

THIRTY-THIRD ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

NOVA SCOTIA,

1897.

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

Published by Order of the Government of Nova Scotia.

HALIFAX :

NOVA SCOTIA PRINTING COMPANY.

1897.

SB354
.N8-

1011011

FRUIT GROWERS' ASSOCIATION

OF

NOVA SCOTIA.

Patron.

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

OFFICERS FOR 1897.

President.

J. W. BIGELOW Wolfville, N. S.

Senior Vice-President.

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

County Vice-Presidents.

ANNAPOLIS COUNTY	... REV. H. HOW	..... Annapolis.
KINGS	... T. H. PARKER	..... Berwick.
HANTS	... STEWART DIMOCK	..... Windsor.
HALIFAX	... B. W. CHIPMAM	..... Halifax.
LUNENBURG	... JUDGE DESBRISAY	..... Bridgewater.
DIGBY	... CHARLES BURRILL	..... Weymouth.
YARMOUTH	... C. E. BROWN	..... Yarmouth.
SSELBURNE	... R. W. FREEMAN	..... Jordan River.
QUEENS	... J. M. FREEMAN	..... Pleasant River.
COLCHESTER	... J. C. BLACK	..... Truro.
PICTOU	... W. O. CREIGHTON	..... West River.
CUMBERLAND	... T. R. BLACK, M. P. P.	..... Amherst.
ANTIGONISH	... J. G. CUNNINGHAM	..... Antigonish.
GUYSBORO	... W. D. CAMERON	..... Guysboro.
VICTORIA	... W. F. McCURDY	..... Baddeck.
CAPE BRETON	... WILLIAM PURVES	..... Sydney.
INVERNESS	... JOHN MCKEEN	..... Port Hood.
RICHMOND	... HON. ISIDORE LEBLANC, M. L. C.	..... Arichat.

Secretary.

S. C. PARKER Berwick, N. S.

Assistant Secretary.

R. W. STARR Wolfville, N. S.

16040.

Treasurer.

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

Auditors.

GEORGE THOMSON,

GEORGE H. WALLACE,

Executive Board.

THE PRESIDENT,
SENIOR VICE-PRESIDENT,
SECRETARY,
TREASURER,
GEORGE THOMSON,
W. C. ARCHIBALD,

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

Fruit Committee.

R. W. STARR,
ISAAC SHAW,
COL. S. SPURR,
B. STARRATT,
A. WHITMAN,

MRS. OLIVIA JOHNSON,
J. E. SCHAFFNER,
C. E. BROWN,
R. E. HARRIS,
T. R. JONES.

Small Fruit Committee.

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

L. D. ROBINSON,
HENRY SHAW,
J. S. BISHOP.

Publication Committee.

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

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

FINANCIAL STATEMENT.

HORTICULTURAL SCHOOL *in account with* G. W. MUNRO, *Treasurer.*

1896.		CR.
Jan. 20.	To balance last account.....	\$ 219 31
Apr. 8.	Transfer F. G. A.....	500 00
May 18.	Government Grant.....	2000 00
July 22.	Dep. Receipt.....	800 00
	Interest to date.....	3 91
Dec. 9.	Transfer F. G. A.....	500 00
		<u>\$4023 22</u>

		DR.
By paid E. Faville, salary.....		\$1450 00
" J. K. Martin, ".....		450 00
" Accounts, Faville.....		253 18
" Pratt.....		1 09
" R. E. Harris, accounts.....		39 58
" Rockwell, ".....		6 43
" C. A. Patriquin, ".....		6 55
" T. E. Smith, ".....		9 00
" E. Chase, ".....		1 00
" Sleep, ".....		2 30
" Coal bills, ".....		22 42
" L. V. Brown, ".....		2 00
" D. A. Munro, ".....		13 71
" A. Athenaum, ".....		8 00
" R. W. Starr, ".....		3 00
" Woodworth, ".....		10 30
" Rand, ".....		7 52
" Davison Bros., ".....		5 45
" School Board, ".....		50 00
" A. Cohoon, ".....		42 00
" F. H. Eaton, ".....		29 00
" Welch, ".....		4 85
" Town—Water ".....		5 00
" Spinney, ".....		1 87
" Dep. Receipt—June 1.....		800 00
" " " July 22, credited to N. S. F. G. A.....		600 00
Balance.....		228 92
		<u>\$4023 22</u>

Dec. 31. To balance on hand..... \$228 92

G. W. MUNRO, *Treasurer.*

I have examined this account and find the charges and vouchers for the same to agree. The balance shown is in the bank to the credit of the School as per bank book.

G. H. WALLACE, *Auditor.*

N. S. FRUIT GROWERS' ASSOCIATION *in account with G. W. MUNRO, Treasurer.*

1896.		Cr.	
Jan. 20.	To balance on hand, as per last statement.....		\$373 61
" 25.	Cash received from Secretary.....		150 00
Apl. 8.	Dep. Receipt		500 00
	Interest, July 22nd, 1895, to April 8th, 1896		14 57
Dec. 9.	Dep. Receipt (Horticultural School).....		600 00
	Interest July 22nd to Dec. 9th		8 95
			<u>\$1649 23</u>

1896.		Dr.	
Feb. 11.	By account, Huggins		\$ 30 00
" 13.	" A. Cohoon		25 00
Mar. 4.	" Chase		6 00
" 11.	" S. C. Parker		133 74
Apl. 8.	Transfer to Horticultural School		500 00
June 4.	Account F. H. Eaton		130 00
Dec. 9.	Transfer to Horticultural School		500 00
	Balance ..		324 49
			<u>\$1649 23</u>
Dec. 31.	To balance on hand.....		\$324 49

G. W. MUNRO, *Treasurer.*

Balance N. S. F. G. A.....	\$324 49
" Horticultural School	228 92
	<u>\$553 41</u>
Annual Grant for 1896.....	300 00
	<u>\$853 41</u>
Total funds, Dec. 31st, 1896.....	\$853 41

I have examined the accounts of Mr. G. W. Munro, Treasurer of the N. S. F. G. Association, and find the charges have corresponding vouchers.

The balance is in the bank to the credit of Association, as shown by bank book.

G. H. WALLACE, *Auditor.*

THIRTY-THIRD ANNUAL MEETING.

(Stenographic Report by W. H. Huggins.)

HELD IN COLLEGE HALL, WOLFVILLE, JANUARY 20th, 21st and 22nd, 1897.

The meeting opened at 7 o'clock, p. m., with President BIGELOW in the chair.

REV. MR. MARTEL invoked the Divine blessing.

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

President BIGELOW presented his Annual Address as follows:—

TO THE MEMBERS OF NOVA SCOTIA FRUIT GROWERS' ASSOCIATION :

Ladies and Gentlemen,—I have the honor of again presenting to you my annual report. For the first time in the history of this Association, owing to an unusually abundant fruit crop throughout this continent, and a consequent overstock in all our fruit markets, the fruit industry has not been remunerative. From the most reliable information obtainable, I estimate the apple crop of Nova Scotia at 500,000 barrels. The crop in Ontario and Quebec is reported to be 3,000,000 barrels, or more than double of any previous year for Canada. The United States Government returns put their apple crop at 60,000,000 barrels. We have shipped already 230,000 barrels, principally to London, there to be met with enormous consignments from United States and Ontario, amounting to 2,300,000 barrels, shipped to England, which has so overstocked that great market that prices have returned to the grower an average of from 75 cents to \$1.00 per barrel. Owing to the above cause, rendered more unprofitable by the exorbitant freight rates and charges by the subsidized lines of steamers running between Halifax and London, the fruit grower has practically been growing fruit this year to enrich the carriers and agents. We have paid the carriers already over \$200,000

in freight, and received about \$100,000 to cover cost of growing, barrels, picking, etc., which results in a loss to us.

Although this immense production may not occur again for some time, I think the time has come when we must base our calculations for apple crops at not over one dollar per barrel average, and at this price with reasonable freight rates, I claim that this can be made the most profitable farm industry in Nova Scotia, and as compared with the low prices likely to continue for all food product, this must be considered an equitable price, and all my previous calculations for apple production in Nova Scotia have been based at \$1.00 per barrel.

The crop of small fruits and berries (plums especially) has been universally abundant, and consequently low prices have prevailed. The extremely low prices obtained for fruit this year should stimulate us all to renewed effort to combine for self-protection against exorbitant freight rates and other charges, to introduce a better system of packing and marketing, and to economizing our business in every department.

I am pleased to report that the Act for the destruction of black knot on plum trees has been effectually carried into effect in this town by C. A. Patriquin, the agent employed by the council, and a larger crop and better fruit has been the result. I hope it will be carried out through the province next year.

You will also be asked to petition the legislature to pass an Act for the destruction of canker worm and other injurious pests, by making spraying compulsory.

It is unfortunate that our fruit growers have not taken advantage of our exhibit of Nova Scotia apples in Berlin last year, by consigning apples to the German markets this year. The United States growers have done so, and as far as I can learn, have obtained remunerative prices. We must find new markets as this business expands.

I regret exceedingly to have to report that the petition of over 1000 representative farmers and fruit growers of this province, presented to the Dominion Government, asking for an annual grant of \$2,000 to aid in establishing an experiment fruit-growing station, and keeping a practical fruit grower employed in instructing and promoting fruit culture in the Maritime Provinces, has been *denied* by both the late and the present government—assigning as a reason that it would

necessitate the supporting of similar stations throughout the Dominion —*which is the very reason we applied for the grant.* Knowing that twenty such stations located in Canada, at a cost of \$2,000 each, or \$40,000 in all, would be of more practical benefit to the farmers of Canada than the millions of dollars now expended by the government in subsidising railroads, steamships and manufacturing monopolists, all of which discriminate against the interests of the farmer and compel him to pay tribute. I ask every farmer in Canada to consider that for the paltry sum of \$40,000, judiciously expended, or about eight cents for each farmer in Canada, he could have the latest instruction in fruit culture and be furnished with sample fruit trees, roots and cuttings best adapted to his locality, and that the Canadian Government has denied him that trifling grant; and I think he must realize that the government regard him as unworthy of their consideration further than that he can be made to pay tribute to all other industries, and vote once in five years. Is it any wonder that a majority of the farmers of the Maritime Provinces have been, and will be, compelled to abandon their native homes and country, and seek a living under a foreign flag, while this is an example of the policy of the Canadian Government respecting this most important industry of Canada.

In the small fruit and berry culture in this province, cranberries, where properly cultivated, have proved most profitable, and an acre of cranberry bog properly cultivated in each county as a specimen, would develop a most profitable industry.

The promoters of the Halifax cold storage warehouse have failed so far in securing the required capital, and fruit growers, as well as all producers of perishable fruit products, are deprived of the advantage of any cold storage in this province.

You will receive a full report of the School of Horticulture from the chairman and director, to which I would add that this important and most useful branch of our Association is doing excellent work, having an attendance of 67 students, representing almost every county of the province, as well as students from New Brunswick and Prince Edward Island. I regret that the financial outlook for this school is not encouraging, costing, as it does, about \$3000 a year. The most that can be drawn from the Nova Scotia Government under present arrangement is \$2000, leaving the balance to be raised by

subscription, and from the funds of the Association, which are about exhausted. I must earnestly appeal to the public to come to the rescue of this most worthy institution.

Amid occasional discouragements, and the unremunerative price obtained for that portion of our crop already marketed, we have the cheering prospect of better prices for the large quantity of superior fruit still on hand, and with a good market in February and March, we may yet make a paying average on the year's fruit crop.

In reviewing the past year we, as an Association, have much to be thankful for, and we should thank God and take courage.

GEORGE THOMPSON moved, and R. W. STARR seconded, that the report of the President be received and adopted, and printed in the transactions of the Association.

The motion, upon being put, was passed unanimously.

DR. CHIPMAN. The Association has very properly and very wisely, I think, adopted the President's annual address, and thereby I take it for granted that they endorse the views presented in that report, and that those views coincide with those of the Association. There are a good many practical points in that address, and one of the most important points touched upon is the grant or want of a grant for an experimental fruit station in this valley. That matter is one of the utmost importance to this Association, to the Horticultural School, of which we have charge, and to fruit growers in general, for it seems to me that unless we get assistance in establishing an experimental fruit station, that our school will not do the work that it might do, and that we ultimately may have to close the school. Then again, in every profession at the present time, there is provided, in one way or another, technical education. If a young man wants to become a doctor and enter the medical profession, he must attend a medical college and be educated there,—going to the college, studying the text books, and going into the hospitals and doing the practical work which he will ultimately be called upon to perform. So it is with every profession, and so also with the farmers if they are to meet the keen competition of the world. It is of the utmost importance that we should supplement or complement our Horticultural School with an experimental fruit station. Therefore I am going to move a resolution, as follows:—

"Whereas, This Association having failed to obtain an annual grant of two thousand dollars from the late Federal Government to aid in conducting an experimental fruit station in this valley and thereby affording valuable assistance to fruit culture in these Maritime Provinces ; and also having been denied the same grant by the present Federal Government ;

"Therefore Resolved, That this Association invite the co-operation of the Ontario Fruit Growers' Association, and all horticultural and agricultural societies in Canada, to urge the Federal Government to adopt a more just and liberal policy towards the farmers and fruit growers of Canada, by a grant in aid of the establishing and conducting of fruit stations in the different provinces."

That, Mr. President, is my resolution ; and while we might say this is the end of it, we failed to get it from one government, and we have been denied it by another, we might give it up.

A Voice—Never give up.

DR. CHIPMAN. We have been working hard for it for a number of years. We had a promise from an influential member of the late Dominion Government that that sum would be placed in the estimates for this purpose. And we have some reason to believe that it was placed there in some form. The present government has been approached by its friends and supporters, and this matter has been urged upon them very earnestly, and they have declined to give the grant. Now the only course to pursue is touched upon in that resolution. We must combine, or endeavour to combine with the Ontario Fruit Growers' Association and with the different agricultural and horticultural societies in Canada, and bring this combined pressure to bear upon the government to get this experimental fruit station. Indeed, we will be glad if they will also establish these stations in other parts of Canada as well.

HENRY SHAW. I take great pleasure in seconding this motion. I take it that the fruit growers of this valley are interested to a man in such a station. Fruit-growing is one of the greatest industries of Canada to-day, and competition is keen the world over, and we must keep abreast of the times or some of us will have to go out of business.

MR. PARKER. The only objection I have is that you do not ask for money enough. If it had been \$20,000 you were asking for instead of \$2000, the government would have had more consideration for it. (Laughter.)

DR. A. P. REID said that this whole subject is one of practical education. It is going to take time not only for our legislature, but the people as well, to appreciate the matter. You know the old saying "that anything is good enough for a farmer," and unfortunately it is going to take time to rub that out. There is no calling in life that requires a more profound knowledge of his business than an agriculturist. Suppose you take my own profession, that of a doctor; it is supposed to be a learned profession, and it necessarily is. A man has to spend sometimes five or ten years in order to be thoroughly acquainted with the principles, and yet what have you to learn— anatomy of the human body and the diseases to which it is subject, and also the best means for looking after it, and that is all. If we take the legal profession—a lawyer has simply to learn the laws of his own country, and the general principles of laws in other countries. But the farmer has got to understand botany, understand the laws which regulate plant life, as much medicine as a doctor, because he has to do with the construction and treatment of animals that are built on the same lines and subject, to a great extent, to the same diseases as the human family, and require somewhat similar treatment, and he requires to have as much, and certainly as general practical knowledge of the care of the sick as a doctor. He requires to know as much law as a lawyer to keep out of law. As a rule he is tolerably well posted in theology. But what he requires to learn is the laws which govern the tremendous field in which he labours every day of his life. He requires to know the laws of the weather; the laws which regulate the growth and the development of the plants; he wants to understand something of geology in order that he may thoroughly understand the property of the different soils which he has to deal with; then, if he is going to be a practical man, he must understand the principles of practical surveying, drainage, and the means of carrying it out; and he has also got to know the laws of the business world; and a business man means one who is able to make the best use of those things which happens to be at his hand to turn them to the most economical result. All these things the farmer needs to know, and must know if he is going to succeed. Therefore, I say, that a farmer needs a technical education, and we should do all we can to establish schools to give him that education.

The resolution, upon being put, was passed unanimously.

CRANBERRY GROWING.

This important part of fruit growing was taken up for discussion, and HENRY SHAW, Esq., of Berwick, N. S., spoke as follows on "Progress in Cranberry Growing":—

Mr. President, Ladies, Gentlemen, and Fruit Growers,—I have a very short story to tell you, but I hope it will be interesting. I am going to speak to you on the progress in the cultivation of the Cranberry Vine, and on the crop for the past year. During the early part of the past summer we had a splendid prospect of a fine crop. On the 6th June came a frost and damaged the crop to some extent on some bogs, killing the blossoms and young shoots, but as a general rule, they blossomed finely, and the crop looked well during the summer. On the 6th September there was a frost that spoiled a great deal of fruit on some plantations. I think, on the Kirkpatrick bog in Aylesford, the crop was nearly destroyed. The estimated amount of the crop this year was 2000 barrels. Three carloads were shipped from Auburn, one from Kingston, one from Waterville, one from Cambridge, and large quantities went in small lots—but there are a great many barrels held yet.

PROF. FAVILLE—Has there ever been a larger crop? Ans. No.

I think the year before last, which was called the big year, we had something like 1200 barrels in our county. It takes a bog about four years before it will grow any.

DR. CHIPMAN. That is all west of Coldbrook? Yes.

Then about the price? The very low price of apples and all other fruits has had an injurious effect upon the price of cranberries. With respect to the crop in the United States this year,—in Cape Cod, it was good; in New Jersey, it was fair—and it was a failure or very light in Wisconsin. An *Early Black* is raised in Cape Cod in large quantities, and this year they softened more than usual—being a short keeper and were thrown on the market, which tended to keep the price low. With respect to the prices in Canada. The highest price was reached in the City of Toronto, where \$7 per barrel was realized; in Montreal, \$6; and the last reports I got from the commission agent was that they were selling at \$5 per barrel. He said he had sold some small lots at \$5, but had a large quantity yet on hand. But nevertheless while we are talking of cranberries, I

have made an estimate that it takes about 8 barrels of Gravensteins on the trees to be worth as much as one barrel of cranberries on the vines. One of my neighbors sent four barrels to the city of London, which netted him within a fraction of \$4 per barrel. It cost him \$1 to pick them off the vine; twenty cents for the barrel; and five cents to pack and haul to the station, which gave him \$2.75. In round numbers you take Gravensteins at 60 cents per barrel, that is what they netted this fall. Take seven or eight barrels, which were worth on the trees about the same price, \$2.75.

I may also tell you that the cranberry business has not suffered as much as the apple industry, and another thing too, there is no prospect for the next ten years of over-stocking our markets. Greater progress was made in clearing up and getting out new plantations this year than any year before. One gentleman in my neighborhood has commenced to cultivate a swamp of ten acres, and he is going to spend \$1000, if necessary; has put in two dams, gates, etc., for the purpose of flooding, irrigation and constructing ditches. As he says, if he can get 6% on his capital, it is better to invest his money that way than place it in the bank, because no bank director can pull up his bog and run away with it. The bog will not "burst" up and banks do. (Laughter.)

The PRESIDENT.—Q. What money is there in raising cranberries at \$5 per barrel?

A. First, and foremost, the land is worth nothing out of which you construct your bog—you could not use it for any other purpose that would bring you an income. Now, you put on that bog an outlay of from \$75 to \$100, and then you will have a piece of land which will be worth twice the amount of your outlay. Most of the bogs cost less than that. We will plant the bog with vines. The first and second years you will have to hoe and cultivate it to give the vines a fair chance; and the third year they will bud up for a crop, and in the fourth and fifth years they will bear enough to pay all expenses. If all conditions are right, you will have a crop worth four or five dollars per barrel, which will pay you for all the expenses you put on it, and from that time onward it will be all profit.

If you flood your bog, you will have to make a dam and put in your gates. The flooding will have to be done in the fall, and the water kept in all winter, and let it out in the middle of May.

With reference to insect pests, I have never known a bog in this country to be damaged with the ordinary cranberry worm, and other worms which are so injurious in the United States. I only know of one spot in Aylesford where the vines were destroyed by these worms. They imported their vines from Cape Cod, which no doubt had all to do with it. Some time ago some parties forwarded to Ottawa for inspection some vines which were attacked by pests, and the authorities pronounced them infested with the Cape Cod fire worm.

I have been looking over the cost of picking this berry in the United States. The barrels cost them forty cents; to gather the berries, I think they pay ten cents for six quarts. In Nova Scotia we only pay one cent per quart. My impression is, it costs in the United States about \$2.70 per barrel, that is to pick, pack and get them to market. In Nova Scotia it is not so expensive. Now, we have a chance to successfully compete with our neighbors to the south of us in their markets, and drive them out of our own.

GEO. THOMPSON. Why is the expense less here than in the United States?

Ans. Well, I cannot tell you except perhaps wages are lower here. We have never had any difficulty in getting pickers. At Cape Cod whole families will go for 40 to 50 miles, and they will board and maintain themselves and pick 6 quarts for ten cents. Their barrels cost them forty cents. I do not know whether their railway freights are higher than with us.

Ques. What can barrels be purchased for here? Ans. Twenty cents.

Ques. Is it the apple barrel? Ans. The same as our barrels.

A. B. PARKER. The American cranberry barrel is much smaller? Ans. We tried to get the same size as the American cranberry barrel, but we found that ours contains two gallons more. Their cranberry barrel is one inch less in head, stave and bilge than our apple barrel.

The PRESIDENT. Q.—What was the Cape Cod crop this year? It was good—I think it was about 400,000 bushels. They raise large quantities of the Early Black variety, which is a very short keeping berry. It is similar to the Duchess apple; it will not keep long.

DR. CHIPMAN. What is the highest price we ever received?
 Ans.—\$15 per barrel the winter before last. Last winter they went up to \$12. This year they are very low on account of all kinds of fruit being so cheap. Grapes being one cent per pound had an effect upon the price of our cranberries.

GEO. THOMPSON. Do not the barrels require to be water tight?
 Ans.—No, sir!

GEO. THOMPSON. I have seen them in Halifax holding water?
 Ans.—That was the foxberry.

PROF. FAVILLE. What does it cost you to place a barrel of cranberries in Montreal? Ans.—fifty-two cents per barrel by the carload.

Ques.—What does it cost to prepare a barrel for market? Ans.—It costs us \$1 to get them picked, and 20 cents for barrels. If they were frosted and required cleaning through a machine it will cost ten cents more.

A. B. PARKER. That is not for a small barrel? Ans.—Yes. To pick, pack, and haul them to the station is about \$1.35. We never had any trouble to get all the pickers we wanted.

PROF. FAVILLE. What is the average crop for a cranberry bog 5 years old, per acre?

Ans.—40 or 50 barrels. This year the June frost destroyed about one-half of my crop—but where the frost did not touch it went as high as 100 barrels to the acre. I had a visit from some of my friends in Halifax, they were surprised to see such a growth of cranberries. We measured one square rod which produced two bushels, at the rate of over 80 barrels to the acre.

Ques.—Are our varieties of cranberries as good as those in the United States?

Ans.—Yes. We have so many excellent kinds, that I would not recommend you to import any from the United States, on account of the risk of introducing insect pests into this country. The best vines we get from our wild bogs in their native state, but they should be selected when the berries are on the vines in the autumn of the year, so that you will know what kind you are getting. We have the Bell, Cherry, Neville, and another unknown kind of a dark purple color, which ripens early and keeps well. These varieties are well worth cultivating, and are the best we know of.

MR. J. S. BISHOP, of Auburn, N. S., read the following comprehensive paper on the introduction and growth of this now important business in Nova Scotia :

“THE PROGRESS OF CRANBERRY CULTURE.”

J. S. BISHOP, AUBURN, N. S.

About twenty-five years ago the late Wm. McNeil, of Melvern Square, planted a small cranberry patch, with a view to supply the wants of his own table, as the vines grew, and came into bearing, the fact became evident to him that this branch of horticulture might be made a source of profit as well as convenience. Accordingly, he enlarged his plot from year to year, and talking the matter over with those, who like himself, were interested in small fruit culture, he induced others, here and there in the valley, to experiment along the same line ; taking care to plant the best native sorts that came within their reach. As literature was somewhat scarce on this subject, and the requirements, and different systems of preparing the ground and planting imperfectly understood, ten years slipped away before the public awoke to the fact that the waste unsightly bogs of the Annapolis Valley could be made to rival its best orchard land in point of productiveness. At this time berries rarely sold for less than ten cents per quart, and the supply was never equal to the demands of the local market.

Cranberry culture was now fairly in progress. A natural bog of about three acres, near the old post-road in the vicinity of Aldershot, that had always been at the service of the public, was leased, enclosed, and with very little done in the way of improvement, yielded the first year the snug crop of eighty barrels.

Since then, every year has seen more or less ground planted to vines, with increasing interest in this direction. In the year '91 it was estimated that there were seventy-five acres under cultivation, only about one-quarter of which was then old enough for bearing. The total yield of berries that year being between four and five hundred barrels ; 170 barrels were sent to Montreal, 60 barrels to London, Halifax, and St. John, while the local demand consumed the balance. With the year '94 came another good crop, this time over 1100 barrels. These were scattered all over Eastern Canada, some going as far west as Hamilton, Ont., convincing all, wherever they

were used, that they were fully equal in quality to the average product of Cape Cod or New Jersey.

More bog was planted to vines last spring than any three previous years in the history of this industry; swelling the sum total for the valley to over 200 acres, representing an expenditure of at least \$20,000.

The past year's crop of cranberries in common with other fruit was very large. It may be safely estimated at 1900 barrels. Two-thirds of these were sent to Montreal. Hitherto that city has been able to take care of all our surplus at a satisfactory price. This year that market was overtaxed from the beginning with a poor quality of berries from the United States, this together with unusually large shipments for fox berries from the Newfoundland and Labrador coast, to say nothing of the low price of apples and all other kinds of fruit, has caused the sale of our berries to be slow, prices ruling lower than ever before known.

It would have been better, undoubtedly, to have sent a part of our crop in small shipments to the London market, prices there being about 25 shillings, netting something like \$4.50 per bbl. The ready sale that we have always met with for this fruit in the Upper Provinces has caused us of late to completely neglect our interests in this direction on the other side of the Atlantic, which, by the way, is *well worth* our while to develop.

Some cranberries are already used there, and it is reasonable to suppose that if through the autumn months a limited quantity were sent over, with our apples, and offered for sale, that whatever prejudice that the English people may entertain against their acid qualities, will, in time, be overcome, and they will be ready to give them a place on their bill of fare.

Up to the present time, in the history of cranberry culture, we have been remarkably free from disease and insects, that, from time to time, give the American cranberry grower more or less trouble. This season we have to report progress in this direction. During the past summer the sixteen acre bog of the Middleton Cranberry Co. was infested with what is known as the *fire worm*. The crop was destroyed, and the vines injured, to what extent I am unable to say. This pest is well known to the Cape Cod growers, and is considered a formidable evil. We can only account for its appearance

in one way ; *it must* have been brought over in vines imported from that district.

While we have *native sorts fully equal in every respect to the best varieties grown abroad*, let us be careful how we introduce strangers. I do not consider there is anything very alarming in the presence of the ordinary berry worm. We have always had a few of these every year, and occasionally they take quite a large per centage of the crop, but while they may be dangerously plentiful one year, it does not follow that there will be any to injure the next. Last year they were scarcely noticeable, the year before they were thought to have done considerable damage.

The prospect for next spring's planting is not so good as it was one year ago. This is owing to the unfavourable condition of the autumn for preparing the ground, rather than to a fallen market. The fact that the same may be said of any crop that depends upon a preparation made last fall will bear us out in that statement.

Although the zeal of the cranberry grower may be in some degree checked by the present depressing state of the market, yet when a fair comparison is made with his prospect and those of any other department of fruit-growing, he has no reason to be discouraged.

The full all round crop of all kinds of fruit the past year has tended to depress prices generally ; but the fact that the climate and the soil in many parts of Nova Scotia is highly favourable to the growing of cranberries remains the same. In view of this, we can certainly produce this fruit *as cheaply* as any other country in the world ; and as the cranberry does not belong to that class that has to be marketed as soon as picked, but can, under certain conditions, be held for some months before offering for sale, or can be sent as far away as we ever think of sending apples, gives an advantage that should not be lost sight of.

If we compare cranberry growing in Nova Scotia with that of other countries, we can claim, at least, some advantages. It costs no more to fit our bogs, and white sand flats for vines, than it does to prepare ground in other places. Once our bogs are in bearing, we have nothing like the enemies to prey upon them that they have in Massachusetts or New Jersey.

While our annual rainfall is in every way sufficient for the maturing of our crop, the Wisconsin cranberry grower has to resort to

irrigation and, in face of the difficulties he has to meet to accomplish this, the Association there, at its last regular meeting, discussed the question whether they would not be obliged to abandon this pursuit and turn their attention to something else. As far as my own experience goes, I have had more gratifying returns from what attempts I have made in the direction of growing cranberries, than any other line of fruit culture. So far as my observation extends, I have yet to learn of an instance where a careful, practical outlay has resulted in anything but a paying investment.

It has hitherto been a query with those who from time to time have passed through our Valley, as well as those long resident, what possible use *could ever be made* of those Aylesford bogs? Now that the problem is thus far solved, all that we need is to go ahead and develop this industry, and *success* will crown the effort.

DISCUSSION.

Q. I would like to know if you have ever tried spraying with arsenical poisons to destroy insect pests, or do you know of them being used?

MR. BISHOP. The Middleton Cranberry Co. sprayed their crop last spring with Paris green, and the result was not very satisfactory from the fact that the spraying was not continued, and that a sufficient quantity of Paris green was not put on the vines to kill the worm. We have sprayed for the ordinary berry worm just after the fruit was in blossom, just when the millers, which laid the eggs, were plentiful, and we thought we checked their progress some, but we could not tell just exactly how far the effort was successful.

PROF. FAVILLE. I have listened with a great deal of pleasure to Mr. Bishop's paper, and also to Mr. Shaw's remarks, and I think that we are fortunate in having these gentlemen to tell us the foundation of this industry. This is reliable information. I am interested personally in a company which is opening up a bog, and before we went into the work, we consulted these gentlemen before buying, and I had the pleasure of travelling from Annapolis to Kentville and seeing a great many bogs, and I found that there were hundreds of acres which can be bought cheaply that are suitable for cranberry culture. There is one point that Mr. Bishop mentioned that I think very important, and that is with regard to the importa-

tion of vines and the consequent introduction of cranberry pests. He said the Wisconsin and Cape Cod growers are continually contending against them. There is a question I would like to ask Mr. Shaw with regard to spraying. I understand that experiments were made in Berwick in spraying with tobacco for the berry worm?

MR. SHAW. One of the growers said that the worms were damaging his vines, so he got a gallon of the extract of tobacco, and diluted it with 80 gallons of water; and he said he put it on at the time to clear the miller out. There were in fact two or three tried the same thing. I was told it drove them all off.

The PRESIDENT. Did it have any injurious effect on the vines?
A.—No.

PROF. FAVILLE. Mr. Selfridge said it would cost \$8.00 per acre for this spraying. He said he tried it on one half acre, and another half acre he did not treat at all. The half acre he treated was protected, while the untreated portion was destroyed.

A. B. PARKER. I understand this was the worm itself? A.—Yes.

MR. SHAW. About six years ago our crop was about destroyed by this worm. The Cape Cod men put up stills for getting the extract of tobacco, and carried on the business of spraying for a few years, but subsequently abandoned it. He thought that the pests which were on the Auburn Co.'s bogs did not come in the imported vines eight years ago, but must have found their way there since. He did not believe in importing vines.

DR. A. P. REIP. This discussion has brought the idea to my mind that the farmer and fruit grower must also have a knowledge of entomology. That almost every day some vegetable is infested with some variety of parasite, and, no doubt, the agriculturists in the future will have to devote more attention to studying insects and also how to deal with them. I want to ask a question for information. From the best authority I can obtain I am given to understand that you cannot make a profitable cranberry bog unless you are able to flood it at such a time as flooding is required. That is the impression that has been conveyed to my mind. I am told that cranberries will grow without being flooded, but that if a man is unable to flood his bog he does not know when these pests will come and destroy them; but if he has the means of flooding it he will destroy the parasite.

A. B. PARKER. Flooding is quite important but not entirely necessary for success. I have a successful bog that never saw one bit of water on earth except what comes from heaven. (Laughter.)

DR. A. P. REID. Can you count on that every year?

A. P. PARKER. No; nor you cannot count on water either. (Laughter.) Water in summer is of no use unless you can control it. I do not know of any bog that you can flood at any time you want to. When this worm is working you can destroy it, but you will destroy your crop. The cranberry cannot fertilize itself under water. It is just as well for the worm to have it as the water.

PROF. FAVILLE. I am of the opinion that the cranberry vines that are taken from the wild bogs are liable not to mature early enough in the fall for this climate, and I would like to ask Mr. Bishop or Mr. Shaw with respect to this point?

MR. SHAW. I cannot speak from my own experience in this matter. I was in a bog on the Gaspereaux a few years ago looking for vines, and I found a spot half as big as that platform, on the 15th December, covered with berries. Unfortunately I put them on land that could be flooded in the winter, but the water would not stay on it. Part of it has done nicely, and every year I get a fair crop of berries from it. All the vines we have come from the wild bogs.

PROF. FAVILLE. Are you always sure of being able to get them?

HENRY SHAW. Yes. I know for a positive fact that seeds of cranberries will produce cranberry vines; like the seeds of a plum. I have seen cranberries growing as white as snow. Get the "Cherry" or "Bell."

PROF. FAVILLE. Is it not better to obtain a reliable grower?

HENRY SHAW. Yes; if you know what you are buying.

MR. BISHOP. It is a great disadvantage to plant a late variety, because the early frost is apt to destroy them. Get a variety that will mature early. A bog that is properly cared for will blossom earlier in the season than one that is left wild. It is well to bear in mind that sanding vines bears the same relations to a cranberry bog that pruning does to an orchard. If the vines are properly sanded, and the bog kept moistened, they will blossom early in the season.

WHAT PLANTS FEED ON.

W. O. CREIGHTON, WEST RIVER, PICTOU CO.

Plants obtain part of their nourishment from the air and part from the soil. If a plant is burned the greater part is consumed and passes off in the form of a gas ; but there is still left a small quantity of ash. No difference how great the heat applied, or how complete the combustion, the ash cannot be driven off. The same thing happens if the plant is allowed to slowly decay on the soil. In the end, that part of the plant that came from the air returns to the air, and that part that came from the earth returns to it.

The dry constituents of plants may thus be conveniently divided into two classes—the combustible, and the incombustible, or the organic and the norganic. The combustible part of plants is always made up of four chemical elements—carbon, oxygen, hydrogen and nitrogen. Without these no plant is ever produced.

Of these, oxygen and hydrogen, in the form of water, comprise the most abundant ingredients of a living plant. Many vegetables contain more than 90% of water. Timber felled in the driest time seldom contains less than 40%. Carbon generally forms more than half of the dry constituents of a plant. Nitrogen seldom exceeds 4% of the dry matter, and generally much less. The incombustible part of plants always contains six chemical elements—potassium, magnesium, calcium, iron, phosphorus and sulphur. These elements, although forming a small part of the plant, are essential to its existence. In seeds free from husk the total ash varies from 2-5% in the straw ; of cereals, 4-7% ; in farm root, 4-8% ; in hay, 5-9%.

Besides these essential elements just named, an ash will generally contain sodium, silicon, chlorine, manganese, and perhaps minute particles of other elements. These are not essential to plant life, although some of them may discharge useful functions in the plant.

The following elements are found in meadow hay :—Carbon, hydrogen, nitrogen, sulphur, oxygen, potassium, sodium, calcium, magnesium, iron, phosphorus, chlorine, silicon.

It is well to remember that the above named elements do not exist in the plant in their simple or elementary state, but in combination with one another. Hydrogen and oxygen occur in combination as water ; nitrogen in combination with potassium, or sodium in the

form of nitrates, phosphorus in the form of phosphates, sulphur partly in the form of sulphates and partly as a constituent of albumenoids.

As has been stated, carbon is the most abundant of the dry matter of plants. The great source of vegetable carbon is the carbonic-acid-gas of the atmosphere. This gas is a union of oxygen and carbon, is always produced by the union of these elements as by the breathing of animals, the burning or decaying of vegetable substances. In some way or other, which we cannot very well understand, the leaves of plants have the power of absorbing this gas, and in the presence of sunlight the carbon acid thus absorbed is decomposed, the oxygen being set free and the carbon retained by the plant.

The plant thus plays a part directly opposite to that of the animal. The latter breathe in oxygen, which unites with the carbon of the food consumed, giving off as one of its products carbonic acid, which is expelled by the animal at every breath. This gas is poisonous to animal life, but it serves as food to the plant. Plants, on the other hand, breathe in (so to speak) the carbonic acid, and breathe out oxygen purified for the use of the animal.

Probably a small quantity of water is also absorbed by the leaves of plants, particularly in dry seasons, but the great source of water is from the soil by means of the roots of the plant. A small quantity of nitrogen in the form of nitric acid, or ammonia, is also absorbed by the leaves of plants, but most plants seem to have no power to appropriate the uncombined nitrogen which comprises four-fifths of atmospheric air. They are thus dependent for their supply of nitrogen, which is one of the most important constituents of plant food, upon the soil chiefly. The humus or decayed vegetable matter of soils has its origin in the dead roots, leaves, etc., of a previous vegetation. It is the principal nitrogenous constituent of the soil. A black soil rich in humus is sure to be rich in nitrogen, a soil destitute will contain scarcely any nitrogen. The nitrogen contained in humus is not in a condition to be used by the plant as a food, as it is generally in an insoluble state, but by the action of a minute bacterium present in all soils, humus and ammonia, are oxidized, and their nitrogen converted into nitric acid; then in the presence of some base as calcium, carbonate or potassium, this is converted into some of the soluble nitrate salts. Of all the readily soluble salts the nitrates are of the greatest

importance to plant food, and when a soil is deficient they must be supplied to secure a full crop.

Of the mineral elements or compounds, which enter into the composition of the plant, only two need to be mentioned—potash and phosphoric acid, as they are the only ones in which a soil is likely to be deficient. The others are supplied by nature in such abundance that we need to take little thought about them. Thus we see that while by far the greatest part of the constituents of plant food required to perfect its growth is supplied by the hand of an all wise and kind Providence in the greatest abundance, and require no forethought on our part for their supply. In human agriculture, however, both animal and vegetable products are consumed off the land that produces them, and if no return is made to the land at least a part of the essential constituents of plant food must be removed in the form of potash, phosphates or nitrates. Hence the necessity of manuring, if permanent fertility is to be retained. The fertility of a soil is thus nearly connected with the amount of nitrogen, potash and phosphoric acid that exists in it in a soluble condition.

Farm-yard manure consists of the solid and liquid excrements of the farm stock, plus the straw employed as litter. Its composition depends very much upon the animals contributing to it, the character of their food, and also a good deal in the care taken of it, and the method of its preparation.

In the case of an adult animal neither gaining or losing weight, the excrement will contain the same amount of nitrogen and ash constituents as were contained in the food consumed. If, however, the animal is increasing in weight, or is producing young, or furnishing milk or wool, the nitrogen and ash will be less than that contained in the food. The manure from this class will consequently be much poorer than from the former, supposing the same food were given to each.

The character of the food will affect the quality of the manure even more than the character of the animal. A diet of straw and chaff will yield only a poor manure, as these foods contain little nitrogen or phosphates. A diet of wheat bran, oil cake or beans, will, on the other hand, yield a valuable manure, as these foods are very rich in nitrogen and ash constituents. A common mode of increasing the supply of manure is by the consumption of purchased

foods as bran, oil cakes, etc. This is the most economical way of purchasing plant food.

The treatment of manure is also important. A large proportion of the valuable part of manure is voided in the form of urine, and generally the richer the diet the greater will this proportion be. Hence, if the urine is allowed to be washed away, as it is by many farmers, serious losses occur. Again, the urea which forms the chief nitrogenous ingredient of urine is speedily changed by fermentation into carbonate of ammonia, and as this is a valuable substance, a loss of part or all of the nitrogen may easily occur, if fermentation is allowed to proceed. Again, if the manure is left exposed to the weather, all the soluble potash salts will be washed out and lost. If a farmer should try how much soap could be made from a barrel of hardwood ashes that had stood for months under the eaves of the barn, he would realize fully the loss of potash from manure thus treated.

Farmyard manure rapidly undergoes fermentation. If placed in a heap it gets sensibly hotter, and carbonic acid is given off. Rotten manure is more concentrated than fresh, and when fermentation is not allowed to proceed too far, little loss occurs, and some of the constituents have become more soluble.

Farmyard manure is a general manure, that is, it contains all the elements of plant food. The immediate returns from an application of farmyard manure is much less than from the same amount of plant food supplied in the form of artificial manures. Its effects is spread over a number of years, as its ingredients are not in a readily soluble condition, while artificial manures are readily soluble.

The true economy of manure can only be understood when we are fully acquainted with the special characteristics of the crops we wish to grow. The composition of a crop is no sufficient guide to the character of the manure suited to it even when we possess, in addition, the composition of the soil on which it is to be grown. It is not the materials which are required to form a crop, but the power of the crop to assimilate these materials that must form the basis of our judgment. In the case of a barren sand it may be necessary to supply all the constituents of plant food before a crop can be grown, but when land is in a fairly fertile condition the total amount of plant food is considerable, and a luxuriant crop may be grown by supplementing

with the particular ingredient which the crop has most difficulty in obtaining. Thus, in a large majority of cases, a dressing of nitrate of soda and superphosphate will ensure a full crop of wheat, barley or oats, and in many cases, nitrate of soda alone will prove effective. These cereal crops generally find the supply of nitrogen in the soil insufficient, and the supply of phosphates more or less inadequate, but in a majority of cases they will be able to obtain a sufficient supply of potash and other essential elements of plant food. In the same way, nitrate of soda alone will produce a full crop of mangels, superphosphates alone a large crop of turnips, while potash salts alone will be very effective on clovers and pasture lands. Thus we are able, by supplying one or two ingredients, to obtain a full harvest. This special manuring is no strain on the land if a systematic rotation is followed. If superphosphate be employed for turnips, potash for clover, and a nitrogenous manure for cereals, the essential elements of plant food will not be diminished at the end of the rotation. At the same time, the most economical result will have been obtained from the manure employed. In the majority of cases, however, this special manuring will only be of advantage in supplementing the general use of farmyard manure. Under these circumstances it would be best to apply farmyard manure to those crops that stand most in need of a general manuring.

As the whole subject of artificial manuring is to supplement the deficiencies of the soil it is highly desirable that a farmer should ascertain by trials on his fields what is the actual amount of increase that he obtains from the application of the manure he buys.

A few carefully made experiments will teach him what his land and crops are really in need of. Should he add superphosphate to nitrate of soda for wheat? What dressing of the nitrate is sufficient? Is superphosphate alone sufficient for turnips? And what is the smallest quantity that will give paying results? These and similar questions can only be answered by repeated trials on his own fields, and on the farmer's knowledge of such facts will depend the economy with which he is able to use artificial fertilizers.

THURSDAY, Jan. 21st, 1897.

The Association met at 10 o'clock, Vice-President STARR in the chair.

MR. W. C. ARCHIBALD, of Wolfville, presented the following paper:
 A PRESENT AND IMPERATIVE VIEW OF COMMERCIAL
 FRUIT CULTURE.

In the year 1860 an impulse was given by the Royal Horticultural Society at the London Exhibition, which led the way to the formation of the Horticultural Association and International Show Society of N. S. in 1863. Its avowed object was to take charge of contributions to European exhibitions and be a channel for conveying to its members the best information on the subject of horticulture.

Among the wise and useful men who broadly and solidly laid the foundations of this Society should be mentioned, R. G. Haliburton, Esq., Dr. Hamilton, Dr. Robertson, Rev. John Storrs, D. Henry Starr, R. W. Starr, and Hebert Harris. This Society was incorporated in 1864 under the name of the N. S. F. G. A., and to-day this large assembly witnessed its thirty-third annual meeting.

In retrospect, I may simply observe that the career of this Association has been well marked by works of a highly beneficent character. Here, individual theories have been subjected to the knowledge and judgment of practical men. While *all* may not have been accomplished, that the masses of the people expected, yet it must not be forgotten while scientific knowledge is wanting true progress will be slow. Hitherto, these investigations have been carried on by the individual grower—a wasteful and most expensive process.

About the period of organization, thousands of trees bearing early varieties of apples were planted, but this year has shown a tremendous loss by loading the markets with these perishable and unprofitable fruits. This mistake of years ago is now costing each fruit grower hundreds of dollars. What is our actual position to-day? After years of persistent purpose, and hard, earnest experience, without the aid of an experiment fruit station, we can only present one autumn apple—the unrivalled Gravenstein; and to this, and this one only, we owe our prestige in the markets of the world. We may enumerate the Ribston, the King, the Baldwin, the Spy, the Russetts, as winter

apples, but other fruit countries can proudly do the same. We must originate or produce by variations and develop superior fruit for winter use as highly attractive as our Gravenstein.

The increasing wealthy classes, from whom the profit to fruit growers, even more in the future than in the past must come, demand showy fruit of high quality and flavor, and by these characteristics of fruit and fruit consumers, must we shape our course. I have said this is a beneficent institution. It is educational and progressive. The teaching of true science tells how to get the most out of nature at the smallest cost. Horticulture presents a class of ideas distinctive from agriculture, yet emanating wholly from the work. Four years have passed since I had the honor and duty of reading a paper before this Association, asking for a committee of ways and means for the establishment of a School of Horticulture. Subsequent events have sufficiently shown that it did not come one hour too soon.

The power and usefulness to a student possessing a horticultural education is an intelligent blending of the qualities of mind and heart into mysteries of nature, surrounding tree life. It also discovers the laws that direct their existence and the principles which underlie the better building of orchards. Here the student is brought in contact with new ideas, out of natural laws, touching the life of plants. It educates to a calling in life and completeness to the man. This education is the best capital for a young man to enter orchard work, and will eventually raise our calling to the level of the highest. The system of higher education is crowding the medical and other professions, and those not wanted are forced into other callings. It may be that the learned professions are looking to the agricultural population for relief. Here is an opportunity for usefulness and a business. To live with nature is an improved mankind, to live with God in nature is to enoble and dignify man. Natural science is a teaching of living, progressive truths, and touches the principles of life and the natural method of growth in plants leading to their development under an assisting hand to perform their highest functions. The discovery of nature's hidden forces surprise us. To be measurably able to understand these laws and seize upon their uses is to bring to us the power of controlling them. We should work with nature's laws, not against them. A young orchard is early brought into bearing by cultivation without injuring the tree or its fruit. Trees are

subjects of habit as man, and the laws which govern our being govern theirs.

We are now at the point where an experiment fruit station in our midst is of prime necessity. For three years we have pressed the matter with the Dominion Governments. We ask from them a grant to purchase a block of land conveniently near the school. If we are to meet difficulties in producing fruits at competing prices, it is not because the people of these provinces have less ability and energy than those of other countries, but because the governments of their respective countries have come to the aid of their people by providing lands and men eminently qualified in this science to test and illustrate our work. A convincing proof of our present need to the Government of Canada is the fact that four years ago the Provincial Government of Nova Scotia were informed, and with commendable statesmanship founded the School of Horticulture at Wolfville. But this is not enough to satisfy the intelligent and progressive fruit-grower. An opportunity to apply and justify scientific research is the demand of the hour. *This* is the present and imperative view of commercial fruit culture. It is plainly a work of public advantage. Last year the state of New York made an extra and supplementary grant of \$60,000 for orchard extension work. Ten years ago the late Government of Canada established a system of experimental farms, one of which was located at Nappan, to benefit the three maritime provinces. Horticulture then occupied comparatively a small place with that of to-day. Development since then with scientific inquiry has taught us if we would secure an improved class of fruits superior to a locality, it can only be done in that locality where the greatest number of favoring conditions centre. The planting of the iron clad varieties of fruits at Nappan station has never, is not now, and cannot, benefit directly the commercial fruit interests of the Annapolis Valley. The Ottawa Central Farm has distributed valuable trees and plants through Canada, but in this highly conditioned fruit belt we have not received one fruit tree, nor do we expect it, that will become a typical commercial fruit here. There, we believe, most valuable principles will be enunciated, to be worked out in the heart of this great fruit region. Are we to be retarded by the standard of the fruits produced in the non-commercial fruit districts of Canada. The struggle for supremacy in tree life should energize us to supremacy in trade. When we plant a tree we plant for a century, and every year in the life of an orchard

adds increased wealth and commerce to the country. In this aspect of permanency we indisputably lead the lumbering, fishing, manufacturing, or mining industries of the province. The government interviews a manufacturer of brick and assists him ; but every request of the fruit grower is denied. This is not a question of free trade or tariff. The manufacturers of Canada have been treated most generously by the fruit growers of Canada. Agriculture is the oldest of the arts on earth, yet the last to ask for justice from governments.

Again, for obvious reasons, the agricultural classes do not adapt themselves so quickly as the manufacturers to rapid economic changes. They are always the last to claim equitable rights from governments. The new fruit station will direct our fruit growers and the government to this great branch and industry of horticulture. The recognition of this important work by the Dominion Government will shake out the old habits of thought, and enable us to put into systematic practice an ever-broadening knowledge. It is the duty of the government to study with us the fundamental difficulties met, and not deny our intelligent and reasonable requests. This year the fruit growers are aroused, as never before, and now is the time to teach by experimentation. There is an educative impulse swiftly rising among the agricultural classes, and it is the government's chance to administer our affairs to the advantage of these influential and useful citizens. Horticulture in Nova Scotia has already extended the trade and commerce of Canada half a million dollars a year, and with just encouragement in seven years more will extend its commerce to one million dollars annually. The government controlling the trade and commerce of Canada ought to give the people contributing directly to the extension of this commerce a prompt assistance before its decline, and assist in accord with the best opinions these people have already pointed out. We believe the prejudice and indifference to matters of detail in orcharding will give way before the public taste, and illustrations of progressive horticulture upon a fruit station in a valley so eminently endowed by providence, to place it in the van among the fruit countries of the world.

The 20,000 fruit growers of the Cornwallis and Annapolis Valley trusted the directors of our experimental farms, that they, in advisory positions with the Minister of Agriculture, would, with momentous concern, advance with us to the realization of our hopes. We are met

by disappointment. The denial distinct from our department at Ottawa will have harmful results. The experiment fruit station would round out our horticultural equipment and bring the great natural resources of our province into view, and the people of the province would be known as a people of refined tastes.

THE EXTENSION OF HORTICULTURAL EDUCATION.

MR. W. W. HUBBARD, SUSSEX, N. B.

Mr. Chairman, Ladies and Gentleman,—When your Secretary was good enough to call upon me to make a few remarks before your meeting, I had thought that the subject upon which Mr. Archibald has just presented so valuable a paper, and correlative with that the subject of horticultural education, which, of course, he was driving at, a practical exemplification of what you could do here in the Annapolis Valley. I was thinking that your Association here could well devote a little attention to the extension of that education to a larger sphere. You are looking, and quite justly, to the Federal Government and Provincial Government to aid you in the pioneer work which you are undertaking, and it is work which, I think, you can look back upon in the thirty-three years of your existence with satisfaction to yourselves. You have accomplished a good deal for your own good no doubt, for the advertisement of your province, and for the whole of Eastern Canada, and perhaps, Canada as a whole, by showing that this portion of Canada could produce fruit unrivalled, perhaps, by any other country in the world; and you can place your products upon the largest market of the world without fear of competition, that is, that you can hold your place securely there. You, of course, have been producing large quantities of fruit this year, and you know, better than I, who have been only watching the markets, that success in a commercial sense has not been yours; and I am glad to see gentlemen here not discouraged on account of that, but that you look to reducing the cost of production; to producing varieties which you can best produce; and by placing them upon the markets in the best possible way to reap the advantage, and secure margins of profits which no other countries could. That is the future we must look in the face. We must make up our minds to what markets we can develop. Educate the taste of the markets, and produce that

product for them for which they will give you the highest price, and you will have to produce these goods so cheaply that even if the market price is forced down we will still have our margin of profit.

We cannot influence, by any course we may pursue, the market price of any country in the world, so we must, by the best way we can, compete with the market prices in existence, which are ruled by law of supply and demand which we cannot control

Now, with respect to some of the necessities for reducing the cost of production: You want here a specific knowledge of the best varieties that you can market. Mr. Archibald has stated that you have an apple par excellence for this Valley—the *Gravenstein*. You want an apple for a winter apple; you want an apple that you can place upon the market until apples come again, that has nothing objectionable in it, and that will be in demand. You want to find those varieties suitable to your circumstances. Now, speaking for the larger field of the whole Province of Nova Scotia, and speaking for the Province of New Brunswick, I am glad to say that you are now able to draw a small revenue for your Horticultural School from these provinces. We want for the larger field a devotion for horticultural education, not so much perhaps for an experiment station here and there, but as it is to get the results of what will best be adopted in a general way. It would, perhaps, surprise you to know the dense ignorance prevailing in some districts in our country with respect to the care of an orchard. I visited an orchard a short time ago up the St. John River. The owner had 300 trees out for about four years, and he was about disgusted with orcharding because his trees would not flourish. He said he would give it up and cultivate hay. Well, the trees looked mean, and I need not tell you they were rather a miserable looking lot of trees. He did not know from any teaching that he had had that cultivation was necessary—that the trees should be fed from the soil. When I went to look at them they were covered with lice, terribly afflicted with lice. I pointed that out. "What," he said, "Do you tell me that my trees are covered with lice?" I replied that they were in that condition, and he was greatly surprised. He did not know that a tree could be affected with lice. This will show you that there is some need for this education—even the elementary branch of an horticultural education. When, through the aid of your Provincial Government, through the expenditure of a large

amount of money by your Association, and by the earnest work on behalf of your leading men, you established a School of Horticulture in this Valley, you did no doubt, a very good thing; in fact, one of the best things you could have done for your locality, and province as a whole; but you do not find that the farmer's sons are flocking to that school to receive information. When the Ontario Government established in 1884 a college at Guelph, they spent a good deal of money, and tried to induce the farmers to send their sons there. What was the history of that institution for ten years? It was a very difficult thing indeed to induce farmers' sons to attend.

When I was there in 1893 I think you could find all *bona fide* farmers' sons that was at that institution then. When they first started it the farmers were not in sympathy with it. They did not realize the necessity of that education. In 1886, I think it was, the government began to get their eyes open a little. They organized a system of farmers' institutes,— if they would not send their people to the college, they would send the college to the farmers. When the professors went around to these institutes in the winter time and showed them in a practical way how they could save money, how they could make use of science on their farms, they began to look at it in a different light; and to-day that institution, if I am not mistaken, is over-crowded with farmers' sons, and they are turning out the very best farmers in the world—men who have graduated there within the last seven or eight years, are making their mark already as progressive farmers. Now, this institute work has been developed until last year, in the Province of Ontario, no fewer than 666 meetings were held in the electoral districts of that province to discuss farm work. You can see how farmers can be benefitted by practical addresses by practical men. They did not conduct these meetings altogether with professors from the agricultural farms, but they utilized the practical men scattered throughout the province. There is a feeling now throughout the Province of Ontario of faith in agriculture, and there is also an improvement in business methods.

We have got to adopt some such system; if you cannot get the farmers to come to the school, you must carry that school to the farmers by some means or other. The other day we had a maritime stock meeting, and we found our ideas were almost identical with respect

to technical education. I think in all lines of agricultural work that is the fact ; so that I would ask you to consider the supplementing of your present system of education with an experimental station. You must enlist the interests of the farmers in this work by carrying the School of Horticulture to the farmers ; by this means you will be able to awaken more interest in fruit-growing than you would under any other system ; and I think that the Provincial Government should assist you by providing you with the ways and means of carrying this work before the people ; and it is only in that way you will be able to build up your school here the way you would like to do. That is my convictions, not only in horticultural lines, but in regard to every other kind of agricultural work. Prof. Faville has done good work in some of the districts he has visited, perhaps in all ; and we hope that he may be available for a few meetings in the Province of New Brunswick before the time of active orcharding next year. We would like to send you a lot of students, and I think that our farmers and our farmers' association will be disposed to recommend the carrying out of such a programme. I do not see that we can better ourselves over there in any other way to a greater extent. You have here a professor who is well calculated to carry that work to the farmers, and we want to see that work carried on in New Brunswick. We believe that we can grow fruit to good advantage in parts of that province. In the lower parts of the St. John valley we have a district perhaps as well adapted as the Annapolis Valley for fruit-growing, and we are anxious to improve that district, and if we can, by aiding you in any way secure your help in return, it will be willingly done, and thank you for what we receive. I thank you very much for your kind attention. (Applause.)

AFTERNOON SESSION.

THE afternoon session was largely devoted to addresses and discussion on the proposed shipping company. The discussion was introduced with the following practical and exhaustive address by P. INNES, Esq., of Cold Brook, Kings Co :—

THE NOVA SCOTIA APPLE AND PRODUCE SHIPPING COMPANY (LIMITED.)

The subject on which I am to address the Association to-day, and upon which the fullest and freest discussion and criticism is not merely desirable but is earnestly invited, is—"The Proposed Apple Shipping Company: Is it a practical scheme, and will it solve the difficulties connected with the transportation and marketing of the crops?"

This is a subject which perhaps lies somewhat outside of the main objects for which this Association was formed, but it is so intimately connected with them, and is in fact their resulting outcome, that its consideration is both appropriate and legitimate. Indeed, I go further, and venture to submit that the Association has largely accomplished the original mission which it set itself to perform, and fulfilled the initial purposes for which it was founded; and that the pressing and paramount question of the hour is not so much the encouragement of production as the profitable utilization of our already large product to the advantage of the producer. Owing in no small degree to the efforts and influence of the Association, the apple-growing industry has attained large proportions and has become, if not the greatest, one of the greatest staples of the province; and it obviously and necessarily follows that its present condition and future prospects and possibilities not only deserve, but absolutely demand, our serious consideration. Science is constantly showing us how to increase our products, but the lesson we have yet to learn is orchard economics, the importance of markets, and how to secure satisfactory remuneration for our labours. It is all very well to pride ourselves upon our prolific production, but unless it can be disposed of to the benefit of the producer, all our efforts shall have been largely in vain, and we have been merely sowing the wind. I have no hesitation in saying, sir, and saying advisedly, that no more important question could engage our attention at the present time, and no more urgent question

confronts our fruit growers, than that of the profitable warehousing, transportation, and marketing of our crops. Upon the proper, judicious and effective solution of this question depends the whole future of our great and rapidly growing industry.

We are not singular in our experiences. The conditions which affect and hamper our industry are felt, and are arousing attention in other localities. The president of the Ontario Fruit Growers' Association, in his address at their late annual meeting, spoke as follows :—
 "Apple culture and the production of this valuable fruit has engaged the attention of our Association for the last thirty years, new varieties continually claiming our attention ; but it would appear to me that the time has fully come when the question of transportation and the development of new markets should engage our careful consideration.

* * * Thousands upon thousands of barrels this year are scarcely paying freight and commission charges in the British market, and we ask ourselves can it be possible that after subsidizing steamships and railways for the transportation of our products, we are now called upon to pay the total value of the product to these companies to carry them to their destination ; or does the fault lie at the other end ? that part of the transaction we do not see. We have before us to-day an object lesson, and one we might study for our future guidance. Large quantities of choice apples wasted in the orchards. Why ? Because of doubt and uncertainty in regard to the system of marketing, and to add to the doubt the increase in the freight rates, which is usually made when the quantity to go forward is large. We want a change in the present system, and you, gentlemen, fruit growers of Ontario, will need to solve the problem." Gentlemen, we have a similar object lesson presented to us in this Valley for our study ; and as we were ahead of Ontario in the formation of a fruit growers' association, so I believe we will be, and ought to be, ahead of her in devising a scheme for the solution of the problem.

The conditions which affect our business, favorably and unfavorably, are well known to you all, and need only be briefly summarized. The suitability of our soil and climate for apple production on a large scale has been demonstrated beyond peradventure. The fruit grown may be fairly classed as of excellent quality in the main, and several varieties have the special merit of being long keepers. The cultivation is limited within a comparatively small area contiguous to the

seaboard. Our harbours are commodious, easy of access, most of them open all the year round, and nearer to the British and European markets by some 500 miles than any other shipping port on the continent. Under such favorable natural conditions, which cannot be taken away from us, our fruit growers should be able to defy competition, to market their fruit more cheaply and expeditiously than the growers of Canada and the United States, and to realize the full market value of their produce, less the ordinary reasonable expense of transportation and brokerage.

But how stands the fact? What is the obverse of this picture? You all know, many of you much better, and from larger experience than I can pretend to, what the actual circumstances and the unprofitable results have been and are. We have had no system, no supervision, no control over our own business. We have been absolutely at the mercy of the speculator, the steamship agent, and the commission agent. We have unreservedly handed our produce to them, and have had perforce to be satisfied with such returns as they were generous enough to grant us. Sometimes we made spasmodic and ineffectual attempts to break loose from our environment by chartering vessels for ourselves, but such attempts invariably ended in disaster, because the steamship lines in possession, and drawing subsidies from the public funds, combined to quote lower rates and kill off competition. In a word, all hands through which our apples pass, and even some hands through which they do not pass at all, from the time they leave the producer till they reach the ultimate consumer, take almost what they please without let or hindrance, and we have no voice whatever in the matter. I am not telling you anything new, gentlemen. This matter has been a subject of discussion at our meetings on frequent occasions, and the situation has been characterized in terms much more direct and forcible than I have used. But so far the discussions have led to no practical results; they remain barren and entombed in our annual records.

In glancing over these records the other day I found that to our public-spirited friend, Mr. A. McN. Patterson, belongs the honor of being the pioneer of the movement which has now, "after many days," assumed the concrete practical shape which I am about to submit to your consideration. At the annual meeting, held in January, 1893, just four years ago, he said:—"What we should do at this very

gathering is to resolve to form a 'Fruit Growers' Shipping Association, and call meetings at Canning, Kentville, Berwick, Middleton, Bridgetown and Annapolis, to bring this matter before our people, and urge them to action. Our people will not join such a combine unless they are instructed as to its necessity, and also they must feel assured that it is not to become the machine of some particular individual who has an axe to grind."

Now, sir, I say for myself, and I believe I can say for my associates, that I have no axe to grind, nor do I seek any position in connection with the proposed company. At a public meeting held in Kentville, some time since, the meeting did me the honor of electing me president of the provisional board. Thereupon, I conceived it to be my duty to look more closely into the matter and endeavour to formulate a practical workable and efficient scheme; and, having done so, to test to what extent it met the views and would receive the support of our fruit growers and farmers in whose interest it was being promoted. So far a good deal of publicity has been given to the matter in the press and at meetings held in different localities. In order, however, that a more direct and authoritative deliverance may be had upon the necessity for, and the merits and feasibility of, the scheme, it has been considered desirable to submit it to the consideration of what may be called the fruit growers' parliament.

The scheme is as follows:—To form a joint stock company, limited, with a capital of \$50,000, divided into 5000 shares of \$10 each, for the purpose of carrying on a general warehousing, shipping, marketing and agency business in apples and other produce in Nova Scotia, Great Britain, and elsewhere. As the project is conceived in the interest and will operate for the behoof of the producer, it is intended and hoped that the whole capital will be subscribed for by fruit growers, farmers, and persons engaged in allied industries. The amount should not be an obstacle, when it is considered that it represents not more than one-half of the annual loss that is incurred under existing circumstances.

The principal objects of the company are:—*First*, the erection of suitable and commodious warehouses at convenient central points, connected with the railway by sidings, for the storing, assorting and shipping of apples. Some questions having been raised as to the necessity for warehouses, I offer the following explanation on this

point :—The warehouses will be available for storing apples while the roads are in good condition, and the weather is favorable, an advantage which many of our growers will readily understand and appreciate. They will be especially serviceable in enabling the lowest possible rates of freight to be secured by bringing competition to bear on the different steamship lines, on the offer to guarantee delivery of so many thousand barrels at a given port on a given day ; which could be easily done were the apples in the warehouses, and carried thence by special trains ; but it is only by having warehouses that such competition is rendered possible. Further, the warehouses are equally serviceable in cases where the cellarge is inadequate, thus obliging growers to dispose of their produce at inopportune times at any price it will bring on a glutted market. This evil, great as it is now, will annually intensify with the annually increasing production, unless such additional storage accommodation is provided. But the essential determining consideration which makes the warehouses a *sine qua non* to my mind is this :—That the company does not intend to permit its capital to be frittered away and its existence snuffed out by the interested combination and cut-throat competition of subsidized monopolist lines, as has been the invariable fate of former ventures. With the apples in its own warehouses, and under its own control, the company can always furnish the cargo it contracts for, and can thus defy any combination or competition. Without this protection the company might be wiped out of existence in a single season ; with it, it will be invulnerable. Of course, warehouses will only be erected, or acquired gradually, as circumstances and business warrant, and they will be constructed in accordance with approved principles. A portion of them, if required, may at any time be fitted up as a cold storage compartment for small fruits, dairy products, or other perishable commodities. Eventually it may be found desirable that the company should supervise the sorting and packing of the apples, and affix its own brand or trade-mark to all packages, and thereby secure for its consignment a guaranteed reputation in all markets. These are points, however, of detail.

Second.—The providing of suitable and properly ventilated steamers for the transportation of apples from and to any port. One of the great disadvantages shippers are at present is having to ship their apples in vessels of whose fitness for the business they have no

knowledge. The company would, in its option, ship from any convenient port in Nova Scotia to any port in Great Britain, or elsewhere. Hitherto, the export apple business has centred at three points—Liverpool, London, and Glasgow, simply because these ports are the termini of regular old established steamship lines by means of which a monopoly has been obtained. Liverpool is the principal distributing centre. London, to which our shipments have chiefly been made, with its vast population of some 7,000,000, within a radius of 20 miles of Charing Cross, is more of a local than a distributing market. I do not speak with authority on the point because it is one which I have not yet fully investigated, but there appears to me to be no good reason why a company such as that now proposed could not directly tap other of the great centres of population which have hitherto drawn their supplies at second-hand, and at additional expense of transport from the three ports named. I imagine it would be possible to arrange direct shipments to such ports as Manchester, Bristol, Swansea, Southampton, Hull, Newcastle, Edinburgh and Dundee, in the United Kingdom, and to Belfast, Dublin and Cork, in Ireland, with profitable results. There is also the possibility of extending the business to some of the markets on the European continent.

Third.—The regulation of shipments in consonance with the requirements and prospects of the respective markets. This is obviously a matter of great importance which has hitherto received but little attention, because circumstances put it largely beyond the control of the ordinary shipper, who had to depend on the conflicting and interested market reports of irresponsible agents. Their policy frequently is to advise shipments irrespective of the state of the market. Knowing that their commission is safe, whatever the result, or if the market is rising the information is withheld until they have bought all the apples they can on their own account, and at the lowest possible prices. The company, by means of regular and reliable cable advices from its own agents, can impart the latest reports to its shareholders, and advise them how to adjust shipments as regards kinds and quantities in accordance with the demands and tendencies of the markets.

Fourth.—The appointment of experienced and responsible firms or individuals as the company's agents in the several markets, who

shall have the exclusive handling of its consignments. By this means, and by exercising the most rigid care in the grading and packing of our apples, we can build up a connection and secure a reputation for them, which they have not hitherto attained to any great extent.

I admit that such an arrangement would not necessarily be permanent, but we are all so much in the dark regarding the way the business is conducted on the other side, and what improvements require to be made, that at first, at least, it appears the best that can be done. I very much fear that investigation will reveal that our apples are often not handled with care in transit from the steamer to the market; and that they are sold by "people whose sole object is to get through as much business as they can in one day, regardless of the condition of the market, and the growers net return."

The principal benefits that will result from the operations of the company are :—

First.—Reduced transportation charges. The control of a large quantity of apples by means of the warehouses will enable the company to secure the utmost advantage of competitive rates, because it will always be in a position to guarantee cargo or space contracted for.

Second.—Abolition of middlemen's tolls. By means of the company the shareholders will transact their own business, and make their own shipments direct to their own agents. Therefore, in so far as the company is concerned, the middleman's occupation, like that of Othello, will be gone.

Third.—Reduced commissions. The privilege of exclusively handling the company's consignments will enable arrangements to be made with responsible firms for the transaction of our business on terms considerably more favorable than those to which shippers have heretofore been accustomed.

Fourth.—Systematic management. No little advantage will result from the mere fact that for the first time the business will be placed on a sound practical basis, and conducted upon strict commercial principles. It will be managed not in the interest of any one individual, or any one shareholder, but as if the whole body of the shareholders were one person, and the whole volume of business were his private enterprise. Order, system, supervision and control will supersede the haphazard methods and chance ventures to which we have been accustomed.

You will naturally say this may be all very well as a scheme, but the cost of maintaining and carrying on such a company will be so large that shippers will be very little better off than at present. We contend that were such a company in operation, it would have saved to the growers this season alone more than the whole capital required. Would have paid the expense of management, and yielded a handsome return besides.

It can be proved beyond a peradventure that a saving of at least 25 cents per barrel can be easily effected on the present system, by doing away with middlemen's tolls, by lower rates of freight, and by reduced commissions to brokers. Have you ever considered what the saving of even 25 cents per barrel on our shipments means? Take the export of this season's crop at the low estimate of 250,000 barrels, and it is not likely to be less in any future year, a saving of 25 cents per barrel represents \$62,500; a sum in one year more than sufficient to accomplish what the promoters of the company have in view. These are facts and figures, gentlemen, and we challenge their correctness being controverted. Of course, there will be expenses in carrying on such a company, but have you ever reckoned what it cost you growers to maintain the dozens of middlemen and speculators spread all over this Valley, paid by you, but not working for your benefit, but in their own interests, or in the interest of brokers on the other side? Why, gentlemen, if it pays English firms to keep their agents in this country all the year round under salary, to look after their interests, surely it will pay the thousands of apple growers in these counties to employ one man to devote his whole time and ability to their interest, and recompense him handsomely for his services.

This is the proposal in broad outlines. You will observe I have said nothing about cold storage for apples. That is an entirely separate question, involving a different set of circumstances, and it has to be solved by other means in another way. If I have occupied a good deal of your time, it is because I have desired to place the question fully, clearly, definitely and intelligently before you in all its salient aspects. If I have occasionally used somewhat strong language it has been, not so much as the mouthpiece and advocate of the proposed company, as that my recent enquiries into the matter have forcibly impressed me with the paramount necessity of adopting broad and radical measures if we are to preserve and develop our great

industry, and reap what should be our legitimate profits. I am satisfied that the scheme, as proposed, covers the whole ground, and is thoroughly practical and workable, and that, if carried out on the lines indicated, it will work a revolution in the apple industry of Nova Scotia that will be of incalculable benefit to the fruit growers. This must be clear to every intelligent and unprejudiced mind. The means to ensure success is easily within our reach. All that is needed is that we combine to work loyally together with a common purpose to a common end ; all that is needed is that we take up this movement in earnest, and support it by our practical action and hearty co-operation. If we button up our pockets, expend our energy in mere idle talk, and expect some one else to do this work for us, then we may rely that the golden opportunity will pass us by, and that our competitors will outstrip us in the race, and usurp the position which by right should be ours, to our loss and shame. To our shame, I say, because, with our natural advantages, with our producing area within small compass, with no long land transport before reaching the seaboard, and with the nearest ports to the European markets, it will be our own fault ; it will be through lack of business foresight, public spirit and enterprise, if we do not occupy the foremost position and realize the handsomest returns.

A. McN. PATTERSON, in an excellent speech, predicted that this company would be a great success.

DR. A. P. REID said that it did not appear to him to leave much room for argument—that in the past they were paying too high for having their affairs looked after. He said that no fruit should leave the Annapolis Valley which was not creditable, and he thought that every man should put his name on the barrels. He thought it was the duty of every fruit grower in the Valley to give every assistance possible to carry out this enterprise in a business-like manner.

GEORGE THOMSON said that he thought there should be uniformity in packing, and also in barrels. That the apples should all be packed by trained packers. The apples should be sent to the company's warehouses and go into common stock, and there picked and graded by the company's men.

J. B. NORTH said that the theory of Mr. Innes' paper was good and should be carried out. He hoped the matter would be carried

forward to a successful issue, and that the anticipations of the promoters would be realized.

A. B. PARKER said the fruit growers wanted this shipping company very much, and he hoped they would be successful in establishing it at as early a date as possible.

M. G. DEWOLF said that he thought this was a very practical scheme, and which could not help but appealing to every man of intelligence.

MR. CHASE said he had listened with a great deal of pleasure to the paper read by Mr. Innes, and he thought that it showed a great deal of thought and preparation. He thought the paper was very theoretical. He would defer a bit before making up his mind that it was absolutely practical. He took exception to the remark made that this company could save twenty-five cents per barrel on the export trade. He could not conceive how this saving was going to be effected.

P. INNES said that a gentleman in the audience had an offer of freight at fifty-three cents per barrel when the rate to the public was ninety cents. He would risk his reputation that this was a thoroughly practical scheme.

MR. CHASE said he had no doubt that the president of the proposed company might be thoroughly capable of organizing a company far more extensive than this, but whether he would find the same management that would be exercised in a railway company would be applicable to a shipping company of this kind, might be somewhat doubtful. He would like to ask if the 53 cent rate was a rate quoted on general steamers? He cited the case of a steamer which came to Halifax with the expectation of getting a large cargo; the result was she only got from 3000 to 5000 barrels, and he had no doubt they would have offered freight at 2 shillings to fill her up.

PETER INNES. Do you get a lower rate?

MR. CHASE. I make my own arrangement from Halifax to the port of destination in the case of freight for some years past. He thought this proposed company was a matter that should be looked thoroughly into, and discussed before it was entered upon.

P. INNES. The idea with regard to the warehouse is this, that there will be a certain portion of the frost proof cellar let out to par-

ties to store their apples in at a certain charge. But the ground floor would be used as a way-station in transit to the steamer. It is not a part of the scheme to resort the apples. The apples would be entirely at the disposal of the owner up to the time he told the company to engage space for him, after which time he would lose the control. He would also have the choice of the agents on the other side.

JAMES PENNINGTON said that the whole of the stock of the company could be placed in Halifax in a week.

T. H. PARKER said the company should be owned and controlled by the farmers and fruit growers in the Valley.

DR. DEWITT said he had been offered ocean freight at 53 cents.

MR. CHASE said that the Furness line had some boats which they did not consider first-class, and which would perhaps, at a time when there was not a very great pressure of freight, allow them to go forward at less freight than a first-class boat; at least that was his experience that they would make different rates for different boats.

J. DONALDSON. I may say that I endorse this scheme, and have taken five shares, but I do see some practical objections; they are going over too wide a field. The agents on this side are a practical necessity for the shippers. I am perfectly satisfied this year with the returns that I have had. We could not expect returns this year the same as in previous years. These men who are grumbling are men who ship spasmodically.

R. S. EATON said he was fully in favour of this scheme, and thought it very essential in order to keep pace with the times. It is high time that the methods of shipping were improved. He warmly congratulated Mr. Innes on the excellent paper he had read. Like the last speaker, he thought the consignees were not to blame for the low prices this year; the reason that such low prices were had was because of the enormous quantity of fruit which had been shipped. It would be very desirable to have these warehouses constructed so that the fruit could be stored in them ready to go forward at a convenient time.

W. E. ROSCOE said that as far as he could see the shipping company would be a success. That a gentleman who could take charge of the W. & A. Railway, when Mr. Innes took it in charge, and make it a paying line, was perfectly capable of taking charge of

this scheme. (App'ause.) Having such a shipping company together with the benefits of cold storage he had reason to believe great results would be obtained.

C. R. H. STARR said that he had been very much interested in the discussion and also in hearing Mr. Innes' paper. He thought that the choice of Mr. Innes as president of the provisional directors was a wise one. He endorsed a very large part of the scheme. He said he had heard a very great deal of this five cents per barrel that agents were gathering. That he had been in business in the Valley for twenty years, and had been paid for his work, and that only. He contended that there was a great deal of misrepresentation with reference to himself and others, with respect to their positions.

W. E. ROSCOE said that in a suit in which he had been engaged some time ago, he found that the agent had received 7 cents per barrel.

WM. YOUNG said that the proposed company could obtain steamers and carry freight as low as any others. He cited the case of the "Nor," which was carrying freight from Kentville at 68½ cents. In his opinion, the ground taken by Mr. Innes' paper had not been shaken.

C. R. H. STARR said that the proposal to put on small steamers to save lighterage would not prove successful. He thought the apples would go forward in bad condition in small steamers.

FREIGHT RATES.

MR. W. YOUNG said that the resolution he wished to move was one of considerable interest, and that it would take more than the five minutes allotted to him by the chairman to go into the subject thoroughly. He believed that the rates now charged on apples were altogether too high,—too high in proportion with other rates charged on the D. A. R. road,—and ridiculous when compared with special rates for export granted by the large transcontinental railway companies. At the present time the D. A. R. quoted a special rate for flour at about one cent per ton per mile, and the lowest rate for apples in carload lots was about three cents per ton per mile. And there were other similar discrepancies, but as the time at his disposal was short, he would not argue the matter further, but would move the following resolution :—

Whereas, The apple industry of the Annapolis and Cornwallis Valleys has grown from small beginnings to an estimated crop of 500,000 in 1896, more than one-half of which has to be transported by railway ; and

Whereas, It is customary for railway companies to grant special reduced rates of freight for great staple natural productions of the districts through which they run ; and

Whereas, the Dominion Atlantic Railway Co. has always exacted a very high rate of freight on apples, averaging about 3 cents per ton per mile for hauling car loads, with no expense for loading and unloading, and a much higher rate for smaller quantities ; and have never made any reduction on their regular tariff rates on apples intended for home consumption, and only a very slight reduction on apples for export ; and

Whereas, The prices obtained for apples this season have not in many cases more than paid expenses, and are likely to remain low in future ;

Resolved, That this Association do appoint a committee to communicate with the Dominion Atlantic Railway, and urge them to take the altered circumstances of the apple industry into serious consideration, with a view of making a large reduction on their apple tariff rates, and of granting a still lower rate on apples for export, so that some relief may be afforded to the farmers, and that the total value of their product be not paid out for transport charges.

There was one other point, though not mentioned in the resolution, that a committee so appointed might consider, and that was the carelessness of the railway company in frequently permitting apples to freeze in transit. A little care and attention on the part of the trainmen would remedy this, and he felt sure the railway company would, in this matter at least, do something in the interests of the farmers.

The above resolution was duly seconded, and, after discussion, carried unanimously.

Messrs. Wm. Young, W. E. Roscoe, and J. E. DeWolfe were appointed a committee to bring the matter to the attention of the railway management.

The following resolution was also put to the meeting and carried, and referred to committee as above :—

Resolved, That this Association protests against the large increase made this year in the rates of freight charged by the subsidized lines of steamers from Halifax to Great Britain, and requests Dr. Haley, M. P., and John B. Mills, M. P., to co-operate with Hon. Dr. Borden and strongly urge on the Dominion Government that hereinafter no subsidy be granted to any line of steamers without the government retaining the right to supervise the rates of freight charged by them, which rates should in no case exceed the rates charged on similar freight from Boston, New York, or Montreal ; and that no subsidy be granted to any steamship company unless the vessels to be used have been inspected and approved suitable for the apple trade by an inspector appointed by this Association.

EVENING SESSION.—7.30 p. m.

PROF. FAVILLE said that the present development of the cranberry business was such that it bade fair to assume large proportions, and he thought it but right that the government should give some attention to it, and he would move that a committee be named to prepare a petition to the Dominion Government, asking them to provide for a cranberry experiment station in connection with the Government Farm, or at some convenient point in the province. Carried without discussion, and Prof. Faville, J. S. Bishop, and S. C. Parker, appointed said committee

P. INNES asked if a score card was provided by the Association for the use of judges on fruit.

The PRESIDENT said the matter had not come before the Association.

P. INNES. If it had not come before this Association this was the time to consider it. There should be some scale to go by. Ontario has an elaborate scale drawn up, and he thought this Association could prepare something of the same kind.

The following gentlemen were appointed a committee for preparing a score card :—Secretary Parker, R. W. Starr, and Prof. Faville.

 PEAR CULTURE.

PROF. JOHN CRAIG, OTTAWA, ONT.

Mr. President, Ladies and Gentlemen,—Allow me to repeat again my yearly remark regarding the pleasure it gives me to be with the Nova Scotia fruit growers at their annual winter meeting. The event of your annual meeting is one to which I always look forward with the keenest pleasure, and one which, should I miss, would cause me very much disappointment.

Your Secretary asked me to say something to you on the subject of pear culture. Our climate at Ottawa is such that we are not able to make a practical success of commercial pear-growing, yet my opportunities of seeing pear orchards, and of studying them in different parts of the Province of Ontario have been such that I have gathered from personal observations considerable data which may be of service to

you in prosecuting this interesting work. In the first place, I think that your position here, considered from a commercial and market standpoint, is most favourable. The production of the fruit is the important matter to consider. There is no just cause to doubt that with such cold storage facilities as are likely to be afforded in the near future, if you have the pears you will be able to place them upon the British market in good condition, and once there, in first-class order, the quality of the Canadian pear is such that it will sell without fear of competition. To come down to the practical necessities that are essential, if you wish to make a success of this industry of pear-growing,—first soil—you should have a particularly deep friable soil; you know that the natural habit of the pear is to be deep rooted, and to ensure success it needs a soil that will allow the roots to penetrate deeply without interruption. In Ontario, growers find that a clay loam underlaid by a gravel clay subsoil is desirable; in some places red clay gives excellent results with dwarf varieties, but the successful regions for dwarfs are not restricted to red clay sections. In Western Ontario, near Windsor, pears are grown quite extensively in black, quite heavy, clay loam. The presence of a large body of water is very desirable, and you are particularly favoured here in that respect. Its ameliorating influence adds an important item to those which are needed if we would attain the highest success. I think about the worst soil that one could select for pear-growing is that which is of a quick sand character, which never seems to warm up and never seems to have much life, which will grow annual crops when surface drained and sufficiently fertilized, which will sometimes even grow apples, but which is death to the pear; growing them in soil of this character encourages fungous diseases. In Western Ontario, between Windsor and Amherstburg, you will find, as you do with apples through this Valley, old specimens of pears which were planted by the early French settlers. They must be considerably over 100 of age, of great size, some of which approach 75 feet in height. Along the Detroit River there are specimens that stand up like cotton woods, with large bolls. They are still healthy and yield large crops. The pears are of small size, and are of inferior quality. But it points to the fact that the soil and climatic conditions are congenial. You have here a good soil and a favorable climate, which are the essentials needed.

I need not say much about the preparation of the soil. You know that thorough preparation of the soil is more than half the battle in starting any kind of fruit-growing. That any hoed crop planted upon a clover sod will bring the soil into a favorable condition for the reception of pear or other fruit trees. About the distances apart at which they should be planted, if you are planting standard varieties, and I believe that you should plant more standard than dwarfs in this locality, I think a distance of twenty by twenty-four or twenty-five feet would be right for most varieties. That is the distance which is now commonly thought by pear-growers to be proper to plant them. Some growers believe in planting them comparatively close in rows one way, and having the rows at right angles double the distance apart, say fifteen by thirty feet; that is a matter which the grower must decide for himself. I think the uniform distance of 20 x 25 feet will be found most satisfactory. In planting the trees most of our western growers follow the practice of cutting back the roots quite severely, rather more severely than in the case of apples; they cut back the tops even more severely, often heading back to a single stem, as in the case of peaches, if not back to the stem, then to the three leading branches, depending upon the character of the growth of the tree. Two year old trees are always preferred to older, and generally preferred to younger trees, although some people like yearlings. Formerly, in pear orchards in the North-west, high headed trees four and five feet high were preferred; latterly this system has been changed, and at the present time a $3\frac{1}{2}$ foot head is most in favour. A system is also in vogue which does not look very tidy in some respects, and I will not say it is best, but is now much practised. This system aims at protecting the stem from the sun's rays by allowing shoots to grow up from some where near the base. They find that this practice prevents the trunk from being sun-scalded, and trees grown in this way appear to be freer and clearer of blight than others. In this way the stem is partly inclosed by shoots. In growing Bartlett's, some growers find it absolutely essential to success, and they believe it to be the correct method. I should advise you to try the low head, rather than the high head.

Then the cultivation for the first five or six years is practically that which you follow in cultivating an apple orchard—keeping the ground clean, and manuring it adequately; and if a crop is taken from

it, be certain that you return a sufficient amount of plant food to balance that which you take away by growing the additional crop.

With regard to training. The first few years in the life of the pear tree is a more important period in forming its future shape. Be particular in pruning at this time then, as in the case of the apple tree. After the pear comes into bearing growth becomes less rampant, and there is less work to be done. It is, therefore, very important to train branches when young, so that they will carry the fruit without breaking down. You will notice when you set out a pear tree that it will rapidly run up two or three main branches, being carried out by three or four feet growth each year. Growers find it best to cut these back one-half each season; this induces a stockier habit, and encourages the production a greater number of laterals.

THE FRUITING HABIT OF THE PEAR.

The fruit is produced on the older wood spurs; these spurs should be taken out occasionally, that is those which have borne fruit. When a spur becomes old it is well to remove it altogether, so that a new one may be pushed up from or near the base; this will produce larger and finer fruit. The natural habit of growth of the majority will be found to be that known as the pyriform.

We need not take up the laborious systems of training that are practised in the old country, such as "fan," "parallel arms," and other methods of cordon training.

With regard to dwarfs. Some of the most profitable pear orchards in Ontario are those known as "dwarfs." The dwarf pear is produced by grafting it upon the quince stock. The quince being slower of growth, the effect is to check the growth of the pear, and its natural size is not attained. There is one thing I would caution you in connection with growing dwarfs; in planting them they should be set considerably deeper than standards or those grafted on ordinary pear stocks. A dwarf should be planted eight or ten inches below the point of union, because as the tree grows older I have frequently seen that those were planted too shallow broken off by a strong wind where the pear joined the quince root. In planting them lower, while it sometimes encourages the emission of roots from the scion, that is the pear top, and may result in getting a standard on its own roots, yet it is safer to plant them deep in order to obviate the possibility of the top being broken away.

Dwarfs are usually planted ten feet apart. This seems to be about the right distance. In garden culture they may be grown nearer by carefully shortening the annual growth each year. In speaking of this, I am reminded of one of the most interesting pear orchards I have ever seen; no doubt some of you have visited it. The orchard I refer to is situated at Rochester, N. Y., and belongs to Messrs. Ellwanger & Barry. Every year that firm exhibits 75 or 80 varieties of pears at the meeting of the Western New York Horticultural Society. These are grown in their own grounds. But what I wish to specially refer to is that these trees are all shortened in every year. They manure them annually, and shorten back the annual growth one-half to one-third, and they say in their experience it is absolutely necessary for the regular production of a good crop.

But to come back to the cultivation again. Formerly pears were treated as apples in the matter of cultivation, but that dread disease called blight, which travels under a very long name—*Micrococcus Amylivorous*, (PEAR BLIGHT). A friend of mine, writing to me, said that owing to the depredations of this troublesome enemy, and the tremendously long name that it bears, he thought it would be well to abbreviate the latter, saying it could be recognized to better advantage under the name expressed by the last syllable of the first word, which he thought was very suitable. Pear blight has been the great enemy to pear growing in all portions of North America. Successful pear orchards have been produced and have come into bearing time and again, only to be destroyed by this disease. We only know of this blight that it is produced by a bacterium, one of the low forms of plant life. These bacteria flourish in the plants and they find an entrance through the young leaves or blossoms, or through spurs on the branches, and the effect in nearly all cases is that ultimately the tree is killed. Badly affected trees look as if struck by lightning, so suddenly do they turn brown.

The only remedy for this disease after it appears is to cut the branches off at once, destroying all affected portions. If it appears on the stem, the whole tree should be cut down. I have seen instances where it appeared first on a single tree in an orchard; if no preventive measures were taken, the next year a dozen trees would be effected in the immediate vicinity. The following year perhaps one-third of the orchard would be infected. And in certain instances I have

seen conclusive evidence that it had been carried in line with the prevailing winds. I have known another instance where a single tree was affected; preventive measures were promptly taken, and the tree removed. In this case the disease entirely disappeared from the orchard. If it does come you should meet it without delay.

CULTIVATION.

To return to cultivation, I said that the system commonly practised some years ago was that which was applied to the apple, but on account of the destruction caused by the pear blight, and owing to the fact that the pear blight flourished most in varieties which made a vigorous rank growth and produced a large quantity of sappy wood, it has been found to be not well suited. Pears with a firm determinate growth are less affected than those of luxuriant growth. A study of these facts has brought about a revolution in methods of cultivation. The most successful and profitable pear orchards in Ontario at the present time are those which are cultivated by sowing clover under the trees; the clover is not removed from the ground at any time of the year. It is cut and allowed to lie and decay upon the ground, and, in this way, to act as a fertilizer. When an orchard is being cultivated the practice is to sow the clover in July; by early autumn it has grown ten or twelve inches, and affords a covering for the ground during the winter. It is cut at blossoming time the following year. It returns to the soil a sufficient amount of nitrogen, which is so material to the healthy growth of the tree. Potash must also be applied in some form of commercial fertilizer, or in wood ashes. The orchard is kept in a clover sod so long as the trees are growing satisfactorily.

With regard to dwarfs among those varieties observed to do best and most widely grown is the Duchess D'angonleme. You will find this variety composing four-fifths of the dwarf pear orchards of the Province of Ontario.

PICKING.

In picking there is a very important point to be remembered, and I assume it is a point which you practical men have no doubt discovered. As a general rule it is not safe to allow pears to hang until their external appearance indicates that they are ripe. It is a good plan to pick the varieties while they are firm and hard. If you allow

Clapp's Favorite to hang till well colored you will find that it has decayed at the core. They should be picked, especially if intended for export purposes, comparatively green in color, though fully grown ; we can always be sure of the fruit ripening satisfactorily afterwards.

PACKAGES.

Barrels were largely used in the past, and are employed to some extent at the present time, but I think we have come to a point when large packages should not be used exclusively. The smaller the package for high grade fruit the better. A very good package now in use is a box 22 inches long by 5 inches deep by 10 inches wide. This box will hold from 50 to 75 pears, according to the size. The fruit is carefully graded, the number being placed on the end of the case. A box of fifty pears means that it contains the largest specimens. Great care should be exercised in grading the fruit, and if the box contains fifty pears it should be so marked, and when the same box contains seventy-five pears, it should be marked accordingly. You will thus obtain an idea of the size and quality of the fruit contained in each box.

With regard to varieties, there has not been very much change in recent years ; the standard kinds, like Bartlett, Clapp, Flemish Beauty, are still very widely known and cultivated. A new variety which is well spoken of is called the Duchess Precoci, or the Early Duchess. For early winter kinds there is nothing better than Beurri D'Anjou, which, it is well known, is one of our best commercial early winter varieties. Winter Nellis is grown largely in California with success. Carloads of this variety are shipped into Montreal every winter.

We have heard a great deal of the Keifer pear. There are some audiences that the minute you mention the name of that pear it has an effect somewhat similar to that caused by shaking a red rag before a bull ; like the Ben Davis apple, it has fast friends and bitter enemies. I need not tell you that this pear has many good qualities. It makes excellent stock for top grafting ; the fruit cans well. To those of you who have been fortunate or unfortunate enough to plant the Keifer I would say top graft it rather than tear the trees out if you are disappointed with the quality of the fruit.

That covers all I had in my mind upon this subject. In summing up I would ask you to remember to plant in a deep clay loam soil : this is desirable ; that heading back the trees when young is neces-

sary ; that keeping the ground covered with a clover sod after the trees come into bearing is a good practice ; that if you are visited with blight, do not hesitate a moment to remove and destroy the trees, root and branch ; that in marketing fruit small packages, carefully graded and carefully handled, are essential to success. (Applause.)

DISCUSSION.

GEORGE THOMPSON said that they were very much troubled in that vicinity with pears cracking.

PROF. CRAIG said that reminds me of a little incident. Four years ago, when the practice of spraying in Ontario began to be a little more than an experiment, one of the growers there had an orchard of Flemish Beauties, the fruit of which always cracked badly ; he said it would not yield to any kind of spraying treatment. This splitting and cracking is a very serious trouble with the Flemish Beauty. The following year he sprayed his orchard carefully, under my direction, with the result that he felt satisfied that beneficial results had been obtained. At the present time the orchard is sprayed regularly with Bordeaux mixture, and last year the owner harvested a very handsome crop of clean Flemish Beauties. He is at the present time a warm adherent to the principles and benefits of spraying with the Bordeaux mixture.

This "splitting and cracking" is a fungous disease and attacks leaves as well as the fruit. It causes black spots on the leaf. It is a very serious disease indeed as regards the fruit, because it renders it entirely unfit for market. It is necessary to apply the mixture early.

GEO. THOMPSON. I had a young pear tree in my orchard infected with it, and I happened to hitch up my horse to it one day and he ate the top off the tree. It threw out a new top, and last year it had not a cracked pear on it.

DR. DEWITT. With respect to the pear blight, do I understand that spraying is useful ?

PROF. CRAIG. I tried spraying to prevent blight on Russian apples some years ago ; though I kept one tree of several varieties almost constantly covered with Bordeaux mixture when the disease was at its worst, it did not prevent new wood from being attacked.

DR. DEWITT. I would like to know what colour the blight will turn the bark on the tree, whether light or dark ?

PROF. CRAIG. At first it is slightly darker than normal, then quite brown.

DR. DEWITT. Does not the same blight attack the plum tree?

PROF. CRAIG. I do not think so, although somewhat similar effects may be seen on the plum trees. There is no record of this form of blight attacking these members of the rose family. It is known to attack the thorn, the mountain ash, the apple, the pear and the June berry. I have no record of it attacking plums.

DR. DEWITT. I know that in this region several pear trees have been attacked and died, and I think there are several instances of plum trees dying also, which is supposed to have been caused by the same thing.

PROF. CRAIG. The disease is easily transmitted in pruning, and I have always cautioned pruners to be careful not to carry the virus on the blade of the pruning knife from a tree attacked with blight to the branch of a healthy tree. It is possible that the plum trees spoken of may have been inoculated through the medium of the pruning knife.

PROF. FAVILLE. Spraying to prevent the cracking of pears, has been carried out with success in different parts of Nova Scotia.

THE BARREL QUESTION.

MR. W. H. CHASE, chairman of a committee appointed by the Kings County Board of Trade to consider the proper sized barrel to be used for the shipment of apples and potatoes, reported as follows: We would hereby express our opinion that in order to meet the present demand in the markets in which our produce is sold, that the proper size barrels to be used should be of following dimensions, viz., that the staves should be thirty inches long outside, or say twenty-seven inches inside between the heads; the heads should be seventeen inches in diameter, and the bilge should be nineteen inches inside measurement.

After a lengthy discussion the following was carried unanimously:

Resolved, That this Association petition the Minister of Trade and Commerce to have the Dominion Statute relating to the size of apple and potato barrels revised, with the view of having a standard barrel of uniform size for those commodities throughout the Dominion, and would submit the following dimensions for such a barrel, which in the view of this Association, would meet the circumstances of the case, viz:—Length of stave, 30 inches; between heads inside, 27 inches; diameter of head, 17 inches; diameter of bilge inside, 19 inches.

A committee was appointed to prepare an act in conformity with above as follows:—W. H. Chase, Geo. Thompson, W. E. Roscoe, and Secretary Parker.

Friday, 22nd January.

As usual, Friday morning was devoted to the business affairs of the Association. Officers were elected for the ensuing year, as will be seen on page 3.

Report of Treasurer was also read and adopted, for which see elsewhere in this report.

REPORT OF THE COUNCIL OF THE HORTICULTURAL SCHOOL.

W. C. ARCHIBALD, *Chairman.*

I take pleasure in submitting the 4th annual report of the Horticultural School, in which is noted its prosperous condition and a growing interest through the province. During the year the government of New Brunswick has joined us, and is now paying the tuition fee of \$50 per student for those in attendance from that province.

The present year's enrollment of students is 63 from Nova Scotia, and 4 from New Brunswick. The school course has been improved and extended as needed, and an assistant teacher employed. The board would most earnestly urge upon the members of this Association to use their influence in securing a large number of the young men and women in their respective districts to attend the school.

The series of lectures delivered in all the counties of the province during the past year was divided into two periods and given in the months of May and October. Prof. Faville was accompanied on the latter tour by B. W. Chipman, Esq., Secretary of Agriculture for the province. The sustaining of the annual system of lecture on horticulture and general agriculture embodies the principles and benefits of the travelling institutes and schools now popular in other fruit states. Your board confidently hope by this means larger and more accurate information on fruit culture will be diffused among the people.

The special course of four months, commencing January 8th, for farmers and farmers' sons, has a slightly increased attendance over

the previous year. The apparatus and green-house of the school has not been extended for want of funds.

The council board again respectfully recommend the Association to ask the government of Nova Scotia to amend the Act relating to the establishment of the school, and condition the grant of \$50 per capita to an average attendance of six months, and increase the maximum basis to sixty students instead of forty as now authorized. This necessary amendment will regulate and bring it in agreement with the public school system of the province, while increasing the government grant.

Report adopted, and executive committee instructed to petition the government accordingly. The executive were also instructed to petition the government for an increase in the annual grant.

COMMITTEE ON EXPRESS CHARGES.

W. C. Archibald, J. S. Bishop, and W. H. Chase were appointed as a committee to communicate with the various express companies doing business in the Maritime Provinces, and endeavour to secure better terms for the carriage of plums and other perishable fruit.

SOME FRUIT POSSIBILITIES OF CAPE BRETON.

H. PERCY BLANCHARD, BADDECK, VICTORIA CO.

In examining different varieties of apples with a view to setting out an orchard in Victoria County, strong advice had been given me to take only those kinds which are the more popular in the Annapolis Valley. Some varieties were condemned, others got the fullest praise. Last fall, though, in going through several orchards in this county, it was a surprise to find that some of those apples, as the New Brunswick, Tetophoky, and such other soft varieties which had received the utmost condemnation, were the only apples in the whole orchard that were really good. The hard apples were small and poor, as if the season were too short, and even the Gravenstein seemed to lack its characteristic mellow juiciness.

On the other hand, apples from varieties which, in Kings County are so soft as to get, if kept any time, punky, are here almost a month later, and much harder. So too with plums. It is true that some of

our large varieties lacks that dead-ripe, thin skinned mellowness which makes them so attractive for the table, and yet a little added tartness to such plums would not be objectionable for preserving. But on the other hand, when the plums to the westward are about gone, ours are just coming in, and, owing to their extra hardness of skin and firmness of flesh when ripe, will stand packing in barrels and fairly rough handling in shipment.

It is, perhaps, a little too soon to be very definite in conclusions. Our orchards here do not get anything like the care and scientific handling that elsewhere prevails. The apple trees bought some years ago at 50 cents to \$1.00 a piece, from the tree agents, were planted, and the bark lice have killed nearly all of them. The people have not learned how to combat this pest or the black knot. It is true that the "blue books" of the Department of Agriculture go all through the country, and contain much valuable information, but they are too big,—and the suspicion with which "book farming" and government statistics are viewed, makes this information wasted. If, instead, on certain subjects, valuable information in a condensed form were prepared and printed in a tasty and attractive manner in colours on sheets of paper say 14 by 18 inches in size, with gum on the back, they would be welcomed in many of the country houses, would serve to adorn the kitchen walls for years, and every fact contained would become an accepted doctrine; each sheet should be confined to one subject.

Until more knowledge is diffused among the people, and the orchards better cared for, it will be difficult to make fair comparisons between the fruit of this and other parts of the province. But if my surmises are correct, then, instead of Cape Breton coming into competition with the Annapolis Valley, the fruit of the one will follow that of the other, and where one may be more attractive for the table uncooked, the other may, perhaps, excel as a shipper and for preserving.

INJURIOUS INSECTS OF THE FARM AND GARDEN.

BY DR. JAMES FLETCHER, OTTAWA.

(Condensed Report.)

Mr. President, Ladies and Gentlemen,—We are much pleased with the welcome you have accorded us, and I can assure you that nothing gives us greater pleasure than to come down here to your annual meetings. Personally, I have particular pleasure in coming to the re-unions of the Nova Scotia Fruit Growers' Association, of which I have been an honorary member for many years. I am quite aware, sir, that there are some peculiar features about this Association and its members. I was especially struck with the discussion here this afternoon. I always thought you were a peculiar people, but now I know it. In one respect you differ from the people of our province, Ontario. I never met before so many public minded people not one of whom had an axe to grind. (Laughter.) This is the first time that I have come across so many of that class of people. I fancy also there is a modesty prevailing here which is characteristic of the inhabitants of this whole province, and which you must have inherited from your Scottish ancestors. You have, too, I doubt not, that proper spirit of enquiry which precedes and accompanies progress. You want to know everything that appertains to your business as fruit growers, but I hazard the guess that some of you have not developed that spirit of enquiry to its fullest extent. It is all very well to get good markets, and consider the best means of getting your products to those markets, but it is easy for any one to see you must get your fruits first before you can market them. One of the reasons why you have not always had the finest quality of commercial fruits in the past is, that you have not seen the great importance of dealing with those minute enemies belonging to the insect world, which every year commit such depredations in your orchards, and deprive you unnecessarily of so large a proportion of your income. A very moderate statement is that ten per cent. of all crops grown is lost every year by the attacks of insect enemies, and to that large amount may also be added an equally large percentage of loss which is due to fungus diseases. I will only mention one of these as representative of the whole class, viz., the black spot of the apple, which you can see on almost every one of the samples of apples that we have here to-day. This disease

can be controlled with a practical remedy, the Bordeaux mixture. Again, the codling moth, which is enormously prevalent in Canada, and is as injurious as it is prevalent, deprives Canada every year of a vast amount of the revenue which she ought to receive. I was very glad to hear the paper by Mr. Starr, for no one knows better than he does that in order to grow fruit successfully you must resort to the practice of spraying. It is now ten years since I last came to Kentville to meet your Association. I then laid before you the necessity, or at any rate, the great advantage, of spraying your fruit trees to protect them from insect attack, and I can say that, although a few of your leading men then recognized the importance of it, a very large majority of your members thought there was very little in spraying, and I tell you now that even to-day there is very much less spraying done here than there ought to be, and that it would pay you if you were to adopt that wise and useful practice. I have no hesitation in saying, as has been estimated, that insect pests deprive each of you of ten per cent. of your incomes every year. Ten per cent. is not quite so easily understood perhaps, as if I were to say you lose ten dollars out of every one hundred dollars worth of your products every year, and this without any protest, and frequently without your even noticing it. Thus, where a man works hard and earns a gross profit of \$100, he only realizes \$90 instead of \$100. It is well for you to attend to these matters, for out of that \$10 you can save, I claim, by simple means, at least \$8, if you will make use of the remedies discovered by entomologists for the different kinds of pests which attack your crops. This loss goes on year after year, not only in this province, but all over Canada, perhaps not so much in this province as in some of the others, because many of you are studying fruit culture so closely; however, taking Canada all over, ten per cent. is a low estimate of what is lost every year. It is a matter for each of you to ponder over and consider what your loss is, and how your crops can be saved. A large number of experiments have been carried on at the different experimental farms in Canada and in the United States, and the result of those experiments has demonstrated that this loss can be very much reduced. Now, I do not think it is necessary to dwell on this subject, because any one who will consider the matter and consult the published records will be convinced that it can be done. Besides that, you understand now pretty well how to treat the different insects which

cause this loss, and we have found that there are practical remedies for most of the insects which attack our crops and reduce our incomes. There is only one secret about the matter and that is for everybody to become as well acquainted with these enemies as possible, for the best way to fight them is certainly to learn as much as we can about their life histories.

This morning we heard that every kind of apple had its own special habitat, viz., the place where it grows to the greatest perfection, and it is just the same with insects, each kind has its own peculiar locality, food plant, and habits of life, and by so much as we learn what these are, are we possessed of the best means of fighting them. When a crop is found to be attacked, we must first of all try to find out what the enemy is, and what its name is, and even this last is an important matter. Farmers should learn the accurate names of the common insects, in order to refer to them when asking for information, for all insects have names, and as there are now several sources of reference in Canada, it is necessary to know the name of the object you are enquiring about, or you may not obtain the information you desire. If a farmer wants to know the food for a cow, he doesn't write to find out how to feed a horse, and a remedy which will answer for one kind of injurious insect cannot always be used for another. You must not get that general impression into your heads that Paris green is a panacea for all insect attacks, and that you will always destroy with it any insect you may find attacking a crop, whatever that insect may be, for if you do you will certainly get many failures. There are one or two simple elements of the study of insects which you must know before you can apply remedies intelligently. In the first place, before you begin to fight any insect, observe the nature of the attack it makes on your crop. This requires a little knowledge of the structure of insects. If you examine a great number of insects you will find that they may all be divided into two classes by the nature of their mouth parts. In one class they have jaws, as in the case of the canker worm, that eats the foliage of trees, sometimes stripping them and leaving them bare. Insects of this class are called biting insects. In the second class we find those which have, instead of jaws, a hollow tube, by means of which they suck up their food in the shape of liquid juices. These are called sucking insects. For an example of this second class I would mention the mosquito or the horn fly, which sucks the blood from cattle, and causes so much annoyance and irritation, and which has made your

cattle lose as much as 25 per cent. of their milk, or of beef, in the case of fattening animals.

The biting and sucking insects are the only two classes we need consider now, but we find among the insects included within these classes there are certain wide differences of habits which make it necessary to modify the methods of preparing or applying the remedies to be used. For the insects which bite their food, as the canker worm does, it is an easy matter to apply to the food some poisonous substance, as Paris green, which is eaten with the leaves, and the insects consequently poisoned. There are many ways in which these poisons can be applied to crops. One of the most economical ways is by spraying them in a liquid form when mixed with water, or they may be mixed with some dry powder and distributed over the plant to be protected as a dry application in small quantities, so as to economize the material, and also to apply it to the plant in such a way that the foliage is not injured. Some of these substances are not only poisonous to the insects, but those most used are of a corrosive nature as well. In order that the plant tissues may not be injured, it is necessary to know how to use these materials properly. Many people seem to lose sight of the meaning of the word spraying, and drench their trees instead of applying the liquid in the finest possible mist into which it can be divided by specially constructed nozzles.

There have been many failures by fruit growers in Canada from their not acquiring, before hand, the necessary knowledge of the remedies, and the proper way to apply them. One thing I wish to protest strongly against is the inaccurate rule of thumb way of measuring such a very virulent and poisonous material as Paris green. There is no measure which is so indefinite as "a teaspoonful," "dessertspoonful," or a "tablespoonful." So much is this the case that one teaspoon may actually contain twice as much as another one. I made the experiment a short time ago of measuring all the teaspoons I could find in the office at the Experimental Farm. There were seven different teaspoons, and the largest contained a little more than double what the smallest one did, and yet in spite of this there is perhaps no measure more generally made use of in the country for Paris green than a teaspoon; yet we know that if we spray our trees with too much Paris green we are sure to get disastrous results, in fact we

do much more harm than if we left them alone to be destroyed by their insect enemies. Spraying as an effective paying remedy has been discredited by some people, who have not been able to control the attacks of the canker worm. For the best results this insect must be fought when very small, and at that period of its development we can destroy it very easily, and it could be wiped out from our orchards if spraying were universally practised. If we allow these insects to become half grown, they are very resistant to arsenical poison, and it is very probable we shall injure the foliage of our tree, and perhaps destroy it, if we apply the poison strong enough to kill the caterpillars.

If the canker worms are not noticed when small, as is often the case, we must have recourse to some other method of controlling the pest. In Nova Scotia you have some trees of such a large size that it is a difficult thing to spray them thoroughly enough to keep this insect in check. In Ontario, I think, as a general rule at any rate, our apple trees are not so large as yours. Your trees being so large, the difficulty and expense of spraying is much increased, and indeed in some cases is rendered impossible as a paying operation; again, some of your trees are planted very closely together, which also makes spraying a difficult matter. A grower must decide upon the method to be adopted according to the circumstances in each orchard. The method of banding your trees, which you have practised here for many years, and which is also found very useful in other parts of Canada, particularly where the trees are closely planted, is an excellent one, and in such orchards as I have mentioned, banding the trees with some viscid material to catch the female moths as they crawl up to lay their eggs, would be better than the cheaper and easier method of spraying the foliage to destroy the caterpillars. These are, however, it will be seen, special circumstances. With us, in Ontario, spraying the trees for canker worm is decidedly the best treatment, because, in most localities, the trees are of small size; but even there in some cases where the trees are large, spraying does not pay so well as banding them; for this purpose, a mixture of castor oil and resin is used much more in Ontario than the printer's ink and oil application of Nova Scotian fruit growers. I prefer the resin mixture, because it can be painted right on the trees without any injury, but if you use the mixture of fish oil and printer's ink, this must be painted on bands of paper and then applied around the stems of the trees, or

injury will be done, particularly on young trees where the bark is tender. Occasionally a combination of the two methods of banding and spraying is advisable. The best remedy for each locality must be decided by circumstances. This cannot always be done without experiment, but if this decision is made wisely, you will then be able to do away with that great factor of failure, uncertainty. If one can give a definite remedy that will give known results, it is an important item of valuable information, because a farmer who is not specially informed can put it into practice and know he is going to get satisfactory results.

Newspaper entomologists are very numerous, but are not, as a general thing, reliable sources of information. Many of the remedies which they invent are published and widely circulated, but are frequently absolutely worthless, and are published over and over again by people who know very little about the subject. Farmers try these remedies and lose their time and money, and as a consequence, they not only leave undone wise practises suggested to them, but besides, many things which they know ought to be done. If we can only satisfy our consciences that there is any doubt about a thing being successful, we shall put it off till a most convenient season, which, like the historic more convenient season, never comes.

First find out what the insect we want to fight is, and then, having decided on the proper way to fight it, apply the remedy vigorously.

COLORADO BEETLE.

The Colorado beetle which eats your potatoes, and which a gentleman present told me was the worst insect you have to fight, is certainly a troublesome pest in all the older settled parts of Canada. You have got to fight it here in the same way as we have in Ontario. The best remedy is Paris green. This insect did not originally occur in this part of Canada at all, but it is here now and we have to fight it every year. This beetle is one of the few insects which has spread from the west to the east. By growing potatoes in large quantities we provided it with a large supply of suitable food. The potato belongs to the night-shade family upon a wild member of which family of plants it feeds naturally in its original home, Colorado. We now find that there are a great number of insects attacking crops where, in years gone by, we did not notice them at all, but there are many other

things which we did not notice before we were specially trained, even when they happened under our very noses. I receive letters day after day, calling my attention to certain weeds or insects which the writers speak of as never having been seen in their district before.

I do not know for certain that the number of kinds of injurious insects is larger than it was, but I do know that the number of people who are attending to these things and observing is ten times what it was years ago, and this number is year by year increasing, so that they notice things now-a-days which before they did not see at all. As a consequence, we find that a large amount of useful knowledge is being gathered together which is available for the use of enquirers on every description of injurious insects all over the country. We have about one hundred different kinds of injurious insects which occur noticeably every year. Of that number I am sure that ninety per cent. have been studied to the extent that we can give, on application, some practical remedy which will save a large proportion of the loss, provided that their appearance is reported promptly and the recommended remedy is used; but, as in the case of human beings, when people get ill, the doctor is not sent for in many instances until it is too late. It is just the same in the case of insects and fungus diseases. The remedies must be applied early if the best results are to be secured.

Now, Mr. Chairman, if I were to give you an account of those one hundred pests I have spoken of, I might touch upon but say very little about those which were of most interest to you. In all the different parts of Canada there are perhaps fifteen or twenty kinds which occur everywhere, and besides these there are another sixty or eighty that you here might know very little about, although probably some occur here, but not to the extent to be of any special interest to you. All these have been classified and studied. Under general principles it is necessary for us to know the insect we are fighting, so as to know what is the best remedy to apply and why we use it, for there are special remedies for each kind, some of which, though applicable for one or more kinds, may be of no use for others. There are special remedies for those insects I have called sucking insects which do not eat the substance of their food, but simply perforate the skin and suck out the sap from beneath. For this class, materials which will kill by mere contact with the bodies of the insects must be used, and we have several of these remedies which can be used under various circumstances.

I think the best thing I can do this evening is to take up your own most excellent and useful Provincial Crop Report and see what insects farmers have been complaining of during the year as those which have been most troublesome on crops in Nova Scotia. I know, of course, how this report is made up. The Secretary of Agriculture, Mr. Chipman, has, in every district of the province, some well informed correspondents who report to him periodically the different troubles farmers have to contend with; when received, all these reports are collated, and are published for the benefit of farmers all over the province. In the report published last autumn I find mentioned several insects, and I have picked out from these those that I thought I could speak to you most acceptably about this evening.

CODLING MOTH

The codling moth or apple worm is the caterpillar of a small moth which lays its eggs on the young forming apples. The perfect moth emerges from the chrysalis, in which form it passed the winter inside a coon spun on the bark of a tree, just about the time the young apples are forming. After hatching, the small caterpillar eats its way into the young apple and destroys it. This insect can be kept entirely in check by spraying with Paris green, one pound, and lime, one pound, in two hundred gallons of water. One of the discussions brought up at your meeting ten years ago by Mr. Rand was very interesting to me. The question was "can bees be poisoned if trees are sprayed when in blossom?" We now know that they certainly can. Definite experiments have been carried out with regard to this matter, and this is the conclusion that has been reached. Bees that were poisoned by collecting nectar from trees sprayed while in blossom were analyzed by chemists, and an appreciable amount of arsenic was found in their bodies. This is conclusive.

We must now consider the question of whether it is necessary to spray apple trees when in blossom. I say it is not. It was thought at one time that the eggs of the codling moth were laid in the open flower, but it has since been found out that they are laid on the sides of the young apples, and therefore spraying can be done at any time before the lobes of the calyx at the summit of the apple close up. The minute insects can get through a very small crack between these lobes, but it is necessary to spray before they close up, so that some of the poisonous material may be deposited inside the cup. The moth

lays its
hatche
It the
cavity
way to
ered th
the flo
as soon
after th
effectiv

This
it has
can be
fallen.
to spray
on the
three ye
also ob
Station.
practice
is conce
affecting
one bro
always h
than the
hang tog
and beg
States th
not occu

The
to this I
have to p
and spray
last ann
wishes fo
will easil
little trou

lays its eggs on the side of the apple, and after the young caterpillar hatches it crawls about for some time on the surface of the fruit. It then creeps inside the calyx and feeds on the skin inside the cavity for a day or two, before it penetrates the apple and works its way to the core, where it destroys the seeds. As it has been discovered that the caterpillar does not enter the calyx until some time after the flowers have fallen, it is apparent that it is unnecessary to spray as soon as we formerly thought. There is probably at least a week after the blossoms have dropped before it will be too late to spray effectively.

This insect destroys much of our very best fruit every year, but it has been proved by experiment over and over again that this loss can be prevented by spraying the trees after all the blossoms have fallen. It is not necessary to discuss further whether it is permissible to spray apple trees while in flower. The fact that the eggs were laid on the apple and not inside the flowers was only found out positively three years ago in Oregon by Prof. Washburn. The same thing was also observed later by Mr. Slingerland of the Cornell University Station. Thus the fact was proved that it is a useless and unnecessary practice to spray apple trees when in bloom, as far as the codling moth is concerned, and it is at the same time a most injurious practice as affecting bees and bee-keepers. In this part of Canada you only have one brood of the codling moth. In Ontario, West of Toronto, they always have two, and the second one is always more difficult to treat than the first. Where a leaf touches an apple, or where two apples hang together, is the place where the young caterpillar generally enters and begins its work of destruction. In Oregon and other Pacific States there are three broods. Strange to say, the codling moth does not occur in British Columbia, as far as we have been able to discover.

CANKER WORM.

The next insect I have noted is the canker worm, and in respect to this I have already spoken at some length. In this province you have to practice both methods of protection, viz., banding the trunks and spraying your trees. These are both described at length in my last annual report, which I shall be glad to send to any one who wishes for it. If you watch your orchards carefully in spring you will easily see when the young canker worms hatch, and you will have little trouble in destroying them by spraying at that time. It is not

necessary in the least to burn the leaves in orchards with Paris green. Fruit growers must learn that there is a proper amount to use and a proper way to use it. One pound of Paris green and an equal amount of lime, to equalize the caustic effect of the arsenical poison, in two hundred gallons of water, is the proper strength to use, and this must be applied with a good spraying nozzle, so as to distribute the material evenly and lightly over the whole tree, moving the spray as soon as the liquid is seen to drip from the foliage. In this way trees may be sprayed as often as necessary without any danger, but above all things it must be insisted that the amount of poison used is weighed and not guessed at or measured with a teaspoon, the hand, or a pail, etc.

THE CIGAR-CASE BEARER.

There is a little insect which occurs here, and which, during the past few years, has done a considerable amount of injury on apple trees in Canada. This is known by the name of the cigar-case bearer, because when a caterpillar it forms for itself a little case shaped exactly like a miniature cigar. In the spring, as soon as the buds open, these caterpillars crawl out from the crotches of the branches or from the little hollows on the fruit spurs, and do much harm by eating the young leaves and flower buds. After many experiments we found that this troublesome pest could be treated by spraying the trees early in spring with Paris green, or, perhaps rather better, with the kerosene emulsion, a mixture of coal oil and soap suds, the preparation of which I will not take time to describe now, but the receipt for which I shall be glad to give to any one who will ask me for it after the meeting, or I shall be glad to send it to them in a printed pamphlet. The emulsion falls on the bodies of the insects and the oily nature of the kerosene suffocates them by stopping up their breathing pores. We breathe through one mouth; caterpillars breathe through eighteen pores in their sides. They have thirteen segments on each side, nine of which is a breathing pore or spiracle. You can kill an insect more quickly by letting a drop of oil fall on it than by cutting off its head.

CUT WORMS.

Cut worms are also well known all over the country. They come out at night, destroying every young vegetable or other plant they may come across, and then hide beneath the soil during the day. In

the
up an
may
your
down
out.
of pa
bages
plant
little
Craig

A
root n
very r
sudden
find t
and st
the m
damp
very e
flower
injure
of Jun
earth
work
a tea
poison
as the
remed
eaten,
make
hot wa
a cupf

Th
mende

the spring this worm, more than any other I know of, will stir you up and alter your disposition for that day, however good tempered you may be. It is most irritating in spring, when you are planting out your garden, to go out day after day and find lovely young plants cut down directly they appear in the beds, or as soon as they are planted out. One of the simplest plans of treatment is to take a small piece of paper and when you put out your plants, such as tomatoes or cabbages, to wind it round the stem before planting. You put in your plant, leaving the paper two inches above the ground. It takes very little time, and will save a great percentage of your plants. Prof. Craig uses this method every year with great success.

ROOT MAGGOT.

Another insect pest of great interest in this district is called the root maggot, which affects the growth of the cabbages and cauliflowers very much. When everything is looking well in the cabbage patch, suddenly the plants wither and die, and upon pulling them up you find that the roots are all destroyed. The maggots consume the roots and stems of the young plants. If you examine your plants during the month of June you will detect the presence of the maggot by the damp earth about the roots, and then you must act quickly. You can very easily find them. I discovered during the past season that cauliflowers of very excellent quality can be grown after having been injured to a considerable extent by these insects. During the month of June, even when the plants are looking splendid, scrape away the earth from the roots and you will generally find small maggots at work; if you do, attend to them at once. The best treatment is with a tea of white hellebore. This powder is the ground up roots of a poisonous plant called *Veratum album*. It is well known to you all as the best remedy for the currant worm. It is a most valuable remedy; not only does it kill by contact, but is very poisonous if eaten, in this respect differing from Pyrethrum. For root maggots, make a tea by using four ounces of white Hellebore in a pailful of hot water, and having pulled away the earth from the roots, pour in a cupful, and then earth up again well around the roots.

There is another remedy I have not yet tried, which was recommended highly by Mr. Slingerland, of the Cornell Station. A substance

which is very noxious to some insects is carbolic acid. Tar, which has the same odour, is also very obnoxious to many insects. By taking a piece of tarred roofing paper and cutting rings of it and placing them around the stems of the plants, the flies which lay the eggs may be kept away.

All insects come from an egg, and the life of all insects is divided up into four well-marked periods, during each of which their habits are entirely different. These are :—1. The egg. 2. The caterpillar or larval stage, during which, as a rule, they are most injurious. 3. The chrysalis, or resting stage, in which, except in a few orders, the insects lie quiet and are without the power of motion. And 4. The perfect insect. Insects all originate from eggs; none are generated spontaneously as some people suppose, but all come from the union of males and females, like larger animals. It is important to understand in which of these stages injurious species can be most successfully dealt with. Some of them you cannot attack in three of their stages, but they may be vulnerable in one of them, and it is necessary to know something of their whole-life histories, so as to find out the proper way to fight against them. Again, some insects are injurious in three of their stages, but the larger number in only one, so that unless we know them in all their forms we may lose opportunities of destroying them, from not recognizing them as enemies.

HORN FLY.

The horn fly is already passing away from your province. It was a bad pest during the last year, but it was worse the year before. Next year its injuries will be less serious. In some sections of your province farmers had a good deal of trouble last year. Some people claim that everything they tried failed. Others, on the other hand, report that they succeeded well. We found that any greasy substance which was applied would keep the flies off our stock for some time. Some mixtures that have carbolic acid in them will keep the flies away, and will also help to heal any sores which may have been made by the animal's rubbing themselves. Carbolic acid has an odour which the flies do not like. If we prefer, we can use the kerosene emulsion, which can be applied by means of a spraying pump. This mixture will keep off the flies if applied regularly.

COLORADO POTATO BEETLE.

A Member. What is the best thing for the potato bug?

For the Colorado beetle Paris green is the best remedy, and can be applied so cheaply and effectively that the ravages of the Colorado potato beetle can be easily stopped. It must be remembered that Paris green is not soluble, but being a very fine powder, it can be easily kept in suspension if you keep it stirred when spraying over your vines. Last winter I found that some farmers in Ontario, although mixing it themselves, because it is poisonous, left it to their hired men to apply, without explaining that it must be kept stirred, and as a consequence, got poor results from the heavy powder settling to the bottom.

White arsenic could be used also, but it is a very dangerous poison to have about your premises, and is much more likely to injure foliage. Paris green should never be used on any vegetable which is used as a pot-herb, that is, of which the leaves are cooked for the table. It should never on any account be used on cabbages. But year after year it is applied to cabbages all over America for the cabbage worm, and I attribute many deaths to criminally careless people using it in this way. There is no excuse for this practice, as we have a better and quite safe remedy in insect powder, which is harmless to the higher animals, which indeed, could eat it, and it would only act as an emetic to them; but yet it is exceedingly fatal to all insects. It acts in a special way by paralyzing the muscles which control their breathing pores, thus suffocating them. It is manufactured by grinding up the flowers of two or three species of *Pyrethrum*, which are beautiful plants growing wild in Persia and some countries in the south-east of Europe. The poison itself is well known in commerce as Persian and Dalmatian Insect Powder. This insecticide may be used either dry or as a tea or decoction. It owes its virtue to a volatile alkaloid. Its effect upon some insects, particularly caterpillars, is most remarkable, a very small quantity paralyzing and, in time, killing them, when merely brought into contact with their bodies. For the cabbage worm, it may be mixed with three times its weight of common flour, and dusted over the cabbages, when it will kill every caterpillar it falls upon or which eats the leaves upon which it or the decoction from it has fallen. Even when applied dry a decoction is soon made by rain or the condensation of dew.

TURNIP FLEA BEETLE.

For this troublesome insect, mix one part of Paris green with fifty parts of land plaster. You should not use tin pepper pots or flour dredges for the application of this powder. Make a small bag of cheese cloth, or two thicknesses of muslin, and then get a bit of string and tie this bag at the end of a short stick, so as to avoid stooping, which soon becomes very tiring. With another light stick tap the bag, and the powder is distributed lightly over the young plants.

Q. Would you use it in water on the potato beetle?

A. I think the easiest and safest way to use Paris green on potatoes is with water. We use, at Ottawa, a spraying machine that is drawn through the field by a horse, but the dry powder is preferred by some.

TENT CATERPILLAR.

This caterpillar has been complained of very much. The name, "the caterpillar," used generally in Nova Scotia, is not the proper name of this insect. Every moth and butterfly in the country is a caterpillar at one stage of its existence, and not one of these should be called "the caterpillar." If you call it the "forest tent caterpillar," which is its proper name, you will be able to get all the information you want, and the best remedy, without any mistakes occurring. It is important to use the proper names, even the popular ones; these are decided upon and confirmed by an association called the Association of Economic Entomologists of America. To this association every year are submitted the names of insects, so that the most appropriate ones may be decided upon. If orchards are sprayed regularly there will be little trouble with this pest. The egg-clusters should also be destroyed during the winter, and the nests of caterpillars destroyed by hand in spring.

PIN OR SHOT BORER.

The pin borer is a little beetle which bores into your apple trees and does a great deal of harm. In England it does a great deal of injury to plum trees. In the United States it attacks the pear, and is called the pear blight beetle. The injuries are all done by the same species. You Nova Scotians gave it the name of the pin borer, and it was such a good one that I adopted it. I first heard the name from Mr. Starr here years ago, and that name is now recognized

generally by entomologists for the insects belonging to the same family. As a general rule, this beetle attacks weak trees ; but this is not always the case. First invigorate your tree and give it a good constitution, and then treat the insects afterwards. This beetle bores into the tree to lay its eggs, from which the young grubs hatch. By its boring through the wood it cuts off the flow of sap, and does a large amount of injury. These insects get into the trees in spring from the outside, and the remedy sometimes adopted of stopping up the small holes, made by the beetles, with tacks and other pegs in summer, is of comparatively little value, the beetles and the young larvar in such holes as are plugged will probably die ; but where one is plugged hundreds will be overlooked. With this as with all borers we find that preventive remedies are the best, and consist of applying to the trees something obnoxious which will prevent the beetles from attacking them.

In apple trees we have the pin borer and also the round-headed and flat-headed borers. For these the best remedy is to coat the trees with one of the alkaline washes, as for instance, soft soap made liquid with a strong solution of washing soda, which makes it more alkaline. If you put in, besides, a little carbolic acid, you have a substance which we know is obnoxious to all insects. The proper time to apply the remedy is when the female beetles resort to the trees to lay their eggs. Two or three washes put on at intervals of three weeks will prevent your trees from being attacked by these insects.

If any one wishes to know anything further with regard to injurious insects, I will do my best to answer any questions. I recognize fully the value of the work of the officers of the Experimental Farm. We believe we are officers paid by the country to give help to all the different classes of agriculturists that apply for it. It is a pleasure to be with you, to get your experience, to hear the questions you ask and to take part in the conversations we have at the meetings and afterwards. If you want to know the best way to fight against injurious insects, let us know what you wish to hear about and we will do our best to help you. We want you to make use of us to the fullest extent possible.

ORCHARD COVER CROPS.

BY PROF. CRAIG, OTTAWA.

Mr. President, Ladies and Gentlemen,—I have been interested for two or three years in trying experiments with a view of ascertaining what, in our climate, would prove the most suitable cover crop for orchard soils. Possibly, cover crops on orchard soils with us, at Ottawa, are more important and essential to ultimate success than they are with you. You, perhaps, might ask me what a cover crop is, and what objects it tends to serve. Well, briefly, they are two—first, the gathering and returning to the soil of that valuable element, nitrogen, and second, the protecting of the soil from the effects of severe frost such as we, in the west, have had this winter, when the ground is practically unprotected by snow. We have suffered a great deal of injury the past two years from a cause which, in the past, was practically unknown, and was, therefore, quite unexpected, namely, that of root killing. We have lost a number of apple, pear, plum, and cherry trees from this cause. The roots were injured and killed by severe frosts which caught us at a time when the ground was not protected by our usual warm blanket of snow. Every tree and plant is able to withstand a certain definite degree of frost; if the frost goes below that point and continues for a long period, the life passes out of the cell. All plant life is stored in the protoplasmic contents of the cell. The action of frost is simply this,—that as frost freezes the materials which compose that cell, from those materials the water is extracted; in cases of severe freezing the cell may then die from the same causes as that which would kill it if visited by a severe drought—simply dies from lack of moisture, all the water being withdrawn from the cell, the protoplasmic contents become completely dried, then life, that mysterious principle, becomes extinct. When freezing the cell contents at ordinary temperatures takes place, the water withdrawn is usually reabsorbed by the cells when the temperature rises high enough to cause the contents to thaw, and no harm occurs; but when abnormally severe freezing takes place, the water is extracted to such an extent that the cells do not reabsorb normally, and life in the protoplasm becomes extinct. This can be explained by taking a bowl of starch paste and allowing it to freeze. At first the contents, the whole, is a sort of cream with the starch

mixed
water
when
becom
the s
takes
T
attach
back
buds
hardin
fruit k
attach
with u
lowed
most o
tected
roots o
depth
trees t
of eigh
while
beginn
import
tection
issue.
is the
Annap
and gra
cover f
analysis
material
I need
grass an
Our
large ex
season
sow up
enough

mixed evenly throughout, but when it freezes you will notice that the water is withdrawn from the starch, a separation takes place, and when it thaws the starch does not reabsorb the water, and the whole becomes a mixible fluid instead, the water remains on the top while the starch falls to the bottom. This is a crude illustration of what takes place in a living cell that is subjected to a severe frost.

That brings us to the condition of killing by frost which may attack not only the tender roots, but which may result in the killing back of the young wood and sometimes, as in the case of peaches, the buds also. Leaf buds and fruit buds have distinctive degrees of hardiness. The leaf bud will stand more frost than a flower bud. A fruit bud has more of the starchy material in its tissues. The frost attacks not only the tops but the roots, and in cases of severe cold, as with us in the north, we have the result known as root killing, followed by the death of a great many of our trees. Last winter was a most disastrous one to our experimental orchards in these parts unprotected by cover crops. The effect of the frost was most severe on the roots of some varieties, which were entirely killed, sometimes to a depth of two feet or more below the surface. On digging up these trees this spring I found, from the surface of the ground to a depth of eighteen inches, that the whole wood tissues had turned brown, while the lower extremities of the roots were sound and healthy and beginning to sprout below the frost line. So with us, one of the most important ends that the cover crop will serve is that of surface protection; but that with you in Nova Scotia would simply be a side issue. The food material that the cover crop would bring to the soil is the point of most importance to you as fruit growers in the Annapolis Valley. I have tried a great many mixtures of clovers and grasses with a view of finding out which would give us the best cover for the ground, and which would, after being tested by chemical analysis, give us the greatest amount of that valuable fertilizing material which we should look for in a cover crop, namely, nitrogen. I need not detain you by going over the number of combinations of grass and clover mixtures which were effected in making these tests.

Our method of orchard procedure, and it is no doubt yours to a large extent, is to cultivate the ground during the early part of the season very thoroughly, and after the close of the growing season, to sow upon the surface some crop which will grow quickly and be large enough to protect it when winter approaches.

You have, I am sure, heard a great deal of crimson clover ; its advantages and so forth. It is undoubtedly one of the fastest growing annual plants that we have among clovers. If you sow it in the spring it will flower, seed and die the same year ; but if you sow it in midsummer, it has not time to flower and seed, it will then live over winter, flower the next year, and, after completing its life cycle, dies. It is, therefore, an annual plant. I tested, alongside of crimson clover, three other varieties, viz., Alfalfa, Mammoth Red, and Common Red. They were all sown on July 13th. Part of the crop was cut for experimental purposes on October 15th.

It was astonishing to find that the crimson clover, though sown on July 15th, gave the enormous yield of fourteen tons per acre, green. The crimson clover gave the largest yield of green material, but it contained eighty-three per cent. of water. The Alfalfa gave less weight of roots and tops, about ten tons per acre. The Mammoth Red gave practically the same as the Alfalfa. The Common Red yielded considerably less.

In the fourteen tons of Green Crimson Clover were contained 104 pounds of nitrogen. If we multiply 104 lbs. by 15 cents, the price of nitrogen per pound, we would have \$15.60 worth of fertilizer mainly taken from the air by that clover crop on every acre of land between July 13th and October 20th. I do not think it is all clear gain, that is, all from the air ; it is probable that part of the nitrogen is extracted from the air which fills the interstices of the soil. But supposing we were to take three-quarters, say 75 pounds, and multiply it by 15, you would have a net gain to the soil by growing a crop of crimson clover of about eleven dollars.

Now the Alfalfa, while it has a less total weight of green material in the tops, it has a larger amount of nitrogen in roots and stems. This is on account of much less water being contained in the stems and roots. This plant runs its roots downwards to a great depth. The Mammoth Clover gave ten tons to the acre which comes very near the Alfalfa in total yield of nitrogen, namely 130 pounds, which would give us at least \$12 worth of collected nitrogen.

I hope I have not taken up too much of your time in going into the characteristics of these plants. I know that you all understand the habits of the leguminous plants and are aware that one of the missions of these plants is to collect from the atmosphere nitrogen

and stor
then ref
the soil
tivate th
this imp
the mec
plant gr
crimson
that plan
will hav
to us as
frosts of
through
under qu
nishes a
furnish t
plant an
matter of
ground.
below the
I reg
as the be
rapidly, a
(lucerne)
green ma
comparati
believe th
Red Clov
A. B.
you cut it
and will b
it accordin
DR. D
same facul
Clover ?
Q. D
well on al
nature.

and store it up in the little nodules on their roots. This nitrogen is then returned to the soil. In addition to that, leguminosae return to the soil large quantities of vegetable humus. It is impossible to cultivate the ground successfully for any length of time without returning this important vegetable substance in some form in order to correct the mechanical condition of the soil, which will become unsuited for plant growth unless green manures are plowed under. The value of crimson clover for this district will depend largely upon whether that plant winters successfully or not. That is a matter which you will have to decide for yourselves by actual trial. It is of little value to us as a cover crop when sown by itself, because the first severe frosts of autumn kill it. We have thus far been unable to carry it through the winter. At the same time, as a rapid grower to plow under quickly, I deem it to be valuable. The Alfalfa, while it furnishes a little more nitrogen than the Mammoth Clover, yet does not furnish the same amount of cover to the surface soil. It is a slender plant and does not branch out like the Mammoth Clover, but, as a matter of fact, there is two-thirds of the whole Alfalfa plant below ground. I followed the roots of one year old Alfalfa fully four feet below the surface of the ground.

I regard the Mammoth Red Clover, considered from all points, as the best plant for the purposes of which I am speaking. It grows rapidly, and gives us nearly as much nitrogen per acre as Alfalfa (lucerne) furnishes a good cover to the soil, and a large amount of green material to be plowed under the following spring. It starts comparatively early in the spring, and does not winter kill, so that I believe that there is no better cover crop than the large form of the Red Clover known under the name of the Mammoth Clover.

A. B. PARKER. Q. How long do you let your crop stand; do you cut it the first season? A. This was sown July 13th with us, and will be plowed under the following spring; you will have to sow it according to your own conditions.

DR. DEWITT. Q. With respect to the Alfalfa, has its roots the same faculty of gathering nitrogen in its tubercles as the Mammoth Clover? A. Yes.

Q. Does it succeed (Alfalfa) in Ontario? A. It does not do so well on all soils. It does especially well on a soil of a light sandy nature.

Q. With respect to the nitrogen gathering plants, does millet gather nitrogen, and does it give a good cover? A. No. Neither millet nor rye. That question reminds me that in the peach-growing districts in Michigan, where crimson clover is not quite satisfactory by itself, they sow with it a light seeding of oats, usually about the 15th of August, because their season is longer than ours, at the rate of three pecks to the acre. The oats grow up and furnish a certain amount of protection to the clover, and the two together make an excellent cover crop.

Q. Will buckwheat make a good cover? A. It has some value, but does not return very much nitrogen to the soil.

W. C. ARCHIBALD. I have an orchard with about one foot of cultivable soil on the surface, and below it is hard pan. The question with me is how to treat that hard pan. Will any of the clovers pierce this hard pan?

PROF. CRAIG. Alfalfa, if it gets a good start, will pierce a hard pan if its not cold and sour. It will do more; it will break it up and make it friable. But before sowing it, I would subsoil as much as possible; this is done by following the ordinary plow with a subsoil plow.

GEORGE THOMPSON. If Crimson clover and Alfalfa are annuals, what is the object in cutting it? A. Alfalfa is not an annual.

GEORGE THOMPSON. Well the Crimson clover is. Is there any object? A. It was cut in this instance to obtain the data. It is not cut in the ordinary practice, but plowed under in the spring.

GEORGE THOMPSON. I understand that the Alfalfa, Mammoth Red, and the Common Red are perennials?

PROF. CRAIG. The Alfalfa is a perennial, as is the Mammoth Red; the Common Red is a biennial.

Q. Are Common Red and Mammoth Red liable to be thrown out with frost? A. On some soils. The Crimson clover is the shallowest rooted of the four. The shallower the root the more likely it is to be thrown out by heaving.

Q. In what form of compound is the nitrogen? A. I am not sure that I can tell you; it is in an immediately available form as soon as the plant is decomposed.

Q. Is it available for plants? A. That has been proven over and over again by actual experiments.

Q. It is not in a free state? A. No. It is associated with the albuminoids and fats. Naturally it cannot exist free. Certain cells in the nodules appear to have the power of collecting nitrogen specially associated with their protoplasmic contents.

Q. It is generally supplied in some form of soluble compound? A. Yes. Soil inoculation has been experimented on in Germany. The nodules can be carried in the soil in which they are from field to field, and the new soil thus inoculated by the bacteria.

Mr. F. T. SHUTT, in the *Ottawa Naturalist* for October, 1896, discusses the process in the following language:—

“The first experiments towards this end consisted in taking soil from a field upon which a legume possessing an abundance of nodules had been grown, and sowing it on the field to be impregnated. This was practically soil inoculation and, though the plan proved eminently satisfactory, the carrying out of it was, in many instances, costly and cumbersome. Dr. Nobbe, of Tharand, Saxony, was the one who first made this practical application of Hellriegel's discovery. He, however, did not stop there, but as we now have to chronicle, he prepared ‘pure cultures’ of these nitrogen-converting organisms, by methods well known to bacteriologists. These cultures or preparations are now made on a commercial scale, so that a sufficient quantity to inoculate an acre can be bought in Germany for \$1.25. The members of the leguminosæ have, it would appear, each their own peculiar bacteria or micro-organisms; and it has been shown that those influencing the assimilation of nitrogen in the clover plant are of no value for the pea crop, and vice versa. Hence the necessity for the preparation of cultures of clover bacteria, pea bacteria, and so on; and these must be used according to the effect desired, or, in other words, according to the crop to be sown.

These cultures consist of “colonies” of these organisms and the preparation has been named *Nitragin*. The practical application of *Nitragin* has been tried in two ways: first, by diluting it with sufficient water and sprinkling the seed with the fluid; and secondly, by treating a quantity of soil with a dilute solution of the preparation, allowing the soil to dry and then spreading it evenly over the field to be inoculated, which is then deeply harrowed.

It is yet too soon to speak of results, but the probabilities are that the experiments now being carried on in Germany and England with this agent will prove successful.”

Q. Will the effect of sowing leguminous crops continue year after year? A. Not after the plant is taken out, upon which the particular bacterium flourishes.

Q. Why not give us the names of the seeds of the other plants that might be sown simultaneously, in order that the process may be set up by others? A. All the clovers, peas and beans are members of the leguminous family. By transplanting inoculated soil from one field to another, the beneficial process is transmitted to the new ground.

Q. Are those germs in nodules in leguminous plants? A. Yes.

Q. Which of the four plants of the leguminous family do you recommend for orchard purposes? A. Mammoth Clover?

Q. Is it hardier than Crimson Clover? A. Yes.

Q. Where can seed be obtained? A. From most of the seedsmen in Canada.

Q. Is it hardy enough to stand the climate at Ottawa? A. Yes.

Q. Is this claimed for the Alfalfa also? A. Yes.

M. G. DEWOLF. In reference to Mammoth Clover, I have known it to remain in the soil in the North Mountain for six years.

PROF. CRAIG. Are you quite sure that it did not reseed itself?

A. No, the same plants would not last more than three years.

A. B. PARKER said the Mammoth Red Clover was the best for Nova Scotia.

PROF. COLDWELL. Q. Do these microbes grow on other crops?

A. No, they set up the action in the soil and they take the nitrogen from the air.

Q. How many pounds of clover seed should be sowed per acre?

A. Sow not less than fourteen pounds.

GEO. THOMPSON. I sowed ten pounds to the acre and had a splendid crop. With respect to the inoculation of soils Lord Roseberry is now testing it at his experimental farm, and the results will be made known shortly.

PROF. CRAIG. It was tested at the Minnesota Experimental Station, and is now past the experimental stage.

W. C. ARCHIBALD. Is there such a thing as the creation of muriatic acid in the soil by the free use of salt?

PROF. CRAIG. That is a point I shall have to leave to a chemist.

T. H. PARKER. As a cover crop, what are the comparative advantages of Mammoth Clover and the Cow Pea? A. I have tried Cow Peas and Soja Beans; these are annual plants from Japan; they are both very strong growers, but leave little cover after being killed by the first frost.

Q. Supposing a crop of peas were left on the ground instead of being ploughed in, would the nitrogen escape and be useless? A. No. There would probably be a certain loss of nitrogen in that which was carried or washed away, but there is not so much lost after all.

M. G. DEWOLF. In your experiments with peas which do you find the best, the Golden Vine or Mummy? A. I think I would rather have the Black Eyed Marrowfat.

RALPH EATON. Q. With respect to the Mammoth Clover, what period do you think it would be better to plow it in as a green crop? A. Early in the spring for orchard manuring purposes.

RALPH EATON. Q. Have you given any preference to clover or peas considering the matter of cultivation as well as those of fertilization; which would you favour for practical use? A. Like a canny politician I would say *at present* I would favour Mammoth Clover, although this may not govern my future action when guided by renewed light and experience.

S. C. PARKER said that about the first of August he had sowed a few pounds of Crimson Clover, it came up nicely, and he was quite encouraged to continue the experiment from time to time. With a fair chance it will winter in this climate all right. The rapid growth it makes in the fall would add considerable nitrogen to the soil. It is well worth the trouble for any fruit grower to sow a little of that seed. It was one of the prettiest things on the farm, and the children passing to school would call to get the blossoms off the Scarlet Clover.

RALPH EATON. In an orchard twenty years old, what would you recommend to fertilize it as cheaply as possible?

PROF. CRAIG. That would depend altogether upon the character of the soil. Supposing wood ashes were worth twelve to fifteen cents per bushel, and gave us seven per cent. of potash, I would apply those at the rate of fifty bushels to the acre; and I would apply, in addition,

bone meal at the rate of three hundred pounds I mean fine ground bone meal.

Q. What weight of ashes do you estimate to the bushel? A. I think they are sold at fifty pounds to the bushel, but usually by the ton.

W. C. ARCHIBALD. If clover was sowed in July, and was killed by the winter frost, is it of any value afterwards in restoring nitrogen? A. There is some loss but not to an appreciable extent. The clover goes on collecting nitrogen till the maximum amount is reached just previous to the formation of the blossom, and previous to the formation of the seed.

J. R. STARR. I would like to know the value of Alfalfa for hay and storing purposes in this country? A. I do not think it is a plant to be recommended for hay purposes.

S. C. PARKER. Did I understand you that Alfalfa would do well in light sandy soils? A. Yes. I have had it growing on the poorest sand; it did not perhaps make a very vigorous growth, but it did very well, and the roots had a decidedly ameliorating effect upon the soil.

R. H. EATON. Is there a better kind of clover to sow on our marsh lands? The clover is dying out on our dykes, and I would like to know if there is a better kind than the Common Red or Late Red for sowing on our marshes. We want something that will stand the winters and dry summers? A. I will refer that to Dr. Fletcher.

DR. FLETCHER. Alsike does well in low lands, and is probably the best.

PETER INNES. Will Mr. Fletcher give us a mixture for seeding down grass plots?

DR. FLETCHER. The mixture that has given us the best results at Ottawa, and which I think will do well in average good soil all over Canada, is the following, which may be sowed in the spring:—Six pounds of Timothy, four pounds of Meadow Fescue, two pounds of Orchard grass, and in ordinary dry land, one pound of June grass, and in low land add also one pound of Red Top. To these grasses add two pounds each of the four clovers, Mammoth Red, Alsike, Alfalfa, and White Dutch. This mixture will give heavy crops of hay for two or three years and excellent pasture afterwards.

PETER INNES. Has the Soja bean been used for ensilage?

DR. FLETCHER. A. I have tried it on the experimental plots and it has cropped heavily. Prof. Craig has also grown it for several years. I do not think it has been actually grown in this country for ensilage in great luxuriance, but I believe it would make an excellent substitute for horse beans in the Robertson mixture.

JOHN DONALDSON asked if cutting the hay before the 10th of July would not kill out the Timothy?

DR. FLETCHER. A. Exact dates mean nothing in discussing general principles. The nutritious principles or valuable food constituents of all grasses are laid up by nature in the plant to feed the seeds which are the means of reproduction. Until the seeds form, these constituents are evenly distributed throughout the whole plant. As soon as the seeds form, however, growth of the plant ceases, and its whole energy is devoted to drawing off the nutrients and storing them away in the seeds. By cutting hay, therefore, as soon as possible after flowering, there is more food value in it than if the seeds are allowed to form at the expense of the stalks. Orchard grass makes a good mixture with Timothy. This grass gives rather light and bulky hay, but it is of good quality. Orchard grass and June clover would be a far better mixture than the ordinary one of Timothy and clover.

Q. How many pounds would you use per acre of that pasture mixture you spoke of? A. Twenty-one or twenty-two if you add one pound of Red Top for low lands.

W. C. ARCHIBALD. Can we induce clover to grow without planting seed. In any old grass land it is said a farmer can induce clover to grow without planting any seed if he manures the land.

DR. FLETCHER. No plant can come into existence except from seed.

DR. FLETCHER related an incident told him by Colonel Blair, now of Nappan, of when he was a boy, his father had every bit of mustard pulled from his farm and buried in a marsh six feet deep, so that there was not a vestige of the plant to be seen on the farm. Twenty-three years afterwards, when the farm fell into other hands, suddenly the whole farm blossomed out with mustard, and it was found that marsh mud had been dug from the land from the very place where, many years previously, the Blairs had buried their mustard.

DR. FLETCHER also exploded the fable of seeds growing after being taken out of mummies. Fifty years was about the longest time known that seeds had been kept which, when afterwards planted, had grown.

GEO. THOMPSON said that the dyke proprietors thought that clover was not a good grass. There is a difficulty in growing it. The best grass that could be sown for dyke was pure Timothy.

MR. BISHOP asked about the root maggot. Two years ago he had prepared a piece of ground for onions which has since been over-run with the root maggots?

DR. FLETCHER. There is no practical remedy for field culture as yet. Certain applications have been made with a measure of success, coal oil emulsion and carbolic acid being the chief active agents.

M. G. DEWOLF exhibited an insect which he said was attacking the seeds in Prof. Faville's forcing houses.

DR. FLETCHER. This is one of the millipedes or centipedes. You will find these sometimes injurious to potatoes in Nova Scotia, particularly where saw dust has been used as a vehicle for liquid manure. They eat the surface of the tubers and give the potato a rough scabby appearance, which injures their sale. I think nitrate of soda has been used with good effect in green-houses for this enemy.

PROF. FAVILLE. Have you had any experience in using crude petroleum for the pin borer? A. I would not use it; I have no doubt it could be used and would give certain results, but it would be dangerous; the efficaciousness would be due to its strong odour which would keep the females from laying on the trees. I think you could, however, use an alkaline wash more safely and get better results. I do not think coal oil should be applied in any form directly on the trunks of trees if you can get anything else. An alkaline wash prepared simply of soft soap or hard soap, diluted with a saturated solution of washing soda, until it is of the consistency of paint as ready for use, is an excellent wash.

Q. Will it not injure the bark? A. No.

Q. Will it injure the foliage? A. It is not for use on foliage, but is painted on the trunks.

W. C. ARCHIBALD. Is it possible to use it too strong? A. No.

RALPH EATON. Would you give us the proper mixture?

DR. FLETCHER. Make a solution of washing soda so strong that no more of the soda will dissolve in the water, and then dilute the soap with this to the proper consistency.

Q. What time do you wash the trees for the pin borer? A. Twice; in the beginning of May, and again a month later, so as to cover the time the females lay their eggs.

Q. Will that wash have any effect on lice? A. Yes, it is a very good one for that purpose.

REV. MR. HOWE. Will this saturated solution of soda stand many rains? A. Yes; it leaves a varnish like covering on the trees.

BARK LOUSE.

DR. FLETCHER. I do not want any one to underrate the danger from the oyster shell bark louse. It is a most injurious insect, but in many instances it is overlooked, although it has perhaps destroyed more trees in Canada than any other insect. It has been fought very successfully in some places. It is easier to fight it in the winter when it is dormant. In the middle of June the young lice come out from under the scales on the bark when they are little insects with legs. After the small lice come out they crawl about for a few days on the branches. They come to a standstill and perforate the bark, sucking out the juice and doing serious injury. Perhaps the best time to attack this pest is early in the spring before the buds open.

RALPH EATON. At that time would you use the kerosene emulsion? A. Yes. I would use kerosene emulsion by spraying it over the whole tree. A man who sprays and washes his trees, as a rule, cultivates them well also, and such a one very seldom has any trouble with injurious insects. An orchard that is well looked after and well kept is certainly less liable to attack than those not so well attended to.

I would also say a word or two with regard to looking after the prunings, as a good deal of injury may be done in your orchards by leaving the cuttings laying around the trees; they should be carefully removed and destroyed, as they bear many injurious insects and fungus diseases. Go through your orchards from time to time, and if you look closely you will soon train your eye to detect the eggs of the tent caterpillar. This can be done at any time in the winter season. About a foot from the tips of the twigs you will see their egg clusters. Pick their eggs and destroy them during the winter.

T. H. PARKER. With respect to caterpillars, he had sprayed twice with one pound of Paris green to forty gallons of water, but without any effect ?

DR. FLETCHER. There must be something radically wrong. I cannot understand why one pound of Paris green to forty gallons of water did not hurt the leaves or hurt the caterpillars. There could not have been the maximum amount of poison in the material used, or it would have destroyed the foliage. I have never found it necessary to use a mixture stronger than one pound of Paris green to two hundred gallons of water. The canker worm, when thoroughly cleared out of an orchard, can be easily kept out afterwards. Attend to them early in the year for one season by spraying early and carefully, then you will get your orchard clean. I would advise you strongly to spray regularly.

In regard to the infestation from other orchards, how does it take place ? The only way that I can think of is that the caterpillars spin down from the limbs of neighbouring orchards and are blown by the wind ; or it is possible they may be carried from one orchard to another on carts, implements, or other tools. I think it is chiefly by being carried on implements. Spraying will destroy all the caterpillars that eat the foliage of fruit trees

GEO. THOMPSON. I found that the best method of treatment is to put tarred paper around the tree to prevent them going up. It is better to have this done about the second week in November. He said that they actually spin a web between trees thirty or forty feet apart, and that it could be seen quite plain on a sunny day. Besides, the south-west wind would also bring them from one tree to another.

DR. FLETCHER said it would be difficult to spray the tops of their large trees. He would prefer the castor oil and resin preparation to the printer's ink, as it could be painted right on the trunk.

Q. What are the proportions ? A. One gallon of castor oil to three pounds of resin. Paint this preparation around the trunk in a band about six inches wide.

MR. R. W. STARR enquired about the collar rot. A. As far as I have been able to observe this injury, it is simply the work of the round-headed apple borer. This name is simply given to the effect after the cause has gone.

MR.
with Pa
the polle
essential

REV.
louse ?
but I ha
where it
deaux m
mistaken

DR. I
Wolfville
crop he l
bloom, an
pose of k
the platf

DR. I
but perh
fully, and

I lear
the forest

Q. V
a whole b

J. R.
green to c
the worm
pure Paris

J. E.
not stop t
the second

J. R.

DR. F
not notice

MR. J
apparently
somed ; th

MR. ARCHIBALD. Q. I would like to know if spraying a tree with Paris green would affect the pollen? A. It would not affect the pollen in any way, but it might affect the pistil, which is the other essential organ of the flower.

REV. MR. HOWE. Q. Will the Bordeaux mixture kill the bark louse? A. Unless you have found that it would, I would say no; but I have heard of two instances in the eastern townships of Quebec where it is claimed that the bark louse was exterminated with Bordeaux mixture, and no other remedy was used, but I think they were mistaken.

DR. DEWITT said that the canker worm came out prolifically in Wolfville during the past year at the time of blossoming. The first crop he had observed came out on the trees when they were in full bloom, and that he and a neighbour had used Paris green for the purpose of killing the worm, and he referred to his exhibit of apples on the platform as the result of his experiments.

DR. FLETCHER. I must say that your apples are particularly fine, but perhaps you lost a great many. I should watch the trees carefully, and only spray when the caterpillars first appear.

I learn from Mr. Starr that the tent caterpillar you have here is the forest tent caterpillar.

Q. What is the name of that caterpillar that spreads a net over a whole branch? A. That is probably the fall web worm.

J. R. STARR. I used one pound of lime and one pound of Paris green to one cask of water. I burnt the leaves some; I did not hurt the worm. I suppose the Paris green was not good. It was marked pure Paris green.

J. E. STARR. If you let the canker worm get half grown you cannot stop them. I think you waited for too long an interval before the second spraying, and then the worm was too large.

J. R. STARR. I sprayed twice before the bloom.

DR. FLETCHER. You probably killed a great many which you did not notice.

MR. JOHNSON. We sprayed our orchards early, but it did not apparently kill the worms, and we sprayed after the trees had blossomed; the worm did not apparently leave the trees, but I noticed

they did not return the next year. I think Mr. Starr will find that the trees he sprayed this year will not have so many worms on them next year.

REV. MR. HOWE said that he thought it was better to spray when the whole tree was wet, rather than when it is dry.

W. YOUNG. How long would it take to get a reply if a sample of Paris green was sent for analysis to the Experimental Farm, Ottawa?

A. It is impossible to say; it would depend on the amount of work on hand in the laboratory at the time. We have only one chemist and one assistant, and we have hundreds of samples sent in in the year, and these are taken in rotation according as they come in. I fancy, however, that this would be the special business of Mr. McFarlane, the analyst of the Inland Revenue Department.

A rough and ready test for Paris green is to dissolve it in liquid ammonia; if there are any of the ordinary impurities they will be left undissolved at the bottom of the vessel.

Q. Would it be well to spray before the buds open in the spring with a solution of caustic potash to destroy the eggs of the canker worm? A. No, I don't think that would be very useful for that purpose.

Q. Would it make any difference to spray when the tree was wet? A. It would not make much difference in this part of Canada, but if the spraying is well done with a proper nozzle, I think better work will be done when the foliage is dry.

CIDER—A PROFITABLE WAY OF DISPOSING OF WASTE AND SURPLUS FRUIT.

BY J. A. CHIPMAN, HALIFAX.

My attention was first called to the cider question—not but what I had thought of it for years—but my attention was newly arrested the past summer, by reference to the quarterly report of the Department of Trade and Commerce of Canada, the 30th of June last, in which reference was made to the production of cider in France. I

have not
reading,

“ In
hectoliter
and cider
goes on
apples are
ment tha
producers

This
France at
On readi
Colmer, c
late in N
follows :—

“ Tha
the mark
doubted
the variet
grown. A
the Cana
Canadian
with the l

“ The
should me
the manag
duct. Ha
past in co
will be co
matter. T
and the p
when onc
goes on in
the losses
a glutton
minimised
sound and
truly temp
second pres
prices for t
choice cide
be stored o
finally, he
refuse from

have not space to reproduce the entire article, which is well worth reading, but I subjoin the following data therefrom :—

“In 1895 France produced 25,586,514 hectolitres of apples—a hectoliter is equal to $2\frac{3}{4}$ bushels, which was either made into cider and cider champagne, or sold to Germany for that purpose. Then it goes on to describe the sections of country where the bulk of the apples are grown, saying, ‘It is the result of long and patient experiment that certain parts of France have become the principal cider producers of the world.’”

This article places the average value of the production of cider in France at two hundred million francs, about equal to four million dollars. On reading the article above referred to, I addressed a letter to Mr. Colmer, of the Canadian Commissioner's Office, London, to which, late in November, I received a reply, from which I will quote as follows :—

“That Canada should be able eventually to produce and put on the market the very highest quality of cider and perry cannot be doubted by any one possessing the most elementary knowledge of the variety and quality of the apples and pears that are commonly grown. And you are, perhaps, aware that Mr. Down, the agent of the Canadian Government in Bristol, has successfully introduced Canadian cider into the English market at top prices in competition with the United States and the home-made product.

“The systematic introduction of cider making into Eastern Canada should mean large profits to fruit growers by affecting economies in the management of the orchards and the best utilisation of their product. Having regard to the experience of Canadian farmers in the past in co-operative dairying, it is probable that the cider factory will be considered the most suitable agency for dealing with the matter. The cost of equipment of a cider factory is very small, and the processes of manufacture are simple and easily controlled when once they have been started. The waste of fruit that goes on in windfalls and culls alone would be entirely avoided, while the losses attending indifferent packing, and the disposal of fruit in a glutted market in years when a good crop is universal, might be minimised to a great extent, and the whole business placed upon a sound and safe footing. The farmer would obtain a wholesome and truly temperance beverage from the unmarketable fruit, and the second pressings of cider fruit, a steady market and relatively high prices for the picked fruit exported, an equally good market for his choice cider product, which, as it improves with age, might therefore be stored or shipped as the course of the market might dictate, and finally, he would retain an admirable fertiliser for his orchard in the refuse from the press when treated with a slight addition of super-

phosphates, a practice followed with the most beneficial results in France.

"It might be well also to associate with the cider factory the evaporating of apples and manufacture of apple jelly from the rinds and cores, etc.

"No province of the Dominion is more favorably situated than Nova Scotia for the development of the cider industry in which perry is naturally included, and in view of the magnitude which the industry has attained in France and Germany, not only in cider in bulk, but in the finer varieties of bottled and champagne ciders, there is undoubtedly a good opening for the growth of the business in Canada, if it be taken in hand intelligently and with care. It may not be generally known that last year the apple crop in Germany turning out poorly, that country imported from France, Normandy and Brittany in particular, thousands of car-loads of apples, taking them as far east as Frankfort on the Maine for the requirements of the German champagne cider industries, much of whose output finds a ready market in the United Kingdom."

You will see by this letter that Mr. Colmer is taking a great interest in the question of cider making in Canada. Situated, as he is, knowing the class of fruit which we send to the London market, the kind of fruit which they grow in England, France and Germany, and brought as he is in direct contact with the National Association of Cider Makers in England, he is in a good position to judge of our ability to make good cider, and to find a profitable market for all we can make.

As Mr. Colmer says, we are well situated for making cider, having the best apples in the world, and if France and Germany can find a market for eighty million dollars worth of cider at a profit, we can find a market for one-eightieth part of that sum, should we ever be able to produce that much. Besides cider proper, including champagne, there ought to be a market for good cider vinegar, in making of which we could use our wormy and rejected fruit. Much of the vinegar sold on our markets is inferior, harmful stuff. The cheapest that I can buy a vinegar, at all fit for household purposes, costs me forty cents per gallon, and I am convinced that a well clarified, pure cider vinegar is bright enough to grace any man's table, and more wholesome than the bulk of acids which we are using. Then again, there are other marketable uses to which apples may be converted, surely at a great profit. There is a flavoring about some of our apples, notably the Gravenstein and the Crab, not found in its

fullness elsewhere. These we could use in the manufacture of jellies. The retail price of half pint tumblers is from 20 to 25 cents, chiefly 25 cents in Halifax.

I am persuaded that we have, lying at our very feet, one of the most promising industries ever suggested to the people of this part of the province, and that all it needs is a little money, co-operation, and determination to do the thing right, and on scientific and business principles, to make the business, in a few years, a great success.

Every man can make, after a fashion, his own cider for his own family use, but every man of you making cider will not make a success of the business. It requires capital, considerable plant and warehousing facilities, if you are going to mature your goods and make them best fitted for the market; requires a practical expert with some knowledge of chemistry; and after all this has been done in the best and most practical way, you must go in search of a market where such goods are sold, and you must have a better article, if possible, than any one else; the best will always sell.

I have noticed that in one or more English companies, started for manufacturing cider, the capital stock has been placed at seven or eight thousand pounds, and I should judge that if we were to start manufacturing here, including all the articles I have mentioned, that forty thousand dollars would be required to make it a success. I am under the impression that I could induce an English company, who are already operating in this country in the manufactory of beer, to take hold of this branch of the business. They might possibly require the fruit growers to take a small part of the capital shares, or to give some sort of an assurance as to the probable quantity of apples, and the price at which they would be furnished. A consideration of this subject may be of some advantage to the people of these counties, and I would like if some idea of the total quantity of apples grown in Hants, Kings, Annapolis and Lunenburg could be given, and which your Association should be best able to estimate upon. With this data, and some general assurance of supply, I would approach the people before referred to and see whether they will take into further consideration the advisability of setting up a plant and sending out an expert.

REVIEW OF THE YEAR.

E. E. FAVILLE, WOLFFVILLE.

The general growth of the fruit industry in Nova Scotia, as observed by me during the past three years, is marked with a rapid improvement and steady building up of the industry, both in large and small fruits, becoming, as it has, the largest of any one branch of farming operations in the province. More acres are being planted each year in a systematic way, and new districts are being opened up with undoubted possibilities. The Annapolis Valley, with its hundreds of acres of orchards, is of necessity pointed to as the most developed fruit section in Nova Scotia. Here may be found four important points presenting themselves which the fruit growers should be striving to understand; they are, viz:—(1) Proper use of commercial fertilizers; (2) The planting of varieties of fruits best suited to the markets; (3) Spraying of trees and crops; (4) Proper packing and marketing of fruit. Those fruit growers who understand the above points the best are making a success of their work. These points are applicable to all parts of the province.

The great help to the proper use of *commercial fertilizers* is an understanding of the value of the soil to be treated, and the general use made by the plant of the three ingredients—nitrogen, potash and phosphoric acid.

Nitrogen is supplied chiefly and most economically by the sowing of leguminous crops, plowing them under in the fall. Potash is found in unleached hard-wood ashes, and muriate of potash, deep cultivation always aids in bringing this source of potash from the soil. Phosphoric acid is found in bone meal and like products. The commercial fertilizers should be applied with judgment, avoiding waste of material. Farm manure should be used first, finishing with commercial fertilizers.

In varieties of small fruits there is but little chance for improvement. In plums, early and late sorts bringing the best market prices, with more of the latter than the former. Apple novelties and special sorts are being superseded by standard market varieties, consisting of Early Winter, Midwinter, and Late Winter. Among the leading varieties are,—Fallawater, Kings, Ribstons, Baldwins, Nonparils Northern Spy, Ben Davis, and Golden Russet, with the Gravenstein as the autumn apple.

Spraying of fruits and fruit trees is becoming more thoroughly understood; every progressive fruit grower should have a spraying outfit, and should not trust this important phase of fruit growing to contract, in which case unreliable work is usually the result.

The *packing and shipping* of fruit is the finished part of the work. Better barrels are needed, and more care exercised in packing the barrels with uniform fruit throughout. The present shipping of fruit to Europe or England is quite unsatisfactory, but it is hoped this will be overcome by the Nova Scotia Fruit and Produce Shipping Co., now being organized. In the packing of small fruits such as strawberries, gooseberries, etc., honest boxes are found to bring the best price.

During my lecture tours through the province the past season I was accompanied by the Secretary for Agriculture, B. W. Chipman, Esq. A large number of agricultural societies and new sections were visited. The presence and practical addresses of the Secretary for Agriculture added much to the value of the meetings. The western portion of the province was visited in the spring, the eastern portion in the autumn, principally Cape Breton. For the past two years I have given an annual report on the fruit prospects in Nova Scotia in the various counties. This year may be observed a greater interest and corresponding healthy growth. The conveyance of information to the various sections is a move in the right direction, as is manifested by the eagerness to obtain correct information.

There are a number of fruit districts equally as favorable as the so-called Annapolis Valley, some of which are removed long distances from the railroad. Even in these cases the fruit product has been found to pay the best of any on the farm. These sections will grow with more rapidity than the Annapolis Valley because of their opportunities of reaping the experiences of the fruit growers in the counties of Hants, Kings and Annapolis. The amateur fruit grower is awake to the idea of purchasing only desirable varieties. In many of the so-called unfavorable fruit districts, enough fruits of hardy kinds can be raised in nearly every instance to supply the home table, and, in a measure, the home consumption.

In the vicinities of seaport and mining towns vegetable gardening should be carried on more extensively. It has been, and is proved to be, a paying industry, thus supplying to this class of people the much

needed fresh product. As much, if not more, care is required and information needed in growing vegetables as in growing fruit trees. Cherries, thus far, have been confined chiefly to Digby County; this should be more scattered; every farmer should have a few trees to supply enough for table use.

The Island of Cape Breton, although seemingly, by its position, unsuited for fruit growing, has many sections in her valleys suited to the growing of apples and plums, while small fruits grow in abundance. Owing to a lack of knowledge this important branch of farming has been neglected in most cases; where followed, it has been made to pay. While the color and flavor and varieties of apples do not come up to those of the Annapolis Valley, their keeping qualities are far in advance. The winter varieties found producing good crops were Ribstons, Baldwins, Ben Davis and Golden Russets, with earlier varieties as Fameuse and Astracans. I am of the opinion that these varieties may be improved, and would recommend the Shiawasse Beauty, which is similar to the Fameuse, being derived from that apple, but larger and more hardy. In plums, the same points as to keeping qualities holds true, reaching a late market on account of their late production and keeping qualities. The same precautions should be exercised in fighting plum tree pests as elsewhere. Fruits have not yet been attacked by plum cuculio. The leading varieties are Lombard, Moer's Arctic and Gage. Thus far there have been insufficient quantities of plums and apples produced to supply the home demand; thus there is produced a home market for quite a large supply of fruits. The farmers of the island are eager to gain information regarding methods of fruit-growing.

In addition to the annual lecture tour this year, it is the intention to make a tree distribution to different parts of the province of a certain number of fruit trees from the nursery grounds of the Nova Scotia School of Horticulture, for testing, so as to inaugurate the planting of correct varieties.

In reference to the above institution I am pleased to report a better attendance, equipment and support than ever before. I believe that the introduction of lectures into the various counties of the province is meeting with the approval of all farming classes which, with the school for the training of the young men, should be strong factors in building up this Association.

FRIDAY EVENING.

The evening session was opened with music by the Wolfville orchestra.

Prof. Faville was called to the platform by the President, and the following address, accompanied by an elegant silver tea service, was presented to him :—

Prof. and Mrs. Faville :—The fruit growers and friends of this vicinity desire to offer congratulations on the happy event of your marriage, and beg that you will accept this slight token of our regard. We trust that you may long remain in our midst, and enjoy long life and much happiness.

PROF. FAVILLE replied in acceptance substantially as follows :—

Mr. President, Ladies and Gentlemen, and Students of the Horticultural School :—I need not tell you that I am surprised, because that goes without saying. When I was informed by Mr. Bigelow that he wished me here at seven o'clock sharp, I had no idea for what he wished me here, but I shall always be here at his orders in the future. I can assure you, Mr. President and gentlemen of the Fruit Growers' Association, that I truly appreciate this gift. This is the land of my adoption, and since coming among you I have received at your hands the very kindest treatment, and I may say, in this new venture of ours, that Mrs. Faville and myself have received the very kindest hospitality at the hands of the people of Nova Scotia. I have travelled in different countries and in different places, but I have never received a more cordial greeting than from the people of this province. Although I was born under another flag in another country, of which I am proud, I am also proud of Nova Scotia, and I only hope that my interests are your interests and that my work will be for the benefit of Nova Scotians ; and I do hope and trust that it will be the privilege of Mrs. Faville and myself to remain for many years in Nova Scotia and be Nova Scotians. If I could say all I would say it would be a volume, but I will only repeat the old saying that we would like you all to come in and take tea with us. I only hope I may merit this kind offering which you have given me this evening. (Applause.)

THE ORCHARDS AND GARDENS OF THE PAST AND PRESENT.

(THE PAST SEEN SIXTY YEARS AGO.)

BY REV. D. O. PARKER, M. A.

The apple I sing of the Paradise Lost,
 In Eden regained at the fruit grower's cost ;
 And orchards and gardens in pictures will show,
 Just such as I saw in the long, Long Ago ;
 And those of the present redeemed from the curse,
 I'll picture for you in mechanical verse.

This picture's an orchard, or that was its name ;
 A typical picture of many, the same ;
 The trees are like beggars on charity fed,
 See, most of their branches are straggling or dead ;
 The knife of the pruner to them is unknown,
 And life is a struggle with weeds overgrown.

Depraved from their birth, like old sinners they stand
 Ungrafted and wild, with no blessings at hand ;
 Their fruitage is sour, and begotten in sin,
 Unlovely without, and repulsive within ;
 Their nature unsweetened by grafting or grace,
 They died as they lived, a degenerate race.

The Poet of yore in his Paradise song,
 Has told us the apple brought discord and wrong ;
 In Eden of old, I cannot believe,
 Such apples were presents from Adam to Eve ;
 Uncomely, unwholesome, repulsive and sour,
 No charm they possessed for that critical hour.

Again in the picture, this something you see,
 If worthy the name, you may call it a tree,
 It stands not alone, for its kindred are there,
 Of fruitage and leafage quite naked and bare ;
 But laden with fungus all black as the night,
 Its mission of sin was to poison and blight.

And here in the garden in spite of neglect,
 The cherry trees flourish like Christians elect ;
 But small are the cherries that grow on the trees,
 All dwarfed by neglect, tho' unharmed by disease ;
 The fruitage is shared by the robins and boys,
 While scarecrows are harmless, as playthings and toys.

In the gardens of old, the red currants were there,
 And grew by the fence, unattended by care,
 O'errun by the brush of their own ancient reeds,
 They struggled for life in a tangle of weeds ;
 The joy of my life was in that early day,
 A branch of these currants when making the hay.

This bush in the corner was brought from the fields,
 Small gooseberries wild are the berries it yields ;
 Exotic, it lingers like a homesick child,
 Preferring the pasture, secluded and wild,
 To a home in a garden, neglected and strange,
 The soil and the culture not suiting the change.

The berries that flourished when I was a child,
 Were those in the pastures, spontaneous and wild,
 The blackberries, strawberries, raspberries red,
 On which in their sweetness the robins were fed ;
 Or plucked by the young, while in pastures they roam,
 For supper and bliss of the old folks at home.

The secret is this, of those blessings of yore,
 They're not what they were in Eden before ;
 The apples have tasted the curse of the fall,
 The trees and the berries, the large and the small ;
 The curse of old Eden remains on the field,
 The orchards and gardens are wild in their yield.

Good-by to the gardens and orchards of old,
 Their wonderful story can never be told ;
 In light of this brighter and beautiful day,
 Their pictures of yore are fast fading away,
 And arts of the true, the beautiful and good,
 In orchards and gardens are now understood.

The growers of fruit in their mission abroad,
 The gospel have preached of the tree and the sod ;
 The orchards rejoice, and the gardens are glad,
 In fullness of verdure and fruitage are clad ;
 And Eden regained is the pride of the land,
 With orchards and gardens admired and grand.

To growers of fruit this high honor is due,
 For preaching a gospel of culture that's new,
 And making the orchards sweet Edens of bliss,
 And apples of discord, to smile and to kiss,
 And giving this Valley a glory and name,
 Distinguished in story, unrivalled in fame.

In springtime the orchards are an ocean of flowers,
 With wavelets a rocking on crests of the bowers ;
 Or scatter their petals in the breath of the breeze,
 Like flakes of the winter that fall from the trees ;
 In autumn their treasures are richer than gold,
 With blessings unknown, to our fathers of old.

The tables of princes they grace with a charm,
 And give to the yeomen enthroned on his farm,
 A relish more choice than the groves of the East,
 To replenish his purse, or sweeten his feast ;
 The citron and orange will never compare,
 With apples, the orchards are now made to bear.

In winter and summer, at morn, noon and night,
 They bring to the table a charm and delight ;
 And freely are given as pledges of cheer,
 In place of the toddy, the wine cup and beer ;
 The bloom of their beauty they place on the cheek,
 And vigor of muscle they give to the weak.

Thank God for the apples that grow on the trees,
 That blossom and ripen in sunshine and breeze ;
 The apples, like sinners, redeemed from the fall,
 Who've heard and have answered the Fruit Growers' call ;
 Thank God that their teaching has not been in vain,
 That graces the story of Victoria's reign.

The plum trees of yore ! here we bid them adieu,
 And welcome with pleasure those trees that are true ;
 No longer they send their black armies abroad,
 Redeemed, we now hail them the children of God ;
 No longer a curse, and no longer a shame,
 Their fruitage are jewels that honor the name.

The sweetest of fruit that the epicure sees,
 Delicious for eating, just plucked from the trees,
 Are plums, that are growing in this Valley of ours,—
 The Fruit Grower's Eden of apples and flowers,—
 Preserved and in cans, in winter when stored,
 Are richest of gifts for the old family board.

Exceptions there are, when in truth I must say,
 Like Christians backsliding, some plums fall away ;
 They need to be nursed and attended with care,
 Like saints in the Kingdom with watching and prayer,
 Or else the black legions will come with a curse,
 And all of their beauty and glory disperse.

In pastures, the berries are growing there still,
 Where cattle are grazing o'er valley and hill ;
 But children to pick them seldom go there,
 They're left for the worms, and the birds of the air ;
 In fields and the gardens, by acres they grow,
 In blossom are white as the mountains of snow.

The berries when ripe are giants in size,
 A feast for the palate, and a joy to the eyes,
 And show to the people the beauty and worth,
 The Lord has bestowed on this wonderful earth,
 Rewarding the Fruit Growers' learning and toil,
 When suiting the plants to the climate and soil.

In seasons of harvest go traverse the land ;
 Go gaze on the prospects the orchards command,
 And think of the long, and heart-aching toil,
 Our fathers endured here in working the soil ;
 This wonderful gospe' of culture and growth,
 They toiled and they died, quite ignorant of both.

Go on in your mission ye lovers of fruit,
 For high is your calling, and grand your pursuit,
 Enlist in your teaching the young and the old,
 And then will they harvest great apples of gold,
 And Eden regained its sweet fruitage shall yield,
 And glory will come to the orchard and field.

And now, in behalf of the Fruit Growers here,—
 The fruits of whose labors so largely appear,—
 To those who are dwelling outside of the fold,
 The call is to enter, your names to enroll,
 Where ethics are pure, and the calling is clean,
 And loyal its members to country and queen,

And nothing is mean—
 "And God save the Queen."

ADDRESS REV. E. M. KEIRSTEAD, D. D.

PROFESSOR KEIRSTEAD, on rising, was greeted with enthusiastic applause :—

Mr. President and Members of the Fruit Growers' Association, Ladies and Gentlemen,—After the excellent poetry and music you have had here this evening, I fear that any common place remarks of mine will not be of so much interest to you ; but, however, I will be as brief as possible and afford you time to hear the gentlemen who are to follow me. I may say, Mr. President, that I read your report of the production of fruit in this valley for the past year, and of the abundant harvest you have had with a great deal of interest. Many explanations are given of this phenomenal crop. Some think that while nature is uniform and distributes her bounties every year, yet that there may be a combination of forces owing to climatic and other changes which produces unusual harvests occasionally. Others think that it demonstrates the contrary, and shows that nature is not uniform, and have other explanations, and for all I know some of you may look upon this phenomenal yield of fruit as a reward for electing a Liberal Government. (Applause and laughter.) But on the other hand, the prices which you have received for this fruit are not so large as you desire, and here explanations are also given. Some attribute it to the action of railway and steamship companies, others to bad handling in the fruit market of the world, others to the state of trade and the upheaval in the United States over the silver and gold issue and the like.

But I daresay that there are some among you also who look on the failure with respect to the prices for your fruit as a judgment for defeating the Conservative Government. (Applause and laughter.) Now, sir, I do not accept any of these theories as satisfactory. As to the abundant yield of fruit, I think the explanation is this, that old mother nature wants to simply occasionally stimulate us and encourage us, and console us for the hard treatment she is obliged to show so frequently, that she means to show us that she has large gifts for us, and to lead us to expect great things in humouring her and obeying her laws ; and further, that with all the science and experience we have, she is going to teach us that she can do continuously what she has done this year, and give us manifold crops in the future such as we have had in the past year, and those will be happy days.

Then in regard to the lowness of the prices. I do not believe for a moment that you can attribute it to the Armenian massacres, or any of those elections that we have had, or anything of that nature; nor these laws of trade which they lay down so definitely and firmly. The reason to my mind is very clear. You have been receiving large gifts from nature, and the bountiful resources of the universe you have had, and your benefactions to Acadia College have not been so large as they ought to have been. (Applause and laughter.) Now, out of the crops you may have in the future, and whatever Mr. Innes may be able to do with his new company, and whatever the condition of things may be in the United States or the old world in days to come, unless you come up strongly to our help in the new departure which we expect to make in the effort to gather \$250,000 for educational purposes here, I cannot afford you the slightest hope that you will have any large returns for your labors. (Applause.)

Another point which you mentioned, sir, was the disappointment to which you had been subjected in not receiving the Government grant in aid of an Experimental Fruit Station. It really seems strange that while we are attempting to follow in the footsteps of the old world, and to some extent the efforts of our friends to the south of us, while we spend millions on preparations for a possible war, it seems strange that we should refuse to spend a few thousands for industrial education. It seems strange that while we should prepare for war we should ignore altogether apparently the provision for the sines vs of war. Yet we are not without hope that after a little time has elapsed and the Government has got a little more accustomed to spending money, that they may see these nations of the old world establishing experimental fruit stations, and may emulate their example and establish fruit stations in this fair country, so that you may be enabled to possess in a large measure the principles of the science which you are all so eagerly seeking. And while the Governments will not do anything for us, I might be pardoned for offering a layman's suggestion that we can do something for ourselves. I would suggest that bureaus of information be established in this section of the country. You have a certain number of well-educated men, astute and far-seeing, and with large experience, who could be appointed to collect information from other countries, who could receive scientific journals on fruit-growing, who could review these works, and the facts

they glean could be brought out from year to year, and the results from other people's experiments could be made known to you.

They could organize themselves into departments for the collection of knowledge on each of the different subjects appertaining to your especial work, and the information could be brought before this Association from year to year by these separate committees, and that information that was applicable to this country could be committed to those engaged in the work, and the students of the Horticultural School could thus have the benefit of such knowledge. The information thus obtained would be of great advantage to you.

I do not know why it is you call upon me year after year, but I suppose it is because I am not connected with you, and yet am interested in you. My subject this evening on which I will address you shortly is

WHAT ARE THE PRODUCTS OF THE FARM ?

How are they to be increased? What is their function?

The products of the farm—what are they? Well, any person will tell you "they are the farm products; everybody knows what they are: peas, potatoes, poultry and the animal products, and apples, pears, plums, and these manufactured articles that you have on the farm; everybody knows what they are." They are shipped off from year to year. These are the products, and how beautiful it is to see them carried away from the farm to the starving peoples in the cities and towns. All these are the products of the farm. But are those the only products of the farm? Does the farm not send products to the learned professions of theology, medicine and law; where have the greatest ornaments of those professions come from but from the farm? And when you look at some of these old homesteads, how beautiful the other products are. See some of these places that bear the stamp of age; look in and see the old man hale and hearty at seventy years of age; a kind of patriarch in whom there are maturity of manhood, rich experience, sympathy with nature, kindness of heart, contentment, peace, deep affection for his family, hope for the future.

And on the other side of the hearth is the still kindlier face of the mother, whose affection has never wavered, whose heart has always glowed, whose hand has never rested through all the fifty years of married life. What a ministering angel she has been indeed. How

many secrets, like Mary, she has pondered in her heart? What a wistful longing is still in her soul for affection of which she has never had too much! What a wealth of memories is hers,—of children's prattle, of household joys, of anxious cares. What poetry is in her movements, what suggestiveness in her smiles, what significance in her sighs, what wisdom in her words. And no more truly did Paul bear in his body the marks of the Lord Jesus than do her hands, the wrinkles on her face, and her whole form bear the stamp of pain and of life surrendered for others. This is the place where human harvests grow. These are the products of the farm.

But there are other products of the farm. There are the curly-headed boys and blue-eyed girls who quickly grow up. Some fine morning the eldest son leaves the farm and goes to college or professional life, or the merchant's store. And some bright June day the girl leaves the old home, and at the marriage altar is laid the foundation of another home in which she becomes "a link in the generations." As the years pass the other sons and daughters go in the same way. Now all these are the product of the farm. The fields furnish food for the cattle you sell, and also for the boys and girls. Their higher nature too is moulded by the environment. Every grateful breeze of summer, every blast of winter, every hill and every brook, every day of sunshine, and every drizzling autumn night leave traces on the life and character of all upon the farm. So Tennyson says: "I am part of all I have met," and Ruskin thinks the epithet *enduring* as applied to Englishmen is from the hard persistent work of the people to hammer their iron into shape. So fully does a people's environment and labor enter into the people's life that as our cities and towns are largely filled with people from the farms in many, say the whole of the country almost, is the product of the farm.

Now, bearing these things in mind, the question I ask is whether you have solved all your problems when you have learned how to get the largest crops and to sell them most advantageously. At the end of the year you must ask not only how much you have saved, but how much your wife and children and yourself have gained in mind and heart and real life.

You surely are not farming simply to raise cattle and fruit. Is it not for wife and children you labor? Is not your farm a means only? Then do not make it the end. You must study the education of boys

and girls as well as the raising of cattle. You know some of the diseases that attack your trees. Do you know the diseases that attack your children? You know what food your trees and cows require. Do you know what food for mind and soul your children need? I beg to point the gravity of this problem, for all your other problems are auxiliary to this problem. I cannot attempt to solve it for you, but I would suggest that it can be studied *first* in the relation of the family to itself and to the farm, and *secondly* in the relation of the family to other families, and to the community in general. For first the work of the farm may be conducted in so large hearted and intelligent a way as to make the highest character. The laws of nature and of economics are concerned in your success, but to know these laws is an education for your children. The home life must be as sweet, intelligent and happy as possible; the boys and girls must see that farming is for life and not think that life is for farming.

But in the second place you must study the relation of your family to other families. You cannot have your own farm clear of thistles while your neighbor's is full of them. You cannot make your own family intelligent unless other families around you are intelligent also. The public schools and the higher education of your country ought to receive more of your attention in order that your family may get its due and your farm yield its best fruitage. At present you do not train your boys and girls in love of beauty, of music, of poetry, to the extent that is desirable. You do not send enough of them to schools like these. You should send more of them, even if it were but for a single term. I hope to see the day when by university extension we can send to our towns and villages able men who will give lectures on natural science history, economics, literature, and other subjects.

Meanwhile, let me urge you, in order to get the best results from your farms, to value highly the provision for the best life of those now growing up in their homes maintained by your labors.

REV. H. HOWE, Annapolis, said he would not inflict an address upon the meeting. He was very glad to be present and hear the instructive addresses of the learned Professors from the Experimental Farm. He had read the address of President Bigelow, and he said he heartily endorsed the facts set forth therein, and he hoped before long to see an experimental fruit station established in the Valley. He believed

that the establishment of the Experimental Farm at Nappan was a wise policy on the part of the Conservative Government; that the Government had taken that inferior tract of land to show that any inferior piece of land in this country is fit for agriculture if cultivated properly. He knew that there were certain climatic conditions that make one part of this country different from another; that it is absolutely impossible to produce to the same degree of perfection in every part of the province; but there was no part of the country that, if rightly used, could not be cultivated to advantage. He thought the Liberal Government at Ottawa should pursue the wise policy of their predecessors in this respect; that they should establish in this Valley, in the rich fertile soil which they had there, an experimental fruit station, in order to carry on scientific experiments with respect to orcharding and the fruit industry. If such an institution were established, there would be wholesome influences in horticulture disseminating from that particular centre, and the fame of the province as a fruit-growing district would be known far and wide. He thought they were all looking forward to something which they had not yet got, and that was an *ideal apple*, equal in size and color to the best varieties which they had now. He said he believed that the new shipping company would be a success under the energetic management of Mr. Innes.

He cited a case of where Canadian apples were sold in the City of Ryde, Isle of Wight, at \$7.50 per barrel.

He believed they were capable of competing in their products in that great nation which Napoleon had characterized as a nation of shop-keepers. The large towns in England where their apples could be marketed were numerous. A trade for the output of the Annapolis Valley could be easily worked up, and rich returns would surely follow. He thought that if the different schemes they had in view could be successfully carried out that the future of fruit-growing as a commercial enterprise would be guaranteed.

He advocated the establishment of a local branch of the Fruit Growers' Association in all the fruit-growing sections of the province. He thought it would be a very wise course to pursue in establishing these local branches, say six districts in our eighteen counties.

DR. FLETCHER said that he and Professor Craig had spent the two days they had been present at the meetings of the Association very

pleasantly. He said he had come from the far wilds of Ottawa, or as Goldwin Smith had described it, "that hypercritical cockpit where a great deal is done in talking," (laughter), and one of the most enjoyable meetings he had spent at this Convention was the meeting to-night. He had enjoyed particularly the remarks of Prof. Keirstead upon the products of the farm. The best products of the farm he observed were the boys and girls. He thought it would be well if the boys and girls would take up some special study in addition to their ordinary avocations of life, for a speciality or hobby, and if they did they would be happier. If they did this they would not want other people to amuse them.

As a naturalist, he would recommend the study of natural history, for it would afford them a great deal of pleasure, besides that, there was the utilitarian aspect which they should consider. He asked if they ever considered the enormous loss of fruits by insect attacks, and the different fungus diseases which were annually depleting the harvests, and the immense ignorance which prevailed in some sections of the country as to the methods of combating these diseases. If these subjects were more thoroughly understood, what an advantage it would be to this country. He said there were numberless positions in the future which must be filled by specialists. He did not know half a dozen people who could take his place when he went hence. He thought there were very few taking up the study of the natural sciences in comparison with the country to the south of us. The colleges in the United States were filled with students, yet science was neglected in this Dominion.

He appealed to those who were present in this hall, where so many good men and women had been trained, to pay a little more attention to the sciences, for they could look forward to positions in the future, and armed with this knowledge they would not be found wanting. With this knowledge they would be of use to the world. He thought Canadians did not recognize the advantages they have over many other people.

PROF. CRAIG then gave an excellent address on Canadian Orchards; with the aid of a magic lantern he threw upon a screen many illustrations of some of the best orchards in Canada.

PROF. CRAIG'S remarks were well received, and the audience appreciated the views very much.

B. W. CHIPMAN, Secretary for Agriculture, said,—I am more than thankful to your President, for he has given me the assurance that he does not expect a very long speech from me to-night. Through the kindness of your President and Professor Faville of the Horticultural School, and the Chairman of the Agricultural Society of this place, I have, unfortunately for you, spoken before you a good many times during the last year, and I fear some one may pay me a doubtful compliment as was one time paid an eminent politician in Ottawa; after he had finished a long speech, the leader of the opposition got up and congratulated the honorable gentleman, for he said he always admired that speech, and perhaps some of you may have the same thing to say to me. But I promise you my speech will not be long.

I have been deeply interested in your Convention this year, and particularly this afternoon, when Prof. Craig and Dr. Fletcher gave you their practical as well as their scientific ideas, which were largely drawn out by the intelligent questions put to them, which, I am sure, will be a source of instruction and information to you. I am sure they must have been delighted to have found an audience so capable of putting questions to them and others.

With respect to the peculiar industry of this county I will pass over and say nothing, as my knowledge is more in the line of stock raising and other general farming. I have, during the last summer, visited nearly every county in the province; I felt that it was my duty to do so when I came into the office I now occupy, and I have found over the province generally a desire for advanced farming, stock raising and dairying, as well as fruit culture. In this Valley I need not remind you of the remarkable strides you are making in fruit-growing. In the County of Yarmouth they are also producing excellent fruit. They are also doing excellent work in the County of Queens, but there is only one Cornwallis and Annapolis Valley in the province of Nova Scotia, and I might say only one in Canada. It seems to me that apples will grow in this Valley no matter whether planted by man or by squirrels, for I have actually seen apple trees growing in stone heaps where the seeds have been dropped by squirrels.

Now with respect to stock raising, I need not tell you there are acres and acres along these mountain slopes where stock raising can be carried along successfully and profitably, and dairying combined with the produce of your orchards will make you a prosperous and

happy people. Special attention should be paid to dairying at this time, as it can be profitably carried on even in connection with orcharding. Although bonuses are being paid by the Government, there are only thirteen Creameries working in the province to-day. Quebec and Ontario have advanced in this line with marvellous rapidity, and still there is room for more. The English market, you know, is a large one; they import \$65,000,000 worth of butter a year, and Canada sends only one and a half millions. There are \$26,000,000 worth of cheese imported into the British markets yearly, and Canada last year sent about \$15,000,000 worth, or nearly 60 per cent. So you see there is room for the butter and cheese industry in Nova Scotia, and I believe that if the people of this province go into farming more generally we will see better times in Nova Scotia.

The School of Horticulture, as well as the Agricultural School, are doing good work, and one thing that has struck me very forcibly is the great interest the girls are taking in horticulture as well as in dairying work, and I predict that good will ultimately follow the work of these institutions.

THE VALUE OF A HORTICULTURAL EDUCATION.

G. W. ELLIOTT, NEW ROSS.

(*Student of Horticultural School.*)

There may be in the minds of some a little haziness as to the benefits to be derived from the study of Horticulture.

The name signifies cultivation of the garden, and suggests that every farm should be a well watered and fruitful garden, a thing of beauty as well as of profit. If a brief comparison be instituted between the farmer of a hundred years ago, with meagre knowledge of the soil he sought to cultivate, and an incomplete grasp of the possibilities of his craft, forcing a scanty subsistence from the reluctant soil; if we compare this man with the farmer of the present day, all doubts are cleared away and the benefits of the study of Horticulture are found to be many and varied.

Let us consider first, the development of this science. This is a day of specialists in all lines. Men are giving time, talent, and means to the critical study and development of individual science, and Horticulture is one of them. The efforts put forth in this

direction have been crowned with abundant success, and this is at the present time one of the most popular and practical subjects of study in the curriculum of education.

That which formerly required a long life of tedious study and experiment, when each man must be his own instructor, may now be gained in a brief and concise form by a few months of careful study in some good School of Horticulture. Thus the practical farmer begins his arduous toil, well equipped and ready to cope successfully with all difficulties, and hands to posterity the soil he has intelligently cultivated, not run out and worthless, as formerly, but steadily advancing in fertility and fruitfulness. But let us proceed to enumerate a few of the many benefits of a Horticultural Education.

By individual study under a competent instructor, by association with others engaged in the same pursuit, and by the inspiration of an interesting public, the farmer is urged to do his very best, and to do it intelligently.

The soil, once a mystery, is now well understood, its properties analyzed, its needs realized and fully met. Soil once thought useless because too dry, has been irrigated and made fertile, lands have been drained for the same purpose; land, long considered run out have been renewed by applying new kinds of fertilizers, and have been compelled to yield abundant harvests. By the scientific rotation of crops, years of barrenness have been obviated, and the ground made to yield better crops with much less drain upon its fertility. New kinds of husbandry have been discovered or developed, and all the products of the farm and garden vastly improved in size, quality and beauty. Besides this, a knowledge of Horticulture enables the gardener to know his friends and foes in the world of entomology, to fully avail himself of the assistance of the former, and successfully combat with the onslaughts of the latter.

But these benefits are not for the farmer or gardener, or the practical fruit grower alone. So wide spread has become the interest in those studies that a liberal education is seriously lacking if it does not include a knowledge of Horticulture, and any one who would intelligently read, converse or listen to public addresses, must have at least a fair knowledge of this important subject. For the farmer, gardener and fruit grower, there is a practical benefit of no mean proportion. For the general student an inviting subject for mental

consideration and development, and for the public speaker, writer, or conversationist, a fund of reference, and illustrations as rich as they are popular. The old idea that education unfitted a man for hard work is now almost entirely superseded. It is to-day well known that body and mind are intended to be reciprocally helpful. A good degree of physical strength is necessary for the prosecution of mental studies, and conversely a well trained and well informed mind is needed, wisely and successfully to direct the powers of the body. While the uneducated farmer has to struggle with difficulties, vainly waiting for some labor-saving invention to turn up, his intelligent contemporary has been busily engaged in inventing machines calculated to revolutionize farming, while the old school held up its hands in helpless horror at the devastation of bug and worm.

The chemist has been compounding liquid death and the skilful artizan devising a ready means of applying it, and the day once so doubtful has been turned from threatened defeat into unmistakable victory. So while the old orchardist has endeavored to induce his hogs to endure the wretched produce of his so-called fruit-trees, the modern fruit-grower delights the palate of the civilized world with gravensteins and russets of unrivalled delicacy and flavor. Such will continue to be the case. Men must learn in the schools of applied natural science and succeed, or learn too late in the school of hard experience, and wretchedly fail.

But we have reason to believe that the minds of our people are fully awakening to the need and opportunities of the day, and that they will advance with ever quickening strides in the direction of intelligent labour and successful competition with all.

Thus, we have endeavoured briefly to point out a few of the benefits of such an education, feeling quite incompetent to do justice to so great a subject, yet trusting that even this faulty presentation of the matter might lead some to a deeper consideration of that which is of such great importance to an agricultural people, who are attaining a world-wide reputation as Horticulturists, and who must be found ready to retain these hard won laurels against all comers.

A very successful meeting was brought to a close at a late hour.

The Association are indebted to Miss Hattie Masters, the Wolfville Orchestra, and the College Quartette for an excellent programme of music, which was much appreciated by the large audience.

MEMBERSHIP ROLL.

HONORARY.

The Earl of Aberdeen, Lady Aberdeen; Joseph R. Hea, D. C. L., Toronto; Admiral Sir James Hope, Harriden, Bo'ness, Scotland; Edwin W. Busnell, Esq., Boston Mass.; Rev. R. Burnet, D. D., Hamilton, Ont.; D. W. Beadle, Esq., St. Cathrines, Ont.; Robert Manning, Esq., Boston, Mass.; F. C. Sumichrast, Esq., Harvard University, Boston; John Lowe, Esq., London, G, B; Sir Charies Tupper, Ottawa; Col. E. E. Babcock, Chicago; Prof John McCoun, F. I. S., Ottawa; Prof James Fletcher, F. R. C S., Ottawa; Prof. D. P. Penhallow, F. R. C. S., Montreal; Prof. H. W. Smith, B. Sc., Truro, N. S.; Prof. John Craig, B. Sc. A. Ottawa; Prof. E. E. Faville, B. Sc. A., Wolfville, N. S.; J. G. Byrne, Esq., Kentville; L. Woolverton, M. A, Grimsby, Ont.; Wm., Sutton, Esq., Port Williams; Prof. William Saunders, F. R. C. S., Ottawa; Prof. Frank T. Shutt, M. A., Ottawa; J. H. Harris, Halifax.

LIFE MEMBERS.

YARMOUTH.

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

DIGBY.

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

WEYMOUTH.

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

BRIDGEWATER.

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

MAHONE BAY.

A. Christholm, P. B. Zwicker.

LUNENBURG.

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

ANNAPOLIS.

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

BRIDGETOWN.

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

PARADISE.

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

LAWRENCETOWN.

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

MIDDLETON.

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

BERWICK.

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

KENTVILLE.

J. P. Chipman, M. G. DeWolfe, R. S. Eaton.

WOLFFVILLE.

J. W. Bigelow, H. B. Witter, R. W. Starr, C. R. H. Starr, John W. Bars, C. R. Burgess, G. F. Waliace, J. W. Caldwell, C. W. Roscoe, I. B. Oakes, R. E. Harris, Wm. A. Payzant, C. A. Borden, Prof. Tufts, Geo. V. Rand, S. P. Benjamin, Prof. Caldwell, J. W. Keddy, C. A. Patriquin, Walter Brown, J. L. Franklyn, Geo. W. Borden, X. Z. Chipman, F. C. Johnson, Edwin Chase, Dr. G. E. DeWitt, Rev. A. W. Sawyer, Mrs. A. H. Johnson, H. C. Vaughn, E. C. Johnson, R. E. Wickwire, Mrs. W. T. Piers, W. C. Archibald, C. E. Starr, G. L. Starr, Geo. Thompson, Prof. Haley, F. H. Mitchell, Dr. H. Chipman, W. H. Chase.

WINDSOR.

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

HALIFAX.

Hon. W. S. Fielding, D. Archibald, Jairus Hart, W. C. Silver, James Scott, Thomas A. Ritchie, A. K. Mackinlay, J. F. Kenny, Hon. P. C. Hill, James Farquhar, Dr. A. P. Reid, Miss M. W. Ritchie, G. E. Lavers, Andrew Mackinlay, Geo. E. Boak, Major W. Clark, Howard Bligh.

CANNING.

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

Col. W. M. Blair, Nappan; J. L. Harris, Moncton; J. B. North, Hantsport; Hon. Isidore LeBlanc, M. L. C., Arichat; B. Webster, Kentville; Chas. H. Cahan, Halifax; J. D. Sperry, LaHave; A. J. Cameron, Guysboro; Augustus Allison, Halifax; Wm. Law, M. P. P., Yarmouth; B. W. Wilson, Waverley; Col. S. Spurr, Kingston; Nathan Curry, Amherst; W. W. Pineo, Waterville; H. O. Duncanson, Falmouth; H. C. Munro, M. D., West River; A. B. Parker, Wilmot; C. C. Cogswell, Port Williams; P. L. Gertridge, Gaspereaux; Arthur S. Clerk, Canard; F. F. Mitchell, Grand Pre; T. B. Macaulay, Montreal; R. R. Duncan, Grand Pre.

ANNUAL MEMBERS FOR 1897.

E. E. McNutt, Truro; Otto Wile, Bridgewater; D. W. Smith, Yarmouth; I. H. Mathers, Halifax; Jas. White, Wilmot; John Coldwell, Gaspereaux; T. G. Angstadt, M. D., Mahone Bay; Jas. Pennington, Lequille; B. Woodworth, Canard; F. A. Eaton, Canard; H. H. Osgood, St. John, J. M. Marchart, Brooklyn King Co.; Mrs. E. McLatchy, Wentworth; Dr. Young, Windsor; A. McN. Patterson, Horton Landing; J. A. Coldwell, Gaspereaux; W. E. Roscoe, Kentville; R. McLatchy, Windsor; J. B. Tingley, Wolfville; A. Whitman, Waterville; Chas. Hibbert, Port Williams; J. R. Starr, Port Williams; J. E. Starr, Port Williams; R. Harvey Port Williams; B. W. Chipman, Halifax; P. Innes, Cold Brook; J. S. Bishop, Auburn; Dr. McKenna, Wolfville; C. F. Elderkin, Wolfville; J. F. Herbin, Wolfville; O. D. Harris, Wolfville; Ross Chipman, Kentville; John Donaldson, Port Williams; Oscar Chase, Port Williams; Rev. Jas. Quinan, Sydney.

THE NOVA SCOTIA SCHOOL OF HORTICULTURE.

EXECUTIVE COMMITTEE.

W. C. ARCHIBALD, Chairman.	J. W. BIGELOW.
COLIN W. ROSCOE, M. A.	R. W. STARR.
C. E. STARR.	S. C. PARKER.
H. CHIPMAN, M. D.	EDGAR HIGGINS, B. A.
R. S. EATON.	E. E. FAVILLE, Secretary.

MISS MAE RITCHIE.

MEMBERS OF COUNCIL BOARD.

CHAS. RUERILL.....	Weymouth.
MISS MAE RITCHIE.....	Halifax.
J. U. ROSS, LL. B.....	Pictou.
JAMES D. SPERRY.....	Petite Riviere.
J. H. SINCLAIR, M. P. P.....	New Glasgow.
GEO. A. COX.....	Shelburne.
JOHN DONALDSON, B. A.....	Canard.
HON. J. M. MACK.....	Liverpool.
ARTHUR KENDALL, M. D.....	Sydney.
J. HART.....	Whycocomah.
PERCY BLANCHARD, LL. B.....	Baddeck.
C. B. WHIDDEN.....	Antigonish.
CHAS. E. BROWN.....	Yarmouth.
D. W. DIMOCK.....	Truro.
ALLEN HALEY, M. P.....	Windsor.
G. B. MCGILL, B. A.....	Middleton.

EXECUTIVE COMMITTEE N. S. F. G. A.

J. W. BIGELOW, President.	S. C. PARKER, Secretary.
C. R. H. STARR.	J. E. STARR.
G. E. DEWITT, M. D.	C. E. STARR.
H. CHIPMAN, M. D.	GEO. THOMSON.

GEO. B. MUNRO, Treasurer.

MEETINGS.

The annual meeting of the Council Board is held the second week in January, also a second meeting in May, at close of school year. The Executive Committee of Board meets the first Friday of each month and other meetings will be held when occasion requires.

ANNOUNCEMENT FOR 1897.

This adjunct to the work of the Association aided by a grant from the Provincial Government is year by year being pushed with more zeal and meets the approval of its members. Since its establishment in 1893 the increasing attendance and strengthening of the courses has involved necessary expenditures which have built up in consequence a strong *practical* and *theoretical* course in Horticulture and its kindred branches of study, which in no other part of the Province could be duplicated by such practical demonstration of fruit growing and its development. The School being located in the midst of the great apple and small fruit industry of the Province, is afforded every possible chance for the very best instruction in this line of work. The Provinces of New Brunswick and Prince Edward Island have endorsed the scheme and working of the institution and students from these Provinces are regularly in attendance each year. The School is equipped with appropriate apparatus for the proper treatment of subjects taken up in the different courses, and from time to time acknowledges donations in this line. In the greenhouse during the winter months fruit trees and plants are in blossom continually, enabling practical experiments to be carried on in cross fertilizing, pruning, budding, and spraying for insects and fungous growths, commercial fertilizers are applied to soils and plants, and soil studied. The grafting room is utilized for the various modes of grafting, aided by root cellar filled with working stock. The microscopical laboratory for use in the study of insects, fungi and plant physiology, being equipped with valuable compound microscopes and accessories, serves as an important acquisition in maturing fundamental principles. Within easy access to this work is the library and reading room stocked with the leading Horticultural and Agricultural journals, periodicals and books, with a complete file of the reports of the various Experiment Stations and Experimental Farms in America, thus coming in contact with advanced horticulture of the present day. The lecture rooms are filled with charts, herbarium of weeds, grasses, etc., serving as illustrations for lectures. Stereoptican views with

lantern slides are used whenever possible in treating subjects. The Nursery Grounds in connection, afford an opportunity in the fall and spring to study the many practices of nursery management. The Manual Training School gives to all students instruction in carpentry, designing and blacksmithing, thus rounding out the practical side while studies in English and other branches are included in the course which are so necessary in equipping the student with such an education, that he may sow the seeds of his labor in the section in which he resides. The subject of Horticulture is pursued chiefly by lectures with practical work above. A short winter course has been added, opening the first of each year, offering special inducements to those who can attend but for a short period during the winter months. To all students, whether regular, short winter, or special, a most hearty welcome is extended. The institution being situated in University town receives a certain tone which is most helpful, in all lines of work granting many free privileges to students. This is the only Horticultural School in Canada. The School year is arranged to suit the needs of farmers. Opening Nov. 1st and closing May 1st. A diploma is granted for full two years course with certificates of proficiency, for special and short courses. Tuition is free to all students. Circulars and information will be sent upon application. All correspondence will receive prompt attention if addressed to Director E. E. FAVILLE, Wolfville, N. S.

The
and
The
try,
side
the
an
ion
fly
nas
nts
ter
a
in
all
ne
to
t.
of
ll
. .
o