

THIRTY-FIFTH ANNUAL REPORT

OF THE

FRUIT GROWERS' ASSOCIATION

OF

NOVA SCOTIA,

1899.

S. C. PARKER, SECRETARY, BERWICK, N. S.

Published by Order of the Government of Nova Scotia.

HALIFAX:
HERALD PRINTING HOUSE.
1899.

THIRTY-FIFTH ANNUAL REPORT

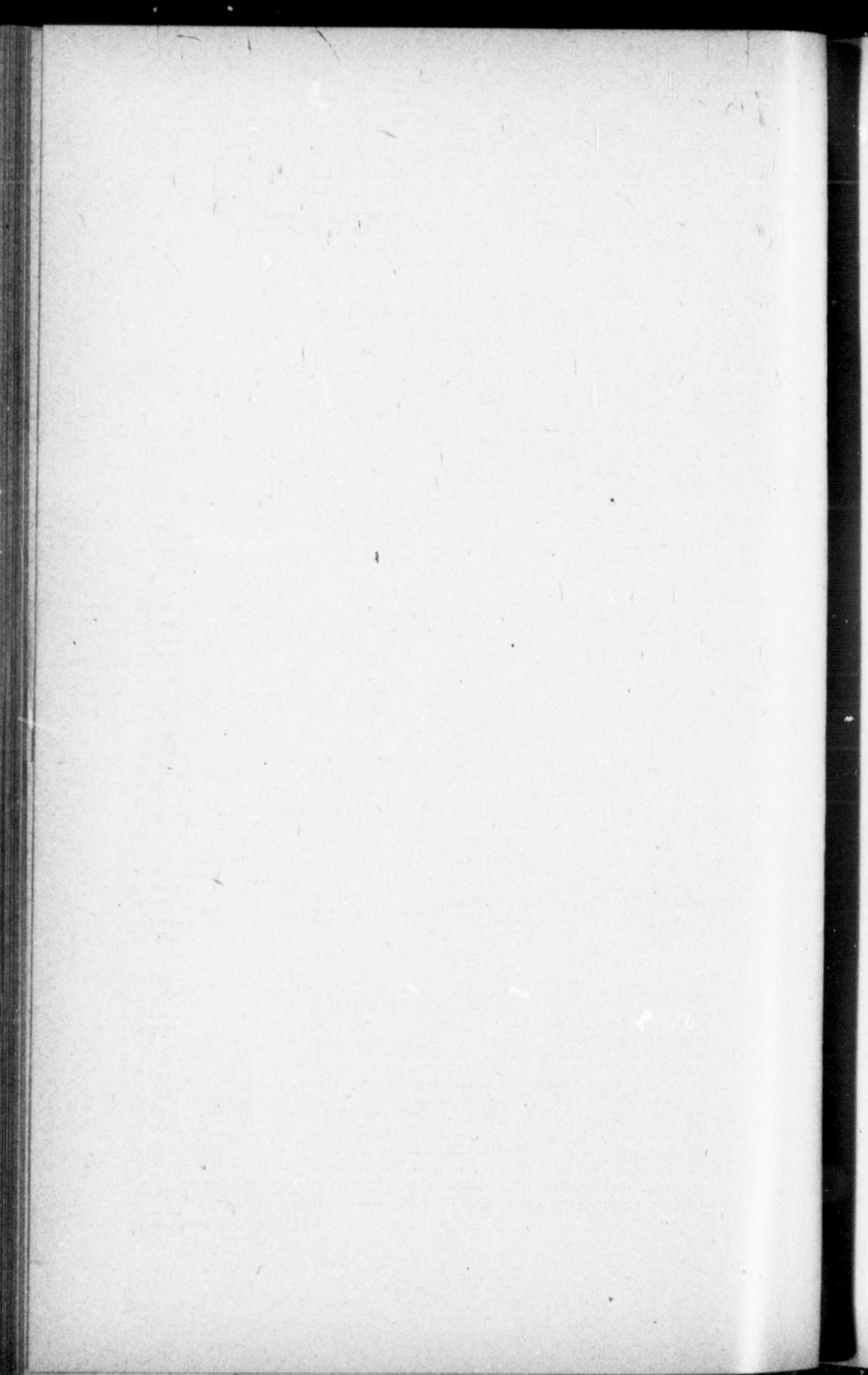
THE GROWERS ASSOCIATION

1901

AMERICAN ASSOCIATION OF GROWERS

Published by order of the Board of Directors

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FINANCIAL STATEMENT.

N. S. FRUIT GROWERS' ASSOCIATION IN ACCOUNT WITH G. W.
MUNRO, TREASURER.

1898.		
Jan. 1.	Balance on hand	\$ 633 30
	Receipts, 1897:—	
	28 annual members	28 00
	R. R. Duncan, life sub	5 00
	1 lady subr.	50 33 50
	Receipts, 1898:—	
	60 annual members	60 00
	Isa. Shaw, life,	5 00
	Jno. Donaldson, life.....	5 00
	J. B. Tingley, life.....	5 00
	Dr. Kindall, life	5 00
	F. P. Rockwell, life.....	5 00
	C. F. Elderkin, life.....	5 00 90 00
	Annual grant, received Jan. 10, 1899	300 00
		\$1,056 80
1898.		
Jan.	Paid J. R. Starr exp. Farmers' Ass'n	4 55
Feb. 5	" Transfer Hort. School.....	300 00
	" Secretary's exps	41 02
	" Secretary's Salary for 1897	100 00
Mar. 2.	" U. J. Huggins, Reporting	27 00
	" J. S. Robinson, Reporting	3 00
18.	" E. S. Crawley, Typewriting	2 00
25.	" R. S. Eaton, Exps. Truro	4 60
May 28.	" Herald Pig. Co., Reports	88 20
June 28.	" A. University, Hall Rent	25 00
Sep. 21.	" R. A. Eaton, Printing.....	4 50
Dec. 24.	" W. G. DeWolf	4 60
	Balance	452 33
		1056 80
1899.		
Jan 16.	Bal. on hand.....	452 33
	" Hort'l School	415 37
	Total funds, Jan. 16, 1899.....	\$867 70
1898.		
Jan. 1.	Balance on hand	139 71
Feb. 5.	Transfer F. G. A.....	300 00
May 3.	Tuition, Cecil Hooper, London, per J. W. Bigelow.....	20 00
13.	Government Grant.....	2000 00
	Greenhouse receipts—Prof. Sears	59 12
Oct. 24	W. C. Archibald.....	25 00
	Interest on deposit.....	5 70
	Government Grant, New Brunswick	150 00
		\$2699 53

Paid Prof. Sears, Salary.....	1440 00
" S. A. Porter, Salary	321 00
" Greenhouse Expense Accts.	227 53
" Starr, Son and Franklin acct.....	2 11
" Town of Wolfville, water	7 50
" Wolfville Coal Co., Fuel	64 80
" Acadia University, Rent	25 00
" Town of Wolfville, Rent	20 00
" Acadia Athenaeum adv	5 00
" Chandler — Microscopes, etc.....	171 22
Balance	415 37

1899.

\$2699 53

Jan. 16 Balance on hand.....\$ 415 37

We have carefully examined the foregoing accounts and have found that all the items of expenditure are properly vouched for and that the balances stated are correct.

GEO. THOMPSON,
G. H. WALLACE,

Wolfville, 17 February, 1899.

Auditors.

ACCOUNT OF NOVA SCOTIA SCHOOL OF HORTICULTURE FOR THE
YEAR BEGINNING NOV. 1ST, 1897, AND ENDING
NOVEMBER 1st, 1898.

EXPENSES.

Rent of Class-room.....	20 00
Rent of School grounds.....	25 00
Water Rates.....	5 00
Advertising	5 00
Expenses of Lecture Trips.....	19 90
Coal	64 80
Greenhouse Expenses	157 79
Microscopes and apparatus ...	171 22
Salary S. A. Porter.....	270 00
Salary F. C. Sears.....	1200 00

\$1938 71

RECEIPTS.

Nova Scotia Governm't Grant	2000 00
New Brunswick Gov't Grant..	150 00
Green house receipts.....	77 17
Donation from C. H. Hooper..	20 00
Nursery Stock sold.....	25 00
	<hr/>
	\$2272 17
Expenses	1338 71
	<hr/>
Balance	\$ 333 46

FRUIT GROWERS' ASSOCIATION

OF

NOVA SCOTIA.

Patron,

HON. M. B. DALY, LIEUTENANT-GOVERNOR.

OFFICERS FOR 1899.

President,

J. W. BIGELOW Wolfville, N. S.

Senior Vice-President,

P. INNES Kentville, N. S.

County Vice Presidents,

ANNAPOLIS COUNTY.....	REV. H. HOW	Annapolis
KINGS "	J. S. BISHOP	Auburn
HANTS, "	STEWART DIMOCK	Windsor
HALIFAX "	B. W. CHIPMAN	Halifax
LUNenburg "	W. E. HEBB	Bridgewater
DIGBY "	CHARLES BURRILL	Weymouth
YARMOUTH "	C. E. BROWN.....	Yarmouth
SHELburne "	T. ROBERTSON, M. P. P.	Barrington
QUEENS "	JUSTICE FORBES	Liverpool
COLCHESTER "	J. C. BLACK.....	Truro
PICTOU "	C. R. B. BRYAN.....	Durham
CUMBERLAND "	T. R. BLACK, M. P. P.....	Amherst
ANTIGONISH "	F. R. TROTTER.....	Antigonish
GUYSBORO "	W. D. CAMERON.....	Guysboro
VICTORIA "	W. F. McCURDY	Baddeck
CAPE BRETON "	DR. KENDALL, M. P. P.....	Sydney
INVERNESS "	JOHN McKEEN.....	Port Hood
RICHMOND "	HON. ISIDORE LeBLANC, M. L. C.....	Aricbat

Secretary.

S. C. PARKER Berwick, N. S.

Assistant Secretary.

R. W. STARR Wolfville, N. S.

Treasurer.

GEO. W. MUNRO..... Wolfville, N. S.

Auditors.

GEORGE THOMPSON,

GEORGE H. WALLACE.

Executive Board.

THE PRESIDENT,
VICE-PRESIDENT,
SECRETARY,
TREASURER,

JOHN E. STARR,
R. S. EATON,
JOHN DONALDSON,
F. J. PORTER,

Fruit Committee.

R. W. STARR,
C. C. H. EATON,
COL. S. SPURR,
GEO. THOMPSON,
GEO. C. JOHNSON,
PROF. SEARS,

MRS. OLIVIA JOHNSON,
G. E. DEWITT, M. D.,
C. E. BROWN,
W. S. BLAIR,
C. M. VAUGHAN,
W. YOUNG.

Small Fruit Committee.

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

S. B. CHUTE,
HENRY SHAW,
J. S. BISHOP.

Publication Committee.

THE PRESIDENT, }
THE SECRETARY, } *Ex. Officio.*

W. C. ARCHIBALD.
R. W. STARR.

Delegates to Farmers' Association.

M. G. DEWOLF,

R. S. EATON.

THIRTY-FIFTH ANNUAL MEETING.

(Stenographic Report by W. H. Huggins.)

Held in College Hall, Wolfville, February 20th, 21st, and 22nd, 1899.

The meeting opened at 7 o'clock p. m. In the absence of President Bigelow on account of sickness, Colonel Shippy Spurr was requested to take the chair, by a unanimous vote. Colonel Spurr said:—

Ladies and gentlemen: By the vote just passed I have been asked to take charge of this meeting to-night. You must not expect me with such a short notice to give you any address, or expect me to preside with the courtesy and ability of our honored President, who, I am sorry to say, is unable to be with us to-night. But I hope that through the blessing of kind Providence and the efforts of a skillful physician that we may have his genial presence here before this session is over. I suppose that is all that is necessary for me to say at the present time.

Rev. F. J. H. Axford invoked the divine blessing.

The Secretary then read the President's Annual address, as follows:

Ladies and Gentlemen,—The landmark known as the President's Annual Address, and which has chronicled the successes and reverses of fruit culture in Nova Scotia for the last thirty-five years, will this year be able to report the most profitable year known in the history of this industry. Owing to the partial and in some cases total failure of the apple crop the world over, the highest continuous prices have been realized in the history of the trade. Nova Scotia has produced about 300,000 barrels of the best apples ever grown here, and from the most reliable authority obtainable they will net \$800,000, about. As most of this crop is exported, it gives a cash revenue from export

larger than all the other exported products of the Province combined, which finds its way into the pockets of the inhabitants and does not serve to enrich a few stockholders as is the case with so many other industries. One new and most encouraging feature of this industry is that the first car-load of apples has been shipped from Pictou county to London and realized the highest market prices, and every county in Nova Scotia should be exporting apples as their most profitable industry. Enough fruit has been grown in certain sections of each county to prove that they are just as capable of producing apples for export as the three western counties.

The world's crop of apples in 1898 was seventy-five per cent. less than in 1896, and the government returns give the apple crop of the United States for 1898 at twenty-three millions barrels against sixty-five millions barrels in 1896, and it is estimated that they require forty millions barrels annually for home consumption. The plum crop was very abundant in localities where the trees were carefully cultivated and is estimated at 20,000 to 30,000 bushels, but prices in most cases barely paid expenses, and only those who grew, packed and marketed carefully made a profit. Pears and small fruits were an average crop and fairly profitable. Experience has proved that the hardy, long keeping varieties of apples are the most profitable fruit product of Nova Scotia, and we should give this our attention.

INSECTS.

Destructive insects have been so completely destroyed by the intelligent use of spraying and other methods that our fruits of all kinds have been of unusually good quality, and every successful fruit grower is fully realizing the value of a scientific knowledge in his business. The much dreaded San Jose Scale has not yet been discovered in Nova Scotia, although Professor Sears has had several specimens sent him which were supposed to be infected. Every municipality where fruit is grown should at once be prepared to carry into effect the law passed by the Nova Scotia Legislature last year for its destruction, as we have reliable information that several large nurseries in Ontario are badly infected with it, and every effort should be made to prevent its introduction in Nova Scotia, especially as a large number of fruit trees

are coming from there this year and they should all be carefully inspected and disinfected before planting.

EXHIBITIONS.

It seemed very important that at least one of our commercial varieties of apples should be entered for a prize at the Trans-Mississippi and International Exposition at Omaha in addition to the very creditable general exhibit made by the Canadian Government, and I accordingly entered one barrel of Gravensteins as the best apple grown in America for dessert and cooking purposes, and secured a most desirable space for it in the horticultural building, for which this Association has received a diploma and Gold Medal. We are much indebted to F. W. Taylor, Superintendent of the Farmers' Institute University of Nebraska, and Superintendent of horticulture, etc., at Omaha, for his care and kindness in conducting this exhibit for us, and the following letter from him will be read with interest:

"Dear Sir,—It gives me great pleasure to say how much your exhibit of Gravenstein apples was appreciated by all lovers of good fruit. The delicious flavour, delightful aroma, and beautiful appearance of the apples attracted a great amount of attention and favorable comment. I am sure that it was well worth your while to make this exhibit, and I assure you that the attention it attracted was equalled by perhaps no exhibit of the same size. The quality of the apples is so good that I do not wonder that your English cousins are glad to buy them at a profitable price.

Yours very truly,

F. W. TAYLOR, Supt."

From the interest manifested and the enquiries since made for this apple, this exhibit will prove to be of great value. This is the fourth medal won for this Association at large exhibits since I have had the honor of representing you without costing the Association one dollar. The barrel exhibited at Omaha was donated by Dr. DeWitt and the expenses paid by the Dominion Government. This is the 16th medal won by this Association since its formation in all the great expositions of the world, and our apples have always been awarded a prize where they have been exhibited in fair competition with the world. As this in-

dustry increases we must find new markets and keep our fruit before the world in every large exposition; and we must make a good exhibit in London this year and in Paris in 1900. Our exhibit in Berlin in 1896 first introduced Canadian apples there, and \$6 and \$7 per barrel clear has been received for consignments of Canadian apples there this year.

At the Provincial Exhibition at Halifax last year we had over one thousand plates, and twenty barrels of superior apples, and the county exhibits were represented by ten counties. When it is known that every county is entitled to draw \$20 and \$10, it is surprising that every county is not represented there. As very little commercial value can be obtained from a local exhibit we have discontinued the grant for artistic exhibits and added the amount to county prizes, etc.

SCHOOL OF HORTICULTURE.

As a detailed report of this school will be made by the chairman, I need only refer to it as being very successfully conducted by Professor Sears with about 65 students in attendance, representing nearly every county in the Province, and its influence in promoting the successful prosecution of the valuable industry of fruit culture is being realized all over the Province, and in no other department of educational work is \$2,000 as profitably and practically expended as in this school and the lecture course of Professor Sears throughout the Province, and we hope the Nova Scotia government will see the importance of employing Professor Sears to lecture and teach in every county during the summer months. A few hours teaching the practical points of fruit growing in our public schools by such a competent professor would be of great value to the Province.

SIZE OF BARREL.

The National Shippers' Association of America have adopted the following sized barrel for apples in America and have resolved not to buy or ship apples in any other sized barrel, and the sooner Nova Scotia fruit growers adopt the same size the more profitable will their business become. Head 17 1-8 inches; staves, between crozen, 28 1-2; bilge, 64 inches, outside.

PROVINCIAL.

As this Association is Provincial and intended to promote fruit culture all over the Province some means should be employed to reach all the people, and if our county vice-presidents would each form a county association of even ten or five members, and meet and discuss fruit growing, they would soon create an interest and promote a profitable industry in every county, and such mission work would be amply rewarded in this life.

The subjects of improved and cheaper facilities for marketing fruit; the value and importance of increased practical and scientific education in this profession, and the necessity for increasing our membership and making this Association more efficient will, during these sessions, demand your careful consideration and united action.

J. W. BIGELOW, President.

On motion of the Rev. Mr. Axford, seconded by Dr. DeWitt, the address of the President was received and ordered to be printed in the transactions of the Association.

Mr. Chas. R. B. Bryan, Secretary of the Pictou County Farmers' Association then addressed the meeting as follows:

Mr. Chairman, Ladies and Gentlemen,—Little did I expect, when I arrived here this evening from Pictou County, that I should be the only one from that county, and be called upon to make the first remarks upon the President's Annual Address. I may say I am glad to be here. I suppose I am expected to say something in respect to the output of fruit from Pictou County. The carload shipped the other day was the first carload shipped from the county to the London market. I do not know exactly what prices were realized, but I was glad to hear they brought the highest price. It shows that the apples grown in Pictou County must be very good ones, and that the apples shipped must have been carefully picked, handled and packed. Before this week is out, another carload will go forward. Mr. James W. Smith, to whom the credit of effecting this shipment is due, expected to be here to-night, at least he told me so yesterday morning, and was to have met me on the train, but yesterday afternoon we had a severe snow storm, and I assume on account of the drifts and state of the roads he did not make con-

nection. I started at 5 a. m., and before I had gone a mile from home, had to stop, take the horse out of the sleigh, turn and go around through the fields. Mr. Smith was perhaps not so determined as I was to get here, for "where there is a will there is a way." I think Mr. Parker has a letter from him, though. I am sure there are a number of gentlemen here who have a little better knowledge of the capabilities of the county than I have. I grow a few apples, but did not ship, having sold mine at New Glasgow for \$2.50. Barrels at present cost us 26c. each; we should get them much cheaper.

Coal has always been the uppermost thought when Pictou County has been mentioned, but there is also good farming land on the west side of the Middle River. On towards River John is where these apples were grown, and we look for a boom in fruit growing, as it is well adapted for it.

I've heard people say "they did not know good apples could be grown in Pictou County." I would like to ask them where their eyes were at the last exhibition. I would not like to say our exhibit was as good as yours, especially to-night; but it was a good second.

In the matter of spraying there is very little done; but one gentleman near me had sprayed his potatoes this year, with good results, and I believe next year many will spray from this one practical illustration.

We hope to have Professor Sears visit us during the coming season, and give us some lessons in spraying. I believe the Horticultural school is doing good work.

We had a meeting of our County Farmers' Association, of which I am secretary, in our district lately, at which Mr. Ralph S. Eaton as well as Professor Sears, gave us quite a practical talk. We intend starting a Fruit Growers' Association in West Pictou, and I observe that your President suggests that each county form a branch of your association, and I think it should be done.

I came to this Convention not to make a speech, but to learn all I could in respect to the cultivation, handling and marketing of fruit. We know a little in Pictou County, but would like to know more. (Applause.)

Mr. W. S. Blair then spoke of fruit-growing in the Province of New Brunswick. On a recent visit to that Province he had seen excellent varieties such as the Ben Davis, Northern Spy, and King of Tompkins. He said the St. John River Valley was well adapted to the raising of fruit. He was present at the Farmers' Association held at Fredericton last year. Mr. J. E. Starr was there, and he heard him remark that the apples on the table at that meeting were equally good with those produced in the Annapolis Valley. He believed that in the St. John River Valley and Carleton County, they had a good fruit-producing country. The attention given to cultivation is not what it should be. He also noticed that they had the first shipment from Prince Edward Island this year which netted them from \$2.50 to \$2.75 per barrel.

Mr. E. Brown (Yarmouth) said, referring to fruit growing in his County that a few years ago it was thought impossible to get a collection of fruit from Yarmouth county. There is an old English apple called the "Keswick Codlin" which thrives well in his County. The orchards inland were very good, but along the coast they were exposed to high winds and cold which are most destructive to tender vegetation. There are certain kinds of plants destroyed by the south winds. At times violent gales from the ocean have a blighting influence. When they began fruit growing in 1867, there were scarcely half a dozen men in the County who knew a Gravenstein from a short Horn—but there were now growing in Yarmouth County about 160 or 170 varieties of apples. For a number of years their Agricultural Society had imported fruit grafts which were sold to the different Nurseries—and from these a number of orchards were planted which are doing well. Sections which are sufficiently remote from the sea coast and which have a warmer climate grow superior fruit. The Yellow Bellefuer usually called the Bishop Pippin, grows well. One thing he had observed was that their markets were well supplied with fruit from California and he thought the California people could teach us a lesson in shipping fruit. They send their tender fruit all the way to Nova Scotia without a blemish, season after season. It was the perfection in packing that had always struck him as being a valuable lesson to

their fruit growers. It was a most valuable thing to learn to pack and ship. He said they shipped large quantities of strawberries to the United States market, but very few people took pains in packing and picking.

J. J. Salter said that he had never seen any fruit better in flavor or quality than that grown in the West River Valley, Pictou County. They made their first shipment of fruit in the autumn of 1897. This fall he had made a trip through the county, and he thought they were taking a great interest in the business. The soil appears to be good and produces fruit apparently without any cultivation. They have not carried on the business of orcharding for commercial purposes heretofore, but apples have simply been grown as a side line to general farming. But now they are taking hold of it with great skill, and in ten years time, Pictou County will be known as an apple section. He had recently seen by the papers that a shipment of fruit would be made on the 23rd of February. The fruit they now ship commands the highest prices in the English markets.

Some Recent Developments in Spraying.

F. C. SEARS, M. S.

Among most of the better class of fruit growers spraying has already become almost as much a part of the season's work as is pruning or cultivation, as it often seems that if all would put in practice what we already know there would be little to be desired in this respect. And yet, every year witnesses some discovery of importance in our warfare against the insect or the fungous pest. Some of these discoveries relate to recent arrivals in the insect or fungous world (or in our part of it at least) like our friend the San Jose scale, but more of them relate to some old acquaintance whose likes and dislikes, habits and weaknesses we thought we already understood. It is my purpose this evening to call attention to a few of the latest discoveries or improvements which have come to light relative to the preparation or application of fungicides and insecticides.

Many of us have thought, and perhaps with reason, that Paris green was so satisfactory in most respects that it was not likely soon to be superceded, and we have therefore possessed our souls in patience when the leaves sprayed with it were burned, or when we were obliged to do extra work at the end of the pump-handle in order to keep the liquid agitated and insure its being at all uniform throughout. Yet a new candidate has appeared in the field which promises to be an improvement on Paris green in at least two important respects: First it is cheaper, and second, it is a clear solution so that a uniform application is secured without any agitation whatever. This new material is the arsenite of soda, which is easily prepared and so far seems very satisfactory. Details of its preparation need not be given now, but I may say that Mr. C. R. H. Starr has used it the past season and I trust will give us the benefit of his experience.

But those of us who still think that Paris green is good enough for us and yet who would like to know, when we go into the orchard, that we are spraying with Paris green and not with Diamond Dyes, may find a simple, yet comparatively reliable test for the purity of the material by treating a little of it with common ammonia. If any of it does not dissolve, then this residue is some adulteration. If, on the other hand, all dissolves giving a bright blue liquid, it is probable that the material is pure, since most of the substances employed in adulterating Paris green are not soluble in ammonia. It is quite possible that the enterprising manufacturer of Paris green may yet discover an adulterant which will dissolve in ammonia, but until then this test is a good one.

In the matter of Bordeaux mixture, which seems to be more satisfactory and is more generally used than any other fungicide, we have been accustomed to think that any other mixtures which we had on hand, whether it had stood a day or a month in the barrel since being prepared, was to be used before preparing any more. Recent experiments, however, indicate that even after standing only a few days, Bordeaux mixture begins to deteriorate, and that if allowed to stand a month in the barrel its value is very seriously decreased. In conducting a series of experiments at the school to discover whether Bordeaux did thus lose its fungicidal value we have adopted the following plan. A drop of Bordeaux

was placed in a small glass and in this drop of liquid, were placed spores of some fungus, as the black spot of the apple. By using Bordeaux of various ages (if you will allow the expression) it was found that while no spores would germinate in freshly prepared Bordeaux, yet in that which had been mixed for nearly a month, the spores would germinate quite readily. These results are not to be considered as final until they have been verified by further tests in the laboratory and orchard, yet other investigators have in a different way, arrived at the same conclusion, Prof Beach, of Geneva, N. Y., being credited with saying that Bordeaux should not be used after it has been mixed for 48 hours. These facts may easily explain many of the failures which have attended the use of Bordeaux and certainly the evidence is sufficiently strong to warrant great care in the matter of using old Bordeaux.

In respect to the use of a simple solution of copper sulphate as a fungicide on dormant trees, some experiments undertaken at the school last spring, show conclusively that in using a solution of 4 pounds of copper sulphate to 50 gallons of water, the usual strength, there is not the slightest danger of injuring the trees, even though the buds have begun to swell considerably. But whether it is a fact, as is claimed by some investigators, that Bordeaux will adhere longer than the simple solution, and if it is a fact whether it is a sufficient advantage to offset the greater labor of preparing Bordeaux has not been conclusively determined so far as I know. I am, however, of the opinion that the fact that Bordeaux is readily seen on the tree, while the solution is not, has led to the belief that the solution was soon washed from the trees.

And now, in closing, a word as to that greatest of all bug-bears to the fruit grower at the present time, the San Jose scale. We do not know that it is as yet in the Province of Nova Scotia, and we sincerely hope it is not, for it is not needed. Yet it ought certainly to be a relief to those who have thought that the scale was to bring about the extinction of the fruit industry, as it is claimed that the grip is to extinguish the human race, to find that the year which has elapsed since we last met, has diminished, rather than augmented the fear of this foe. And we have the satisfaction of knowing that the best talent of our brothers in

Ontario, as well as our Yankee cousins across the border, is engaged in perfecting a series of remedies which seem likely to prove as satisfactory for this insect as Paris green has been for the canker worm. As an indication of the success which has attended the attempts to hold the scale in check, let me quote from one or two of the leading investigators—Prof. W. G. Johnson, of Maryland, says: "I began my experiments upon badly infested peach, pear and apple stock direct from the nurseries and one year old pear, plum and apple trees from the orchard. The hydrocyanic gas treatment was used and many tests were made as to amount of potassium cyanide to use and the time of exposing the nursery stock to the fumes. By these experiments we concluded that nursery stock to be replanted should be exposed to the gas for 30 minutes or longer and that 18 to 25 grains of potassium cyanide should be used to each cubic foot enclosed. All the trees used for these experiments were badly infested and after fumigation were set out in an isolated field and carefully watched, and I am happy to report that up to the present time, (two years later), not a living scale has been detected upon any of the trees."

Mr. H. P. Gould, of Cornell University, whose experiments have been largely with kerosene, says, "The San Jose scale does not appear to be very difficult to kill when insecticides are brought in contact with it. The difficulty arises chiefly from the fact that the scales are often more or less protected by the roughened bark, crevices and other natural conditions of the host, and from the rapid increase of the pest. Great care and thoroughness are of paramount importance. When the work is thoroughly well done, and frequently repeated, satisfactory results may be expected. Of the different kerosene mixtures, the 20 per cent or 1 to 4 mixture gave the most satisfactory results. The practicability of spraying for the San Jose scale is dependent upon conditions. Nursery stock, if badly infested, should usually be burned."

Let us hope that Nova Scotia may remain free from this pest, but let us also believe that if it does come, our fruit growers will prove in this instance, as they have in every other, that nothing can discourage them, that they are a match for anything, which may have the hardihood to invade their orchards.

DISCUSSION.

W. S. Blair.—Do you think that if the copper sulphate is dissolved and allowed to remain in the cask—stock solution—that the copper sulphate will deteriorate?

Prof. Sears.—Only after it is mixed.

W. S. Blair.—Have you had any experience with Plumatus?

Prof. Sears.—No.

W. S. Blair.—What mixture would be the best for that?

Prof. Sears.—I should think some form of kerosene Emulsion or kerosene mixed with water. I have never had any experience with it.

W. S. Blair.—I have used tobacco water. One mixture I put a little soft soap in. Do you suppose the lye in it would injure the leaves? I think it would.

Prof. Sears.—I have seen leaves injured by it.

W. S. Blair.—What strength do you think would be the best?

Prof. Sears.—I think it is difficult to gauge it. Do you use the stems?

W. S. Blair.—Yes.

Prof. Sears.—I tell the strength by the color. I boil the stems and dilute them with plain water.

W. S. Blair.—I use 10 lbs. of stems to a gallon of water, but I have had the best success with Kerosene Emulsion.

C. R. H. Starr.—I used Pure Arsenic with very satisfactory results. From memory I cannot give you the formula. It certainly is very effective and I think with much less risk of injuring the leaves. I regard it as a better solution in every way.

Dr. DeWitt.—Did you use pure arsenic or did you put soda in to neutralize it? I think that is the method, where arsenite of soda is used and arsenite of lead, as well as the arsenite of copper, which we have used for a long time in the Bordeaux Mixture. I believe we always have had to use an alkali for neutralizing. We can readily see why soda can be used as an alkali with arsenic.

C. R. H. Starr.—Yes, but I cannot give you the formula from memory.

Prof. Sears.—How did you use lime with it, in the same way as with Paris Green?

C. R. H. Starr.—Yes.

J. S. Bishop.—The Arsenite of Soda is a cheap production and gave very good results last summer.

W. S. Blair.—Has Mr. Bishop used it on fruit trees?

J. S. Bishop.—I used it principally on Cranberry Vines, but it can be used with the best results on trees. It is used in Massachusetts for the destruction of the Gypsey Moth and for killing potato bugs, by spreading it on the vines. Each of these ingredients is dissolved separately in a wooden pail, and then they are poured into a cask of water—if they are combined before putting into the water, they create some sort of chemical action. Its specific gravity is not so great as Paris Green, therefore, it is suspended in water for a longer time.

Prof. Sears.—Mr. Starr used a plain solution so you would not have to agitate it. That is a great advantage.

Dr. DeWitt.—I understood from Prof. Sears, that Arsenite of Soda had been used, and that it was a clear solution. Was lime put in it?

Mr. Bishop.—I used acetate of lead—common sugar of lead.

Dr. DeWitt.—Putting Arsenic with Soda will make arsenite of soda.

R. W. Starr.—I do not think I can give you anything interesting on this subject—the matter under discussion is between arsenite of soda and arsenite of lead, which are two different materials—and they both have been used with success.

Prof. Sears spoke of the Plumatus and of the use of different materials for its destruction. In olden times, when I was in the Nursery business, I was troubled very much with it, and I tried dusting with lime. I could conquer them at that time on nursery stock, but on large trees it was different. Dry air slacked lime was the best thing I could use.

A. Whitman (Waterville).—I must say my experience has been that it does not pay to spray. Last season I got sick of it. I came here last year and listened very attentively to all that was said on spraying, and I was thoroughly convinced by what I heard that it was a necessity, and went home with the full determination to spray my trees, which I had not done before that. I had to employ a man, but it would have been better for me to have hired him to stay away. The foliage looked as if a fire had run through

it. I paid particular attention to the instructions given here. If I had sprayed three times I would not have had an apple at all.

Dr. DeWitt.—I would like to know the formula Mr. Whitman used?

Mr. Whitman.—I employed a man who understood his business—We followed the instructions laid down last year.

Mr. Thompson.—What was the condition of your lime, was it fresh slacked lime or was it partially air slacked?

Mr. Whitman.—It was fresh lime.

Mr. Thompson.—We are careful in using fresh water slacked lime.

Mr. Miller.—I think I was one of the first in the Valley to introduce spraying in Annapolis County—I think it was perhaps 12 years ago that I first heard of spraying by which insect pests could be overcome—and I made enquiries and procured a spraying apparatus. I wanted to test it thoroughly before I recommended it to my friends, and I must say, that in every particular, the evidence that had been brought before me was corroborated in my own experience, and after that I felt I was justified in recommending the article to my fellow farmers. At that time it was a common thing to see orchards stripped of their foliage—This was the work of the Caterpillar. I think Mr. Whitman did not use the Bordeaux Mixture in the proper manner, and I know there are instances where spraying is condemned because the spraying mixture is not properly made. He referred to a case where a farmer had sprayed before the eggs of the insects had been deposited where the spraying had no effect. He recommended spraying every time.

Mr. Harris said he had sprayed on the 12th and 26th of May, with good results. The spraying did better where the trees had the old bark scraped off, which he sprayed from top to bottom—and after they went out of blossom, he sprayed a few rows again. But the trees sprayed on the 12th and 26th did much better than those sprayed after they went out of blossom. He had one third more apples on the trees sprayed before they came out of blossom than those sprayed after. He made a mixture a little stronger than Bordeaux Mixture. He believed in spraying when the eggs were about to be hatched.

S. C. Parker said he had yet to see the Bordeaux Mixture or any reasonable ratio near that formula do any harm. He had succeeded in ridding his trees of the Forest Tent Caterpillar. He said he had visited Ralph Eaton's orchard and had observed an experiment, where one row of trees had been left unsprayed, and the result was, that 75 per cent of the apples were affected with black spot, while the rest of the orchard which had been sprayed turned out beautiful fruit. With respect to Mr. Whitman's trouble there must have been too much Paris Green, or too much lime, and either he did not understand it, or the man who sprayed did not understand his business. He had seen the solution put on trees, till they were purple without injurious effects.

He said he had some Flemish Beauty pear trees, and the fruit was always doubled and twisted and distorted in every possible shape and form—but after spraying, they turned out good fruit. With respect to the Leaf Blight on the Plum Tree, which had caused thousands of trees to die last Spring, and which will also cause trouble in the future, that the Bordeaux Mixture if used—two or three applications—he would guarantee, would keep the leaves bright and healthy throughout the season. He said he spoke from experience.

E. S. Collins suggested that it may be the case that the Paris Green that Mr. Parker use was not as good quality as that which Mr. Whitman used. Once he had the same experience as Mr. Whitman had, but he attributed it to the strength of the Paris Green.

Rev. F. J. H. Axford said he had good and bad results from spraying—He had never burnt his trees—He had sometimes sprayed his trees four times in the season—Last year he had sprayed four times. He did not know where the secret lies, but he had not had good results, especially as last year was an exceptional year with respect to fruits. He had sprayed when the buds were opening with clear solution of vitriol, and shortly after when the buds were swelling—and again before the blossoms were out—and after they had fallen—and yet he had not had so many spotted apples for a long time. He did not know the reason. He had made the mixture in stock, but he had not measured it always himself. It may

have been possible that the spores from his potatoes had gone on to his apple trees.

Mr. George Thompson said that as spraying had got from apples to potatoes, he could mention a discovery that had recently been made. People who had been troubled with Charlock or wild turnip—by spraying when it is in blossom will not injure the grain but will destroy the wild turnip. It was discovered by a Frenchman and has recently been used in Scotland.

W. S. Blair said he had used the Bordeaux Mixture according to the formula recommended by the French scientist on grain in which considerable Charlock was found, but his experiments seemed to injure the grain while at the same time the Charlock thrived. The injury may, however, have been due to the mixture being too strong for the condition of the plants at that time.

Mr. Cunningham (Antigonish) said he had listened with a great deal of pleasure to the discussion. He would like to get some information with respect to the Bud Moth.

R. Starr—With respect to Bud Moth on Pear Trees—He had noticed for some years, that a tree was denuded of leaves by this bud moth—every branch that was preparing to make young wood, was cut, at the same time it did not destroy all the fruit on the tree. The trouble at that time passed away without a cure and the tree made considerable growth. The insect has done a good deal of injury in this county. He advocated spraying about the same time as a person would, to kill the Codling Moth, or to destroy the early growth of the Tent Caterpillar or the Canker worm, to kill the Bud Moth. There is one thing certain, that the insects will not hatch until the growth has commenced, so as to give them some form of food. The Canker Worm and the Tent Caterpillar will commence with the growth of the tree. In spraying for the Codling Moth, it is generally possible after the petals have dropped from the fruit, and as soon as the fruit has set. Because in that case, the little fruit is standing up and the calyx of the fruit forms a cup to hold the spray, and the Codling Moth is sure to lay its eggs in the calyx of the fruit, and in that way, you kill it much easier than others.

Our fungicide mixtures will not only kill insect life, but act as fungicides as well.

Mr. Bryan said he hoped Prof. Sears would visit Pictou county next year. He also desired to know the best varieties of plum trees for his County—and also with respect to a flower called the “Stinking Willy,” which is reported to have an injurious effect on cattle.

S. C. Parker said with respect to Black Knot, to chop off the tree at the root was the most efficacious remedy.

Mr. Bryan said they applied to have the Black Knot law carried out but no action was taken.

Geo. Thompson said he had used Commercial Potash, which dried up the Black Knot, and the bark came out quite clear. He was so pleased with the experiment that he had written to Prof. Saunders, and asked him to try it.

TUESDAY MORNING SESSION.

The Dairy as an Adjunct to the Orchard.

P. C. BLACK, Falmouth.

Mr. Chairman, Ladies and Gentlemen,—There is only one excuse for my appearance here on your programme this morning, and that is through the mistaken kindness of your Secretary, who assigned this subject to me. Coming, as I do, from a county where the dairy and orchard has not reached such a high state of perfection, it is with diffidence that I approach this subject in this County. I do not pretend to pose as an authority on orcharding or dairying, and probably will tell you something which you are already familiar with, but I hope my remarks will bring out some discussion, and draw forth something of value on these important and leading lines of farm work. The most successful farmer today, is he who is more or less a specialist. We in the western part of Hants County consider this part of the Valley is par excellence for the apple tree, and in this valley fruit growing is the most profitable branch of agriculture that can be engaged in, and it should be more or less of a specialty. This idea of specialty may be carried too far. It is not well to have more acres of orchard than we can properly fertilize and cultivate. It is better to have ten acres properly attended to than twenty or thirty half looked af-

ter. The farmer today who is most successful has one or two leading lines, for instance, the orchard and dairy. However, we should not forget the old repeated advice "Not to have all your eggs in one basket." A fruit tree like any other plant will not grow spontaneously without cultivation and fertilization. This question of the economic fertilization of our orchards is a most important one. I have heard that an orchard can be properly fertilized through chemical manure. It may be quite possible. Keeping dairy cows are a source of fertility to fertilize our orchards. Dairy products take comparatively little plant food from the soil. We are told that in selling a ton of butter, we do not sell twenty-five cents worth of plant food—while in selling a ton of Timothy hay, we part with \$6.00 worth of plant food. It will not pay to keep cows for manure alone. And having this end in view, we should keep cows of a dairy breed—in other words, we want a special dairy machine. There are many advocates of the dual purpose cow, and they claim that she will give a useful flow of milk, and can be then turned out a fairly good beef animal. It is as well to argue that in selecting a mowing machine, to choose one strong and heavy, so that after you are done using it you can sell it for old iron. Having selected a good breed, we should feed the cows in an economical manner. This question of feeding is a most important one, especially as to what foods or combination of foods is best calculated to give paying results. We can do but little towards increasing the market price of our dairy products, but we can reduce the cost of running our dairy by careful attention to the cows' ration. The orchardist is able to utilize his land for the production of food for his dairy cows. You want plenty of succulent juicy food, roots or ensilage corn. These crops demand high cultivation. I have had some little experience in growing ensilage corn during the last ten or eleven years. In my experience ensilage is the cheapest feed that I can raise for dairy cows; I might say more with respect to this important crop, but I do not wish to take up more of your time. In addition to this corn food, we can grow clover hay, which supplies good fodder—Then we can also supply green fodder by raising peas. I have found a pea crop to my advantage—peas belonging to the family of nitrogen gatherers. Even when the trees come

into full bearing so that food crops are no longer practicable, we are still able through the agency of the dairy cow to increase the fertility of the orchard.

Pigs are a grand thing in an orchard—many people forget that a pig is a grazing animal. You may confine them with a cheap low fence in your orchards, and they will take care of the Codling moth as soon as they drop from the trees after spraying. I would not put the pigs in until the trees were eight or nine years old, as the trees are liable to be injured.

W. S. Blair.—Do you sow clover in the Spring and then turn the pigs in the orchard? I do not know that it is profitable to turn them into a large orchard and let them run at large.

P. Black.—We confine them in a small part of the orchard, changing from time to time, and let them feed on the second crop.

A Voice.—How many pigs do you have to the acre?

P. Black.—An acre of clover should feed from twenty to twenty-five.

S. C. Parker.—I know there are a number of gentlemen present who are interested in this paper. It is an interesting subject to every farmer.

Dr. DeWitt said he would like to know more about the cultivation of an orchard by the sowing of leguminous crops. Many people throughout the province have not the Dairy as an adjunct. He thought the plowing in of leguminous crops would be advantageous in cultivating an orchard.

J. J. Ferguson, of Smith's Falls, Ontario, being present, was called on, and said:

Mr. Chairman, I came here to listen, not to speak, but since the question has been brought up, I might say a few words. Now I do not know that I can say anything specially in connection with the bacon hog, as an adjunct to fruit culture and orcharding. The way I have been treating it over in the Province of New Brunswick, is especially along the line of hog culture, pure and simple. I know in Western Ontario, in certain sections, a great many hogs are fattened on the refuse or waste apples. But an important question comes in here, and that is the question of the effect which the waste products of the orchard will have on the hog—on the quality of the bacon. That is an important question. If we are

going to maintain our place in the market of Great Britain for supplying first class bacon, we must look to the quality of that bacon. I am very much afraid to say words of encouragement in this direction. It has been found that feeding with a large quantity of apple refuse, has an injurious effect upon the quality of the bacon, and therefore I think it would be highly unwise for me to say very much in that connection. We can go to a very great length in advocating the coupling of these two branches together.

Voice.—We do not grow any refuse apples down here.

Mr. Ferguson.—I am very pleased to know that—Blessed be the people of Wolfville for theirs is a garden of Eden. It may be you do not have any windfalls down here. There is a possibility of feeding waste apples to hogs and getting good returns, but the question is to feed within reasonable limits—if you do not do that you will injure the quality of the bacon. I think the hog is out of its place in this district. I feel rather a lonesome feeling down here (Laughter). You must look very carefully to the kind of hog which is supplied to the packer. Until the farmer produces the right kind of a hog, the packer cannot turn out first-class bacon. For years in Ontario the farmer produced a kind of a hog which the packer did not want and the business was retarded and the price kept away down. The farmers themselves were the losers in the end. But by careful feeding, our farmers have met with success. In New Brunswick they are advocating the erection of a packing establishment in some convenient center. The trouble in that Province is, that the packer is afraid he cannot get the right kind of hog in sufficient numbers. It is no use to say that there are thousands and thousands of hogs produced in certain districts—there might not be practically any of those hogs fit to be converted into first-class bacon and sent forward to the old country. If the farmers are going into this business, it is indispensable that they commence with the right kind of hog. I would recommend the Tamworth improved Yorkshire, large English Berkshire and the Chester White.

Crossing the Yorkshire dams with Berkshire produce a good pig with great length and depth of side and light back. In the Berkshire, we get easy feeders—quite gentle pigs, which suit the average farmer. By crossing, we can, to a certain extent, reach

good results. For the average farmer, we would recommend a cross instead of pure-bred hogs.

Pear Culture.

J. J. SALTER, Newport.

Mr. Chairman,—I presume we have all come to the conclusion that fruit-growing culture is only in its infancy, and whatever progress has been achieved, the business is still in its primary state. But it seems to me that there is interest manifested, not only in this valley, but in other parts of the Province. We heretofore have not produced enough of some fruits for our own consumption. Many, who did not know they could produce fruit for commercial purposes, are now going into it as a business—and I think fruit growing is going to extend. Now seeing that fruit growing is going to be one of the chief industries of this Province, we should not only study the development and enlargement of apple growing, but also grow other fruits that succeed well in this Province. There are some fruits that can be successfully grown that heretofore have received little attention—among these fruits is the pear. The pear, I think should engage the attention of our fruit growers. It is indigenous to this Province, and it would have a phenomenal success, if properly cultivated. The pear, on account of its mellow juicy flavor and fine aroma, stands at the head of all fruits. It has a long season, and can be sold from August until early spring. Of course fruit growing is now past the amateur stage in this Province, and we are all more or less looking at it from a commercial standpoint—for dollars—and the first point to look for is the market. The market for pears is the same as the market for apples—the British market. I have been watching the sale of pears in the British market for the last five years. The man who has a good pear orchard has a Klondike. They sell in the British market from \$2.50 to \$4.00 a box. They are shipped in boxes, half barrels and barrels. The varieties I would advise you to get are the late autumn and early winter varieties that are shipped from the middle of December up past Christmas and the holidays. I would recommend Buerre D'Anjou, Buerre Clairgeau, Buerre Bosc.

The pear will grow in our ordinary orchard soils—but it can be produced to great perfection in our rich deep loam. It requires a high state of cultivation. The relative value of apples and pears are 1 to 4. Although the apple is our staple production, yet I think it would be very unwise to confine our attention solely to that one fruit. There will be years when from some cause or other the apple will be a failure. It is in mixed fruit growing that we can obtain the greatest results.

Pears are in a general way divided into standards and dwarfs. The standard is grown by grafting on the pear stock. The dwarf by grafting on quince stock. The dwarf seldom grows more than 8 to 10 feet high.

The ground should be highly fertilized and well cultivated, and one-half of the previous year's growth should be kept back. Under this treatment you will have success. Those who have made a failure in growing dwarf pears trees must have made mistakes. One reason of failure is in not planting them to the required depth and not cutting them back. The tree succeeds best grown in a pyramid form. The lower branches should not be more than one foot from the ground. Some pears grafted on the quince, excel in quality—such as the Duchess and Beurre D'Anjou. If one is planting an orchard from 30 to 40 feet apart, the space between can be filled up with dwarf pears 10 to 12 feet apart, which will yield profitable returns. I would advise planting dwarf instead of standard varieties.

With respect to growing the early varieties, we have not canneries and a local market in order, perhaps, to make them a success. Wherever I have seen pears in this Province, they have done excellently—they have borne heavy crops and excellent fruit. I do not see why pear growing should not become as great as the apple industry is now. The boxes are generally supposed to hold a bushel, but I cannot vouch for the fact that they always do. I saw a quotation of \$4.00 in the Glasgow market last year. I believe that if they were more extensively cultivated and put upon the market, that the demand would increase.

C. R. Starr.—What variety of winter pear would you recommend?

Mr. Salter.—The Frederick Clapp. It will grow either as a standard or as a dwarf.

Geo. Thompson.—Have you ever been troubled with a scab that cracks them? What method would you adopt to prevent that?

Mr. Salter.—That is prevented by spraying. The pear has its enemies as the Leaf Blight—but I do not think it is prevalent in this Province. It is found in some pear-growing sections of the United States. The blighting of the wood and bark—I do not think we have had it here. The leaf blight and bark blight are two different diseases. The leaf blight can be prevented with the Bordeaux Mixture. The bark blight is more serious. I saw by the reports of the Ontario Fruit Growers' Association, that they can overcome it by spraying, but I believe it has never been stated as absolutely certain that this process of destroying it is effective. There is also a slimy slug that eats the leaves—that also can be overcome by spraying. The leaf blight turns the leaves red.

Q. What time do you spray?

Mr. Salter.—Just as soon as it appears.

J. Jackson.—What is the cause of the pears not being in good form—hard—woody?

Mr. Salter.—A pear tree, after bearing for 20 or 25 years generally outlives its usefulness, and the pears are sometimes woody and hard.

J. Jackson.—I have been advised to fertilize with iron filings.

Prof. Shutt.—I cannot imagine any soil so deficient in iron. Exceedingly small percentages of iron can be found in the ash of plants—6 to 8 per cent of Oxide of Iron. On general principles I do not see how it could act beneficially.

S. C. Parker.—As a matter of chemistry, I do not think they would ever get there to do any good.

Prof. Shutt.—No. They might be acted on by certain humic acids. If they were, I think it would have a detrimental effect rather than an ameliorating effect.

J. Jackson.—I have seen a fruit grower applying iron to the trees, and some driving nails in them.

Prof. Shutt.—Why not apply green vitriol, if you want to apply iron—It is exceedingly difficult to see what good it is.

Q. Is swamp muck any good?

Prof. Shutt.—That is chiefly a nitrogenous manure. What you are doing in applying that swamp muck, is giving humus to the soil and nitrogen. When you apply that in a fresh condition, you are not furnishing the soil with immediately useful or assimilative food. I have no question of doubt, but that the mechanical condition of the soils is improved by supplying crude muck.

TUESDAY AFTERNOON SESSION.

Horticulture in the Maritime Provinces.

W. S. BLAIR, Nappan Experimental Farm.

Vice President, P. Innes, Esq., in the chair. Mr. W. S. Blair, of the Nappan Experimental Farm, addressed the meeting on "Horticulture in the Maritime Provinces."

Mr. Chairman, Ladies and Gentlemen,—This is the first time I have had the opportunity of having my name upon the programme of this Association, and I feel assured that there are many here who can discuss the subject more ably than I can. This subject is a broad one, "Horticulture in the Maritime Provinces," and I want to deal with the subject as briefly as I can, because I realize that the time of your Association can be more profitably taken up by others. There is one point we should consider, that is the condition of the Maritime Provinces with respect to the production of fruit.

I will deal with apple growing first. In the first place, there are certain conditions which I consider absolutely essential in order that apple growing may be successful. One of the most important things is protection to the fruit trees. We find that fruit trees that have this protection from the hills or from the mountain ranges, or from trees, are doing well, and are making full growth. You will find this to be the case in whatever part of the Provinces you may go. I observed in the Province of New Brunswick, an orchard, the trees of which were planted 15 feet apart—the outside row was to a certain extent unprotected. The outside row protected the inside rows so that they made better growth. In an adjoining farm the trees were planted 30 feet apart on similar soil, but on account of not being as closely planted or having

any protection were not making as thrifty growth as in the other case I referred to. I also remember another case where two dozen apple trees were planted alongside of a building, where they were exposed to the prevailing winds, but the trees were making an indifferent growth. On the next farm the trees were protected by the buildings, and they produced good fruit year after year. I quote these examples to show you that wherever the trees were planted with protection, they were were making good and thrifty growth. In some sections, close planting is beneficial. By planting the trees closely also the trees are less liable to sun scald. One tree will protect the other. A case came to my notice in New Brunswick where the outside row was badly affected with sun scald and the inside of the orchard was not touched by it at all. I also remember another case where fifty per cent. of the trees were affected by sun scald owing to not having protection or shelter. Protection in close planting is undoubtedly a good thing. I also know of another case where sun scald was affected by pruning. I know of a case where the trees were 25 years old—Wine Sap—producing good fruit. The gentleman who owned this orchard was advised to prune his trees. He did so and gave his orchard an ideal pruning. Next year following, the bark of his trees began to peel off, and he lost fifty per cent. of his trees; and in fact I think he has lost seventy-five per cent., due to the fact of removing the surplus growth. He allowed the sun to strike in among the main branches; whereas, if he had allowed the surplus growth to go, the trees would not have been sun scalded.

I think it is a mistake for the fruit growers of the Maritime Provinces to attempt to grow fruit on heavy clay soil—heavy clay sub-soil. A soil of that description will not make the trees have a thrifty growth. One of the difficulties we have to contend with in Nappan is that we have a clay soil with a heavy clay sub-soil. Where you have a heavy clay sub-soil, it is a mistake to attempt to grow fruit trees; and I lay down that principle in any talk I have with farmers. The mechanical condition of the soil and protection are two of the most important elements the fruit grower should take into consideration.

Then there is the cultivation of the soil and the proper care of the tree. Then there is another important thing in selecting

the right kind of fruit tree for the locality. There are certain varieties which will do well in the Northern parts of New Brunswick, but which would not be profitable for the Annapolis Valley. In Carleton County, N. B., you will find varieties which are making vigorous growth, and they have been exporting apples to the English market and getting as good prices as you are getting here. But these fruits may not be of as good quality as yours. I question if you can get better than the Gravenstein. They are growing the Famuese. They are now growing good apples in New Brunswick and Prince Edward Island, exporting them to the English market with good returns. Now, what is the reason they have not been successful in growing fruit before? They have not taken proper care of their orchards, but have allowed their orchards to go to grass; and of course, with the result that the fruit is of an inferior quality, and woody; and the idea has gone abroad that they cannot produce fruit successfully. The first shipment has been made from St. John to the British market. They sent the Northern Spy, Ben Davis, and a lot of hardy fruits like the Bishop Pippin. I heard Mr. John Starr say, at the Fredericton Convention, that he saw as good Bishop Pippins there as were produced in the Annapolis Valley. If you had been there and seen the fruit, you would have been willing to admit that it was of an excellent quality.

When we go into the cultivation of the plum we find that in Northern New Brunswick they will not winter well. Moer's Arctic have been grown, and returned good prices. But the market is now flooded with this fruit. In the southern part the trees will grow all right without being laid down. In P. E. I. they will grow without being laid down.

Coming to Pears, up on the Kennebecasis the pear—Clapp's Favourite and Bartlett—are growing well, and producing excellent fruit. In Westmoreland County I saw an orchard which had a number of Bartlett trees, eight years old, producing one bushel on each tree.

When we come to small fruits, we find that large quantities of strawberries have been shipped from Kings County, New Brunswick, into the Boston market. They have been placed there as late fruit, and have brought large returns. They bring from 9

to 10 cents a quart, and the farmers are reaping a large return from this fruit. Now we come to the question of vegetable growing, and I will just touch on that briefly.

We find in Carleton County, New Brunswick, a large canning establishment. Sweet corn, beans, peas and other varieties of vegetables are canned for market. We find that the produce of the Pure Food Canning Company will bring 20 per cent higher prices than the product from Ontario. The quality is the first consideration with a canning factory. They want the best varieties of these vegetables for canning, and they will not take any other. The St. John River Valley is pre-eminently a horticultural valley. I was through that valley last year, on the 20th June, and in the Grand Narrows, up on the Grand Lake, I picked strawberries that were ripe. These strawberries were well developed, splendid fruit, and of excellent quality. I also found excellent tomatoes, half formed, some as big as a hen's egg. Those are placed on the St. John market in the first week in August. Some of the farmers grow 3 and 4 acres every year and ship them to the United States market. One farmer had 27 acres of garden truck. I would urge upon the farmers of the Maritime Provinces to grow at least sufficient vegetables to supply his own demand. A great many think there is too much detail work in connection with growing fruit. A gentleman came to me at a meeting, and said that he had an idea in his head to start a small fruit plantation, but said he did not know how to go about it. Now if I had explained to him the hill system, the row system, the matted system, light soil, heavy soil, the different kinds of fruits, and deluged him with ideas, he would have turned away. In a case of that kind, tell a person he can grow strawberries—take the Wilson variety—that it will grow on any soil, in almost any section of our Province—and start in with 100 plants; prepare your land as you would for potatoes; manure it heavily; lay out rows 3 feet apart, and plant them as cabbages; give them good cultivation, pull out the weeds by hand when you cannot get them out with a hoe, keep the weeds down, and nature will do the rest. Any one with instructions like these could easily go to work and be a successful fruit grower.

Many of us are not taking advantage of the privileges we might enjoy, and I just throw out a few hints which I hope will be followed up—as quite a quantity of small fruits and vegetables can be grown for export or local market as well as keeping each individual farmer's table well supplied.

Mr. J. E. Starr differed from Mr. Blair in respect to close planting. Said it was the bane of New Brunswick and one of the evils he pointed out in his tour through that province.

At this juncture Hon. Sydney Fisher, minister of agriculture, accompanied by Hon. Dr. Borden, and B. W. Chipman, secretary of agriculture, entered the room, receiving an ovation.

ADDRESS OF WELCOME.

An address of welcome to the hon. minister of agriculture, was then read by W. H. Chase, president of the Wolfville board of trade in conjunction with the Fruit Growers' Association.

To the Hon. Sydney Fisher, Minister of Agriculture of the Dominion of Canada:

Honored Sir,—In conjunction with this old and distinguished society, the Fruit Growers' Association of Nova Scotia, to whose good offices we owe the honor and privilege of having you among us to-day, I beg, as president of the Wolfville board of trade and in conjunction with the president and members of the F. G. A., to extend to you a cordial greeting and a hearty welcome.

We are happy, both in having you visit Wolfville to-day, and in the opportunity that will be afforded us of listening to a minister of our government who will take an important part in the programme of this afternoon's transactions. This is, we believe, your second visit to Wolfville. On the former occasion you were made aware of the important work being done here in connection with agriculture and horticulture, a work so intimately associated with the portfolio of your distinguished office. In the work of to-day we feel it a duty to repeat on this second occasion of your visit to our town, what was then said. The various departments of this work will be stimulated and benefited by your being among the speakers on this occasion, for you are in accord with the efforts put forth for their improvement and advancement.

As a member of our government we make you welcome to-day. As head of the greatest and most important factor of our national life and labor, we repeat the welcome. As having been yourself a practical farmer, and having acquired a great experience along this line, we make you thrice welcome, honored in your position, and honoring your position. We are also glad to see with you this afternoon our own honored and worthy representative to whom we also hope to have the pleasure of listening.

We value this occasion and privilege, and cannot but express the hope and wish that this may not be the last visit you will favor us with.

Honored sir, we thank you, and beg of you to accept our respectful and best wishes.

Mr. Fisher acknowledged the address and the meeting entered upon the discussion of

Freight Rates and Cold Storage.

Mr. Frank Andrews, of Middleton, spoke as follows:

Mr. President,

Your Secretary, who has a faculty of roping people in and making them do what he wants, told me I must prepare a ten minutes' paper for this Association on the question of "Freight Rates and Cold Storage," and I yielded to his mesmeric influence in a "moment of weakness."

If this meeting were composed exclusively of fruit growers I should say little or nothing upon the subject of freight rates, but would at once proceed to take advantage of the latitude which such an occasion permits—where there are no rules of order and fine spun theories of parliamentary procedure to vex one's soul, and at once pass on to subjects a little more fresh. For this subject has been worn threadbare and shiny at the seams. Every man, woman and child in the Annapolis Valley, from the muddy waters of the Avon at the one end to the jumping off place at Digby Gut at the other, knows all about the extortionate rates our fruit growers have paid, from the time the first barrel of apples was shipped to England down to the present hour. As we were accustomed to repeat in our schoolboy declamations: "You all do know the story of our thralldom. We are slaves" &c., &c., &c. Why then should we take up the time of this association to-

day repeating these things? To do so would at first thought appear to me a good deal like one woman kissing another one—a waste of material.

Perhaps, however, it might be worth our while to repeat these things once again for the special benefit of the stranger who may be within our gates. Is there, then, a politician here, or a member of parliament, or a person who wants to be one? and that, methinks, includes most all the men, and some few of the women, judging by the way the new woman is hustling for the right to vote “just like a man.” If there are any of these here then what follows is addressed especially to them while the rest of the audience who know it already, might as well quietly lay back during the next ten minutes, and sleep the sleep of the just.

From points on the Dominion Atlantic Railway to London the freight on a barrel of apples is ninety cents. And it might be said of this charge in the language of the Prayer Book: “As it was in the beginning is now and ever shall be, world without end, amen.” It was that when the first barrel was shipped long long ago, it was that when the last one was shipped by the last steamers which left Halifax. And I half suspect that if apples are being shipped to England when the last trumpet sounds, the “last man” the poet tells us about will be charged ninety cents on the barrel, unless, indeed, in the meantime some modern Moses arises to lead our people out of the Egyptian bondage to which they are now subjected by the transportation companies. Of these ninety cents, 17 are for railway freight leaving 73 cents or 3s. as the ocean freight from Halifax to London. Comparing this rate with that from Boston, New York or Montreal, it will at once be seen how extortionate it is. At the beginning of the last fruit shipping season the ocean freight from Boston to London was one shilling and nine pence.

Later in the season this rate was advanced to two shillings, or thereabouts, being at the highest but a little over one half that charged from Halifax. Even to-day apples can be shipped from stations on the D. A. R. to London via Boston for 86 cents, while from the same station to London via Halifax it costs 90 cents. That is to say apples can be put on board at any of the stations of the D. A. R., taken to Yarmouth, reshipped there by

steamer to Boston, and again reshipped there for London, with all that changing and extra handling at 4 cents per barrel less than they can be sent direct by train and steamer to London with but one handling in Halifax. And when we consider that the steamers from Halifax are paid a fairly liberal subsidy of our money, while that from Boston receives no subsidy whatever, it will readily be seen that something is wrong somewhere. It will be claimed, I presume, that there are more steamers seeking freights at Montreal, Boston and New York than at Halifax, and that therefore the competition at those places keeps down the rates. This may be true, but what is the subsidy given for if not in some way to help to even up or counterbalance the reduction created by this competition? If it does not help to secure cheaper freights, then it does no good and had better be withdrawn.

The excessive rate of 90 cents per barrel, plus the charges on the other side, of commission, cooperage, truckage, dockage, light-erage, and a lot of other things, sometimes I fear including "steal-
age," brings the entire expense up to the vicinity of \$1.35 per barrel. And some seasons that is about all the apples sell for in the London market, sometimes, indeed, not even bringing that amount. At such times the transportation companies and the people on the other side scoop in the whole business, leaving the poor fruit grower with nothing but a clear conscience—a realization of the fact that he, by his long season's toil has helped to keep up "A vaster Empire than has been." This is no fancy picture. Every fruit grower present has had such experiences as these during some years. Last season wher prices were better, results were more satisfactory; but these would have been even more satisfactory if the conditions were what they might be.

But excessive freight charges are not the only things which tend to make the fruit growers' conditions burdensome. Quite frequently the fruit is injured during the passage across. Too frequently, indeed, the words "heated," "slack," "open" &c. on the account sales tell the story of the over heated and badly-ventilated steamers, or of careless handling resulting in a realization of less than half the market price. And why should the steamship companies be careful about these things? Why shouldn't they pack the cargo close and fill up the holds clear to the decks?

The more they can carry, the closer they can pack the fruit, the larger the profit for the trip. No matter what the barrel contains, when it is landed—whether its contents be cooked or frozen—the 90 cents has to be paid. True, the shipper has the company's guarantee to land the fruit "in good order and condition." But what farmer wants to fight a law suit with a big English steamship company! Fine picnic it would be to go over to London, hunt up evidence and all the rest of it! I have known instances where shippers and speculators have suffered a loss of \$5,000 on one steamer load alone, solely from too close packing in the hold of the steamer, and want of proper ventilation. But no matter what the loss may be, our people have simply to submit to it rather than risk a lawsuit with a wealthy English steamship company.

Besides these our fruit growers have other grievances of a minor nature. The steamship people charge extra for every bill of lading they give, which as common carriers they ought to give free. They give rebates to a certain favored few, rebates usually of ten cents per barrel, and sometimes I believe even higher; which rebates these agents or shippers pocket by re-letting the space they engage to the farmers, while these latter find it difficult or almost impossible to secure space direct from the steamship agent in Halifax. Frequently, too, when space is engaged and the fruit forwarded by train it is left in Halifax till the next boat.

Nor is this all. While professing to charge but 90 cents per barrel for freight, frequently when the account of sales is received from London the freight "as per bill of lading" actually charged is more than that. I have been shown a number of accounts this season where the freight actually charged averaged just a dollar a barrel. In fact what with excessive freight charges, too close packing in the steamer, want of proper ventilation, and petty exactions and extortions, the conditions surrounding the shipment of fruit to the English market are as bad as they well could be. The whole business is rank and smells to Heaven.

I make the statement without fear of successful contradiction that the greatest boon which could be conferred upon the fruit growers of the Annapolis Valley is to give them cheap freights between Halifax and London, with such improved conditions as

will assure the landing of our fruit in good condition. As there seems now little probability of securing reciprocity with the neighboring republic, these two things, cheaper freights and improved facilities, are more essential now than ever before, for yearly the cost of production is lessening and competition is becoming more keen. Our fruit growers must have equal opportunities in reaching the world's markets as their competitors have. We ask those whom we entrust with our affairs to secure these things for us, and we will overlook a multitude of sins in other directions: If this cannot be done through the instrumentality of the subsidy then let it be taken away from them entirely, and give all steamship companies a fair field and no favor. But for Heaven's sake do not continue to pay our money to these people if it secures us no advantage in return, and only helps to perpetuate a monopoly, by aiding them to buy off or crush out all opposition, as they have thus far successfully done.

In all cases a subsidized steamer carrying fruit ought to be subject to inspection by a representative of the department both when loading and discharging her cargo, and the proportion of subsidy for each trip should depend upon the condition in which the cargo is landed. The steamship people ought to be made to assume some of the risk, and pay some penalty for improper handling.

COLD STORAGE.

It will be possible for me to make but the briefest reference to the question of cold storage as my time is about exhausted. This is one of the most remarkable trade developments of recent years, and it is a thing that has come to stay. Through its instrumentality, perishable products of all kinds can now be kept for any desired length of time, while formerly they could be kept in their fresh state but for a day or so at most. The world's great centres of commerce and of population are now drawing their supplies of perishable products from the most distant, as well as near by sources, and by means of cold storage appliances these great centres are available as a market for the producers of distant continents and islands.

We are grateful to the Minister of Agriculture for the efforts he has thus far put forth to give the people of this province

the benefit of this boon. That it has thus far failed to prove a success, is, I believe, neither his fault nor ours, but is largely owing to the want of sympathy with the movement which the steamship people have manifested. The time when cold storage would have benefited our fruit growers most was at the beginning of the shipping season when gravensteins and other soft varieties were being sent. But the appliances, I believe, were not put on until after these were shipped, and when these were provided little or no pains were taken to let the fact be known. The agents or shippers along the line of railway who were getting the rebate had no sympathy with the cold storage movement, from the fact, I suspect, that they got no rebate on those barrels sent in cold storage. At any rate in our part of the valley, some of these agents persuaded farmers not to ship in cold storage. Then, too, quite early in the season a story was started in London, I half suspect by the steamship people, that the few sent in cold storage did not reach the other side in good condition. Added to these things is the fact that while they bargained with the department that the extra charge for cold storage should not exceed ten shillings for 70 cubic feet of space, or less than a shilling a barrel, they immediately proceeded to charge 35 cents per barrel or 45 per cent. more than their contract allowed. Then, too, at an early stage of the season before our people had time to receive returns for the first lots sent in cold storage, the announcement was made in the Halifax Herald by the company's representative that the cold storage appliances had been taken out of their steamers, the statement being falsely made that these appliances had been put in as a private enterprise. Under all these circumstances is it any wonder that cold storage proved a partial failure on these boats?

Dr. DeWitt said,—Mr. Chairman, Ladies and Gentlemen: "Providence helps those who help themselves." This maxim, I believe to be true of the farmer as well as of the fruit grower of this valley. The farmers and fruit growers have known for a long time past that they have had to pay a higher rate of freight for the transportation of their apples than the shippers of any other country in the universe. They know that in this essential, they have been handicapped—that they must either ship or sell to some speculator, and if they ship they do so at a great disadvantage and

loss. They know too, that their only salvation from this monopoly is to get down to business—build warehouses along the line of railway—put themselves in a position to deal with the Railway Company, and obtain a freight rate in order to ship at a greater profit. They know all of this. They say, “yes, yes,” to all of that, but they act as if they do not believe it. In other words, they do not act at all. They remain passive—they do not try to help themselves—that is in many instances. They seem to think that the men who advocate some change in this pacific condition have some sinister and ulterior object, and that they are trying to seek advantage at others’ expense. But when they are asked to unite and combine so as to obtain proper rates, they act as though they do not mean it. At the commencement of the apple shipping season, the freight rate between Boston and the ports of Great Britain were less than they were between the port of Halifax and the ports of Great Britain, consequently, some shipped via Boston—but soon the freight rate was raised over there, and they could not ship with profit in that direction, and they soon began to realize they were between his Satanic Majesty and the deep sea. Because, when they applied for space in the boats at Halifax, they could not get it—it was all engaged.—“It is engaged for this sailing.”—“It is engaged for next sailing.” “The agents and speculators have engaged it.”—they are told. It was alright for the speculators, and it was alright for the steamship to conduct their business in such a way to fill all their space; but it was rather hard on the farmers, reminding one of the wicked epitaph in the churchyard:

“Here lies the body of Mary Ann,
 “She lies in the arms of Abraham,
 “Which is alright for Mary Ann,
 “But it’s pretty tough on Abraham.”

Governments may legislate and governments may come and go, but, until the farmers get down to business themselves, and do their business as business men do theirs, there will be failure and dissatisfaction. It has been the experience of the past that subsidies have not lessened the freight rate to the farmers. The agent, who is, and has been, a necessity—must be paid for his work—and the steamship companies say that they cannot depend

upon isolated farmers to load their boats; consequently the farmer who ships any apples through the agents must pay a maximum rate. Whether shipping by the farmers or through the agents, these steamships would still have their minimum freight rate to offer to the largest shipper. I contend it is the duty of the farmer of this valley to get down to business and co-operate. It has been often asked if orchard planting can be safely extended. To this I would say, "Yes." Twenty times the amount now grown in this valley can be marketed if there were concentration and co-operation, because there would be better packing, there would be better shipping, there would be better preservation of the fruit in transit, better quality of the fruit, and our markets would be extended. I am not complaining that the government has not done more for the farmer; nor am I complaining of agents or steamship companies, which charge high rates, or large shippers, or speculators who make large shipments. Had it not been for the speculator here this year, those who gave a liberal price for our product, many of us would have had to live, figuratively speaking, on oatmeal or bran cakes. I am not complaining of this. If I am not complaining, I am lamenting that the farmers have been waiting for something to turn up. Now, sir, if by the granting of subsidies, the apple shippers will get a lower rate of freight, it will, no doubt, be beneficial to the farmers, but if these boats subsidized will not lower the freight rate, it is doing the farmer a positive injustice.

It is reasonable to ask the government to see to it that a less amount of freight is charged by subsidized boats.

It has been my humble opinion for a long time that the apples shipped from the port of Halifax to the ports of Great Britain do not need cold storage. I think that our soft apple, which is the Gravenstein, can be shipped in its season as well as any other variety in its proper season. My experience in cold storage this last season has been very limited. I may say that as late as November, I shipped two barrels of Gravensteins here through the agent of Nothard & Lowe, and wrapped the fruit in paper. One barrel was put in cold storage, and the other was not. They were sent by the Furness Line. When the returns came in the results were the same. Both sold for 16 shillings a barrel. No comments

were made, therefore I concluded they arrived in the same condition. It is cheaper to wrap our apples in paper than pay the extra sum for cold storage—in fact it will not cost half as much.

Yesterday, at the Board of Trade meeting, mention was made of a uniform barrel. There is a necessity for a uniform barrel. I stated here last year and I have stated elsewhere, that in London and Glasgow, I observed that the barrels which held 3 bushels brought from one to two shillings more than the barrels which did not hold as much. Our apple barrels have got a reputation. Those who go to the market know them wherever they are seen. They generally hold good fruit; and they will have a Nova Scotia barrel if they can get it. Our apples are being packed better every year and go to the markets in a better condition than before. So whatever barrel we adopt, it should be uniform.

W. E. Roscoe, Q. C., Warden of Kings County, said:—"Mr. President, Ladies and Gentlemen,—With your permission I will say what occurs to me in reference to the subject to which we are giving our attention where I am. There is very little remaining to be said, after the exhausted remarks of the last two speakers, and it is hardly worth while for me to face this audience under the circumstances. The most, probably that can be done is to accentuate what has been stated here. That we are suffering from the unbearable and exorbitant rates all can see; that we have always labored under this difficulty, everybody knows, but that we must keep on laboring under this disadvantage I do not concede. Mr. Andrews said we can do nothing. We are even now doing much. That which we are doing to-day; that which we are all going to try to do, may be of the most effective character in reference to this subject. We have here with us not the Government of the Dominion of Canada, but we have a member of that Government, most particularly charged with the duty of controlling the department that has this very subject in hand, which we have before us. We have not only that member here, but we have another and a prominent member of that Government, a man of our own choosing, who knows all that we are talking about; who is interested directly in this very thing; interested personally and who knows the whole subject matter of this business; and we are here to talk to those two gentlemen, and they are present to hear all we have to

say on this very important question. Now, Sir, what have we got to say in relation to this subject? We have a line of steamships to transport our apples from Halifax to ports of Great Britain subsidized: but whether it should be subsidized or not, is a matter upon which various opinions exist. If no good comes to us from these steamship subsidies then we should abolish them. That goes without saying. (Applause). Whether that extreme move should be taken, or whether there is not in the granting of the subsidy or the withholding of it, a weapon by which we can compel fair play and proper treatment in respect to transportation of the staple article which we produce in this county is a question which we should consider. (Applause). We find, it appears to me, that it is a part of the programme of the present Government to subsidise a line of steamers to go up the Bay of Fundy to the Port of St. John. Why do they send a subsidized line of vessels to that part of Canada? Is it for the benefit of the people who live in that part of the country, or is it for the benefit of those who handle shipments through that port by that subsidized company? What would be said of this subsidized line if freight from St. John on wheat over the C. P. R., was double what it was on the same commodity from the same locality of production, from Portland over the G. T. R.? What would the Government say to this? What would the people say who raised the wheat? The Government would not continue a Government if it did not listen to the voice of the people on such a matter, because the people would not tolerate its existence. Why should not the same kind of treatment be dealt out to the apple grower as is dealt out to the wheat producer? The subject needs only urging on the part of the people. If the one thing obtain in the one case, why not its counterpart obtain in the other? If it costs more to send wheat through St. John than through Portland, why should apples cost twice as much through a Nova Scotian port as through an American port? It is a principle beyond controversy that every Government has a right to so manage the affairs of the country which it governs that it shall be for the good of the people whom it governs. The cupidity of ocean steamships has always been by Governments looked after to see that the people do not suffer. In England they do not allow a steamship to be loaded down below the Plimsoll

mark, because the Plimsoll Act looks them in the face. The Government says by that Act, "You shall only put so much on board your steamship," and the company must obey. A Government has as much right to regulate rates as quantities. We have a weapon to use in this subsidy and we should get this thing straightened out, as it is an injustice as it now stands to the people of this county. The precaution should be taken in drawing up the subsidy contract, to stipulate that the company should carry apples from Nova Scotia at something like the rates they are carried from Boston or Portland to the Continent of Europe. If we cannot get that from the Government let us know the reason why. We have two members of the Government here now to hear what we say. We now have an opportunity of expressing what we know are our grievances. I know the Minister of Agriculture has been here before; he has faced the same question before in this county. He is here the second time to find out in some way a solution of what he was not able to answer satisfactorily after he had made a first visit to this county.

These gentlemen have been put in a position where they can do something for our advantage in this all-important matter by the votes of the people, and we would be far short of the duty we owe to ourselves if in the future we do not remember their action in reference to ocean rates on this agricultural staple of Western Nova Scotia.

Hon. Mr. Fisher, (Minister of Agriculture) on rising was greeted with loud applause. He said:

Mr. President, Ladies and Gentlemen,—Before proceeding to take up the very interesting discussion which has been before you, I wish to thank the Fruit Growers Association of the province of Nova Scotia, for the kind invitation they extend to me to be present at this, their annual Convention. It is true I had an opportunity once before of being present in Wolfville, but it was not such a gathering as this that I attended. I understand this is a representative gathering of the whole of the fruit growers of the Province of Nova Scotia, and I daresay, that while the Annapolis and Cornwallis Valleys are represented here, yet there are many others from the whole Province. It is a very fortunate thing for me as the Minister of Agriculture to come in contact

with ladies and gentlemen whom I see before me. It is part of my duty as Minister of Agriculture to meet those who are engaged in agriculture—as I am myself engaged in it—to meet those who are engaged in the same business of farming and horticulture. I may say that in coming in contact with them I am better able to do my duty to them. Coming face to face with the farmers from the different parts of the Province, I am much better informed with regard to the needs and wants of agriculture, in the Dominion of Canada, and better able to advise how those needs may be met. The question which is before you this afternoon, is one local in its character; that is to say it is a question of your local business relations and not one in which I am particularly well informed. Mr. Andrews said it was a subject you knew by heart. I do not know it by heart, and therefore, I am at a disadvantage. You know all about it. I do not. I cannot teach you anything in regard to it. Before this meeting closes I hope to have an opportunity of talking about fruit growing and the business of agriculture in connection therewith, and perhaps I might be able to give you some ideas; at all events they are long continued observations and careful study of these questions. This question is one of which you know more than I do. You are more familiar with the facts. It is true I stood before an audience in Kentville for two hours, and had a great deal of information given me in regard to it, and what I am able to say to you must be largely beside that. I am not going to detain you two hours to deal with this question, and therefore I would remove that impression from your minds at once.

It is a question which is of the greatest importance for your business, and therefore you are rightly greatly interested therein. It is a question which belongs to that great class of questions which practically nobody understands—the question of freight rates and transportation. It may be that a few railway magnates of the continent understand it. (Laughter). We always find them fighting about it—and there are a great many differences among them. We find steamship owners also discussing it with a great deal of acrimony, as to statements and facts—and therefore it would be well to clear the air by coming to rock bottom facts about the matter. The statement was made here this afternoon, and it was made yes-

terday at Kentville, that you are obliged to pay considerable more for the rate per barrel from Halifax to the English coast, than you are charged from Boston to the English coast. I am not a bit surprised. I am rather surprised to think that you are surprised at it. It is a well-known fact that our Canadian ports, not Halifax alone, but Montreal as well, and St. John have been at a disadvantage in freight rates with Boston and New York. That has been the case for years. It is the case not only from Halifax on apple freights, but it is the case on those of wheat rates.

Mr. Roscoe—On apples it is twice as much.

Hon. Mr. Fisher—You are charged more, and the Government have not been able to help it. Why is it that of the North Western wheat, only 15 per cent comes through Canadian ports? Because it is cheaper to ship it through American ports, although it is building up the trade of our rivals and building up their ports. Why is it so? Because there are hundreds of vessels coming and bidding for the freight where in Halifax and St. John there is only one. Because in those ports there is a congested amount of freight and tramp vessels come there and underbid the regular lines; whereas, in Montreal and Halifax, tramp vessels do not come at all. And it is only by subsidies that we have any ships at all. Do not imagine that this is a grievance which is peculiar to the Annapolis and Cornwallis Valleys. This is a question peculiar to the country. It applies to all our products.

A statement was made by one of the largest butter exporters in Montreal, that if the butter shipped from Montreal to England during the last season, during the opening of that port alone, had been charged at the same price shipped from New York and Boston to Liverpool, that there would have been \$238,000 in the pockets of the dairymen of this country. That is to say, the butter shipped from Montreal to England was charged on the whole shipment of 209,000 packages \$238,000 more than the same quantity shipped from Boston and New York to England. It is not only a question peculiar to your apple shipments, but it is a question which is of the widest consequence to the whole continent of America—and everything that goes to England is involved in these shipping rates. If we are subsidizing a line

of steamers we have a right to impose conditions. As a matter of fact, in the contract with the Furness Withy Company, there is a clause which enables the Government to fix a maximum rate—that is to say, we can say at the beginning of the year that so much shall be the highest rate charged. Now freight rates vary from day to day and from week to week. I have seen quotations from here—Mr. Andrews, I think it was, wrote me a letter, giving me the rates from Boston. I saw a statement in your paper for a period that it ran from 1s. 9d. to 2s. 6d. in Boston, showing that freight rates are not always the same there. These subsidies have been given to these steamers on your account and your representatives have asked for them—and it is a question I will have to leave to you to decide what you want in the matter. Now there is another matter which has been alluded to here to-day, and which comes more particularly under my own control; and that is the question of Cold Storage.

Cold Storage was not put in until late in the season. My impression is, the first steamer came to Halifax in the month of August with cold storage; but I am not absolutely certain about the date. I made the contract with the Furness Withy Line last June, and if I am not mistaken indeed, the vessel came out in August, and was ready to sail before the first of September. When I first encouraged this system of mechanical cold storage, I informed the Furness Withy people they would get the same terms or subsidy for putting in cold storage, as vessels going to Montreal and Quebec. I had a long correspondence with the Furness people, and they would not put in the cold storage at that time. They said I was not offering favorable enough terms, and they could not afford to do it. Last Spring the Furness Withy people having found out that the Montreal people had been doing a good business, came to me and asked me to give them the same terms, and made the arrangement I speak of before the close of last session in the month of June. By that contract five steamships were to give a weekly service from St. John and Halifax, to London, with 10,000 cubic feet capacity in each vessel. The terms of the bonus was that the Government should pay one half the cost of the installation—for a term of three years—during which time they were bound to maintain the installation and

bound to operate it. This last Fall, very soon after the first vessels came to Halifax, the Furness Withy Co. wrote me and said that the people of this part of the country refused to send their apples in cold storage, and they wished to take it out. I said that I would not allow them to take it out. It was put in there for the benefit of the people of Nova Scotia and New Brunswick. We appreciated and understood that there was some risk in the initial stage of that business. I said they must live up to their contract. It was also hinted that the plant was not operated. It never entered my head that it was not operated or that it would not be availed. I had the experience of Montreal, where 17 vessels were leaving in a week, all of them fitted with cold storage and there was not one case where the cold storage system was not operated; and in that respect I must confess I may have been negligent that they would not operate the installation which they put in at their own request. If they did not do it, I will make them suffer for it. And in the year to come, I will have a man there to see they do live up to their contract; or will withhold their subsidy. Dr. DeWitt has spoken of the condition of apples being kept in cold storage and ordinary storage respectively, and I am not at all surprised at the results. For late apples with good keeping qualities in cool weather, if the vessel's hold is properly ventilated, you do not need to put them in cold storage to send them safely to England; but I do venture to say—and the experience of the West has shown it (your climate and your conditions may be different, I do not know that)—that the shipments sent forward in cold storage will yield you better results. I know of one case where it yielded 25 per cent. more profit to the shipper, where he had a shipment in cold storage and one not in cold storage. I believe that for early apples, for delicate fruits as plums and pears, that cold storage is most beneficial. When it comes to winter, there is no need for ice or mechanical cold storage, provided always that the holds of your vessels are ventilated.

When I was in England last summer I went into this ventilation of holds, and I found that butter and cheese suffered through the lack of ventilation. I went to the heads of the different steamship companies and pointed out to them that at a small

expenditure of \$200 per vessel, they could easily put in electric fans and ventilating shafts, and they promised to have it carried out. In Montreal, two thirds of those who took our cheese and apples, were properly ventilated with electric fans and proper shafts. It was simply a representation in a business like way to the heads of the firms, and they, seeing the propriety and advantage of it, gave orders and it was done. If it has not been done by the Furness Withy people, then the promise which the head of their firm gave me has not been fulfilled.

I heard the question of uniform barrels discussed here. I will leave that question to my friend, Hon. Dr. Borden, who has dealt with it in the House of Commons in the interest of the people of this Province. He understands it and knows it. I have found a great deal of complaint as to the lack of uniformity in your barrels. A uniform package is as absolutely necessary in the apple trade as it is in any other article. The market there wants uniformity in its package all the time. If you do not send your produce forward in a uniform package always containing the same weight, you will be at a disadvantage. When a man orders 1,000 barrels, he will not do it unless he knows what quantity he is to get in each barrel. He must know whether it is 2 1-2 bushels or 3 bushels. I am not prepared to give you an opinion. It is not a subject upon which I have any particular authentic knowledge. I do know about the trade. If you send 1000 bbls. to the London and Liverpool market, the man who buys them wants to get just as much in one barrel as in another. If you ship 2 1-2 bushels at one time, and 3 bushels at another time, it will hurt your trade. It is absolutely necessary if you wish that trade to succeed in England, that you shall adopt a uniform barrel and strictly adhere to that barrel.

I thank you heartily for your kind attention in listening to me.

Col. Shippy Spurr—I would like to ask the Hon. Mr. Fisher one question. He said they had the power of fixing the maximum rate of freight with this company. Has that rate been fixed, and what is that rate?

Hon. Mr. Fisher—No. It has not.

Col. Shippy Spurr—I would ask why it is that these sub-

sized steamers can come here and carry deal from the ports of St. John, and wheat, space for space, at about one half they will carry apples for?

Hon. Mr. Fisher—That is one of those questions of special rates, or transportation problems I do not pretend to know. There are different classes of freight. Deals and wheat are the cheapest freight carried across the ocean. Just as a railroad train has different classes of freight. Apples are the highest—I suppose it is on account of their value and delicacy and difficulty in handling. All freight is classified 1, 2, 3, 4, etc., and the more perishable class, as eggs, apples, delicate fruits, etc., cost more to carry. Wheat which is loaded and unloaded by elevators is one of the cheapest classes of freight, and I am told that vessels will carry it at a lower rate than any other commodity.

W. E. Roscoe—I would like to make sure of the fact with reference to the comparative ocean rates on wheat from St. John and Portland. I would like to know if the rates on wheat, coming from the same place in Canada via the C. P. R. and St. John, to Great Britain, and via the G. T. R. and Portland, are different?

Hon. Mr. Fisher—They were extremely low in St. John. I have not got the figures with me, but I know as a matter of fact, for ten years back the general rates from the West to Europe have been considerably lower through New York and Boston, than they have been through St. John and Halifax.

W. E. Roscoe—I am speaking now through St. John and Portland. I am told they are the same?

Hon. Mr. Fisher—I could not say whether they are the same or not.

John Donaldson said it would be well to give the cold storage plant another season's trial.

Hon. Mr. Borden, (Minister of Militia) on rising, was greeted with applause. He said:

Mr. Chairman, Ladies and Gentlemen,—If you will permit me, I will continue this very interesting discussion for a very few minutes; and I may say you will be glad to know that it will be for a very few minutes. From what I hear of the different things in regard to transportation rates, and in regard to cold storage, it reminds me very much of what they used to tell me

as a Presbyterian, as to the doctrine of election: "You can and you cannot; you shall and you shall not; and you'll be damned if you do not." (Laughter.) Whether the system of cold storage is kept on, the whole responsibility is to be thrown upon my hon. friend Mr. Fisher and the Government of which I am a member. I sympathize with you a good deal, and am glad to observe there are many recruits added to the band of workers, of which I was one for 18 years. I contended here against steamer subsidies for years. I have always felt that the steamboat subsidies were an absolute mistake, and a positive injury to the people who have to export apples from this part of Canada. I am a member of the Government which is continuing a policy in which I expressed myself in times gone by. As I said yesterday, I say to-day. I consider the interests of my county, and of the Province, and of course of the great Dominion at large, would be better served by me remaining in the Government, notwithstanding the fact that I differ from my colleagues—because I can fight the battles there, of my friends, rather than make it a question to resign and retire from the administration. And that is why I remain in the Government. I have stated it in the past, that I believe we would be better off if we left the trade of Halifax and the trade of St. John to the competition of the different steamboat lines. And I will say furthermore, and I do not think my position is an untenable one, I am prepared to use the best influence I possess to withdraw from those lines those subsidies. I am happy to know—and I have been told by the representatives of two lines—that they would rather be without the subsidies than with them. Speaking of the steamship lines, I regret that an agent of one of the lines is not here. I say publicly and openly, I consider it to be a rather suspicious thing that that line, with the agent of which I have had conversations and correspondence since last autumn, has withheld from me the rates which they charge from Halifax, for the fruit conveyed from Halifax to London. I was promised no later than Sunday last by a gentleman representing an important line at Halifax, that he would attend the meeting at Kentville and be here to-day. He may be here. I hope he is. If he is not here, I have only to say that he has not placed in my hand what he promised to place in my

hand—a full explanation of the rates charged to the people of this valley for the products they are sending to London through his steamship.

That is all I have to say except one word more. This question of transportation, as the Hon. Mr. Fisher has told you, is a big question. It is not a question to be settled here. It is not a question which has been fully understood up to this moment. It is a question, however, upon which the interests of all the producers on this side of the Atlantic largely depend to-day. I believe that the transportation lines—the people who carry the goods which we produce, ought to be fairly paid for their labor—and I think you will all agree with me upon that point. I believe, however, that when they undertake to get more than a fair remuneration for their work, and to take unfairly from the profit which the producer ought to receive, that they are doing that which they have no right to do. And I believe that the Government should intervene by the strong arm of its power and see that the producer gets a fair price for that which he produces, and that the man who carries the product does not get an unfair advantage over the producer. (Applause.) In the North West Territories, the cry has been going up against the C. P. R. for years. What has been the cry? That all the profit the products would bear was taken by the transportation lines. That the railroad men, having a monopoly, simply ascertained how much it would take to enable the farmer to live, they allowed him that much, and they took all the rest and put it in their pockets. That, I believe, has been done; and it is being done—and I believe it is the duty of the Government to intervene. I do not say it is being done there now. But it is the duty of the Government to prevent any such outrageous proceedings against the producers of this country.

He said as far as he was concerned, he would be happy to be able to assist his friend, Hon. Mr. Fisher, who would give his special attention to this matter. That he himself was a producer, and engaged largely in agriculture and horticulture, and he wanted fair play done to himself. He said he had been informed by the Deputy Minister of Trade and Commerce, that two steamers of the same line were now loading grain; one at the port of Boston,

and the other in the city of St. John; and the rate upon the grain in the city of Boston was nearly 50 per cent. more than the rate in the city of St. John. That is an illustration which would show them how these freight rates differed. That it was impossible to fix a freight rate or control a freight rate—they are controlled by the circumstances of the trade at the moment. Take the rates quoted in Boston last autumn—1s. 9d. and 2s. 6d. per barrel for apples. Those were the rates in Boston during a short period of 8 or 10 weeks. From 1s. 9d. up to 2s. 9d., showing a sliding scale. It was absolutely impossible for any Government to fix a rate. It was true they could fix a maximum rate; but when a Government undertook to fix a rate for steamboats and railroads in this country, the steamboats and railways would cease to run. All they could do was to see that undue charges were not made.

BARRELS.

With regard to this matter, some years ago Mr. Chase, on behalf of the Kings County Board of Trade, or possibly the Fruit Growers' Association, forwarded to him certain resolutions, asking him to get an amendment to the Dominion Act, which fixed a certain Standard Barrel—and the resolution which had been passed practically fixed the size of the barrel at what it was prior to Confederation—prior to 1866. He (Mr. Borden) went to Sir John Thompson and discussed the matter with him, and he promised to do something; but before the session closed, something occurred and it went over. Last year he went to his friend Sir Henry Joly, who has charge of the department, and asked him to see what could be done; and he had a new clause prepared as follows, to be substituted for section 18 chap. 104, Revised Statutes of Canada, 1886. (Weights and Measures Act.):

Sec. 18. All apples packed in Canada, for sale by barrel, shall be packed either in cylindrical veneer barrels, having an inside diameter of 18 1-3 inches and 27 inches from head to head inside measure, or in good and strong barrels of seasoned wood, 27 inches between the heads, and having a head diameter of seventeen inches, and a middle diameter of nineteen inches; and such last named barrel shall be sufficiently hooped, with a lining hoop within the chimes, the whole well secured with nails.

He said he submitted this to the Association, and he desired to know from them whether or not that amendment was one

which would satisfy them. He thought there would be considerable opposition to a change, from the Province of Ontario. As he pointed out yesterday at Kentville, the manufacturers of barrels would only make the barrels they could sell; and when the producer and the shipper refused to take a barrel of a certain size—the mean size if you like—the coopers would not make any more of them.

He said it gave him a great deal of pleasure to be present with so many familiar faces, whether they were identified with his political banner or not—that this was a time when they could afford to forget party politics. He thought the Valley was the finest and the best on the face of the globe, and was finely adapted for the fruit growing industry, and would in the future, according to its acreage, produce more barrels of apples than any other county. All they had to do was to put their heads together to solve these questions of freight rates and transportation facilities. He believed in technical education, and hoped that the Provincial Government would see its way clear to take steps to vote the necessary money, to enable a Technical School to be established; a school fitting and becoming a province like this. (Cheers.) There was no reason why they should not have a good agricultural college, and there was no reason why it should not be located on this very hill. (Applause.)

Mr. Roscoe—Does the Government now consider the rate on apples excessive? If so, why has not the maximum rate been fixed?

Hon. Mr. Borden—I have no hesitation in saying that the rate is excessive. Sir Richard Cartwright, the head of the department of Trade and Commerce, owing to a rush of business, has not been able to give this question the consideration it deserved. He did not know whether a maximum rate could be established or not, but he would promise this—that he and the Hon. Mr. Fisher would call the attention of their colleagues to this fact, and something tangible would be done in the near future.

Ralph S. Eaton said that the discussion in the newspapers on this subject had taken up a number of phases of it, but there was one phase which had not been, and which he thought would be appreciated by the farmers present, as the great losses many of them had sustained in several lines of their work during the past

few seasons was very marked. When thousands of acres of potatoes in our province, which promised from their appearance in the middle of the summer a yield of 150 to 300 bushels to the acre, had been cut down long before their maturity, by leaf blight, and reduced to a crop of not more than 100 bushels per acre on an average, the farmers could certainly realize what this meant to them. When a large number of beautiful orchards of plums, the pride of their owners, had completely succumbed to the effects of leaf blight and black knot, and the money and labour lavishly spent, was admittedly wasted, and when thousands of barrels of apples were either rendered entirely unfit for market, or reduced from a first to a second or third grade, from the effects of the black spot, farmers could not be blind to the fact that knowledge meant dollars and cents. The knowledge of these fungous enemies, and how to combat them was just what the Agricultural College taught under the head of Biology. The ravages of the canker, stripping, as it has done so often, many of the orchards of this province of their foliage and fruit, the depredations of the codling moth and bud moth, need only to be mentioned to be forcibly remembered. The life and management of these insects was studied at the college under the head of Entomology. The Hon. Mr. Fisher had told us of the immense loss stock raisers were annually sustaining, in feeding, through want of the knowledge of agricultural chemistry. Thus we could detail the importance of better acquaintance with many other subjects; such as dairying, veterinary work, etc., to say nothing of the value of the study of botany, grammar, composition, arithmetic, book-keeping, mensuration, English literature, physics, mechanics, and political economy, all of which helped to round out the education of agriculturalists and which occupied such an important position in the catalogue of a college such as we were asking the Government of Nova Scotia to establish in our province. It is true the present generation of farmers could avail themselves of considerable information on many of these important subjects, by means of agricultural papers, and the bulletins of the various Experimental Stations; but they are exceedingly slow in grasping this information, and in putting into practice on their own responsibility. At an agricultural college the farmers of the

future can become as familiar with the obstacles and enemies now causing such serious losses, and the ways of handling them as with the more ordinary routine of work, and then with brains and energy, will be infinitely better able to contend against the ever increasing difficulties and competition. Looking at the question from a financial and economical standpoint alone, and having regard only for our soil production the government of Nova Scotia would act wisely in concentrating the labour and money now expended, necessarily with great disadvantage, on the two schools we have, and establishing, even at considerably greater expense, an Agricultural College fitted to the needs of this province of such large natural agricultural resources.

H. H. Wickwire, M. P. P., said it would be his pleasure to give his very best efforts to furthering the wishes of this association. We have never yet had an agricultural school in Nova Scotia. The institution we had at Truro was an institution which, in trying to teach both teachers and farmers, had failed in both. He believed that the only reason the Government was not taking hold of this subject more vigorously was because the farmers of the country did not manifest a deep interest in the matter and that they would not send their sons forward in such numbers as would make that institution most useful. Here there was more interest manifested than elsewhere, and for that reason he thought the county of Kings was the best location for the college. Then in Kings County the institution might be self-sustaining. It might be a commercial nursery for the whole Province, and it would be of great advantage to the great fruit belt.

B. H. Dodge, M. P. P., said it would be unwise to defer the establishment of a college and wait for a Maritime Agricultural College. Rather let us go ahead and form the nucleus of what some day would be a great institution.

B. W. Chipman thought that the resolution would pass without any help from him. He believed thoroughly in the necessity of a good combined horticultural and agricultural school with a farm of several hundred acres attached. There should be one hundred acres of nursery. It should carry on extensive dairying, beef raising and other lines. We had in Nova Scotia the best local mar-

kets in the Dominion, and these amalgamated schools would do much to show how these markets could be filled.

M. G. DeWolfe did not think the farmers of Kings county deserved the college because the farmers were not sufficiently independent.

Ralph S. Eaton, Colonel S. Spurr and Peter Innes were appointed a committee to interview the Government and present this resolution.

Hon. Sydney A. Fisher thought that the crying need of the country was more agricultural education. There were very few technical agricultural schools, and agriculture needed knowledge as much as any other occupation. The era of manual labor alone had passed from our history in Eastern Canada. Farming cannot be learned by intuition but by hard study and work of both hands and brain.

In the countries which are our rivals a great deal of money is spent on agricultural education. He warmly praised the Guelph Agricultural College, and thought that the excellence of Ontario's products and live stock was largely due to the influence of this institution. A man should aim to go to school till the day of his death.

If you establish a school here, make it a good one; don't be afraid to spend money on it; and don't expect it to pay. So long as it was tried to make the Guelph school pay, the results as an educational institution were not satisfactory.

In regard to fruit growing, he wanted to say a word. He believed that the orchards here would want fertilizing, as well as those elsewhere. He was informed that a considerable amount of commercial fertilizers were used. He believed that this was not business; he believed that the fertilizer could be made upon the farm and made without costing one cent. He believed the people here to be intelligent and industrious. If, he said, you don't want work, don't farm. Just get right out and let in some one who will.

Dairying could be made to pay in Quebec and Ontario. The Nappan Farm dairy herd had paid, and paid well. He found that Halifax drew its beef supply from Ontario. Why could not this beef be raised here, and in making it make thousands of tons of

valuable manure for your orchards? He was glad indeed to know that a pork packing establishment was to be started in this province. Hog raising went naturally with dairying.

There was here a great opportunity for poultry raising. There was a great demand in England for both eggs and poultry meat. He thought the birds would do especially well in the orchards.

Poultry must however be properly fattened for export. In the experiments made by his department in preparing poultry for the English market, they bought birds weighing three pounds, and turned them off weighing six pounds.

In extending dairying he believed that butter making was the best branch.

The skim-milk was the best hog feed known. The bacon hog was a different animal from the old-fashioned mess pork hog. This hog must be fed in some way to give him the needed exercise. He must not have more than a half inch of fat upon him. You can make such a hog and have 50 per cent. profit upon him. The hog can be produced for about 3c. per lb. and sells from 4 1-4c. to 6c. per lb. when scientifically fed.

The breeds which have been most successful in the west have been the Tamworth, the small Yorkshire and the Improved English Berkshire.

EVENING SESSION.

Vice-President Innes occupied the chair.

The following resolution was placed before the meeting by W. E. Roscoe, seconded by Col. Spurr, and supported by J. E. Starr:

Whereas revolutionary changes have been made of recent years in every branch and detail of agricultural and horticultural industry, with the result that if we would hold our own against keen and world-wide competition, intensified by cheap and rapid transportation facilities, we must conduct our business in accordance with the best new and improved methods, and educate our young people who are to adopt farming as a profession, in those

scientific principles on which successful agricultural practice is based, just as doctors or engineers are educated in the sciences which underlie their professions; and,

Whereas the so-called Agricultural School at Truro, while probably serving a useful purpose as the science department of the Normal School, is inadequate to the needs of the country, and has failed of its purpose as an agricultural school; and

Whereas the Horticultural School at Wolfville, while doing good work as far as the circumstances will admit, is necessarily carried on under considerable disadvantages; and

Whereas the Provincial Model Farm is situated in a locality that does not admit of its being operated in all departments to advantage, and has failed of its purpose to afford practical and encouraging object lessons to our farmers and our farmers' sons; and

Whereas our present disconnected institutions are behind the age, and cannot do other than imperfect and unsatisfactory work, besides being carried on at an unnecessary waste of effort, time and money:

Therefore Resolved: That, in the opinion of this Association, it is expedient and necessary, both in the interests of agriculture and in the public interests, to forthwith establish a Provincial Agricultural College and Model Farm, efficiently equipped with all necessary accessories, for providing a combined scientific and technical agricultural education to our farmers' sons and others who propose to adopt farming as their profession and life-work; that the said college and farm should be located in Kings County, because from the conditions, circumstances and surroundings which obtain in that county a locality is presented where scientific study and practical work can be combined and prosecuted under the best possible conditions, and with the best possible prospects of success; and that a delegation be forthwith nominated to submit the views of the Association to the Government and Legislature, and to urge the importance of the subject, and the necessity for immediate, effective and patriotic action.

WEDNESDAY MORNING SESSION.

Secretary's Report.

Mr. President: Gentlemen:

Your secretary for the past six years begs leave to submit the following:

It is my pleasure to congratulate this association on a prosperous year in fruit growing. Although the apple crop was comparatively light yet the increased area yearly coming into bearing, together with improved methods of cultivation has given us more apples for export than in any one year of our history, except the abnormally large crop of 1896, and I think we are safe in asserting that the crop for 1898 will return more money to the growers than any other year in the history of fruit growing in Nova Scotia.

It is also a pleasure to congratulate this association on the status we are assuming among organizations of the day. Two years ago (1896) we were able to adjourn the Provincial Legislature for a day, and the Governor of Nova Scotia, and many of the Provincial Legislators came to this town to attend the sessions of our Association. This year we are even more highly honored in having present one of the Cabinet Ministers of Canada, the Hon. Sydney Fisher, Minister of Agriculture. These things I assert are according to us a position and influence that must be felt in increasing interest in the business which we are here to develop, and I am assured the Honorable Minister will thank us to speak plainly of our needs and we can be assured of his close attention to our interests. During the year ending Dec. 31, 1898, sixty persons paid the annual fee of \$1 and six paid \$5 and became life members of the Association.

The Annual Meeting was a large and successful gathering. The report of the Transactions lies here on the table.

The Horticultural School has had a very successful year. Prof. Sears proved to the satisfaction of the Executive Committee that they had done wisely in calling him to the charge of the institution. More than 50 pupils were registered and the full grant of \$2,000 was drawn from the Provincial Government. We

were also pleased to receive \$150 from the Government of New Brunswick, a pro rata amount for three students from New Brunswick, who were in daily attendance at the school.

Premier Emerson, in forwarding draft for the amount, spoke in terms of commendation of the school and said he was disappointed that more students from N. B. did not avail themselves of its advantages. A very pleasing feature of the year's work lies in the fact that the School of Horticulture, for the first time in its existence, lived within its income, in fact had some \$500 surplus to pay into the Association funds, reimbursing in part moneys that had been advanced for its support. Prof. Sears has proved himself not only a practical and scientific horticulturist, but something rare to find in these times, an economical administrator. I think this association is of the opinion that the time has come when agricultural education in this Province should be placed on a new basis, and instead of two schools poorly equipped and insufficiently manned, we shall soon see (let us hope) in the Annapolis Valley an Agricultural School that will be a credit to the Province of Nova Scotia, and of great advantage to the young men who may desire an agricultural training. We are still facing the problem of improved shipping facilities. The shipping problem has been in a more than usually unsatisfactory state, the buying of a competing line by the Furness Co. has put the shipper entirely at the mercy of the Furness Company, and they have used their power freely. The ships have been insufficient to carry away the apples as required. Carloads of apples were held over for weeks in Halifax and shippers suffered much loss in consequence. The small shipper is paying full rates and the local agents are reaping a rich harvest of 5 to 15 cents per barrel. Two years ago with the low prices this was severely felt, but in this year of good returns, no one seems disposed to do anything more than to grumble, as no effort has been made to float the Nova Scotia Shipping Company. The good seed sown by this Association in the east is bearing fruit, the Pictou County farmers have this year shipped apples to the London market, and P. E. Island has also experimented some in the same way.

The display of fruit shown at the Provincial Exhibition was quite up to the average. The showing of fruit at these exhibitions

is falling more into the hands of a few, who make a business of exhibiting, and efforts should be made to draw out more individual exhibitors, and in that way diversify the interest. The barrel question is still "in statu quo" and Nova Scotia is still handicapped in the Liverpool market, and in St. John's, Newfoundland, and indeed some of our local markets as well by the small, mean looking barrel used by too many of our fruit growers. It appears to me, Mr. President, we are at a crisis in the affairs of this society. We have come to a stage in the history of the Association, when orchard expansion can be left to take care of itself, and there remains to us the broader fields of scientific growing, shipping and marketing, or placing our apples on the market in the best condition and appearance. The time has now come when instead of spending two or three days annually in discussing these points and then leaving them for twelve months, some concentrated effort should be made to put these questions on a more secure basis. The prohibition act passed by the Dominion Government, shutting out foreign trees, has resulted in a greater impetus to nursery growing in Canada. Several small nurseries are doing some business in Nova Scotia, and there is a good opening in this Province for a very large increase in the growing of trees to supply our local demands.

There is a two-fold reason for this in the fact that the San Jose scale has secured quite a place in Ontario and trees from that Province are quite likely to be infested with the dreaded scale.

Report of the Council Board of the Nova Scotia School of Horticulture.

W. C. ARCHIBALD, *Chairman.*

To the Nova Scotia Fruit Growers' Association:

I have the honor to submit the 6th annual report of the Horticultural School and to refer to the work of the current year as perhaps the widest in its range of studies and most important in its history. Following is a tabulated statement of the students and class studies:

STUDENTS AT THE N. S. SCHOOL OF HORTICULTURE.

Class.	Total number enrolled.	From N. S.	From N. B.	From P. E. I.	Students of Acadia.	Entered, but dropped out.	Hours per week, Class-room.	Hours per week, Laboratory.
Beginning Botany..	16	16				2	3	
Advanced Botany...	20	17	1	2	16	4	3	2
Physiological Botany	7	5		2	6		2	2
Begin'g. Horticulture	10	10					2	2
Adv. Horticulture..	7	7			1	2	3	1
Scil Studies	12	11		1	1		2	
Totals	72	66	1	5	24	8	8	
Counted Twice	4	3		1	1			
Actual Totals	68	63	1	4	23	8		

A special class for boys between the ages of 11 and 13 years was formed at the beginning of this school year. Agriculture is given at the start its rightful place. We believe a living sympathy for the subject will be maintained and the boys will be trained to observe the things they see. The prejudice found existing at this early age, it is thought, will be more easily removed and the liking for rural pursuits take its place.

The winter schools afford a special opportunity for the practical study of the frame-work of the trees, and, in some respects their characters are more pronounced. The methods of their twig growth and branching essentially differ. The

steepled poplar and the horizontal branched oak are two extremes in shapes. The aspect of trees in winter as they stand in the view of the horizon is an interesting study in landscape. We think of trees much as we think of persons. They suggest thoughts and feelings restful or spirited. At this season of the year we get a different expression of them. Even the farmer is disposed now to consider the character of his trees, but it requires training to observe the minute differences between the varieties of plums or apples or the branches of the same tree. Boys of this age who are trained to think as they look on fine types of orchards in the vicinity of the school give wide opportunities to the teacher.

NATURE AND CHARACTER OF EXPERIMENTAL WORKS.

To enforce and illustrate the teaching of the class-room, where-ever possible, the operations described, such as grafting, are actually performed by the student and in studying the structure and growth of the plant the microscope is freely used to the end that the student may ascertain by actual observation the truth of what he learns from text books and lectures. (The value of the nursery stock sold during the year from the greenhouse and grounds is \$91.84.)

THE USEFULNESS OF GROUND AND PLANTS.

They furnish laboratory material for all classes in microscopic work, which is in itself of great importance. They illustrate many points thought out in teaching and seen as specimens in the discussion of landscape art.

Another and very important phase of the work of the school is the "spraying meetings" held in the orchards of interested growers. At these meetings Bordeaux mixture was prepared according to formula. The ingredients were weighed and mixed in the presence of the spectators, giving all present an opportunity to observe the details and ask questions. Samples of Paris Green were tested for purity and added to the mixture and the trees were sprayed. Eleven of these "spraying meetings" were held in Kings, Annapolis, Digby, Yarmouth and Lunenburg counties, and in every instance were largely attended and marked interest manifested. So encouraging and profitable have these

meetings been, it is now proposed to substantially enlarge the work the coming season. One month was given to lectures in the various counties of the Province. (During the year, \$200 was expended for microscopes and other apparatus for the school.)

The need of a larger institution is felt in a greater degree this year than heretofore and an adequate teaching force was never so strongly felt as now. On all sides young men on the farm are seeking more education, but they want agriculture as well as horticulture, and they cannot afford the time to obtain one line of instruction at one school and the other at another school. Furthermore it is folly to attempt to separate two subjects which are so intimately connected as are horticulture and agriculture. No man living can say what is horticultural instruction and what agricultural instruction for the very reason that many subjects are both horticultural and agricultural. That the horticultural school has done great good no one who is conversant with its history and work will attempt to deny, yet it cannot be expected that one man should offer a sufficiently extended course to cover all the lines in which the young farmer is seeking information. The work must be strengthened and extended and experimental lands secured.

Report of Delegates to the Nova Scotia Farmers' Association.

Truro, February 9-10, 1898.

Your delegates beg leave to report that they attended the third annual meeting of the Nova Scotia Farmers' Association, held at Truro on February 9th and 10th, 1898.

They consider this was the most important session yet held by that body, and the attendance was large; the farmers realizing the advantages of such a society.

The main object of your delegates was to watch the interests of your society; and to that end, the following resolution was moved and seconded by us:

Whereas, the Province of Ontario has deemed it expedient to ask for legislation regarding the importation into that province

of nursery stock and fruit, infested with that most dangerous and pernicious San Jose Scale; and

Whereas, the Nova Scotia Fruit Growers' Association has drawn up a bill asking our Local Legislature to pass an act to protect the interests of Nova Scotia Fruit Growers in respect to this Scale:

Resolved: That the Nova Scotia Farmers' Association now in session, endorse the action of the Fruit Growers' Association, and recommend that the Nova Scotia Government pass such legislation as will best guard this most important industry of our province.

The motion carried.

RALPH S. EATON,
M. G. DeWOLFE.

Fertilizers for Orchards.

FRANK T. SHUTT, M. A.,

Chemist of the Dominion Experimental Farm.

Mr. President, Ladies and Gentlemen:

The subject for our consideration this morning is the economical manuring or application of fertilizers to orchards. It appears to me at the present time that this is a question which is beset with certain difficulties, difficulties which are peculiar to the subject itself. It may be advisable in order to make clear what I have to say respecting this matter, that I should enumerate and somewhat explain these difficulties, for they are such that at present we can only give basis or fundamental principles with regard to the general requirements of fruit trees and indicate within certain limits the amount of plant food that may be economical to apply. These indications may serve as a guide to the individual, who must apply his intelligence (knowing the conditions of his soil as regards fertility), in judging of the amount and value of the fertilizing material that he can use.

The reasons for this are somewhat as follows: It has only been within recent years, comparatively speaking, that fruit growing has been taken up on a large scale in many districts, that is to say, as a commercial enterprise, and consequently there are very

few data regarding the manuring of orchards of an exact character that we can consult. In this connection, I would ask all those who manure or fertilize their orchards to keep a record of the amount, nature and date when applied, so that we may have exact data as to the effect of certain fertilizers on the different classes of soils for our future guidance. The first difficulty we meet with in a discussion of this question is this lack of experience as to results. Secondly, it would appear that many engaged in in the fruit growing business have had the impression that fruit trees grow naturally, i. e., without manuring, as forest trees grow. Now, the conditions in our orchards are quite different to those in the forest. It has been a mistaken notion, and one that has resulted in much apathy in this question of fertilization, to suppose that the orchard soil does not lose in fertility. Every year, soil plant food is not only taken away in the fruit and leaves of our orchard trees, but considerable quantities are also stored up—practically locked up—in the trunks and branches. In the forest the leaves decay and their plant food is returned to the soil, but in the orchard, there is an annual loss of plant food in the fruit and in the leaves.

An important feature in orchard soil is their mechanical condition; the growth and vigour of the tree depends largely upon good soil mixture. I am inclined to the belief that not only is the soil exhausted or partially exhausted by fruit trees (as it would be by any other crop), but that unless care is taken, its porosity or openness and its capacity for retaining moisture will be greatly reduced, owing chiefly to loss of humus. Humus or semi-decayed vegetable matter is a most important constituent for orchard soils, since without it they readily dry out. Probably many of us do not realize the very large amount of water necessary for tree growth and fruit production. Soil moisture does not rank second in importance to any element of plant food that we can apply.

The fertilizing of ordinary farm crops is somewhat different to that of orchards, for cereals and roots are annual crops; whereas, the orchard crop is a continuous one. The trees make the same demands upon the soil year after year, but with ordinary farm crops we can have a rotation, which tends to preserve an

even balance of fertility in the soil. We must remember, therefore, that the trees are making a draft upon the soil resources in certain lines, and they do this continuously. There are certain elements being withdrawn year after year which cannot be replaced in the orchard soil by rotation of crops. We must add them directly to the soil.

Further, the requirements of fruit trees are somewhat different to those of our annual field crops. The trees must grow a certain number of years before they can come into bearing. During this time, the draft upon the soil is continuous. Though there is no immediate return, the future productiveness of the tree depends very largely upon the vigour of its growth while it's young. The fertilizer, which we put in the soil today, may give its returns 2 or 3 or 5 years hence. Again, the growth of the tree continues throughout the whole season, whereas, many of our ordinary farm crops grow and mature in a few weeks. This points to the conclusion that plant food for orchards need not be in so soluble or available a condition as that for a rapidly maturing crop, such as cereals.

The manuring of an orchard, however, does not differ in any radical way from that of other farm crops, although we may have to consider the peculiarities of the grain crop, or the root crop, or any other. The elements of plant food required by all are the same, though they are not required by all in the same proportions.

Now, perhaps, you will pardon me if I refer briefly to a few fundamental truths. The first thing, it seems to me, is to realize, and not to know in a mere abstract way, that plants are living things. They have not got locomotion like animals, but they have a life which is in a sense analagous to animal life. They increase in size and reproduce by virtue of the food they absorb. Without food, plants, like animals, could not live and increase and reproduce. Abundance of plant food of the right character means abundance of fruit. We may next enquire what is the nature of their food and where do they get that food from? When we have answered these two questions we are in a position to apply the knowledge towards an economical method in the feeding of our farm crops. Whence do plants obtain their food? Partly from

the air; partly from the soil. That from the air, through their leaves; that from the soil, through their roots. That from the air must be taken in in the form of gas; that from the soil must be taken in in the form of a dilute solution. It is really from the air that our plants derive the greater part of their sustenance; it is only a comparatively small part they draw from the soil. The gas which plants—including, of course, all crops—obtain from the atmosphere, is furnished by nature in abundance. It is known as carbonic acid gas. It exists to the extent only, of 1 part in 10,000 in the air; yet this quantity is quite sufficient for the requirements of all plants and trees. The case is different, however, in regard to soil plant food; such must be returned by man when he removes the crop or portion of the crop; otherwise the soil loses in fertility. I have already said that the food absorbed by roots must be in the form of a solution. That teaches us that plants cannot make use of solid or insoluble food. The question of the solubility or availability of plant food is a most important one in connection with the economical manuring of our soils.

There are some ten elements which plants take in larger or smaller quantities from the soil, but it has been found necessary to replace of these, four only. Not that the others are non-essential to the life of the plant, but the fact that they are absorbed in very small quantities from the soil by the plant, and that the soil usually contains such an abundant supply of them, they need not be considered as necessary to be replaced. The four important elements that I have referred to, and which plants derive from the soil, are these: nitrogen, phosphoric acid, potash, and lime. It is not always necessary that lime should be applied. There are many soils, especially those from limestone rocks, which are well supplied with lime. The first three of those elements I have named are known as essentials, because they are those of which the soils are first depleted or exhausted by cultivation.

Lime is not so necessary for apple and pear trees, as it is for the stone fruits, but it is nevertheless a valuable constituent for the orchard soil, for trees grown upon limestone soil are found to be sturdy, strong stock, and to have a vigorous growth. Lime acts in two ways, mechanically and chemically. It serves directly

in furnishing nourishment for the growth of the tree, it serves indirectly in the liberation of locked-up plant food, more especially of the potash. It does most useful work in improving the texture of both heavy clay and light soils. It is usually, however, on the former that it is especially needed.

Nitrogen is an essential for plant life. Its function more particularly is to encourage leaf growth. Leaves are very necessary to the well being of the tree, as they serve the purpose both of mouth and stomach. The fruit also contains a certain amount of nitrogen. It is chiefly needed, however, for the development of the leaf, without which a good crop of well-formed apples is not obtainable. Trees, in common with all plants, take their nitrogen from the soil in the form of nitrates—compounds formed by various influences and under certain conditions from the nitrogenous organic (vegetable) matter in the soil. The process is known as nitrification, and is brought about by the agency of minute organisms (always present in the soil) when the soil is in good tilth, warm and moist.

Phosphoric acid is contained in the mineral part (ash) of the woody tissue in wood and leaves, as well as in the fruits and seeds. It is not only necessary for growth, but seems to have a special value in the maturation or ripening both of the wood and fruit.

Potash: This, of all the mineral constituents, is the most important for fruit trees, both large and small. The well-being of the tree largely depends upon an abundant supply of soil potash in an available condition. It forms by far the greater portion of the "ash" of the wood and leaves, and approximately one-half of that of the fruit.

Before we consider the question of special fertilizers, I wish to emphasize the importance of previous culture and fertilization of the land. It is of the very greatest importance to have the soil in good condition before the trees are set out. In such a soil the young trees get a good start. The soil should be fairly rich in vegetable matter, well drained, open and mellow. Preparatory culture of the soil is half the battle. It pays well to thoroughly manure preceding crops and to give the soil the best of tillage. In good soil the trees receive a benefit during the first five years that may be seen long after they have come into bearing.

I would impress upon you that there should be an abundance of plant food over and above the immediate wants of the trees. This has been agreed upon by all those who have given this matter thought and study. Such is repaid both in the quantity and quality of the fruit harvested. The best looking and the best flavoured apples are always from well nourished trees.

Some have asked me whether it is better to apply barnyard manure, or commercial fertilizers. It does not seem to me one can answer such a question in a word or two, since the materials differ so widely in their nature and value. There are cases where barnyard manure may be all that the soil requires. There are many instances, undoubtedly, in which we can advantageously use it for orchard soils. There are also soils upon which it would be wise to apply in addition, ground bone, superphosphate, or some form of potash, as the case may be. I can only lay down certain fundamental principles with regard to the application of fertilizers; the previous history of the soil must be known before we can prescribe for the individual case. I may illustrate my meaning, as follows: The doctor must consider and study his patient. There may be a general treatment for typhoid fever, yet that treatment must be modified with each particular patient. One patient may have a weak heart, and on that account the treatment will have to be modified; and so on. A man must read and learn, and then use his own intelligence and observation in orcharding, as well as in the practice of medicine. Not only must the plants' requirements be known, but the nature of various fertilizers and fertilizing materials understood. Thus, for example, nitrogen is needed for orchard trees, but it is not economical to supply this nitrogen as nitrate of soda. We can supply nitrogen in a very much cheaper way, and in a more lasting form. An application of barnyard manure or an occasional crop of clover turned under will furnish nitrogen and humus both effectively and cheaply. The excessive use of fertilizers containing available nitrogen is to be avoided, for such would tend to extend the vegetative growth too long into the autumn, retarding the ripening of the wood and fruit.

Bone meal is an excellent source of phosphoric acid and nitrogen for orchard soils. It contains from 20 per cent. to

25 per cent. phosphoric acid and 3 per cent. to 5 per cent. of nitrogen. By its decay in the soil its plant food is liberated slowly in forms that can be utilized by growing trees. It gives its best results on moist, warm, open soils.

Superphosphate, i. e., plain or acid superphosphate, contains in the neighbourhood of 15 per cent. to 17 per cent. of phosphoric acid, the greater part of which should be immediately soluble and available. It is sometimes used in conjunction with bone meal for orchard soils as an immediate source of phosphoric acid. The term superphosphate is frequently, but erroneously, used as a general term to comprise all classes of fertilizers. It should be restricted to the material I am now speaking of, and which does not contain either nitrogen or potash.

Potash: There are several sources of potash available to the farmer and orchardist. First, I would speak of unleached wood-ashes. An average sample should contain 5 per cent. to 6 per cent. of potash, and about 2 per cent. of phosphoric acid in addition to, approximately, 30 per cent. of lime. Their potash is present in a most desirable form for crops generally, and there is no more useful fertilizers for fruit trees, both large and small.

Secondly, there is a large class of potash compounds imported from Germany. Of these, I may first mention muriate of potash, containing about 50 per cent. actual potash. This is largely employed in agriculture, and is frequently the cheapest form of potash purchasable by the fruit grower. It is not, however, a desirable form, according to some authorities, for potatoes, sugar beets and tobacco.

Sulphate of potash contains usually about 52 per cent. actual potash. There are, however, several grades, and it should be bought on analysis. The market price of the sulphate generally makes its potash a little dearer than that in the muriate.

Kainit: This is an impure chloride (muriate) of potash. Good samples contain from 12 per cent. to 14 per cent. actual potash. It may be used to advantage on all crops for which the muriate is advised.

In buying fertilizers, the purchaser should calculate the relative price per lb. of the several constituents from the quotations he receives and the analysis of the materials submitted by the

vendor. By so doing, the orchardist will be able to determine the cheapest form in which to purchase his plant food.

The two following formulæ are recommended by an eminent authority, Professor Voorhees, of the New Jersey Experiment Station, for orchards:

No. 1—Bone meal, 100 lb; Superphosphate, 100 lb; Muriate of potash, 100 lb. Application, from 400 lb to 1,000 lb per acre.

No. 2—Bone meal, 150 lb; Muriate of Potash, 100 lb. Application, same as No. 1.

For berries and small fruits, apply, in addition to the above, 100 to 150 lb nitrate of soda, in the early part of the season.

We may now consider for a moment or two the value of clover in the orchard. By reference to the reports of the past three years of the Experimental Farms, you will find that we have estimated the amount of humus and nitrogen that can be furnished by growing and ploughing under a growing crop of clover. In the foliage and roots of such a crop we have from 75 to 130 lb of nitrogen per acre, besides a very large amount (varying from 7 to 14 tons) of green material, which would on decaying, go to form a considerable amount of humus. It will be seen, therefore, by this means—a very cheap one, for it is only the cost of 8 to 10 lb of clover seed per acre—we can enrich our soil in that costly element, nitrogen, and at the same time vastly improve its texture. I think it would be an excellent practice to grow and plough under such a crop in the orchard every third or fourth year.

C. F. Starr—What proportion of wood-ashes would you put per acre?

Prof. Shutt.—Of good wood-ashes, I should say 40 to 60 bushels per acre would be a very good dressing every 3rd or 4th year.

C. R. Starr.—In the event of our using bone meal and superphosphate, instead of supplying chemical potash, could we use wood-ashes, supplementing it with a certain amount of kainit?

Prof. Shutt.—Yes, I think there is no form of potash ahead of wood-ashes. Good wood-ashes will contain from 5 1-2 per cent. to 6 per cent. of potash and 2 per cent. of phosphoric acid. We may say that the potash is available and in excellent form to

furnish food for our crops. It is not the same with phosphoric acid in wood-ashes. It is not quite so available as phosphoric acid in superphosphate. I would advise you to supplement the 40 or 50 bushels of wood-ashes, which I think would be a fair average—you might go up to 80 or 100 bushels if the soil were poor—with a 100 lb or so of superphosphate. I think it is better, on general principles, to fertilize more frequently with smaller dressings, than larger applications at longer intervals. To put on a little often, rather than a large amount at longer intervals, would appear to give the best results. I think 40 or 50 bushels every 2 or 3 years would be quite sufficient for most soils.

S. C. Parker.—In speaking of wood-ashes as commercially used—we buy them by the ton—what would be the weight per bushel?

Prof. Shutt.—I suppose a bushel of ashes would weigh from 40 to 50 lb, so that 40 bushels would be a ton. As I have said, they should average from 5 per cent. to 6 per cent. of potash. The law with regard to fertilizers is that when sold above \$10 per ton the purchaser has a right to demand a copy of the analysis. It is against the law to sell fertilizers above this price without having them first analysed by the Inland Revenue Department.

Question.—What is the commercial value of real good hard wood ashes?

Prof. Shutt.—They can be bought for ten cents per bushel in many parts of Western Ontario; the Massachusetts men readily pay 25 cents per bushel for Canadian wood-ashes.

Geo. Thompson.—Muriate of potash is worth \$33 a ton here.

Prof. Shutt.—That would, therefore, be a very cheap source of potash, probably the cheapest you could obtain in Nova Scotia.

Mr. Johnson.—What brands of superphosphate would you recommend?

Prof. Shutt.—If by that you mean a plain superphosphate, containing phosphoric acid only, I should advise you to consider its price in conjunction with its guaranteed percentage of soluble phosphoric acid. The plain superphosphate usually will contain from 15 per cent to 17 per cent of soluble phosphoric acid.

S. C. Parker.—What is acid phosphate?

Prof. Shutt.—That is the same thing as superphosphate.

S. C. Parker.—What is rock phosphate?

Prof. Shutt.—It is a material mined or dug up in South Carolina or Florida and ground very very fine, but not treated with acid, consequently its phosphoric acid is not so soluble or so valuable per lb., as that in superphosphate. Perhaps its phosphoric acid is not worth more than 2 cents per lb. to the farmer, as it only slowly becomes available in the soil.

Question.—Is apatite used?

Prof. Shutt.—It is used for the manufacture of superphosphate, being converted by oil of vitriol into superphosphate, and a very good brand of superphosphate it makes. That made from bones, however, contains a certain amount of nitrogen and consequently has an additional value on that account.

C. R. Starr.—What about slag?

Prof. Shutt.—Basic or Thomas slag is coming into prominence in Canada. Its phosphoric acid, while not immediately available becomes slowly soluble in the soil. It does not contain nitrogen or potash. It is a waste product in the manufacture of Bessemer steel and is largely a phosphate of lime, together with free lime. It gives the best results on sour soils, soils rich in vegetable matter, and those deficient in lime.

Dr. Kendall, (Sydney) said that he thought it was not due so much to the phosphoric acid as to the ordinary effect of lime on soils.

Prof. Shutt.—Probably its effects are due to both elements. They have had excellent results in Germany with slag on peaty soils, applying it at the rate of 500 lbs. per acre. I think it might be profitable on soils rich in iron, or soils red and sandy.

Question.—What do you consider the best fertilizer for young trees?

Prof. Shutt.—Young trees require more especially nitrogen, but also phosphoric acid and potash, older trees require more particularly potash and phosphoric acid.

Mr. Bishop.—What proportion of the constituents would you advise for a young orchard?

Prof. Shutt.—A fertilizer containing 3 per cent of nitrogen, 8 per cent of potash, and 6 per cent of phosphoric acid should give good results. I would also refer the enquirer to the formulae already given. If you were to sow your clover in July and

turn it under when it has made a good growth the following May you would be able to furnish the soil with as much nitrogen as if you added 10 to 15 tons of barnyard manure. For young trees in poor soils, 100 lbs. of nitrate of soda to the acre might be advisable. It might be applied in two dressings during the growing season.

Question.—Is it necessary to use anything besides barnyard manure?

Prof. Shutt.—Yes, in most instances for fruit crops you want to supplement it by some form of potash. I think you can fertilize to good advantage using barnyard manure and wood-ashes. The wood-ashes supplying the potash and phosphoric acid, and the barnyard manure the nitrogen and organic matter.

Geo. Thompson.—Can you tell us with respect to the fertilizing power of salt?

Prof. Shutt.—It is not a constituent of plant food, but is frequently a useful indirect fertilizer, since it tends to liberate lime and potash in the soil. It seems to give best results for root crops and cereals, but I very much doubt the economy of using it generally.

WEDNESDAY AFTERNÖON SESSION.

The Orchard and How to Obtain the Best Results from It, and Horticulture at the Central Experimental Farm, Ottawa.

W. T. MACCUN, Horticulturist.

Central Experimental Farm, Ottawa.

Mr. Chairman, Ladies and Gentlemen.—This is the first opportunity I have had of appearing before the Nova Scotia Fruit Growers' Association. My work at the Experimental Farm, until recently, was of such a nature that I did not leave there often; but when your old friend, Prof. Craig, resigned his position, I was promoted to take his place, and now I find it necessary, in order to keep in touch with the farmers and fruit growers throughout the country, to visit the different sections and learn the con-

ditions which obtain there, become acquainted with the men, and perhaps, through talks such as this, give and get some information. There are two subjects which I especially desire to bring before you this evening. One is that on which I am advertised to speak, namely, "The Orchard and How to Obtain the Best Results from It;" the other is "Horticulture at the Central Experimental Farm."

Ever since the Experimental Farms were established, 11 years ago, horticulture has been one of the most important branches of work carried on at the Central Farm. At that place there are about 40 acres devoted to the growing of fruits and vegetables. On these 40 acres, there are being tested a large number of varieties, and I shall now speak of the different classes, individually, and discuss some of the experiments carried on with them.

APPLES.

There are at present, at the Experimental Farm, 653 varieties of apples. These have been gradually brought together from several countries, and information regarding their hardiness, productiveness, and freedom from disease is being obtained as the trees develop. This year a permanent book was opened in which the yield from every tree in the orchard, when it comes into bearing, will be entered annually. As the trees and rows are numbered it is only necessary to open the book at the place where the yields of the desired tree are recorded to ascertain whether that tree is a heavy or light bearer, whether it has produced good fruit and other data regarding it. This information will be published from time to time in the annual reports. Experiments are being carried on to determine the best means of preventing diseases of apples, to determine the advantages or disadvantages of the various methods of grafting, etc. The Russian apples are being thoroughly tested, but perhaps you are not as much interested in them here as we are at Ottawa. There are more than 200 supposed varieties being tried, but out of this number there are only about 4 or 5 which can compare with the best apples grown in this province or in Ontario. A few of them may be a little harder than other kinds and may be planted where better varieties will not succeed.

PLUMS.

There are 130 varieties of plums being tested at the Experimental Farm, but as our winters are very severe there are few of the Domestic or European class among them; but the improved American sorts are, many of them, very desirable for Eastern Ontario and the Province of Quebec, and should prove valuable to those who live in some parts of this province, and in parts of New Brunswick. These plums make excellent preserves and, on the whole, are quite profitable where the European varieties do not succeed well. The results obtained in testing the different kinds are published in the annual reports.

PEARS.

A limited number of pears are also being tested, but it has been found that the better kinds do not succeed well at Ottawa. A few of the Russian sorts are quite hardy, but the fruit is of inferior quality.

CHERRIES.

About 50 varieties of cherries are being tested. Three years ago, there was a very severe winter, which did great injury to the cherry orchard. Nearly two acres were destroyed at that time, the trees being killed at the roots. It was found that this root-killing was, in a large measure, due to the fact that the trees were grafted on European stock, which has been found unsatisfactory at the Experimental Farm. In 1891, Prof. Craig began experiments in budding on the native pin or cherry bird (*Prunus Pennsylvanica*), and the trees thus propagated are doing well and produced very profitable crops last year.

Q. Ralph Eaton.—Have any cherries shown signs of weakness where the budding was done? I know of cases where the new wood has broken away from the wild stock. Is there a lack of affinity between the two?

Mr. Macoun. I find the union is perfect in trees that have been budded for seven or eight years at the Experimental Farm. The union may not last for many years, but it will last long enough for the trees to produce profitable crops.

Ralph Eaton.—How many native varieties have you used for grafting?

Mr. Macoun.—We have only used the Bird or Pin cherry, *Prunus Pennsylvanica*.

Ralph Eaton.—How do you distinguish them ?

Mr. Macoun.—The Pin cherry is a small bright red cherry. The Choke cherry is somewhat larger and is astringent; then there is the Black cherry.

Ralph Eaton.—Is the stock of the Choke cherry more dwarfish than the other?

Mr. Macoun.—Yes, the Pin cherry is a small tree, and the Black cherry a large one. The cherry I speak of is a small bright red sort and is acid without being astringent. The Choke cherry and the Black cherry cannot be mistaken, as the Black cherry grows on a large tree.

Ralph Eaton.—Can you tell us whether the Pin cherry has a short life?

Mr. Macoun.—I do not know what age it attains, but should not think it to be a long-lived tree.

Ralph Eaton.—We have acres in the Valley of burnt lands growing up with wild cherry, and yet 10 or 12 years ago, we did not see them.

Mr. Macoun.—Are they affected with the black knot?

Ralph Eaton.—Yes, but that does not kill them to any extent.

Mr. Macoun.—I should say that they would live 25 years at the most and that is long enough to make a cherry profitable.

Ralph Eaton.—Assuming a cherry tree had a short life, would that have any effect on the tree which was grafted?

Mr. Macoun.—It would certainly. The cherry trees at the Farm budded on the Bird cherry are still, however, among the most vigorous that we have there.

Q. A voice.—Are they easily grafted?

Mr. Macoun.—The scions take well on this stock. Last spring we did considerable crown grafting on the bird cherry and some grafts made almost six feet of growth during the summer. The stock used was about the size of one's middle finger. The trees propagated in 1891 were budded.

Ralph Eaton.—Do you insert four or five buds?

Mr. Macoun.—No, only one bud, and this is inserted in the stock, near the ground when it is in the nursery row.

Ralph Eaton.—Have you ever experimented in grafting the cherry on the plum stock?

Mr. Macoun.—No. There have been experiments made at the Experimental Farm in grafting the Sand cherry (*Prunus pumila*) on the plum, but the Sand cherry has no value in the Annapolis Valley. In Manitoba and Northern Ontario it is used considerably, however. The results of the grafting are that in some cases the union was good and in other cases it was not.

Ralph Eaton.—Have you tried grafting plum on the cherry?

Mr. Macoun.—This has not been tried to my knowledge. Has anyone here tried grafting the apple on the Hawthorn? And if so, with what results?

C. R. H. Starr.—It has been done here. Pears on Hawthorn. Pears will grow successfully for a few year, top grafted.

Mr. Macoun.—With us, the Hawthorn is a slow growing tree.

S. C. Parker.—I have seen a union made by the pear, with the Hawthorn in a hedge 10 feet high.

GRAPES.

A large number of varieties of grapes are also being tested at the Experimental Farm, there being 169 varieties in all. I do not know whether you can ripen many varieties of grapes in the Annapolis Valley. There were 130 varieties which ripened at Ottawa last year. In my report, a list of twenty-five of the earliest is being published, in the hope that it will prove useful in those parts of Canada, where few varieties will ripen. These can be obtained from any of the reliable nurserymen in Ontario.

Mr. DeWolf.—Is it possible to get any grape in Canada lacking that peculiar flavour?

Mr. Macoun.—Yes, we have a few at the Experimental Farm, but most of them are too late. One called the Kensington, a white variety, which was originated by Dr. Saunders, by crossing an American with a European variety does well. It is rather late for the Ottawa district, but where it can be grown to perfection should prove a good variety for the English market. The Delaware is another grape without the peculiar flavor referred to, but it is too small.

SMALL FRUITS.

Experiments are also being conducted with currants, raspberries, and strawberries; of the latter, 290 varieties were tested last year.

TOBACCO.

Thirty-five varieties of tobacco were grown at the Farm in 1898. Tobacco should, I think, be grown on every farm where it will succeed. It is one of the cheapest and best insecticides you could have. Tobacco is not hard to grow and is easily handled in making an insecticide.

Ralph Eaton.—In what lines do you use it as an insecticide, practically speaking?

Mr. Macoun.—For killing the Aphis.

Ralph Eaton.—Is that more practical than Kerosene Emulsion?

Mr. Macoun.—Yes, I used it extensively in 1898, and Prof. Craig, in 1897.

Ralph Eaton.—And ordinary tobacco? A. Yes.

Mr. Macoun.—Used in that way it is as serviceable as the Kerosene Emulsion.

Ralph Eaton.—What kind of tobacco—Black Jack?

Mr. Macoun.—We use the kind grown on the farm. We use about ten pounds to a barrel of water, steeping it first in hot water. We give the plum trees three applications on successive days, if possible, or at very short intervals.

Ralph Eaton.—What sized barrel do you use?

Mr. Macoun.—40 gallon barrel.

Mr. Macoun.—A mistake is made in using the Bordeaux Mixture, Kerosene Emulsion and tobacco. People sometimes spray and expect that one application is enough. The Aphis multiply enormously. If you spray today, and leave the trees for a week you will probably find them as bad, or worse. The idea is to give them three dressings, one right after the other—in three successive days if you can, before they multiply—that is my conclusion from the results we got this year. I like tobacco water; it is easy to handle. In the year 1897 our orchards were badly affected with the Aphis. Prof. Craig tried some very extensive experiments that year with several insecticides, but it was very difficult

to check the Aphis that year. He found that tobacco water mixed with whale oil soap was one of the best things he tried.

Ralph Eaton.—Does it injure the foliage?

Not in our orchard.

Ralph Eaton.—You think it is perfectly safe to try in a proportion of 10 to 40?

Mr. Macoun.—Yes. I add 2 lbs. of whale oil soap with 10 lbs. of tobacco stalks in order to make it stick better; but I think if you use soft soap it will answer the same purpose.

Geo. Thompson.—Is it better to steep it in hot or cold water?

Mr. Macoun.—We steep it in hot water.

W. C. Archibald.—What methods would you suggest for improving the varieties of fruit—from scion or bud—how shall we make a selection?

Mr. Macoun.—I think you can to a certain extent change the character of the future tree by buds which are well developed.

W. C. Archibald.—Some trees have a wood producing habit and others a fruit producing character. How are we to discriminate and improve the varieties. We know in the animal world the best is propagated and the stock is improved. Does not the same law apply to the fruit world?

Mr. Macoun.—As I said before, I have no doubt whatever, that by proper selections of scions you can improve the growth of the tree. There is variation in buds as there is variation in other things.

Q. A voice.—How are crosses produced?

Mr. Macoun.—For example. If you desire to cross the Northern Spy with the Ribston Pippin, making the latter the female parent; open the flowers of the Ribston Pippin while they are in bud and rip off, with a pair of forceps, the anthers or male organs; then take the pollen from the flowers of the Northern Spy and dust it on the stigmas, parts of the female organs, of the flowers of the Ribston Pippin; now tie a paper bag over the flowers operated on to keep out insects. When the fruit is set, change the paper bag for a gauze one to admit sun and air. The seeds from the fruit thus obtained, if planted, should produce trees and fruit whose characteristics would partake, in a greater or less degree, of the Northern Spv and Ribston Pippin.

THE ORNAMENTAL IN HORTICULTURE.

Considerable work has been done at the Central Experimental Farm, under the direction of Dr. Wm. Saunders, the Director, in respect to the ornamental side of horticulture.

In the Arboretum and botanic garden also there are about 2,700 species and varieties of trees and shrubs, and about 1,200 of perennial flowers. Notes on some of these are published yearly; and it is hoped that they will prove of much value to those who desire to ornament their home grounds, and to increase their knowledge of trees, shrubs, and flowers.

HOW TO GET THE BEST ORCHARD RESULTS.

As the different branches of work in connection with the orchard have been taken up so thoroughly by others who have already spoken, I shall but touch on each very briefly, and reply to any questions, if in my power to do so. In successful fruit growing, as in everything else, the most important factor, in my judgment, is the man. Not every man will make a successful orchardist. Nowadays a great many go into fruit growing, thinking they will make an easy living by it, but they soon learn by hard experience that there is competition in fruit growing as in anything else; and if he is not an enthusiast, and does not carry on the work properly, he is very likely to fail.

SITE.

With regard to the best site for an orchard, I may say that I do not know what is considered the best site in the Annapolis Valley; but in Ontario and Quebec, we find that it is best to have an orchard on a northern slope. We have very strong, drying winds during the months of March and April, and frequently the trees get badly sun-scalded. By having them on a northern slope they are more protected from these winds, and are less liable to be affected by changes of temperature.

SOIL.

The soil should be of good quality—clay loam being probably the best—and thoroughly drained. It is impossible to raise good trees unless the soil is well drained. Then the land should be in good condition before planting. The first few years that a tree

is in the orchard, it should have the most careful attention. The larger your tree is when it comes into bearing—all other things being equal—the more profitable it will be.

VARIETIES.

It is when one desires to know what are the best varieties to plant that the value of a local fruit station comes in. It seems to me, it is very important that you should have such a station in the Annapolis Valley. Your conditions are so different from those in any other part of the country, that what work we can do at the Experimental Farm at Ottawa, or at Nappan, in the way of testing varieties, cannot be of very much service to you. I would advise you, if possible, to procure trees in all cases from local nurserymen—if they are reliable. Nurserymen in other provinces do not know your conditions here so well as those living in this valley. Varieties should be planted that command the highest prices on the English market. Shipping qualities and high colour are two of the most important points in apples sent to England. Where these are combined with a good dessert fruit, it is so much the better.

W. C. Archibald said he was strongly of the opinion that the Government should start a nursery to experiment in a scientific manner, in this valley.

CULTIVATION.

After a proper soil has been chosen, and the trees planted from 30 to 40 feet apart each way; the surface soil should be kept cultivated during the growing season, because, in this way only, can you get the trees to make satisfactory growth when young. At the Experimental Farm we are adopting the plan of ploughing under a cover crop nearly every year. We sow Mammoth Red Clover in July at the rate of 12 lbs. per acre; by autumn it has grown sufficiently to form a good covering, and protects the roots of the trees during the winter. During the following spring it is ploughed under, and the soil is kept cultivated until about the 15th of July, when it is re-seeded with clover. We never recommend ploughing an orchard in Ontario in the autumn, as, if this is done, the roots—especially if the orchard has been in sod—would probably suffer severely, and in some cases the trees would

be killed outright. I believe in the Annapolis Valley, fall ploughing is practised with good results. Not so in the colder parts of Ontario and the province of Quebec.

Geo. Thompson said, by putting clover on in the winter, the trees would be injured by mice.

Mr. Macoun said that the trees could be protected by paper.

Rev. Mr. Axford.—Can you use too much barnyard manure on an orchard?

Mr. Macoun.—Yes.

Q.—If the trees are 60 years old? I doubt if you could hurt them with manure when they are that old.

Q.—I have put it on at that age, and the trees made too much growth.

A.—You must have always kept your orchard in good condition.

Q.—Do you think stable manure is as valuable a manure as we can use?

A.—Yes. Clover, however, is the cheapest way in which you can supply nitrogen; and by the addition of superphosphate and wood ashes or muriate of potash, you can get the other necessary plant food. Wood ashes, or muriate of potash, in addition to barnyard manure, is usually necessary when the trees are in full bearing.

Q.—(A voice).—In ploughing in bone meal and muriate of potash, would you put it on and plough it in?

A.—I would plough the land first and then harrow the fertilizer in.

SPRAYING.

You all, I presume, know the importance of spraying, because it is generally practised in this valley. There is no doubt that fruit cannot be grown successfully without spraying. There are so many enemies both insect and fungous, to fight, that it is absolutely necessary to spray to get good fruit. I saw a good object lesson in Montreal not long ago, where a man who had sprayed, got 1,500 barrels of marketable apples off his orchard; while his neighbor, who had a good orchard, but did not spray, got scarcely a barrel of saleable fruit. There are many other instances of this kind.

Prof. Sears.—With respect to grapes; have you tested Rogers' hybrid varieties?

Mr. Macoun.—Yes, we have tested a large number of them. Herbert Rogers' 17, Lindley, and Agawam are among the best. The two former are early.

Ralph Eaton.—Which way do you gauge the Bordeaux mixture, by weight, 4 and 4 each, or do you use the ferro-cyanide of potassium test?

Mr. Macoun.—Our method usually is to weigh out the proper quantities of copper sulphate and lime, and this is done very carefully. It is safer, however, especially for the average person, to use the ferro-cyanide of potassium test.

Ralph Eaton.—Don't you find a great difference in lime, in neutralizing the effect of blue vitriol?

Mr. Macoun.—Yes, a marked difference; and that is why it is safer to test the mixture before using it.

Ralph Eaton.—The lime being unequal in quality? A. Yes.

Prof. Sears.—Have you undertaken any experiments where an excess of lime is a detriment? A. No.

Rev. Mr. Axford.—Would you recommend the new insecticides advertised, which are used dry, in place of Paris green?

Mr. Macoun.—Paris green has proved the most satisfactory so far.

Rev. Mr. Axford.—The difficulty is to keep the Paris green in suspension?

A.—Yes, the water has to be stirred frequently.

Value of Irrigation.

HENRY SHAW.

There are a great many things we know and a great many things we do not, and many we never will; but we do know that if there was no water, vegetation could not exist, and also, if there was too much water neither could it exist.

Now it is the right conditions we are seeking for. The essential thing is the proper amount of water to make our lands productive. We drain our wet land to get rid of a superabundance of water. For our dry lands, we depend on rain, manures and

cultivation to make our crops grow; and when the rain ceases coming for some time a drought comes on. How quickly vegetation shows it first. The sandy pastures dry up, the cows drop off in their supply of milk, the oat crop heads out very short, and the leaves turn yellow, the hay stops growing and becomes very light; the strawberries dry up; the leaves of our fruit trees curl up and lose their glossy appearance; the apples will color and ripen prematurely and fall off the trees before they are full grown; and everybody will be looking and wishing for rain, even though the wind be Northwest.

Luther Wilcox, Colorado, a gentleman who has had 20 years' experience, has written a nice book on Irrigation. He calls it the "Wedding of Rain and Sunshine." He tells us that 70 per cent. of the food grown for the human families is raised by Irrigation. This statement may appear singular to us living in a country where irrigation is never practised and seldom required except on sandy land, having a loose porous sub-soil. But he refers us to China with her immense population, having the best and most extensive Irrigation works in the world. To India, where immense sums of money are being yearly expended to water the dried plains of that drought stricken country; to ward off the dreadful famines that come so often to Egypt, Spain and the Barbary states. He also tells us that, in the western part of the United States there is over one billion of dollars invested, and one hundred million of acres of now worthless lands, that can be made productive, and which will support fifty million of a population. If we turn up the report of the Department of the Interior of our country for the year 1895, we will be surprised at the interest there was constructed three hundred miles of Irrigation Canals and ditches at a cost of one hundred and ten thousand dollars—capable of irrigating one hundred and forty thousand acres: And taken in the great Northwest in Irrigation. It tells us that there is eighty thousand square miles, or fifty millions of acres of now worthless lands that can be made productive, and that in 1895 the government have a staff of Engineers taking measurements and laying out lands and getting ready for the settlers, so we see that irrigation has become a live question with us. Wilcox also tells us that soil requires 70 per cent. of its bulk of water

to make it productive, and to keep that amount of moisture in the soil it wants two inches of rain per week, during the growing season, and sandy lands will require much more. We know that lands having a retentive sub-soil that will hold the water that comes from the spring rains and melting snow, will withstand quite a severe drought if kept well cultivated: But with sandy lands, having a porous sub-soil, it is very different. In it the water goes both ways—up and down.

I am very fond of trying experiments. Last summer I dug a hole one foot deep and filled it with water, and in six minutes it settled all down in the sub-soil. I repeated this experiment five times and every time the water settled away as quickly as it did the first time. So we see, that kind of soil cannot hold water and when there comes a drought the surface thereof becomes very dry.

The roots of our apple trees never come within 5 or 6 inches of the surface, for the plough keeps them cut off, and if there comes a rain it will only sink in one or two inches, and the first fine windy day that comes it will dry up and never reach the roots. So we see that an ordinary rain in a dry time will do no good to our apple crops on sandy lands.

I hope it will be interesting to you if I tell you some of my experience.

You all remember the season of 1895—how dry it was. I kept the harrow going in my plum orchard twice a week from the middle of May till the middle of July. About the first of August I noticed the plums shrinking up and falling off by the bushel. I hauled four hundred barrels of water, which was about three barrels to a tree. It acted like magic. The plums stopped dropping off and grew to a full size. The leaves became bright and glossy and the result was that I had a good crop. The Astrachan apples were going the same way. As an experiment I put twelve barrels of water around one Astrachan tree and the result was a fine crop. A good portion were number one apple, while the un-irrigated trees dropped a large part of their fruit, and what stayed on were mostly No. 2's. During the spring of 1896 I put up an aermotor wind-mill that would raise one hundred and twenty barrels of water per hour, in a whole soil breeze. We had plenty

of rain these last three summers for ordinary lands, but my land being sandy, I was obliged to keep the pump going and put on tens of thousands of barrels of water. Where I put the most water, I had in succession, three good crops of apples and plums, and to all appearances the trees are budded for a full crop next year.

I am inclined to believe that, if we supply our trees with the right kind of manure, and in sufficient quantities with plenty of water to enable them to perfect their crop of fruit, also the buds for the following year, we will have no difficulty in raising good crops of some varieties at least, every season.

C. C. James, Deputy Minister of Agriculture for the Province of Ontario, has published a nice book of Agriculture. Every farmer and fruit grower ought to have one. It is up to date in every respect. He tells that water is most essential, that without water the manure which we apply to our land would do no good. It carries the different fertilizers to every part of the tree to form wood, leaves and fruit, and passes out through the tiny pores on the under side of the leaves. This proves to us that the best time to manure our orchards is in the Autumn. The fall rains dissolve the manure and carries it into the ground where it is safe from waiting. In the spring when the trees wake up from their winter's sleep as it were, they find their food so to speak, ready and waiting for them; whereas, if we put the manure on in the spring and the weather becomes dry, a large portion of it will dry up and lie on the surface in lumps with the moisture dried out of it, and no more good than so many brick bats.

No doubt you have all noticed how quickly the leaves will wilt and dry up on the branches you pruned off when the trees are with leaves. The water supply is cut off from the tree and what is in the branches and leaves quickly pass off through the pores on the under side of the leaves, and if the ground should become as dry as the air, or the water supply entirely cut off, the trees would die as quickly as if they were chopped down, or pulled up by the roots; and in proportion as the water supply is cut off, in the same proportion will the apples suffer in growth and quality.

If any of you think I have been extravagant in my ideas on irrigation I can give you enough evidence to the contrary.

No doubt all of you have heard of that celebrated Gravenstein tree on Joseph Kinsman's farm in Lakeville. There is a stream of water running beneath the branches of that tree within a few feet of the butt the whole year round; and I venture to say, that there is not another tree of its age in America, that has produced as many barrels of No. 1 apples as this one has.

DISCUSSION.

Q.—Do you think that the sun drying up the manure takes much of the substance out of it?

Mr. Shaw.—You see a lot of dry manure lying in the field does not do much good. Our trees do not eat their sustenance, but drink it. If you put the manure on in the fall, it will be carried down into the sub-soil.

Pete Innes.—How far do you carry the water?

Mr. Shaw.—The water is brought from the brook to the pump, and it is raised up 22 feet, and carried over on to the orchard, and thence by furrows made by a plow to where it is needed.

Q. Do you put 12 bbls. to each tree on each application?

Henry Shaw.—Yes.

S. C. Parker.—Does the application of water have any effect on the Black Knot on the plum trees?

Henry Shaw.—No, sir.

Q.—Or on the Leaf Blight?

Henry Shaw.—No, sir.

Q.—Is there any difference putting it on on a bright day, or putting it on on a cloudy day?

Henry Shaw.—No, I do not know that it makes any difference.

Q.—What did your pump cost?

Henry Shaw.—It cost about \$150 all told. The only thing I am sorry now is that I did not get a steam engine to raise more than I can with the windmill pump.

Q.—Which are the best soils?

Henry Shaw.—Clay soils or loam soils will hold water better than sandy soils. I sub-soiled to the depth of 18 inches, and I think I broke up the sub-soil so that the water goes through it quickly. I think I made a mistake by doing that.

Q.—Then you would not advise sub-soiling?

Henry Shaw.—No. Nor putting lime on; but you can put ashes on.

Peter Innes.—Is there not a lot of lime in wood ashes?

Henry Shaw.—Yes, sir. It is said there is lime and phosphoric acid in wood ashes. It is almost a perfect manure.

EVENING SESSION.

Top-Grafting ; its Advantages and Possibilities.

F. C. SEARS, M. S.

The use of top-grafting in the propagation of the apple is very general in Nova Scotia, where conditions seem to be especially favorable for its success, and my object in the discussion of this is to call attention to some of the advantages to be secured by this method of propagation but which might, perhaps, be overlooked by the orchardist.

Top-grafting as usually practised has this advantage over other methods of propagation, that we know the character of the stock on which we are grafting, and can therefore tell something of what the effect of this stock will be on the variety we are propagating.

That the stock used does influence the scion cannot be doubted, and in proof of this let me cite one or two instances. A most interesting case of this kind was related to me by my friend, Mr. Robert Starr. Briefly stated, it was this: Some years ago Mr. Starr bought a dozen Baldwin apple trees, and when they came into bearing it was noticed that one of the trees bore apples a year in advance of any of the others, and the fruit was so highly colored and ripened so early as to be scarcely recognizable as Baldwins; yet the true Baldwin flavor was there, though somewhat intensified, leaving no doubt as to their identity. The last tree of the lot to come into bearing produced very large, light colored apples that ripened very late indeed, and though, when they finally did ripen, there was no doubt as to their being Baldwins; yet the flavor was

exceedingly weak, by no means as pronounced as the typical Baldwin flavor. A few years later sprouts came from below the graft on both trees and were allowed to grow in order to determine what characters the original stocks had shown. It was found that these shorts exhibited the same differences which had characterized the apples. In one case they were small and short jointed, reddish in color, both leaves and twigs, and ripened early in the autumn, the leaves falling before frost. In the other case the shorts were coarse and green, long jointed, and did not stop growing in the fall until nipped by frost. Without prolonging further this phase of the discussion I may say that numerous similar instances might be given, showing conclusively that the characters possessed by the stock are shown to a greater or less degree by the fruit borne on the tree.

Accepting this as true, let us see what practical application can be made of the principle involved, in securing desirable qualities in our fruits, more particularly in apples. First, we recognize that more highly colored fruit is, as a rule, desirable. Is it not possible, then, to profoundly modify the color of any of our fruit by top-grafting them upon trees of more highly colored sorts? For example, would not Gravensteins be improved in color if they were worked upon Ben Davis trees? Undoubtedly they would. From our present knowledge it cannot be accurately predicted to just what extent this influence would be shown, but enough has already been stated to show that whatever influence is exerted by the stock will be toward making the fruit approach in color to the fruit borne by the stock.

Again, as to season of ripening. If so variable and elusive a character as color of fruit is likely to be transmitted, is it not reasonable to expect that the period at which a certain variety ripens might be changed by varying the stocks upon which the variety is grafted? In this connection Prof. Bailey says: "Grafting often modifies the season of ripening of fruit. This is brought about by different habits of maturity of growth in stock and scion. An experiment with Winter Weli's pears showed that fruit kept longer when grown upon Bloodgood stocks than when grown upon Flemish Beauty stocks. The latter stocks in this case evidently completed their growth sooner than the others. Twenty-ounce apple

has been known to ripen in advance of its season by being worked upon Early Harvest. If all this has been done, is it not reasonable to suppose that if the Gravensteins were grafted on the Ben Davis, as was before suggested, not only would the color be improved, but the result would be Gravenstein apples with better keeping qualities? Some one may object here that if the Gravensteins be thus grafted on the Ben Davis it will not only partake of the characters of the latter in color and season of ripening, but in other qualities as well, and we shall have our Gravensteins, the pride of Nova Scotia, tending to become as dry and tasteless as is proverbially the case with the Ben Davis. In answer to this objection I would say that there might be some ground for it; yet it is not a real objection, since in the common practice of root grafting we graft the Gravenstein on to seedlings, not one in ten thousand of which would probably be equal to the Ben Davis

One other point in this connection is worthy of the most careful consideration, and that is the importance of selecting scions from the best and most prolific trees in propagating any variety. Every observant orchardist knows that certain of his Gravenstein trees, for example, bear more and better fruit than certain others do, and the same is true of other varieties. Not only this, but certain branches of a tree bear better than others. As a proof of this fact that even all branches of the same tree are not alike, I need only to cite the case of the Red Gravenstein, which originated on a single branch of a Gravenstein tree. With these facts before us it is scarcely necessary to state the conclusion that the selection of scions for grafting deserves greater consideration than it usually receives. What would be thought of a stock breeder who paid absolutely no attention to the individual characteristics of the animals he bred from! Why even in an ordinary dairy herd, kept simply for milk, we recognize the importance of individuality and save the heifers only from the best cows. And yet when it comes to plant breeding we take scions from any tree and from any part of the tree—suckers, water sprouts, anything, so long as it is the desired variety. The time has come to make a decided change in this respect, and top-grafting offers the most simple remedy, since it gives an opportunity for each man to select his own scions from his best trees and set them in whatever stocks he prefers.

That in this discussion we are treading upon ground not quite so fully understood as some other fields of Horticulture, I am quite well aware; yet it seems to me that we do know enough to warrant the belief that with sufficient care in the selection of stocks and scions we may greatly improve, not only the productiveness of our trees but the color and keeping qualities of the fruit as well.

DISCUSSION.

John Donaldson.—With respect to grafting the Gravenstein on the Ben Davis—the latter is a slow growing tree. I am afraid the Gravenstein would grow out of the Ben Davis. I have grafted Gravensteins on the Cayuga Red Streak.

Professor Sears.—I only gave the matter as an example. I have not thought it out. But your objection is a good one.

Professor Macoun.—There were two examples at the Experimental Farm—Seven years ago there was some top grafting done of the Northern Spy on Wealthy and Duchess. I am afraid in a very few years the trees will be top heavy and break off. In the Wealthy and Northern Spy, there is such a difference between the top and the trunk that it is unstable and it is increasing every year. The habits of both trees should be well-known before top grafting. We are starting some work in this direction and on which we are top grafting many of the tender varieties, and we are hoping to get some of the best winter apples to succeed—that is top grafting on hard stock.

A Government Nursery.

W. C. ARCHIBALD, Wolfville.

I wish to say a word from an educational standpoint about the improvements of varieties of fruits best adapted to the varied conditions of the province. No fruits are grown equally well in all districts or fruit countries. Our best fruit seems to have narrow limits and do best near the place they originate. The Gravenstein is of German origin, but finds an equally good home with us. But nowhere else does it reach the same point of excellence. Each year fruit-growing will become more a specialised industry. It is not enough that a variety bear fruit, but the

tree must live more comfortably and bear better fruit with us than elsewhere. If varieties will not do so we might drop them from our lists for new orchards. All growers note the difference in the bearing habits in a row of trees of the same variety. The large and highly colored apples are found on certain individual trees year after year. We soon learn to look for exhibition fruit. Even the branches on the same tree differ. Some are feather shaped (i. e.) the twigs and spurs grow out of the two sides, while others grow out from any point of the circle. The finest fruit is invariably obtained from certain individual branches. Again every bud is an individual and carries in itself the whole life of a tree. Some buds are large, some are small, some transmit a wood-producing habit, others inherit a fruit-bearing character. Nature is constantly multiplying these variations and secures "the survival of the fittest" to live in a tree. But nature does not consult the demands of trade. Where then shall this work begin and how shall we proceed? First we should label our choicest trees—the best bearing branches and individual spurs for buds or scions. The commercial Nurseries propagate their varieties from scions taken at the most convenient point without regard to their fruit-bearing value.

We should have a government nursery on the model farm, where specialists have but one supreme and ruling motive of action, the beginning and improvement of varieties adapted to this valley and province. We should lose no time in taking up this important work. Hundreds of thousands of trees are now planted annually, and we cannot afford delay. The government who sees this work in the true light will undertake it and enrich the people of this province.

We should have a college of agriculture and model farm in this great fruit valley. Meritorious conditions should decide it now, as it must eventually place it within the valley. No question is ever settled—be it moral, commercial or political—until it is settled right. The government has placed its highest educational light in the eastern counties—at Truro—warmly supported by the people of the whole province. The government is now asked by a people—the superior in intelligence and wealth of years ago, to build another college light in the west—both so set, and shining

at the same time—where the ambitions of the whole people will be satisfied—and with broad foundations laid, each to be the nucleus of great and useful institutions in the days to come.

Cranberry Pests and How to Combat Them.

J. S. BISHOP, Auburn.

There are three species of insects found on our Cranberry bogs, that are likely to give the grower more or less trouble. These are the vine-worm, the fruit worm, and the span worm.

THE VINE WORM.

The vine worm, know as the "fire worm" or "black head," first made its appearance in this country about the year 1892, on the property of the Middleton Cranberry Company at Auburn. For the first year or two it attracted no further attention than that something appeared to be the matter with one corner of the bog. The affected locality continued to grow larger year by year until the whole bog was thoroughly infested with this pest; and the crop has been destroyed for the past three years. Previous to last year, very little attempt, if any, was made to check the progress of this insect, which has now extended to several of the neighboring bogs; and threatens, unless prompt action is taken, to over-run all our bogs and destroy the cranberry industry while yet in its infancy. As very little was known respecting the habits of this insect, we were altogether at sea as to what course of treatment we should adopt against it. Upon enquiry we find that the fire worm has been known to the Cape Cod people for a number of years; and is not considered there as the growers' worst enemy. Where mid-summer flooding is possible, the trouble is easily controlled. Without the water supply, insecticides have to be used, although some growers decline to use water when available, claiming that flooding injures the keeping qualities of the fruit. This insect has two broods in a year. The eggs have a very minute scale-like appearance, of a yellowish colour. Those that produce the first brood are laid the summer before on the under side of the leaf. The time of hatching varies somewhat according to the time the water is drawn off the bog in the spring, and the earliness of

the season. If the vines are partly submerged, those that project out of the water will hatch first, which will be about the 25th of May (the time that the vines shew signs of starting to grow), and continue hatching through the early days of June. The worm, at first, can only be detected by the aid of a glass; when full grown it is a little less than half an inch in length, of an olive green colour, with a black or a yellow head. As it nears maturity it weaves a sort of web over the upright that it is feeding upon, sometimes bringing two or more uprights together that are near, thus forming a protection from rain or dew, where it can feed continuously. Toward the last of June the worms all disappear, giving place to the moth, which is also very tiny, of a greyish brown colour; and flits about, rarely ever rising more than a foot from the ground, as it lays the eggs for the next brood. These, in turn, hatch out about the middle of July, when the plants are going out of flower, and in the course of a few days completely skeletonize every leaf on the patch, giving the bog the appearance of having been singed with fire; effectually destroying the crop prospects for that year. The first brood never appears to be numerous enough to materially injure the vines; but the second hatching is beyond description—the moths rising in clouds, as you walk over the bog in late summer, settling down immediately to their work of laying eggs as you pass along. The time to commence treating this pest is just as early in the spring as the eggs begin to hatch. If the vines can be flooded early in June, for sixty hours, just as they are well hatched out, no further treatment is necessary for that year; but as in the case of most of our bogs here in the valley where re-flooding is impossible, a careful watch must be kept of the vines, and spraying commenced as soon as the worm shows itself. If the season is not too wet, a couple of sprayings at intervals of three or four days will be sufficient to destroy the greater part of the young worms; but if the bog is neglected until after the insects are full grown, and the webs formed, it is almost impossible to effectually eradicate them. The Cape Cod people use tobacco-water for spraying their bogs made by steeping tobacco stems in huge iron tanks containing from eight to ten barrels, and going over the bogs as often as necessary. Tobacco stems there are worth \$12 per ton; but as this is not a tobacco

growing country, this remedy in a measure is beyond our reach. Paris green, in the proportion of half a pound of green to 40 gallons of water, will just as effectually destroy them; but it is said by some to injure the vines if applied while in blossom. During the past summer on the Middleton Cranberry Company's bog, we used arsenate of lead, according to the formula so successfully employed in the extinction of the gipsy moth in Massachusetts. This preparation is claimed by Professor Fernald of the Hatch Experiment Station, to be the coming insecticide for all leaf-eating insects. The advantages of arsenate of lead are: that it remains in suspension in water much longer than Paris green; that it can be used in any degree of strength without injury to the most delicate foliage; and that it remains in an effective condition on the leaves for a long time, not washing off as readily as Paris green. Arsenate of lead cannot at present be obtained in a commercial form, but is produced by combining acetate of lead with arsenate of soda. The rule we used was twenty-two ounces of acetate of lead to eight ounces of arsenate of soda dissolving each separately in a pail of water, and pouring into a cask containing about forty gallons. This quantity is sufficient to spray half an acre. We used a spray pump with two hose lines with seneca nozzles at the end of extension rods; mounted on a low waggon with wide tires, spraying at the rear. With a boy to drive the horse, a man at the handle, and one at each hose, we were able to move along at a slow walk, wetting thoroughly a twenty foot strip. If the day was windy we found it necessary to always move toward the wind, to avoid having the spray blown back on us. We were late getting our apparatus and chemicals ready, not commencing until the greater part of the first brood of worms had entered the moth state. Our climatic conditions were most unfavourable, as nearly every day proved showery. We sprayed several times after the second brood hatched, and succeeded in keeping them in check to a considerable degree. A part of the bog that was more carefully sprayed was entirely freed from this insect.

THE FRUIT WORM.

Every cranberry grower is more or less familiar with the fruit worm. It closely resembles the codling moth of the apple, both

in appearance and the way it works. The eggs are laid by a greyish white moth on the blossom end of the young berry, just after setting—usually between the 15th and 25th of July. The eggs hatch in a few days, and the worm is said to feed on the outside of the berry for a short time before eating its way into the inside. If the vines are sprayed at this time, or a little earlier, with Paris green or arsenate of lead, the greater part of these worms will be destroyed. If left alone they continue their work until the fruit is nearly matured. As fast as one berry is eaten so that it dies, the worm enters another near by. If picking is begun early in September before the fruit is ripe, many of these wormy berries will be gathered by the pickers. These in the course of one or two weeks will rot, making the entire lot nasty. Where picking is deferred until the proper time, these nasty specimens will have rotted or dried on the vines, and be rejected by the pickers. Almost any year a few of these worms are to be found; and when plenty, 75 per cent, or even more of the crop may be destroyed. The moth of this insect will show itself on the bog early in the morning during the blossoming season, and if plenty, trouble may be anticipated; if not very abundant, nothing need be done for them.

THE CRANBERRY SPAN WORM.

The span worm may be classed among our recent acquisitions. During the past summer these worms appeared on quite a number of bogs throughout the valley, and may be the occasion of serious mischief if they continue to spread and thrive with us. The eggs of this caterpillar are laid by a yellowish-brown moth about the 12th of June. They hatch in a fortnight and commence feeding on the leaves of the vines, trimming off everything but the upright stock. They do not confine themselves to the cranberry alone, but feed on various kinds of bog vegetation, such as the common leather-leaf and grasses. They attain their full size about the end of July, when they change into a dark brown pupae, and remain just beneath the surface of the ground until the following spring. When they are numerous they soon strip the bog of every green thing. When their presence is suspected, the bogs should be carefully watched; and if the moths are abundant, preparations should be made for spraying with either Paris green or arsenate

of lead, just as soon as they commence to hatch, as they readily yield to the poison then; but after they are nearly grown, they are not such ravenous eaters as when younger, and take strong poison to affect them. This fact should never be lost sight of in spraying for any of the insects that infest cranberry bogs. If you want to do thorough work, begin in the first of the season. It costs no more to spray then than it does after the crop is partially destroyed.

It is an erroneous idea to suppose that flooding a bog during the winter will rid it of insects. So far as I know, any form of insect life that is likely to do us injury, needs no better protection for its eggs in the dormant state than a pond of water. It is equally true that they will winter in the most exposed localities without further protection than what is afforded by the vines. There are other insects found on bogs that may under certain conditions prove to be pests, which have hitherto scarcely come under our notice.

In conclusion I would urge the necessity of growers frequently examining their bogs in the growing season, and making themselves familiar with the different species of insect life found there, and if possible not to allow anything of an injurious character to become established. It is generally easier to avert an evil than it is to cure it.

DISCUSSION.

R. W. Starr.—Do you think that the Fire Worm was introduced into the country by plants imported, or is it indigenous to the place?

J. S. Bishop.—There seems to be a difference of opinion. I was under the impression that it was introduced through the Vines that came from Cape Cod; but in talking to Prof. Fletcher, he did not think it was so. He said the same worm could be found in Ottawa, and it was likely to be found anywhere under certain conditions. It is to be regretted that it was not noticed earlier and steps taken to exterminate it.

A voice.—Were any of the vines imported at the time it was discovered?

J. S. Bishop.—There were a few vines imported from the States by the Middleton Cranberry Company, in order to get a better variety; but it has since been proved they are no better.

R. W. Starr.—The other insects are natives of the country?

J. S. Bishop.—Yes, sir.

Prof. Macoun.—It is stated that it was stopped in Cape Cod by tobacco insecticide. I do not know whether this remedy has been used for insects which eat the leaves. Has it been used for the fire worm?

J. S. Bishop.—I have been in correspondence with some of the leading cranberry growers at Cape Cod. I may say that they use it (tobacco) in large quantities. They have large tanks in which they use the stems by the ton. A question was asked by one of my neighbours why they use tobacco instead of Paris Green. I may say that a man lost his life by Paris Green and since then the growers have not used it to any great extent but stick to the tobacco. Capt. Crowell of Cape Cod sprayed his bogs seven times in the summer. He is a practical grower. I was also told that arsenate of lead was used with success.

Prof. Macoun.—What is the strength of the tobacco water?

J. S. Bishop.—He did not give it to me, but I am of the opinion that it was strong.

C. R. H. Starr.—Most of the apple shippers in the room are aware of the fact that we have been labouring under a very serious matter, that we seem to have no control over the breaking of our barrels on board the steamers after being shipped from Halifax. When, where, or how this occurs we are at a loss to know. It has been a matter of serious importance to the shippers from the fact that an annual loss is occurring in this respect. We have been unable to get any satisfactory reports from the ship owners. Our bills of lading are such that when they deliver the heads of a barrel whether there is anything in them or not, that is all we can compel them to deliver us. When the barrels are delivered with one or two bushels in a barrel these are sold as "slacks" or broken barrels, and we get very small returns for such barrels. This is a matter which has been under discussion for a number of years. My principals and correspondents in London recommended the bringing the matter before the Green Fruit Section of the London Chamber of Commerce. These bills of lading which I have referred to were some years ago compiled by a committee of the London Chamber of Commerce and the Underwriters

Association, and certainly the Underwriters have the best end of the stick, as it has been proved over and over again. We have no redress whatever for damages in this way. I received this cable which came to hand a few minutes ago from London addressed to myself:

"I have brought damaged barrel question before the Chamber of Commerce today and hope for favorable results"

"Lowe"

Knowing this Association was in session Mr. Lowe has sent this cable as they now have this question before them for consideration. A Resolution endorsing this action might be of assistance to them in London and perhaps do us no harm here. Therefore I will move the following resolution:

"Whereas the question of broken barrels, always a serious matter to apple shippers, seems to be growing more and more serious;

Therefore resolved that this F. G. A. heartily endorse any efforts on the part of Messrs. Nothard & Lowe, or others who may be able through the London Chamber of Commerce or other means to bring about a remedy for the evil that has become almost intolerable.

The motion upon being put was passed unanimously.

Hon. Mr. Longley (Atty.-General) on rising was greeted with applause. He said: Mr. Chairman, Ladies and Gentlemen, I won't deny that it is a very great pleasure for me to spend an hour or two, more by accident than by deliberate design, at this most important Convention of the Fruit Growers of Nova Scotia. I may state, however, that the idea of taking any formal part in the programme, or making any formal speech, never seriously entered my mind. On behalf of the Legislature I desire to acknowledge with very great appreciation the kind invitation that was forwarded to the members to attend in a body. I had hoped that those members of the Legislature who are not specially hampered and clogged with departmental duties would have availed themselves of that opportunity and come up; but somehow that movement did not take definite shape, and no person appeared to lead off in the matter, and therefore there was not a general exodus from the Legislature as the Government would have been glad if

there had. It was out of the question for some of us to attend, but some of the members might very well have come up, and I have no doubt they would have been interested in your exercises, at all events the invitation was duly appreciated. I think that the proceedings this year have assumed more than usual importance for one or two reasons. One was that you were favored with the presence of the Minister of Agriculture of Canada, who leaving aside all matters which might be the subject of difference of opinion, is recognized as a most admirable and efficient man in the discharge of the duties of his especial department. I think that no man has occupied that position, and at any rate it is not at all likely for some time to come a person will occupy that position, who brings such a wealth of practical knowledge and general scientific appreciation of the agricultural profession as the Hon. Mr. Fisher (applause); and I am sure that the interest he has taken in visiting every part of this Dominion, and no part of this Dominion as much as the Maritime Provinces, is an indication that he rises to the full stature of that position. I am sure his visits from time to time in the future will be appreciated. Another matter that has given the proceedings of this Association some interest is that it happens to take place at a time when the air is full of Agriculture in the Province of Nova Scotia. We have seen the public press enriched by able, eloquent and perhaps I might say erudite communications from the farming population on topics of interest to that profession in recent times, which if they had no other result, at all events have stirred up interest in the general subject of agriculture in the province, and in that respect have been useful contributions to the literature of the day. There was a time in the early history of the province, in 1820, when the interests of agriculture were greatly neglected, when Mr. John Young, a very able man and hard-headed Scotchman,—and some of us have seen specimens of hard-headed Scotchmen in our own day in this country (Laughter)—undertook to awaken an interest in agriculture in Nova Scotia, and by a very able series of letters in which he persistently kept pegging away, he aroused great interest and caused organizations to be established which succeeded in developing and building up the agricultural interest of the Province, which for a time produced grand results, but which after a course

of time fell back, and a few years ago looking over the Province we could see a lack of enterprise in agricultural matters. This is due to various reasons. Due in the first place for the reason that this Province to which we belong is a Province of exceptional resources. No portion of the whole continent of North America has such a number and variety as this Province. If any person wishes to challenge that statement, let him select any portion, and I will show you that I am right in my contention. If you ask the people of the United States which are the two greatest states, most would name Pennsylvania and Ohio. Well, Pennsylvania and Ohio have iron and coal, so has Nova Scotia, but neither has got a single ounce of gold, and Nova Scotia has Gold Fields which are as promising as any on the continent of North America. Pennsylvania and Ohio have a limited lumber industry. We have a lumber industry which has done a great deal in the past and which is still more active and putting out a larger product than any other period in the history of the country. Pennsylvania and Ohio have no fish whatever, and the Province of Nova Scotia is the very center of the fishing industry of the world. I have no hesitation in saying that there is a greater aggregation of marketable fish surrounding the coast waters of Nova Scotia than can be found surrounding the waters of any other portion of the whole continent. Our people have had so many irons in the fire to turn their attention to that agriculture has not been a necessity to us as it has been to other portions of the continent, and that is the reason it has been allowed to drift. And while it has languished in Nova Scotia in general one branch has not languished—The fruit growing industry—that has made steady and rapid progress. And the Fruit Growers' Association which has been formed within the period of my remembrance, formed when the apple was looked upon with contempt and the old French trees planted by our predecessors were allowed to be used for firewood. The apple industry in the Valley since the formation of the Fruit Growers' Association has made wonderful progress, and at no period in its career has its future looked brighter than at present. Therefore I say that the Fruit Growers' Association of Nova Scotia is a body that we can well regard as being able to take care of itself. It needs no

outside assistance, needs no nursing from the Government, although it has always received that recognition and consideration from the Government which so important an institution could very rightly and properly claim. We give a small grant each year to the funds of the Association. And when we undertook what we thought at that time the arduous and dangerous experiment of assisting to establish a horticultural school, we furnished the main fund by which such a school could be kept in successful operation. How far the school will be able to continue, how long it will be able to continue under the present auspices, is a matter which I would not like to undertake the duty of predicting. This much I will say however, that there never was any period in the history of the school when its opportunities for good were greater than they are now, when it was in abler hands than under the management of Professor Sears (Applause). He has secured the confidence of the fruit growers of this Valley, and the confidence of all who have taken the pains to become familiar with the work and methods of the school, and if you cannot succeed with him you are not likely to succeed with any person.

HORTICULTURAL EDUCATION.

Now the subject of Horticultural Education has been up for discussion, and the question of what the Government can do for agriculture has also been up for discussion. I want to point out to you now, those of you who have not been charged with the responsibility of Government and have not had to look face to face with the problem of what to do, and to do that which is wise, judicious and profitable, that it is not an easy thing to know what to do for the agricultural population of this province. Our revenues are not sufficient to give extravagant sums, but it is sufficient if prudently expended for all purposes of developing the important industry of agriculture in Nova Scotia. But when we are face to face with the question it is a problem what to do with the money so that the greatest benefits may result from its expenditure. We give the sum of \$8000 in grants to agricultural societies, which is distributed over all parts of the province as widely as we can. The impetus given to these societies by government aid has caused the farmers to come together and secure the best stock and seeds and grain.

That grant has been given for years. I do not say it has not been doing good. I may have felt dubious when that grant was given that these agricultural societies were achieving that success that they should otherwise do. In some places they are excellent vigorous bodies. In other places they are chiefly the means of making a raid upon the Treasury of the country. Nevertheless, while having this question of agricultural societies before us, it is not easy to determine whether to drop that grant, neither is it easy to see what we could substitute in place of it to develop important agricultural matters. One thing was discovered some years ago—that the Dairy industry was being entirely neglected in Nova Scotia; and, although by voluntary effort some cheese factories were established in the Province, these had all been allowed to go down. The Government came to the rescue and offered bonuses for the Creameries in the Province, and wisely so, as in most of the centers of the Province the full sum has been taken advantage of, and a great number of these factories have started up. By this means a little impetus has been given to that important industry, and has drawn people to the necessity of dairying, and not putting all their eggs in one basket. In that respect it has accomplished some good.

In respect to the matter of agricultural education I wish to speak to you with the utmost frankness. I have stated that agriculture in this Province had become a secondary consideration. If you look at the trade returns, you will find that agriculture barely figures in them at all whereas in fish we have an export trade of millions. In respect to agriculture generally, the Province scarcely raises its own food supply, and the amount we have done in the way of increasing the wealth of the Province in sending products abroad, outside of this valley, is small. We are obtaining millions of wealth from our mines, and therefore it is that the agricultural industry has to become a secondary industry to us. We have associated with us in this Dominion the great province of Ontario, which has more than four times the population of Nova Scotia, and considerably more than four times the wealth of this Province, and a Province which lives and moves and has its being in agriculture; and if you should strike down its agricultural resources, Ontario would practically fade off the face of the earth. Whereas, if agriculture

was wiped out of Nova Scotia, we would still remain, as we would have the industries of mining, fishing and lumbering to fall back on.

He said the agricultural school in Ontario had been in operation years before it reached its present standing; and it had not a larger number of pupils compared with the enormous population of that Province than our own had. He said that while listening with the greatest possible attention to the able discussion on this topic, he believed that were the two institutions to be united, they would still be languishing for Provincial patronage. In regard to the policy of the Government upon this question he was not in a position to say. When the agricultural school was started in Truro, he had urged the location of it in this Valley. In a Cabinet composed of eight or nine individuals there would be differences of opinion, and the majority must prevail. If there had not been a fire in Truro, the school would still be there working out its destiny as best it could. He said he had used his influence in the most vigorous, determined and unremitting manner to prevent it being rebuilt on the old site. He believed that scientific training was becoming the necessity of this age. He thought that there should be a school of science in connection with the Normal School. He said the Government were willing to let the vital question remain in abeyance until there is an opportunity of ascertaining what is the wisest, what is the best, and what is the true policy to pursue. As for his own views, his own sympathies were with the West. He would consider the interests and the rights of every section of the Province. He said that the establishment of the pork packing establishment at Middleton was an indication of life—and he believed it would be a valuable investment in the country. A Mr. Wilson, an able editor of the London Mail, who visited this country some years ago, was so taken with it that he thought seriously of resigning his position and staying in the Annapolis Valley. In closing, he said he was extremely pleased to have that opportunity of addressing the Association. (Applause.)

Grading and Marking.

T. H. PARKER, Berwick.

Mr. President,—It has been our practice for years past to meet together from time to time, to exchange greetings and discuss questions of practical importance to the fruit growers. It is to be regretted that so few of the many engaged in the fruit industry, avail themselves of this opportunity. We who do, ought to be more practical in our discussions, formulate the results of a life long experience, and place ourselves upon record for their benefit. With this end in view, I am induced to offer a few practical suggestions upon the time-worn question of grading and marking fruit.

The question of sorting, grading and marking fruit, to produce the best results, at first thought, is a simple one; but when viewed in a more general aspect, its solution becomes far more difficult. To affix a mark or brand to an empty barrel or package is a simple matter; but when the barrel or package is filled with fruit properly graded, and wishing to affix a brand or mark that will be the exponent of its contents, it is then the difficulty appears.

Presuming we have the fruit properly graded and packed, ready for disposal (and knowing well the fact that fruit is bought and sold "unsight and unseen,") it becomes a necessity that the mark affixed be a representative sign, that will clearly convey to the mind of the purchaser the true character or quality of its contents.

At the present time there is such a diversity of marks used by fruit growers and shippers, that the whole system of grading and packing has become confusing and unmeaning. To verify this statement, go you and examine a single car load of apples; you will likely find one shipper who makes use of the numerals 1, 2 and 3 to represent his fruit; another will use "Extra," "fancy," "choice," and "medium"; while a third will appropriate to his use "x", "xx", "xxx", "xxxx", and so on, while peradventure another will begin at the other end, and say "xxx", "xx", and "x." How ridiculous! How is the purchaser of that car of apples to know what he is getting! It is simply a lottery.

To remedy this evil it might be well for the Fruit Growers' Association, or the "Apple Shipping Co.," when duly organized, to take measures to simplify this method, and adopt a trade mark, with a view of superceding the conflicting methods now in use—and to serve as a safeguard to the buyer.

Unfortunately, hitherto we have been working at the wrong end of this question, giving too much prominence to the mode of marking, to the neglect of the more essential consideration of properly grading our fruits. When we get right on the grading, the marking will take care of itself. Let it be clearly determined what shall constitute "Standard grade;" then he who marks it otherwise commits a fraudulent act. Let this Association formulate and adopt a code of rules as a guide to regulate this matter. And let those rules be published on leaflets, to be supplied to fruit growers in general.

In dealing with this question, I would suggest that "xxx" be used to denote the "standard" grade of our apples, which shall include only perfect fruit, well developed, average in size, good in color, sound, free from blemishes, such as rot, bruise, or spot; possessing the normal characteristics of its own variety. The second quality shall be known as "xx" grade, which shall consist of good, well-matured, sound fruit, not worm-eaten, though in size, form and color may fall below the standard grade. However, in some instances, under peculiar conditions we find varieties that are above the average in excellence. Those who chose, may do well to make a selection of such, and brand them "extra." These two grades with the extra, are supposed to include the entire crop worthy of shipment. The balance whether much or little may be regarded as "culls". Sell them if you will; but in so doing, by no means compromise the fruit industry. Sell them for what they are.

Another feature of the apple question claims our consideration, viz: "Inspection." Of all questions in this line with which we have to deal—this is the most intricate and perplexing, and the most difficult for solution. It is a question that has engaged the attention of this association more or less for twenty years. and yet unsolved.

While the commercial laws for inspection may be successfully applied to fish and flour, yet that they are not applicable to apples is obvious to the fruit grower.

Possibly science may have come to our rescue. In the wonderful discovery of the X rays have we not ground to hope that in the near future we have a solution of the difficulty? Since by its application, a bullet or a needle may be discovered and located anywhere in the human system, is it too much to expect under a further and more perfect development of science, it may be so applied as to give a transparency to a barrel of apples, so as to discover its defects? For the time being, or till a remedy through this channel may appear, we must continue to trust largely to the integrity of the packers; or in other words he who sorts and packs his apples must be his own inspector.

It is true we have instances of fraudulent packing. But let it be made imperative on the packer to place his name in full on every barrel sold.

I am not prepared to believe that of all men, the fruit grower is the most miserable. It often happens that he has to bear the odium of other men's sins. As a rule, I believe the fruit grower aims to do the right thing. It is important that we combine for self-protection, and devise every laudable means to shut off from our fraternity every unprincipled and fraudulent packer.



(Read before the Royal Horticultural Society, London, England, January 31st, 1899.)

A YEAR AMONG THE ORCHARDS OF NOVA SCOTIA.

By CECIL H. HOOPER, M. R. A. C., F. S. I., of Swanley,
Kent, England.

The peninsula of Nova Scotia is situated on the east side of the Dominion of Canada, and south of the entrance of the Gulf of St. Lawrence. The climate here is very pleasant, in spite of a long and rather severe winter. The country is remarkably well supplied with water by its countless little springs, and its numerous lakes as well as by the heavy falls of snow in winter, and frequent and heavy showers during the summer months, the latter generally falling at night, leaving the days bright, warm and cloudless. The scenery is beautiful, the abundance of native trees rendering it particularly attractive; the most common of these are spruce, fir, pine, larch, birch, maple, ash, alder and oak. The acacia tree is often seen, and also in some parts the French willow and English elm have been introduced and thrive well. Nova Scotia is said to have the largest variety of flowers, mosses and ferns of any country; wild eatable berries are also very plentiful; they include strawberries, raspberries, blueberries, huckleberries, blackberries, and cranberries.

THE CORNWALLIS AND ANNAPOLIS VALLEY.

The Cornwallis and Annapolis Valley is the principal fruit-growing district in Nova Scotia. It is one continuous valley of about 100 miles in length, and varying in width from 6 to 11 miles, situated between two nearly parallel ranges of hills of about 600 feet in height. The North Mountain shelters the valley on the north west, and from the strong winds off the Bay of Fundy; the South Mountain, which is a little higher, bounds it on the eastern and southern side and runs N. E. to S. W. In the middle of the

valley there is a watershed, the Annapolis river running S. W., the rivers of the Cornwallis district running N. E.

These rivers are small, but owing to the great rise and fall of the tide (60 feet) the salt water runs up far inland, carrying with it enormous deposits of alluvial mud or silt and allowing ships to go several miles inland.

Near the mouths of the rivers there are salt marshes which are overflowed by the tide and grow salt hay, which is eaten by the cattle during winter. Higher up are the dyked marsh lands reclaimed from the sea, forming very rich meadow land. Grand Pre, the district rendered famous by the expulsion of the Acadians, lies in the eastern part of the valley, on the shores of the Basin of Minas, across which, Cape Blomodin, the termination of the North Mountain, is clearly seen; owing to the beauty of the country, its historic interest and the cooler temperature, it attracts many visitors from the United States during the summer months. Apples and plums are grown throughout the valley and in the centre near the towns of Middleton, Aylesford and Berwick, raspberries, blackberries and strawberries are grown, also some peaches and a few grapes; one farm I visited had 6 acres of strawberries. Most of the soft fruits are sent to Halifax and Boston; but the market for these fruits is at present rather limited. In the centre of the valley there is a large area of bog land, which, it has been found, is well adapted to cranberry growing. This industry is rapidly increasing.

The greater part of the valley was originally covered by forest, which has been cleared save at the foot and sides of the mountains.

THE SOIL.

The soil of the valley is partly formed from the disintegration of the Trap Rock of the North Mountain, partly from the syenitic granite of the South Mountain, together with the red loam and coarse-grained sand of the new red sandstone in the valley, which abounds in oxide of iron, lime and gypsum, forming a fertile soil admirably adapted to the cultivation of apples, plums and various fruits, as well as of potatoes, swede turnips, oats, maize, pumpkins, beans, etc. Wheat growing and beef production have lately decreased, owing to the competition of the western provinces; the dairying industries are, however, increasing.

THE FARMS.

The farms are, almost without exception, occupied by their owners, most of them small, compared with the average size of English farms, and still smaller, of course, compared with many farms in the west of Canada and the United States. The labour is largely performed by the farmer and his sons, with but little hired help. The farm-houses and buildings for the most part are neat, comfortable and give the impression of prosperity; they are almost all constructed of wood, painted white; they are generally situated near the high road and, as the farms are frequently long and narrow, extending often back into the woods and down through the marsh land to the river, the farm-houses are frequently within a quarter of a mile of one another, which enables life there to be of a social nature, if desired. Prohibition of intoxicating drinks is rigidly enforced throughout Nova Scotia with the exception of a few towns; there is consequently very little drunkenness. Roughly speaking, the area of these farms varies from 20 to 120 acres, about equal parts of grass and arable land, the latter including one to five acres of apple orchard. There are a few farms with as many as 60 or more acres of orchard, but a large proportion of this has been planted within the last ten years and is not yet in full bearing. Many orchards are 50 years old and a few apple trees remain which were planted by the French more than 150 years ago. The apple tree certainly thrives here and the orchards are generally neatly laid out and well cared for; the growth of the trees is more rapid and they attain a larger size than is common in England. The fruit is usually large, well coloured and abundant, and of pleasant flavour, particularly the Gravenstein, owing, I suppose, to quicker growth and shorter season. I do not think the flavour generally is quite as nice as that of good English Apples. Although the shape of the trees, the cultivation and the fruit in the best English orchards equal, I think, anything I saw in this valley, the average of the two countries is much in favour of Nova Scotia.

Throughout the valley there is a telephone system which connects railway stations, shops, doctors' dwellings and many of the farmers' houses. The charge is five pounds for installation, £2 10s. 0d. yearly.

On one occasion I sent a cable to England from the sitting room of the farmer's house in which I was staying, and received one back.

Co-operative cheese and butter factories stud the valley every few miles. These encourage the keeping of dairy cattle, which industry profitably accompanies fruit growing. The local agricultural societies own pedigree cattle for the improvement of native stock. At Canning, in the Cornwallis Valley, there is a vegetable evaporating factory, (Kerr's) which was busy drying vegetables for the soup of the miners at Klondyke. It has in former years fulfilled contracts to the satisfaction of the English Government, for naval and military supplies.

PRUNING AND TRAINING.

The trees are, as a rule, well-shaped, as the farmers begin early in the life of the tree, to shape them. They like their trees to have a central leader with the main branches distributed evenly about it. The height of the branches from the ground is regulated, so as to allow horse cultivation under them.

It is found by experience that it is best to saw off the branches as close against the trunk as possible. If it is necessary to remove a large limb, they commence by sawing in a short distance from below, upwards, in order to avoid splitting the wood and tearing the bark. Large wounds grow over best when the edge is smoothed off with a knife, and then covered with some substance to exclude moisture, and thereby prevent decay. Gum shellac dissolved in wood-alcohol is found to be the best substance for this purpose, though white lead paint, or grafting wax are both good.

Generally speaking, summer pruning, of which a good deal is done, promotes fruit-fulness; winter pruning tends more to wood growth. Pruning in Nova Scotia is chiefly done at the end of winter, whilst snow is still on the ground. When the trees are bursting into bloom is found to be a good time, though the opinion is, that pruning may be done any time during the winter without disadvantage to the trees; the discomfort being that of the man who prunes.

In case of a tree being split at the forking of the branches, a hole is bored with an augur right through the tree, at right

angles to the split, and the parts are drawn together by an iron screw-bolt and nut; which damages a tree less than binding together with a hoop of iron.

Again. On Mr. Ralph Eaton's farm (Kentville), in order to train the young tree to grow upright, in case of the trunk bending, a screw-hook is screwed into the tree, and by means of a wire attaching the hook to a peg in the ground, the tree is drawn into the desired position. These hook-eyes and wires are also used to train the branches into correct position where necessary.

FERTILIZING OF ORCHARDS.

Rotation in the fertilizers applied to the orchard, is recommended as advantageous. For example: stable manure one year, chemical fertilizer another. Farm-yard manure greatly benefits old, neglected orchards requiring nitrogen; but its use should be discontinued where trees run too much to wood and leaf, without fruit, and some fertilizer containing potash and phosphate would probably prove more beneficial.

Green manuring or cover cropping is much employed in Nova Scotia to supply vegetable matter.

In Canada, wood ashes are the best possible manure. They are applied at the rate of twenty to forty bushels per acre; those from hard-wood being better than those from fir trees. The ashes contain about five to seven per cent. potash, two per cent. phosphoric acid.

As the available supply of farm-yard manure and wood ashes is very limited, commercial fertilizers are largely used; the two in most common use are finely ground bone meal at the rate of five to eight cwts. per acre to supply phosphate and nitrogen, and muriate of potash at one to three cwts. per acre, to supply potash.

In the adjoining valley of the Gaspereau, there is a bone mill, to which farmers take bones to be ground.

Nitrate of soda is not, from what I noticed, much used in the Nova Scotian orchards, save sometimes to give young or old trees increased vigour. Nitrate of soda at 95 to 96 per cent. purity, equals 15.6 to 15.8 per cent. of Nitrogen.

In a paper on fertilizers for orchards in Nova Scotia, published in "The Farmers' Advocate," the following ingredients were recommended:

For small fruits, (strawberries, raspberries) per acre: 150lb nitrate of soda; 250lb muriate of potash; 800lb bone meal.

For apple orchards: 100lb nitrate of soda; 200lb muriate of potash; 550lb bone meal.

For orchards with clover: 200lb muriate of potash; 250lb Thomas phosphate. (Basis slag.)

E. B. Voorhes, of the New Jersey Experiment Station said:

"To provide vegetable matter and to improve the physical quality of poor soils, apply yard manure once in four years, in fall or winter, at the rate of from five to ten tons per acre. To aid in the decomposition of vegetable matter, and to insure a sufficiency of lime as plant food, apply lime at the rate of twenty-five bushels per acre, once in five years. To provide in addition, an abundance of all forms of available plant food at the times needed for the development of the tree and fruit. Apply annually, chemical fertilizers in the following proportions:

Nitrate of soda	100lb.
South Carolina rock superphosphate	100lb.
Ground bone	200lb.
Muriate of potash	200lb.

"The amounts to be applied, depend upon the character of the soils, the kind of fruit, and the age and vigour of the tree; these given perhaps mark the minimum. In a number of best orchards the quantities applied are very much larger than is here indicated; and the larger application is believed by the growers, to be proportionately profitable."

Frank T. Shutt, Chief Chemist of the Dominion Experimental Farms, wrote:

"Assuming the leaves of a full-grown apple tree to weigh 50 lb, and reckoning 40 trees per acre, the manurial value contained in the 2000lb of leaves is equal to:

Nitrogen	17.74lb.
Phosphoric acid	3.88lb.
Potash	7.84lb.

The leaves are returned to the soil, but the fruit is exported. This, in the case of an orchard 25 years old, producing 160 barrels per acre—equal to say 20,800 lbs. of apples,—there is a loss to the soil of approximately,

Nitrogen	8.9lb.
Phosphoric acid	5.3lb.
Potash	32.8lb.

Professor E. E. Faville, the late professor of the Nova Scotia School of Horticulture, gave as the yield and composition of fruit per acre:

	Tons	Nitrogen	Potash	Phosph. acid.
Apples.....	15	30lb	45lb	3lb.
Pears	10	12lb	36lb	10lb
Plums	2	16lb	8lb	2lb
Berries	11 1-2	Trace	7lb	2 1-2lb

The following is given as another useful formula for manuring orchards:

Good rotten barn-yard manure, 10-15 tons per acre.	
Kainit (13 per cent. potash)	300-700lb
Or muriate of potash (50 per cent. potash)....	100-200lb
Bone meal, (fine ground)	100-200lb
(2 to 3 per cent. nitrogen, 22 per cent. phosphoric acid.)	
Or Superphosphate	125-250lb
(16 per cent. phosphoric acid.)	

ORCHARD TILLAGE.

The apple trees are planted 33 to 40 feet apart; in a few instances with plum trees between, in one direction of the lines.

For the first few years the ground is ploughed deeply (8 inches), in order to break up the soil and to encourage the roots to grow down to a sufficient depth to escape injury in case of drought and to be below the reach of the plough. The whole surface of the orchard is tilled from the beginning. In ploughing the plough is turned partly out when within a few feet of the trees and runs shallower (4 inches deep) as the roots near the butt are closer to the surface; immediately round young trees the surface is generally carefully forked over. Between young trees, potatoes are frequently grown, using bone meal and muriate of potash as fertilizer. The deep ploughing needs only to be kept up for a few years in order to establish root growth.

The kind of plough in general use has no wheels, but has a sharp curved mould board, which although it increases the draft, the difference is more than compensated for by the better

condition the soil is left in. The ploughing is done either in the fall or early spring; in Canada fall ploughing is not recommended for clay land, as it tends to puddle it and make it become hard and stiff, the frost consequently enters to a greater depth and root injury may result. In ploughing one aim is to obtain a level surface, thus one year the soil is ploughed from the trees, the next towards them, one year east and west, the following north and south. Most of the farmers whose land runs down to the river bank, dig and haul the salt marsh mud on sleighs during winter and spread it on the orchard land; this is disintegrated by frost and more carefully spread in spring. This mud has a fertilizing value and also the salt in it probably aids in keeping the land moist. Early tillage saves the moisture accumulated during winter and early spring and puts the soil into fine condition to warm up and get the trees quickly to work. As thorough cultivation renders plant food available and is the best conservator of moisture, tillage is begun early by ploughing so as soon as the snow has thawed, and the land is sufficiently dry to be worked. Harrowing follows, which stirs the ground thoroughly to the depth of about 3 inches. This is performed about every two weeks until late in the summer; the drier the soil the oftener it should be done. The varieties of harrow used include the spring tooth, the spike tooth, the disc and acme. If the wood growth of trees is too luxuriant, it may be checked by lessening the tillage and by withholding nitrogenous manure. As the orchard trees stop growing about midsummer vigorous tillage then ceases, so that the new growth may ripen sufficiently to stand the cold of winter, and as the trees can now spare considerable moisture, catch crops are with advantage sown such as tares and buckwheat.

THE CROPPING OF ORCHARD LAND.

Young orchards, say for the first 12 years, generally have some crop grown in them, such as early potatoes, maize, beans, and other hoed crops. These crops need cultivation during the early part of the season, and are removed about the middle of July or first week of August. Buckwheat and oats are also grown, but are not as satisfactory as the land cannot be thoroughly worked. Some space is allowed around the trees so as not to grow crops directly

over the roots of the trees. For these crops bone meal and muriate of potash are frequently sown in the drills.

In the older orchards the land is generally uncropped, but frequently harrowed. I have seen orchards almost weedless, due to this frequent cultivation. In some cases after the trees are about 12 years old clover is sown and left down for 3 or 4 years and mown for hay. This is however exhaustive unless some fertilizer is used.

ORCHARD COVER CROPS OR GREEN MANURING.

The object of cover crops or green manuring is to gather and return vegetable matter to the soil and to protect the ground from the effects of severe frost, especially when unprotected by snow.

For this purpose the orchards are very thoroughly cultivated during the earlier part of the season, and after the close of active growth about July or August, the surface is sown with some crop which will grow quickly and be large enough to protect the soil during winter.

Crimson Clover (*Trifolium incarnatum*) in parts of Canada and the United States where it stands the winter, is found admirably adapted to supply nitrogenous vegetable matter to orchards, at little cost; it is however rather a risky crop in Nova Scotia.

Mammoth Clover is found to be the next best, sowing 14 lbs. per acre; tares, lucerne, common red clover, peas, buckwheat, rye and oats are also employed for this purpose. A fair growth will be obtained the same season which is ploughed in early the following spring, in order not to retard the spring growth of the trees. These crops help to keep down weeds, and where successfully grown enrich the soil at less cost than with farm-yard manure. Where clover and other plants of the leguminous family are grown, nitrogenous manures may be omitted, as these plants have special power to take up nitrogen.

SPRAYING FOR FUNGI AND INSECTS.

In Canada both insects and fungi, where they do exist appeared to me to be more plentiful and more destructive than at home. Canker in apple trees is however very rare. Woolly aphid is not common, and it is said to have come from Europe, and that Europe did not derive it from America.

For horticultural purposes insects may be divided into two classes, (1) those that chew their food, such as caterpillars; and (2) those that feed by sucking the juices, such as scale insects and aphides.

The chewing insects may be destroyed by distributing poison over those parts of the plant upon which they feed

In Canada, spraying is almost universally practised; useful pumps are manufactured for the purpose, provided with a paddle to agitate the liquid. The pump is usually fitted into a paraffin barrel, the hose pipe is 10 to 15 feet long, often lengthened by a light bamboo tube rod 6 to 10 feet long, in order to reach high up into the trees. The spraying nozzles are mostly of the Vermorel pattern. The barrel is mounted on a cart or low waggon ("sloven") and drawn by a horse through the orchard, taking two or three persons to drive, pump and direct the spray. A photograph accompanying the paper illustrates this. In some cases orchards are sprayed quite early in spring to clean the bark of the trees from scale and moss, using 1-3 to 1 lb caustic Rock potash to 1 gallon of water, or this may be applied to the trunks with a vegetable fibre (not hair) lime-wash brush either at this time or in June. For spraying with the stronger potash solution men sometimes wear old macintoshes, rubber gloves and strap a mackintosh over the horse.

Powdered caustic potash is sold at most grocery shops in Canada, as it is used for soap making, a 1 lb tin costing about 5d. These are very convenient for spraying purposes.

Spraying for fungi, Black spot or Scab on apples (*Fusicladium maculatum*) may be done before the blossom or foliage opens, in order to kill the spores. For this, copper sulphate alone (3 lbs to 40 gallons of water) can be used, without lime, as there is no foliage to burn. The first spraying jointly for insects—caterpillars of the Codlin Moth (*Carpocapsa pomonella*), Tent or Lackey Moth (*Clisocampa Americana*), Canker or Winter Moth (*Anisopterix pometaria*) and fungi is done when the fruit buds begin to unfold but before the flowers expand, the second time just as the last blossoms fall, and if caterpillars are numerous or black spot shows on young fruit or leaf the spraying should be repeated, say once every 2 or 3 weeks.

The mixture in common use is the Bordeaux mixture as the fungicide, Paris Green as the insecticide.

To save time, for the former, stock solutions of sulphate of copper and lime are made separately, the Paris Green is added direct.

The formula commonly adopted is:—

	For apple.	For plum and peach.
Copper sulphate.	4 lbs.	3 lbs.
Quicklime.	4 lbs.	3 lbs.
Water.	40 gallons.	40 gallons.
Paris Green.	4 oz.	3 oz.

Copper sulphate is readily soluble in cold water, and still more so in hot. The solution is made by hanging the crystals, contained in a sack or basket, in a barrel of water, near the surface so that it is just covered by the water. Vessels of wood or earthenware should be used for dissolving the sulphate. Dissolve 1 lb. of copper sulphate per 1 gallon of water for a stock solution, then take 40 lbs for a 40 gallon barrel.

Take say one bushel of lime which should be freshly burnt, place it in a barrel and pour say 4 gallons of water on it to slake it, afterwards add enough to make it into a creamery mixture like putty, then pour on a little more water to exclude the air and prevent change in character, then cover the mouth of the barrel to prevent evaporation.

For making up a 40 gallon barrellful of the spraying mixture, take 4 gallons of the copper sulphate solution (4 lbs.) dilute with four or five times the quantity of water. Then take some of the lime putty, mix it with water and add it to the solution, straining it through a funnel-shaped box, with a copper wire mesh strainer at bottom. In order not to add an unnecessary amount of lime, thereby risking the clogging of the machinery, it is advisable to test so as to ascertain whether the sulphuric acid has been neutralized by the lime. For this purpose a solution of ferrocyanide of potassium, (half-ounce in half-pint of water) is used. Take a spoonful of the mixture from the barrel, in a white saucer or a glass, and add a few drops of the ferrocyanide solution. If a reddish brown color appears, the mixture needs more lime, if there is sufficient lime no discoloration takes place.

Next weigh or measure out about 1-3 or 1-4 lb. of Paris Green, put it in a cup and make it into a paste with water; add this to the mixture in the barrel.

In Nova Scotia Paris Green is sold at most of the hardware stores in card-board boxes, containing 1 lb costing about 9d. It may be tested for its purity by ammonia, which should dissolve it completely, producing a deep blue liquid.

When Paris Green is used alone without the Bordeaux mixture it is always advisable to add an equal quantity of lime, for the purpose of taking up the soluble arsenic which may exist and might injure the foliage.

To spray twenty-year-old trees, planted 40 to the acre, costs about 2s. to 4s. per acre per application for materials, and takes about 1 1-2 to 3 gallons per tree to spray thoroughly on both sides. It takes nearly double the quantity to spray when in full leaf that it does before the blossoms open. About 4 to 6 applications are generally needed.

Professor Bailey tells us that with a 300 gallon tank drawn by two horses, with three men, one drawing and pumping, the other two standing on the rear platform two or three feet above the tank, directing the spray, each with a hose pipe, the pump having an automatic stirrer; with this rig five acres of full grown apple trees can be thoroughly sprayed in a day.

For currant and gooseberry caterpillar, white hellebore is used either as powder or if used as a liquid 1 oz. to 3 gallons of water is recommended.

The trunks of old trees are sometimes scraped with a short handled triangular hoe or box scraper, to clean off loose bark and moss, the dwelling-places of the bark lice, and the winter quarters of the codlin moth; this is usually done about April.

Insects, the food of which consists only of the sap or juice of the plant and which thrust their beaks through the epidermis of the plant before they begin to suck in their food, are unharmed by any poison on the outside of the plant. This class of insect, to which scale and aphid belong, can only be destroyed by some substance which is applied to the insect itself, which enters the pores of the body and so kills it.

For apple bark scale (*Mytilaspis pomorum*) the following mixture is used, either in winter or about the middle of June, when the young lice are hatching out:—

Paraffin	2 gallons
Rain water	1 “
Hard soap	1-2 lb. or
Soft soap	1 quart

The soap and water are boiled together, then paraffin is added. The mixture is well stirred. For use, 1 part of the mixture is added to 9 of water and applied to the bark either as a spray before the leaf opens, or with a brush in summer.

Dr. Fletcher recommends a solution of washing soda, so strong that no more will dissolve in the water; then dilute the soap to the proper consistency.

To counteract mildew on the leaves of gooseberry bushes, Potassium Sulphide 8 oz. to 25 gallons of water is employed.

FRUIT TREE BANDING.

The placing of bands of sticky material to prevent the ascent of the female Winter Moth, in America called the Canker Moth, is practised to some extent in Nova Scotia, though it is generally considered that if spraying is thoroughly done at the right periods, grease banding is not necessary.

The substances chiefly used are bands of tarred roofing paper painted with printer's ink, or castor oil and resin applied direct to the tree. Professor Craig recommended, for winter use, 2 lbs. castor oil to 3 lbs. of resin warmed together, but not boiled, applied warm; and for spring use, 2 lbs. castor oil to 4 lbs. resin. These mixtures are applied after scraping off loose bark, either direct or on the surface of paper. The band is placed about 2 feet from ground and about 6 inches wide, and is put on at the end of October or early November.

Grease banding seems specially useful in the case of large trees, which it is difficult to spray thoroughly.

APPLE PICKING AND PACKING.

The kind of ladder commonly used for apple picking is one fairly broad at the base, but the sides of which at the upper end terminate in a point. They are liked as they can be conveniently

placed among the branches. The baskets used are of a rounded shape, with swing handle, holding a little more than a peck. These are convenient for emptying the fruit gently into the barrels in which they are removed from the orchard without sorting. Fallen apples are picked up and sent to Halifax.

The barrels of apples are placed either in a special apple packing house, or more generally in the cellar under the barn or house, ready for sorting and repacking. The apples are sent over to England chiefly between the end of September and the end of March. For sorting, the apples are poured out of the barrels on to a table, usually about 5 feet long and 3 feet wide, with a ledge all round 4 to 5 inches high, covered with carpet, felt or sacking. The sorting divides the apples into:—

1st, of good size and quality.

2nd, smaller, but of good quality, both shipped to England.

3rd, scrubs, which are sound, but scabbed, ill formed or otherwise defective, sent to local market.

4th, rotten for pigs.

Sometimes the extra good apples are picked out as specially "Selected".

The barrel most commonly used in Nova Scotia is made of fir staves with birch hoops, holding about 140 lbs. fruit and costing 10d. Barrels with staves of maple or elm with elm hoops are used to a lesser extent, but are commonly used in Ontario and the United States. These hold about 150 lbs. of apples and cost 1s.

In packing, the bottom and bilge hoops are first nailed, then a thin layer of wood wool called "Excelsior" is placed at the bottom, next a sheet of white paper the same size as the end of the barrel. A layer of "headers" is then laid; these are apples of average size, those best coloured being chosen. These are placed stem downwards. The barrel is then filled by carefully emptying in the fruit, using hinge-handled baskets. The barrel is gently shaken each time fruit is added, so as to pack the fruit closely. It is filled 1 or 2 inches above the rim. In order to get the apples tightly packed so that they do not move after packing and become "slack" in traveling, a round board lined with sacking or saddler's felt is placed, padded side downwards, on the top of the apples; the barrel is rocked on the floor if of cement, or if not, on a heavy

plank. The apples thus shaken and pressed sink to about the level of rim; any spaces are filled with small apples, then another piece of white paper is placed on the apples, the chine hoops are knocked up to loosen them, to allow the lid to enter the mouth of the barrel, then the lid is laid on, and the screw or lever press is applied to the barrel to press the lid into position; followed by the tightening of the chine hoops, and nailing of the head and hoops.

The name of the apple, together with the owner's name and address are stencilled on the top of the barrel; the name of the salesman on the bottom.

The cost of sending over to England—London or Liverpool—from the Annapolis Valley, via Halifax, is about:—

Rail	(60 miles).	1s. 3d.
Steamer.	(3,000 miles).	2s. 6d.
		3s. 9d. per barrel.

The Salesman's commission in London is usually 5 per cent.

Mr. S. C. Parker tells me the average nett price received by the grower was per barrel for the crop of 1896 about 4s. 2d. (1 dollar), for that of 1897, 8s. 1d. and for 1898, 6s. 3d.

The grower considers 8s. per barrel, clear of expenses, (barrel, freight and commission) a very good price, but occasionally they do not pay expenses, due to inferior fruit, bad packing or glutted market.

The apples are sometimes bought on the trees at so much a barrel throughout the orchard, and if packed by the grower, 1s. per barrel is paid for picking, packing and hauling to the station.

There are several large apple buyers who have large stores and packing sheds, capable of holding several thousand barrels; these are generally situated close to a railway station, to enable the barrels to be loaded direct into the cars.

The "London City" by which I returned carried 1,480 barrels; the Furness line to which this boat belongs receives a subsidy from the Canadian Government to run a fortnightly service of steamers.

CRANBERRIES.

Around Berwick, Waterville, Auburn, Aylesford and Cambridge, in the middle of the valley, cranberry growing is fast

increasing; here the soil is moist but not stagnant; it consists generally of one or more feet of peaty soil over sand. In 1896 there were about two hundred acres of cranberry bog, and in 1897 about 2,500 barrels were raised. They keep well in barrels for fully nine months; when required for shipment, they are sorted and cleaned by hand and by machinery and sell in London at 25s. to 35s. per barrel. The cranberry beds take 4 years to come into bearing and are said to last about 40 years. The crop is said to average about 40 barrels per acre. The rows are planted 15 to 24 inches apart, plants 4 or 5 inches apart.

Once in three years the bogs are sanded about 1-2 inch deep taking 50 two-horse loads per acre. During the winter the plantations are in many cases flooded, in order to destroy insects. One company owning a large area of cranberry bog which had been badly infested with "fire worm," at the recommendation of the Canadian Department of Agriculture, sprayed the plantation with arsenate of lead (1-2 oz. arsenate of soda in 1 qt. water, 3-4 oz. acetate of lead in 1 qt., pouring the two together and adding 5 gallons of water). This insecticide has been found very effective, and may take the place of Paris Green in orchards, as in a trial in the Central Experimental Farm, Ottawa, in 1895, the percentage of wormy fruit (Codlin Moth) was even less than where Paris Green was used.

For useful information as to cranberry culture, I would recommend purchasing the Report of the Nova Scotia Fruit Growers' Association for 1897; I believe cranberries would be a remunerative crop on moor and heather land in England and Scotland, as I consider the land is of similar character to that of Nova Scotia, in which cranberries thrive so well.

Mr. S. C. Parker has written to me saying that upon the recommendation of Messrs. Nothard & Lowe (Tooley Street, London) cranberries have been generally shipped this season in boxes holding 10 lbs., this package gave good results, netting about 2s. 6d. per box.

NOTES OF THE YIELDS OF FRUITS.

At Cornwallis Rectory there is an old French Nonpareil apple tree probably 150 years old, measuring 10 feet girth one foot from

the ground. The Rector, the Rev. F. J. H. Axford, told me that during the 20 years he has been there, the amount of fruit from it has varied from 2 barrels up to 16, the average being 9 barrels. A photograph of this tree, taken by his daughter, is given.

At Wolfville, in 1896, from Mr. Elliot Smith's orchard 20 barrels were gathered from three Gravenstein trees 25 years old. In the same year from the farms on Canard Street, 50,000 barrels of apples were gathered within a distance of 3 1-2 miles along the road.

In the Gaspereaux Valley, 1,700 barrels were gathered from 13 acres of orchard belonging to Mr. Gurtridge.

Strawberries, 100 bushels or 3,200 quarts per acre I was informed was an average yield, 5,000 being exceptionally good. Price usually 5d. to 7 1-2d. per quart, but sometimes as low as 2 1-2d. Strawberries are grown on the "matted row" system.

Raspberries 2,000 quarts average, 5,000 very good; price 4d. to 6d. per quart.

Blackberries 2,000 average, about the same price as raspberries.

Cranberries, 50 to 100 barrels of 150 lbs. Price 25 to 30s.

Price paid for picking all berries, 1-2d. per quart.

Potatoes are extensively grown and exported to Cuba. Burbanks, early and late Rose and Chilis are among the varieties most grown, the average yield is about 200 bushels per acre, price varying from 1s. 3d. to 3s., according to season.

VARIETIES OF FRUIT CHIEFLY GROWN IN NOVA SCOTIA.

APPLES. Gravenstein—and Banks' red Gravenstein are fit for shipping about the middle of September.

Baldwin.

King of Tomkins County.

Nonpareil—commands a high price, which is in its prime in the following May and June. It is mostly grown in Annapolis County.

Ribstone Pippin—the best apple of English origin.

Golden Russet.

Ben Davis.

Northern Spy.

The Bishop Pippin or Belle Fleur, introduced by Bishop Inglis, the first bishop of Nova Scotia, is much grown for use, but does not stand shipping.

Blenheim Orange.

Fallawater.

Rhode Island Greening.

PEARS. Bartlett or Williams' Bon Chretien, Clapps' Favorite Flemish Beauty— as standards (In Ontario, Duchesse d'Angouleme is much grown as a dwarf.)

PEACHES. Early Crosby and Early Alexander.

PLUMS. Moer's Arctic, Lombard, Greengage, Magnum bonum and Bradshaw. The wood of the European and American varieties are subject to a very destructive fungoid disease, "Black Knot," (*Plowrightia morbosa*) which I trust we may never get in England, but from this disease the Japanese varieties are almost entirely free. Burbank, Wickson and Abundance are the most popular Japanese sorts.

GOOSEBERRIES AND CURRANTS are but little grown. The American varieties of gooseberry are small, the best being the Downing. English varieties of gooseberry mildew badly. Red currants fruit well, but Black currants do not thrive.

RASPBERRIES. Cuthbert, Marlborough, both of American origin.

BLACKBERRIES. Snyder, of American origin.

STRAWBERRIES. Wilson's and Crescent Seedlings are mostly grown in alternate rows, Parker Earle, a new variety is highly recommended. European varieties do not thrive on the American Continent.

CHERRIES are largely grown around Bear River and Digby; it is a district in which wild cherry and oaks grow naturally in the woods. Black and White hearts and French are the varieties mostly grown.

CRANBERRIES, are got wild from the North Mountain and near the lakes.

ORCHARD IMPLEMENTS. Some of the best orchard implements I saw in use in Nova Scotia were:

Pomona Pump. (Goulds Manufacturing Co., Seneca Falls, New York.) of which a specimen is exhibited.

Eclipse Pump (Morrill & Morley, Benton Harbor, Michigan,) both of these pumps have hard brass working parts complete, fitted on a 40 gallon barrel, with hose, bamboo rod and double Vermorel nozzle, £3. 15. 0.

Costing singly about 24s. additional for carriage to London.

Orchard Spring Tooth Harrow (Syracuse Chilled Plough Co., Syracuse, N. Y.) £3. 15 0.

As an example to us in co-operation amongst farmers and Government aid to agriculture, I will give a short account of the work of the Nova Scotia Fruit Growers' Association, its school of Horticulture, the Nova Scotia Office of Agriculture and the Canadian Government Department of Agriculture:

THE NOVA SCOTIA FRUIT GROWERS' ASSOCIATION

was formed in 1863, when the acreage under fruit was probably about 2,500 acres. In 1893 it was estimated that there were 12,000 acres of bearing orchard with 8,000 more of young trees. In 1871 apples were first sent to England. In 1896, a good year, it is estimated that 750,000 barrels were produced, of which 450,000 were exported to England. The Association has for its objects:

The increase of cultivation of the various kinds of fruit.

The spreading of information as to the best methods of cultivating, packing and shipping fruit.

The discussion of subjects of mutual interest, as freight rates by rail and steamer, ventilation on steamer, handling of barrels on embarking and disembarking to prevent damage, condition of fruit on arrival in markets, possible new markets.

Once a year, in January, it has a three days' session at Wolfville, at which papers are read and discussed; I attended it in 1898 and thought it must be very valuable to the farmers who attend in large numbers. Each member receives the printed report.

The yearly subscription is a dollar. (4s. 2d.)

The Secretary is S. C. Parker, Berwick, Nova Scotia.

At the Halifax Industrial Exhibition in October there was a fine exhibition of apples, plums, cherries, peaches, and grapes, from Nova Scotia and New Brunswick under the management of the Association.

THE SCHOOL OF HORTICULTURE, WOLFVILLE, N. S.

was established in 1894 by the Nova Scotia Fruit Growers' Association assisted by a government grant. Horticulture, Botany and Microscopic Botany are taught by an able professor, F. C. Sears. The School consists of a class-room, with a good collection of English, Canadian and American books on Horticulture, Horticultural Journals, about 12 good microscopes and a collection of pressed wild plants. Beneath the class-room is a potting shed, or workshop, and adjoining a glass-house with economic and ornamental plants and flowers, in which grafting, budding and propagating are taught. There is also a root-cellar in which apple stocks for root-grafting during winter are kept. Surrounding the school are ornamental grounds with a nursery of young fruit and other trees and plants close by.

The horticultural course is at present confined mostly to the propagation of plants and to fruit-growing, dealing with wind-breaks, protection from frost, setting out and planting, tillage, manuring, cover crops, renovation of old orchards, grafting, budding, the life histories of fungi and insects, spraying, harvesting and packing of the fruit, cold storage, etc. The School of Horticulture is attached to the Wolfville University.

The classes are held during the winter months from November to the end of April. Having myself attended the course I cannot speak too highly of it.

The course is free and farmers are invited to come and look round at any time, attend any lecture, and bring any questions. Although there are such exceptional advantages, there are but few who attend regularly.

The following were the Text Books used at the School of Horticulture in Winter, 1897-8: (they are excellent books.)

"The Principles of Fruit-growing" by Prof. L. H. Bailey of Cornell University.

"The Spraying of Plants" by E. G. Lodeman.

"The Nursery Book" by Prof. Bailey.

"The Pruning Book" by Prof. Bailey.

All published by MacMillan & Co., New York and London.
Price about 5s. each.

THE NOVA SCOTIA OFFICE OF AGRICULTURE

in 1897 issued free to all farmers and others interested in the subject, a useful pamphlet, "Practical Hints to Fruit Growers," upon Insects, Fungi, Spray Machinery, insecticides and fungicides.

The Provincial Government has an agricultural and dairy school with model farm at Truro, which deals also with the growth and care of fruit. Lectures on agriculture, dairying and horticulture are given throughout the Province, with field demonstrations which appear to be well attended, judging from the one on spraying which I attended on Mr. Ralph Eaton's farm, near Kentville.

THE CANADIAN DEPARTMENT OF AGRICULTURE

issues at frequent intervals valuable bulletins on agricultural and horticultural subjects sent free to farmers. It has an experimental station in each Province for trial of different varieties of corn, vegetables and fruits. That of Nova Scotia is at Nappan; the Central Experimental station is near Ottawa, where soils and manures are analysed free to farmers, insects are identified and advice given on matters connected with Agriculture and Horticulture.

In 1897 it sent over an expert Mr. J. E. Starr (himself a large apple grower) to report on the condition of the fruit arriving in England and Scotland from various parts of Canada, to see whether any improvements in packing, cold storage, (for grapes, plums, etc.) steamer accommodation, marketing, could be suggested, or new markets found.

In conclusion, I can recommend Nova Scotia as a delightful holiday resort, and where a good deal may be learnt in agricultural methods. The people are very kind and sociable, and willing to give information. And finally, I would here like to record my best thanks to my friends across the Atlantic.

MEMBERSHIP ROLL.

HONORARY.

- Hon. Sydney Fisher, Ottawa.
 Joseph R. Hea, D.C.L., Toronto.
 Edwin W. Busnell, Esq., Boston, Mass.
 Rev. R. Burnett, D.D., Hamilton, Ont.
 D. W. Beadle, Esq., St. Catherine's, Ont.
 Robert Manning, Esq., Boston, Mass.
 F. C. Sumichrast, Esq., Harvard University, Boston.
 John Lowe, Esq., London, G. B.
 Sir Charles Tupper, Ottawa.
 Col. E. E. Babcock, Chicago.
 Hon. J. W. Longley, Halifax.
 W. T. Macoun, Ottawa.
 John Macoun, F.I.S., Ottawa.
 James Fletcher, F.R.C.S., Ottawa.
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ANNOUNCEMENT FOR 1899.

The establishment of the School of Horticulture is one of the most important works of the Association, and one of which every member is justly proud, for it is the only horticultural school in Canada, or indeed, in America. The school is aided by a grant from the provincial government, but many members have spent both time and money in the up-building of this institution. It offers to the young men and women of the province a thoroughly practical course in horticulture, where the principles taught in the class room are illustrated and enforced by the actual performance of the different operations.

The school is located in the most prosperous fruit-growing district of the province, a fact of no small significance, for on every hand the student may see evidences of the importance of this industry, and examples of men who have made a success of the growing of fruit. And, aside from this, it gives the student an opportunity to observe the details of school management, as performed by practical fruit growers.

The school is equipped with much valuable apparatus, making it possible to illustrate practically many of the subjects taught. The greenhouse is supplied with many plants which furnish material for microscopical study of their structure. A number of fruit trees are also grown in the house, so that students may become familiar with budding and top-grafting by performing these operations themselves. Root grafting of various kinds is performed in the grafting room, attached to which is a root cellar, where materials for such work may be stored. A room adjoining the greenhouse is fitted up as a microscopical laboratory, with compound microscopes, dissecting microscope and various accessories. By the use of the microscope the student is made familiar with the structure and growth of such fungous diseases as the black-knot of plums and the black spot of apples, which knowledge will aid them greatly in

combatting such pests in the orchard. The library and reading room are also connected with the greenhouse and form a very important part of the equipment of the school. Besides many scientific works, the library contains books on the spraying of plants, injurious insects, fertility of the land, and many other practical subjects. The leading horticultural journals are kept on the reading room table, and bulletins are received from all the experiment stations and experimental farms in Canada and the United States, so that the student may become familiar with what is being done in all lines to advance our knowledge of horticulture.

Text books have been substituted for the lectures formerly given in the different studies, it being believed that in this way a more thorough knowledge of the branches taught could be gained in the time devoted to each subject. The first year of the course includes the following subjects: 1. "The Propagation of Plants—(a) by seeds, including requisites for germination, seed testing, preparatory treatment of seeds, sowing, requirements of temperature, regulation of moisture, etc.; (b) by layers including a description of the different kinds of layers, how made and with what plants they are used; (c) by cuttings, including parts of plants used, treatment to secure best results, different kinds of cuttings, etc.; (d) by grafting, including a comparison of the different methods, with the special use of each; (e) by budding, including the growing of the stocks for different trees and various methods of performing the operation. In all cases where possible the student is given illustration work in the different methods. 2. "The Spraying of Plants," including a discussion of the various materials used, the preparation of each, spraying pumps and nozzles, and a study of the more important insect and fungous pests, with the treatment for each. 3. "The Principles of Pruning," which embraces the season for pruning, the effect of winter and summer pruning, best method with different fruits, etc.

The second year is devoted to the general principles of fruit-growing, much time being devoted to a study of the soil in its relation to fruit growing. Briefly outlined, the course will embrace the following: The selection of land for different fruits, the tillage of fruit lands, the use of commercial fertilizers and barnyard manure, cover crops, planting of fruit grounds, renovating

old orchards, wind-breaks, picking and packing fruit, packing houses, storing fruit, shipping and reaching consumer.

The character of the town in which an institution is located is always of the utmost importance, and in this respect the school of horticulture is particularly fortunate. Wolfville is strictly a temperance town, and the social atmosphere is exceptionally good. The fact that Acadia university is located here is also of advantage to the students in many ways.

The school year is arranged to suit the needs of farmers, opening on November 1st and closing May 1st. A diploma is granted for full two years' course, with certificate of proficiency for special courses. To all students, whether regular or special, a hearty welcome is extended. Tuition is free to all. Further information will be furnished upon application to Director F. C. Sears, Wolfville, N. S.



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