.

ANNOUNCEMENT.

THE NOVA SCOTIA SCHOOL OF HORTICULTURE.

E. E. FAVILLE, DIRECTOR, WOLFVILLE, N. S.

This School established by the Association is about closing the second year. Since its organization the school has had a large attendance and marked interest in its welfare is manifested throughout the province. Nearly every county has been represented by students. The work of instruction in the school aims toward the linking of theory with practice in the study of horticulture and its kindred branches. The course is so arranged that the student may study English, Mathematics, etc., being thus better qualified for understanding the science of horticulture. The school work is facilitated by a good equipment, a library of good reading on the various subjects taught, about twenty papers and periodicals with files of bulletins from the various Experiment Stations on this continent, to which the student has free access, a well equipped lecture room, charts,

specimens, etc. for illustration of lectures; a green house, containing a large collection of exotic plants, filled for the carrying on of experiments in seeding, planting, pruning, budding, soil experiments, etc., affording the student the opportunity of doing nursery work with aid of root cellar and work house and of performing the various methods of grafting; a laboratory room for microscopic work in examination of fungous growths; collection of economic insects for study; together with many other valuable aids to practical study, such as field work in orchards in vicinity of the school, studying cultivation, pruning, drainage, care of crops, orchards, etc.

The Acadia Manual Training School affords all students an opportunity of acquiring skill in carpentry, designing and use of tools. The school being situated in a University town affords many opportunities of worth to students. The opening of the school year has been so arranged that students can enter late in the fall, leaving at the close of school the first of May. It is expected that students will possess a knowledge of the branches taught in our common schools. The school year will open on Nov. 1st next. Tuition is free to all students. Circulars will be sent upon request. All correspondence will receive prompt attention if addressed to Director Horticulture School, Wolfville, N. S.

MEMBERSHIP ROLL.

HONORARY.

THE EARL OF ABERDEEN.	D. W. BEADLE, ESQ., St. Catherines, Ont.
LADY ABERDEEN.	ROBERT MANNING, ESQ., Boston, Mass.
ROBERT GRANT HALIBURTON, M. A. F. S. A.	F. C. SUMICHRAST, ESQ., Harvard University, Boston.
JOSEPH R. HEA, D. C. L., Toronto.	JOHN LOWE, ESQ., London, G. B.
ADMIRAL SIR JAMES HOPE, Harriden, Bo'ness, Scotland.	SIR CHARLES TUPPER, London, G. B.
EDWIN W. BUSNELL, ESQ., Boston, Mass.	COL. E. E. BABCOCK, Chicago.
REV. R. BURNET, D. D., Hamilton, Ont.	PROF. JOHN MCCOUN, F. L. S., Otta- wa.

PROF. JAMES FLETCHER, F. R. S. C., Ottawa.	J. G. BYRNE, ESQ., Kentville.
PROF. D.P. PENHALLOW, F. R. C. S., Montreal.	L. WOOLVERTON, M. A., Grimsby, Ont.
PROF. H. W. SMITH, B. SC., Truro, N. S.	WM. SUTTON, ESQ., Port Williams.
PROF. JOHN CRAIG, B. SC. A., Ottawa.	PROF. WILLIAM SAUNDERS, F. R. G. S. Ottawa.
PROF. E. E. FAVILLE, B. SC. A., Wolf- ville, N. S.	PROF. FRANK T. SHUTT, M. A., Ot- tawa.

LIFE MEMBERS.

YARMOUTH.

Hon. L. E. Baker, Frank Killam, John H. Killam, C. C. Richards, Augustus Cann, E. J. Vickery, Amos B. Brown, S. H. Crowell, James Burrill, Robert Caie, B. B. Law, C. A. Webster, M. D., J. Brignell, Chas. E. Brown.

DIGBY.

J. C. Shrieve, John Daley, W. B. Stewart, J. M. Viets, F. S. Kinsman, M. D.

WEYMOUTH.

Chas. Burrill, Rev. A. B. Parker, D. Kempe, W. W. Jones.

BRIDGEWATER.

F. B. Wade, Judge Desbrisay, Robert Dawson, Robert Dawson, Jr., Hon. W. H. Owen, Frank Davidson.

MAHONE BAY.

A. Christholm, P. B. Zwicker.

LUNENBURG.

Senator Kaulbach, C. Edwin Kaulbach, M. P., L. W. Oxner, Joseph Creighton, A. B. Coldwell, J. M. Owen, J. Joseph Rudolph, A. J. Wolfe, S. A. Chesley, James A. Hirtle, James R. Rudolph, J. N. Mack, M. D., J. F. Hall, James W. King.

ANNAPOLIS.

Thos. Whitman, W. M. DeBlois, Rev. H. Howe, J. M. Owen, Mrs. Francis Handfield, C. D. Pickles, A. D. Mills, Wm. M. Wetherspoon, Augustus Robinson, M. D., R. J. Uniacke, Arthur Harris, Capt. Geo. E. Corbett, J. B. Mills, M. P.

BRIDGETOWN.

Hector McLean, Capt. J. W. Longmire, O. S. Miller, O. T. Daniels, J. A. Morse.

PARADISE.

B. Starratt, W. H. Bishop, Jos. C. Morse, J. E. Forsythe.

LAWRENCETOWN.

S. C. Primrose, M. D. James H. Whitman, L. R. Morse, M. D.

MIDDLETON.

G. C. Miller, Sydenham Howe, G. B. McGill, Guilford Morse, Albert Gates, F. M. Chipman, Thomas Jones, E. C. Shaffner, J. E. Shaffner.

BERWICK.

T. H. Parker, Fred Fisher, H. J. Chute, Maynard Cogswell, N. J. Bryden, Geo. Selfridge, S. C. Parker, A. S. Banks, T. R. Lyons.

KENTVILLE.

J. P. Chipman, M. G. DeWolfe, W. Montague Manning, R. S. Eaton.

WOLFVILLE.

J. W. Bigelow, H. B. Witter, R. W. Starr, C. R. H. Starr, John W. Barss, C. R. Burgess, G. H. Wallace, J. W. Caldwell, C. W. Roscoe, I. B. Oakes, R. E. Harris, Wm. A. Payzant, C. A. Borden, J. F. Tufts, Geo. V. Rand, S. P. Benjamin, James S. Morse, A. E. Caldwell, J. W. Keddy, C. A. Patriquin, Walter Brown, J. L. Franklin, Geo. W. Borden, X. Z. Chipman, F. C. Johnson, Edwin Chase, Dr. G. E. DeWitt, Rev. A. W. Sawyer, Mrs. A. H. Johnson, H. C. Vaughn, E. C. Johnson, R. E. Wickwire.

WINDSOR.

W. H. Blanchard, John Douglas, Geo. H. Wilcox, G. P. Payzant, J. B. Black, W. H. Roach, C. E. DeWolfe.

HALIFAX.

Hon. W. S. Fielding, D. Archibald, Jairus Hart, W. C. Silver, James Scott, Geo. Lawson, Ph. D., Thos. A. Ritchie, A. K. Mackinlay, J. F. Kenny, Hon. P. C. Hill, James Farquhar, Dr. A. P. Reid, Miss M. W. Ritchie, G. E., Lavers.

CANNING.

F. W. Borden, M. P., E. K. Illsley, E. M. Beckwith.

Col. W. M. Blair, Nappan; J. L. Harris, Moncton; J. B. North, Hantsport; Chas. E. Starr, Esq., 50 Chatham Street, Boston; Isidore LeBlanc, M. L. C., Arichat; B. Webster, Kentville; Chas. H. Cahan, Halifax; J. D. Sperry, M. P. P., Lahave; A. J. Cameron, Guysborough; Augustus Allison, Halifax; Wm. Law, M. P. P., Yarmouth; B. W. Wilson, Waverley; Col. S. Spurr, Kingston; Nathan Curry, Amherst; W. W. Pineo, Waterville; H. O. Duncanson, Falmouth; H. C. Munro, M. D. West River.

ANNUAL MEMBERS FOR 1895.

E. E. McNutt, Truro; A. D. Elderkin, J. S. Morse, Dr. Higgins, Geo. Thompson, Rev. A. Cohoon, W. H. Chase, G. R. Crispo, Wolfville; Fred H. Mitchell, R. R. Duncan, Dr. H. Chipman, Grand Pre; Freeman Eaton, W. H. Hardwick, R. E. Rand, Geo. R. Pineo, Canard; Wm. Rand, Canning; W. S. Blair, Nappan; Capt. Tuzo, A. McN. Patterson, Horton

Landing ; Ross Chipman, P. Innes, Kentville ; John Donaldson, Rev. F. J. H. Axford, Port Williams ; G. N. McKeen, Gays River ; R. McLatchy, Windsor ; Benj. Woodworth, Church Street ; E. R. Clark, W. M. McVicar, W. E. Armstrong, Dr. Robinson, Annapolis ; John B. Thomas, Bear River Isaac Shaw, Berwick ; Norman Gentle, Mr. Dobson, Sydney ; A. A. McDougall, Maitland ; Chas. L. Powers, Yarmouth ; Rev. E. Kennedy, Windsor ; A. W. Eakins, Yarmouth ; W. O. Creighton, West River ; Rufus Boyer, E. M. Clay, Halifax.

COMMENT.

(From Halifax Chronicle, Feby. 2nd, 1895)

Professor John Craig, of the experimental farm at Ottawa, while passing through this city yesterday, on his way from the meeting of the Fruit Growers' Association at Wolfville to the Dominion Experimental Farm at Nappan, was interviewed by a Chronicle reporter on the impressions gained during the time of his visit. He said: "In the first place, no Fruit Growers' Association in the Dominion of Canada seems to have so many men of wide experience and the ability to give that experience to their fellowmen by public speech as the Nova Scotia Fruit Growers' Association. The meetings were of a most enthusiastic character and well attended, and brought out the largest amount of information which so far I had been at. That the Annapolis Valley stands alone in the fact that she possesses the only pure horticultural school belonging to Canada, and that this school is under the control of a body of men who have this work at heart and who are best qualified to guide it in the lines that it will be of the greatest usefulness to the province, and that it was a great credit to the provincial government that they have seen the necessity of a school of this kind, and that it will have a marked influence in the future in directing the attention of the farmers and the farmers' sons to the benefits derived from a knowledge of the principles underlying the science of horticulture.

"Some of the most important points brought up in the meeting were the methods of preserving in the most

economical manner the fertility of the soil; this was brought out in a very valuable discussion which followed a paper presented by Prof. McGill and one by myself, and which showed that the Nova Scotia fruit growers were awakening to the fact that the marvellous fertility of the Annapolis Valley soil was not a bank which could be drawn on indefinitely, but was one which would have to be replenished annually in an economical and practical manner."

Another subject which he touched on briefly, and which he thought would be of great value to the fruit growers of the valley in the future in the marketing of their apple crop, was that of cold storage. Experiments in cold storage with a view of finding out its effects on the quality of the fruit and its keeping properties have been carried on during the past season, and they were now in a position to say that it is certain to be a most valuable factor in the successful marketing of all early and more perishable kinds of fruit, and it was pleasing to learn that it was likely that a cold storage building would in the near future be established in the city of Halifax. At this point it will possess peculiar advantages both to the owners of the building and to the shippers of fruit in the valley.

Professor Craig further expressed himself as pleased with the progress made in the horticultural school under the direction of Professor Faville. The work undertaken by Prof. Faville was entirely new, the field was yet unexplored, but by his energy, ability and perseverance he has made a magnificent start, and with the support of the Fruit Growers Association and the farmers generally throughout the province the future of the horticultural school is very promising.

Prof. Craig further expressed himself in regard to the necessity of an experimental station being established in connection with the horticultural school. This, he said, was an adjunct which possessed most valuable features from the instructive standpoint to the student. Object lessons could there be obtained and practical experiments carried on of inestimable value, not only to the student, but to the fruit growers of the valley, and he hoped that either the provincial or federal government would see the wisdom of supporting such a valuable adjunct to the horticultural school so well begun.

YOU WANT IT !

GATES'

LIFE OF MAN BITTERS, PURIFIES THE BLOOD, ONLY 50 CENTS.

Harris M. Foster, Esq., of Hampton, Annapolis Co., writes that in the year 1875 his wife was sick with liver complaint and general debility, and three doctors pronounced her incurable, and after suffering for five or six years I heard of your Life of Man Bitters, and went to Bridge-town to get it. I saw one of the doctors and told him she wanted to try Gates' medicine, and he said, by all means, it will do no harm. I got the Bitters and Syrup, and in a comparatively short time she was well and able to attend to her household affairs. Since that time I have kept Gates' medicine in my house nearly all the time, but have tried some other medicine highly advertised but always go back to the old Gates' Life of Man Bitters. I do believe there is no better medicine in the market to-day, and am willing to answer any one that will write to me about it.

Address— HARRIS M. FOSTER, J. P.,
Hampton, Annapolis Co., N. S.

RHEUMATISM CURED,

Port Greville, Sept. 5th, 189

C. Gates, Sons & Co.—Gents: Last summer I had a bad attack of rheumatism in the hip, caused by cold and exposure. I used a bottle of your Syrup and one of your Acadian Liniment, and it cured me, so that I have not had a return of it since, though often exposed at sea. At another time I used your Vegetable Plaster for a bad kink in the back, with the best success.

Yours truly, CAPT. ISAAH MORRIS.

Was Sick over 2 Years. Friends thought I could not Live. Gained 30 Pounds in Flesh.

Canada Creek, Dec. 14th, 1892.

Messrs C. Gates & Son, Gentlemen: This is to certify that I was sick for over two years and was unable to work, having a fearful cough and no appetite, and friends thought I could not live long. In April last I took about six bottles of your Life of Man Bitters and Invigorating Syrup. My appetite soon returned, system worked well, and I am now ever thirty pounds heavier than when I first commenced taking the medicine. I am also able to do my work, and feel altogether like another man. I intend taking some more of it now, and believe there is none as good in the market to-day.

CHARLES E. EATON, J. P.

Gates' Nerve Ointment. The Best Healing Medicine.

Canning, Feb. 8th, 1894.

Messrs Gates, Son & Co.—Gentlemen: Last July I was at work caulking on a ship at Kingsport, and fell through the staging and hurt the shin bone of my leg, which turned to a running sore. I tried a good many things prescribed by the medical profession, but did not succeed in getting anything to help it until I used your NERVE OINTMENT, which effected a cure in a very short time. I have used your other medicine with good effect.

Yours truly, JOHN HENDERSON.

