



ANNUAL REPORTS
OF THE
Fruit Growers' Association
AND
Fruit Branch
ONTARIO
—
1909

Forty-first Annual Report

OF THE

Fruit Growers' Association

OF

ONTARIO

1909

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1910

Printed by
WILLIAM BRIGGS,
29-37 Richmond Street West,
TORONTO

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present the Forty-first Annual Report of the Fruit Growers' Association of Ontario.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,

TORONTO, 1910.

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Fruit Growers' Association of Ontario.

OFFICERS FOR 1910:

President JAS. E. JOHNSON, Simcoe.
Vice-President R. W. GRIERSON, Oshawa.
Secretary-Treasurer P. W. HODGETTS, Parliament Buildings, Toronto.

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Ontario Agricultural College: Prof. H. L. HUTT, Guelph.

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Auditor: W. G. LINDSAY, Department of Agriculture, Toronto.

REPRESENTATIVES TO FAIR BOARDS AND CONVENTIONS:

London: D. JOHNSON, Forest; C. W. GURNEY, Paris.

Ottawa: R. B. WHYTE, Ottawa; HAROLD JONES, Maitland.

Toronto: W. H. BUNTING, St. Catharines; P. W. HODGETTS, Toronto.

Ontario Horticultural Exhibition: W. H. BUNTING, St. Catharines; JAS. E. JOHNSON, Simcoe; E. LICK, Oshawa; P. W. HODGETTS, Toronto.

COMMITTEES:

Executive: President, Vice-President and Secretary, with C. W. GURNEY, Paris, and F. S. WALLBRIDGE, Belleville.

Transportation: W. H. BUNTING, St. Catharines; L. A. HAMILTON, Lorne Park; R. W. GRIERSON, Oshawa; E. D. SMITH, Winona; R. J. GRAHAM, Belleville; WM. RANDALL, Grimsby; J. L. HILBORN, Leamington; J. E. JOHNSON, Simcoe, and the Secretary.

Co-operation: JAS. E. JOHNSON, Simcoe; ELMER LICK, Oshawa; ROBT. THOMPSON, St. Catharines; ADAM BROWN, Owen Sound, and D. JOHNSON, Forest.

New Fruits: Prof. H. L. HUTT, Guelph; W. T. MACOUN, Ottawa; J. W. CROW, Guelph; and H. S. PEART, Jordan Harbor.

Historical: A. McNEILL, Ottawa; L. WOOLVERTON, Grimsby; HAROLD JONES, Maitland; W. T. MACOUN, Ottawa; W. DEMPSEY, Trenton; A. M. SMITH, Pt. Dalhousie.

Judging Scales: W. T. MACOUN, Ottawa; Prof. H. L. HUTT, Guelph; A. E. SHERINGTON, Walkerton; W. H. DEMPSEY, Trenton; H. S. PEART, Jordan Harbor.

FINANCIAL STATEMENT, 1909.

<i>Receipts.</i>			
Balance on hand, Dec. 31, 1908.	\$1,690 63	Delegates' expenses	86 40
Members' fees	237 60	Advertising	30 75
Fruit Show:		Printing	32 75
Sale of fruit	1,254 95	Rent of hall, etc.	33 00
Entry fees	151 77	Periodicals for members	311 80
Legislative grant	1,425 00	Stock subscriptions, Horticultural Publishing Co...	200 00
Interest	39 72	Postage	97 00
	\$4,799 67	Printing "Success in Apple Growing"	116 40
		Pomological Committee:	
		Travelling expenses	64 10
		Exhibits	28 24
		Transportation Committee:	
		Travelling expenses	122 93
		Transcript proceedings of R. R. Commission....	10 00
		Co-operative Committee:	
		Travelling expenses	51 55
		Printing	12 50
		Directors' travelling expenses..	90 50
		Horticultural Exhibition:	
		Committee travelling expenses	26 50
		Incidentals	77 84
		Balance on hand, Dec. 31, 1909.	1,411 07
			\$4,799 67

<i>Expenditures.</i>	
Fruit Show:	
Cash paid for special prizes	\$431 16
Cash paid to exhibitors for fruit	922 15
Labor	209 65
Transportation, storage, etc., of exhibits	225 64
Judges' expenses	20 00
Printing	21 00
Incidentals	23 55
Annual Meeting:	
Lecturers' expenses	143 19

(Signed) E. D. SMITH,
President.

P. W. HODGETTS,
Treasurer.

Examined and found correct this
10th day of January, 1910.

W. G. LINDSAY,

Fruit Growers' Association of Ontario

ANNUAL MEETING.

The fiftieth annual meeting of the Fruit Growers' Association of Ontario was held in the Temple Building, Toronto, on the 10th and 11th of November, 1909.

MR. E. D. SMITH, the President, called the meeting to order at 10 a.m., Wednesday, November 10th.

PRESIDENT'S ADDRESS.

BY E. D. SMITH, WINONA.

Fifty years have passed away since the charter members subscribed at Hamilton, Ontario, forming the beginning of the Ontario Fruit Growers' Association, that has been in active force in Ontario since that date.

It will be well at this time to take a retrospective glance at the progress made during the last fifty years in Horticulture in Ontario, and, at the same time, see if the lessons learned in that fifty years may enable us to improve and make more profitable our calling in the future.

There are a number of papers to be read at this meeting, looking back fifty years, in regard to special lines of fruit-growing. I would not be able to touch upon the ground occupied by these papers if I felt inclined, as my experience does not reach so far and our provincial statistics do not give us very much information at that very early date. However, remembering back for thirty-five years I know that the progress has been most wonderful in the acreage of the various fruits. During that time we have seen most, if not all, of the canning factories and jam factories established in Ontario. All of the tender fruit-growing industries have practically been established within fifty years and have grown to the very considerable proportions that we know they have reached to-day. It is true there were at that time a considerable number of apple orchards, but they were of small dimensions individually and it has only been of late years that orchardists have gone into the growing of apples on an extensive scale, directly for commercial purposes.

According to the Blue Books, we have at present growing in Ontario over 7,000,000 apple trees in bearing; 14,000 acres of vineyards; 350,000 acres of orchard and garden.

As fruit-growing increased in area and importance, difficulties began to crop up and it has been one of the functions of this Association to endeavor to educate the fruit-growers how to overcome these difficulties. Some of them have required legislative remedies; others physical remedies. We have gone on step by step suggesting as far as possible laws to improve the conditions of the industry. We have not always been able to get all we have wanted, sometimes, because we have not been very unanimous, but we have been able to secure many important laws and regulations that have enabled us to pursue our calling more profitably. The Black Knot and the Yellows Acts were both, I believe, suggested by this Association, and have

proven to be of inestimable value. The underlying principle of these, as well as some succeeding Acts, has been throwing upon the municipalities the onus of bringing these Acts into operation on the petition of a limited number of residents of the municipality. This relieved the Provincial Government from responsibility and throws the responsibility entirely upon the municipality. This, I consider only a partial remedy for very contagious diseases. It does not fully answer the purpose because the boundaries of these townships may be infested from adjoining townships where the Act has not been put in force. Still it was a step, and a very important one, in the right direction. It has enabled us to fairly well control most of the diseases covered by these special laws. In some cases, however, where not backed up by unanimous public opinion, they have fallen by the wayside. For instance, the Act regarding the bandaging of apple trees and the killing of the Codling Moth. Saltfleet tried this. I am not sure whether any other township tried it or not, but, owing to lack of interest on the part of considerable numbers of people interested, the Act was allowed to fall into disuse.

It seems to me that the time has come when it is opportune to discuss the advisability of having similar laws carried out throughout the whole Province under the supervision of Ontario authorities. There was a good reason in the earliest days why this should not be done: It had not yet become absolutely certain, or at any rate a large portion of the fruit-growers had not become convinced, what were effective remedies. For instance, many contended that spraying was a wasteful extravagance. Many would point to orchards where they had just as good fruit year after year on unsprayed trees as those that were sprayed, and so long as a large number, perhaps a majority, were not absolutely convinced, it would have been difficult to persuade the provincial authorities of the necessity of enforcing spraying. The same is true in regard to San José Scale, Black Knot and Yellows, and others. But owing to the wide dissemination of information through government agencies, such as Farmers' Institutes and Fruit Institutes and through discussions in the Fruit-Growing Societies and through the horticultural press, I believe, at the present time, the vast majority of fruit-growers have come to fully realize the absolute necessity of thoroughness in caring for their orchards, not only in cultivation and fertilizing, but in the combating of noxious diseases and pests.

We cannot expect assured success except by united action, and the greater the sphere of united action the more effective will be the result. If the sphere of action is limited to a township, there certainly will be portions of it that will not receive the benefit from the measures that are being used. Consequently, it must follow that, to have a really efficient control over these enemies, we must have a wider field wherein prohibitive or destructive measures are employed, and it seems to me that it is a function of this Association, being the parent society in Ontario, to thoroughly discuss at an early date the advisability of asking the Ontario Government to put in force, over the whole of the Province, legislation that will stamp out or keep in subjection the most prevalent contagious diseases and pests.

We have in Ontario 7,000,000 bearing apple trees. In a favorable season these trees ought to bear at least one barrel per tree of packed apples No. 1 or No. 2. That is an extremely modest estimate. I do not believe, at the present time, we are securing one barrel more than half of this. We have no statistics to know exactly how many apples are packed and shipped. We are able to tell how many are shipped abroad, but we are not able to know how many are used up in the Dominion of Canada; and so what I have said is only an estimate. Why then are we not packing a barrel to a tree? Everybody in the apple business knows that,

on an average over this country, not more than half of the apples grown upon the trees are either fit for No. 1 or No. 2. In fact, I believe if the apples were packed in strict compliance with the Act, not over one-third of the apples grown in Ontario would be packed this year. The cause of this enormous waste and loss as everyone knows is twofold; first, chiefly, the fungus; secondly, the Codling Moth. Now there are orchardists who know that both of these can be absolutely controlled in the worst sections of the country. Hundreds of apple men will admit that the fungus can be controlled by spraying, and I think no one will doubt that the Codling Moth can be controlled if there was a universal law fully enforced compelling everyone to use every effort to destroy the Codling Moth either by bandaging or spraying.

Several of the Western States, and, in our own Dominion, the Province of British Columbia, have laws much more strict in regard to fruit-growing than any that have been suggested in Ontario, and fruit growing in these localities has become one of their staple industries. They pride themselves on it. They laugh at our packing, and although our packing has improved rapidly of late years, still the vast majority of it is not what it ought to be. We must start at the beginning and enforce the production only of good fruit. With thorough spraying we can grow the finest Spys in the world, and the Spy is, taken all round, perhaps the most valuable apple in the world,—at any rate, that grown in Ontario. There is no country that can beat us growing Baldwins. It seems to me that, in those parts of Ontario where these apples thrive, a national specialty ought to be made of them. The ordinary fruit-grower or farmer or packer can scarcely realize what might be made out of these fruits when properly grown. There is no difficulty in getting 50c. per barrel more for well-grown and well-colored fruit than for that which passes as the same grade, but merely passes.

The great future possibility of apple growing in Ontario lies in producing perfect specimens of good varieties of apples. We have the soil and the climate to do it. All we need is united action in combating diseases and we can only get united action by provincial authority.

As an instance of the result of thoroughness, this season Mr. Joseph Tweddle, of Fruitland, grew and packed upon twelve acres of Spy orchard over 3,200 barrels of apples, the great majority of which were No. 1, and he was obliged to throw out not more than 4 per cent. of the total production of the trees on account of Codling Moth; whereas, in other orchards not so thoroughly sprayed, a large portion of the crop, in some cases one-third of it, even in well-sprayed orchards, had to be thrown out on account of the ravages of the Codling Moth. These apples at the modest price of \$3 per barrel for such choice stock brought a gross return of \$800 per acre from land that is worth only \$100 per acre, in the Township of Binbrook, where they were grown.

I know of no kind of fruit-growing anywhere in Canada that will produce greater returns than this, except in very special cases indeed. I have seen crops of plums, peaches and blackberries bring considerably more money, but it happened to be a happy combination of a big crop with big prices. Now, Mr. Tweddle's crop was undoubtedly a big one, but the price can be maintained for Spys nine years out of ten of the grade and quality that these were. I think the farmers of Southern Ontario are missing their opportunity when they do not take the most up-to-date care of an orchard of any kind of our good winter apples. I say Southern Ontario, —I might say all Ontario; possibly more care is required in Southern Ontario, as the Codling Moth is a more destructive pest than in the northern part. If our people become thoroughly aroused to the value of their location for growing apples under

skilful management, Ontario will very soon stand at the front, not only of the Provinces of the Dominion, but of this Continent, in the very profitable production of a high quality of apples.

If there is one thing more than another I have noted that we are deficient in and which we have not provided for, it is not having in Ontario skilful apple packers. Few people realize what an army of men go into the orchards each autumn to pack the product of Ontario orchards. I have no means of getting at exact numbers. Each autumn 10,000, and more, of our young men go to the West to help harvest the crops there. I believe there are at least as many occupied in packing apples in the fall. At any rate it is a goodly army and most of them are untrained or badly trained. Of this army of men, how many can tell with certainty twenty varieties of apples one from the other? How many can define exactly what a real No. 1 apple should be? How many can distinguish the line between a No. 2 apple and a No. 3 with any degree of accuracy? My experience is that the number is exceedingly small that are really efficient.

Now how are we going to remedy this? The Fruit Marks Act originated by this Association has been the means of improving to a considerable extent the apple-packing, and this year the packing of other fruits as well in Ontario, but it has failed to perform all that was expected of it, and it has failed to perform nearly all that it is capable of doing, for the simple reason that there are so few skilled men. The inspectors themselves in some cases are not properly skilled men. The opinions of two inspectors will not tally. The apples that will pass one inspector will not pass another.

When the ladies of Ontario made up their minds they wanted domestic science taught in the schools, they found the Government quite willing to adopt their suggestions, but they discovered immediately that there were no teachers. So, before domestic science could be inaugurated in the school, a school to teach teachers had to be organized and Sir William MacDonald and Professor Robertson stepped into the breach, and the one organized and the other provided the means to organize schools for that purpose. What we want in Ontario is a school to teach apple-packers how to pack apples. Some little has been done in this connection through demonstrations at Fall Exhibitions, but I can readily see that at that busy time few of the young men who are really in need of this education are able to take advantage of it, besides it is limited in scope and in time.

It seems to me the apple industry in Ontario is of such importance as to warrant the Government in spending a moderate sum of money in engaging teachers who might travel about from one part of Ontario to another in the winter time and provide a short course of say two weeks in the training of those who wish to learn how to properly grade apples and how to know the leading varieties, at any rate, by sight. Even a five days' course would be of inestimable value. It would not cost the Government a great deal to get a sufficient number of instructors for this. Commencing the first of December and ending the first of April, eight courses might be got in of two weeks each by each instructor. I know there are some who have a hobby that co-operative societies are going to cure all the troubles. Under certain circumstances co-operative societies may be of great benefit, but I see no reason why an individual may not do what a co-operative society can do. I know of at least two individuals who are doing as good, if not better work, than any co-operative society that I know of, and I have no doubt there are many others in the Province. The whole thing depends upon the man at the head.

If a co-operative society gets as its manager a strong, able man, that society will probably succeed, but that same able man could carry on a private business in

exactly the same way and achieve exactly the same results. The difficulty is not so much with the system in vogue in Ontario as it is with the men engaged in it. The leading dealers find themselves handicapped by being unable to get sufficient help, trained help, and still worse handicapped by having to put up in most cases, apples that have been unsprayed or uncared for. Consequently, in bad years the greater portion of them are really only fit for No. 2 or No. 3. So that, summing up the apple situation for the future and taking advantage of the lessons of the past, my suggestion is that the greatest improvement can be made by pressing forward to obtain two things: First, compulsory care of orchards in respect to contagious diseases and insects that spread rapidly; and, secondly, in the training of young men in the proper art of packing and naming apples.

There is scarcely any limit to the possibility of apple growing in Ontario. There are hundreds of thousands of acres of the choicest apple growing land in the world still untouched. Our markets are expanding and will expand more rapidly in the future if we put up only a high grade of apples. We have never had a year when a very high grade of apples did not bring a profitable price in the British market. Our own market, West, is growing rapidly and will absorb enormous quantities of high grade apples. They are willing to pay an extra price for a good grade of apples. Even the United States market will frequently take large quantities of high grade apples, especially Spys.

We are importing each year into Canada approximately \$75,000 worth of apples. A large part of these are early apples, which might be grown in the southern part of the Province; I believe some of our best early apples would return anybody good money, planted in the earliest parts of the Province. I believe an orchard of Wealthies in the southern part of the Province would pay anybody good money, and it is not the earliest apple by any means. The North-west consumes large quantities of apples as early as they are to be had regardless of price. At present we are bringing in too many from across the border.

I wish to take this opportunity of saying that, finally, the Dominion Government have placed inspectors in the tender fruit belt at the solicitation of this Association and others, and that these inspectors have been of great value to us during the past season. We, in the Niagara district, would like to see more of them. They have been the means of checking to some extent the fraudulent and careless packing of some of the tender fruits.

The remarks that I have made in regard to compulsory care of apple orchards applies equally to peaches, plums, cherries, grapes and other fruits. Almost every fruit we grow has some enemy that is spread by means of the wind, or the birds, or some other agency, from one farm to another and from one locality to another, and no matter how carefully and thoroughly one man or even one township applies the remedy for these respective enemies, they cannot expect to be altogether successful when incursions of these enemies are liable to occur from a neighboring farm or township at any time. One of the most serious of these raiding pests is the San José Scale.

It is true that in some parts of the Niagara district the laws are well enforced and the scale is kept in subjection. In my own township there is very little scale, because we have insisted upon thorough inspection and thorough spraying or eradication of the insect through the offices of the inspector. Still it is almost impossible to entirely eradicate the San José Scale unless the whole Province acts as a unit. A bird may light on a tree infested by San José Scale in a fruit-grower's orchard, fly half a mile and light on another orchard and deposit one scale. That is enough

to start a colony, and in a short time it is spread over a large section and the fruit-grower finds he has an infested orchard.

The Mildew of the grapes, the Black Rot of the grapes, the Yellows in peaches and the Black Knot in plums and cherries, and the Blight in pears are all propagated by spores carried by the wind, birds or insects. From all such enemies and diseases a fruit-grower is entitled to protection by the State, in my humble judgment. There is a common law of the country under which no man is bound to submit to a nuisance perpetrated by another; the Government steps in and sees the man committing the nuisance, and says, "You must not do this; you must not create a nuisance for your neighbor." But this is exactly what the fruit-grower is doing who propagates scale, fungus or other diseases that are carried by the wind or by natural agencies, such as birds, to his neighbors' orchards.

After having grown fruit successfully, however, the battle is only half won. The marketing of the crop is a matter of almost equal importance to the growing of it. The marketing of the crops of peaches, plums, pears and grapes and other tender fruits is approaching rapidly as near perfection as one can expect for perishable products, and the methods of the marketing of apples have improved considerably of late.

Twenty-five years ago almost the entire product of the Niagara district was sold through commission agents in the large cities. These gentlemen, after paying the freight or express charges and deducting from the proceeds what they considered reasonable remuneration for their services, returned the balance, if any to the grower. This system of marketing was far from satisfactory. To-day, however, nearly all the product is sold directly to the trade throughout the Dominion without the intercession of the commission man, thereby giving the producer an opportunity of exercising his own judgment as to the price he will take and the market he will sell in. To such an extent has this reached that the men who were formerly commission men entirely, have now become purchasers to a very large extent, and it only requires the unanimous support of all growers to stop entirely the pernicious system of sending the bulk of the crop to be sold by commission merchants. I do not for one moment say that commission merchants are not necessary; there are times when some outlet for surplus products must be found. There is then sometimes no other means except sending the goods to a broker to be sold for what they will bring. But this system should be resorted to in as few cases as possible.

The same condition existed in regard to our apples a few years back and does to a large extent to-day, but each year sees larger numbers of buyers in the field, so that to-day no one who has apples packed in a real first-class manner that can be depended upon, need take any chances on a commission market. The only reason why every apple in Ontario is not bought direct at a price to be agreed upon between buyer and seller is because a large number of the packs cannot be depended upon for the quality. It should be the aim of this Association, in the future as in the past, to do everything in its power to raise the standard of quality. Honest packing and good quality are the foundation stones of success.

It would be an ideal condition in apple packing if a merchant in England or any distant place could be sure when he bought a parcel of apples as No. 1 that they would come up to a given standard, a uniform standard. There would be no difficulty in finding a market for every barrel of apples packed in Ontario at the shipping point at a highly remunerative price if that were the case.

During the past fifty years there has been a gradual improvement of varieties, especially of the tender fruits. I do not think our knowledge of varieties is at all

what it ought to be. I hope for good results in this direction from the new Experimental Farm at Jordan, but these results naturally will be brought about only after the lapse of considerable time.

We require a pear of good quality that will not blight. We require peaches and plums of good quality that will ship to distant markets, as the greatest market for all our fruits is coming to be more and more our own North-west Provinces, and to reach these with our tender fruits in good condition requires good fruit of good shipping qualities. Sufficient attention has not been paid to this in the past and our knowledge along this line is limited. Our climate in Ontario is such as to produce juicy, rich, delicious fruits. These naturally are not good carriers. We have to compete in the markets of the North-west with the products of the irrigated orchards of California and British Columbia where these fruits grown in a rainless atmosphere are dry and have on them no germs of rot when they start out on their journey. Consequently, it seems to me that one of the main purposes of experimentation in the future should be to introduce fruits that will carry well to these markets to compete there on favorable terms with the products of the Pacific slope.

Experiments have been made during the past season in shipping our peaches to the British market with great success. I think there is no reason why Elberta peaches should not be laid down in the British markets in perfect condition, shipped by express to Quebec, thence in cold storage on boats that only require five to six days to land them in those markets. I say Elberta, because it is a peach which possesses better carrying qualities than any other we have. We require an Elberta all along the season of peaches, or better still an improvement on the Elberta in quality; but I cannot agree with the gentleman who ranks the Elberta amongst peaches, along with the Ben Davis amongst apples, and the Kieffer amongst pears. I think it takes a higher rank than these.

Ontario was honored during the past autumn by the American Pomological Society holding its annual meeting in the city of St. Catharines. The visitors, some 300 in number, were taken for an excursion through the Grimsby and Winona district one day, another day through the Niagara district, and as many of them as chose to go for a trip to the Agricultural College and Farm at Guelph. The date of the meeting at St. Catharines was fortunate in respect of showing our visitors our peach orchards at their best, but unfortunate in that fruit growers were too busy to attend the meetings, as a rule. Hence, the local attendance was very limited at the Pomological Society meetings at which many most interesting papers were read and discussions held. Our visitors expressed themselves as highly pleased with their visit, and made many complimentary remarks as to the position of the fruit-growing industry in the Niagara district.

I wish to take this opportunity of complimenting the two greatest railway companies in the country, the Grand Trunk and the Canadian Pacific, on the improved freight service for fruit to the North-west. Some two or three years ago the Grand Trunk inaugurated a through service to Winnipeg of five days and a half, which was a vast improvement on the time taken by the route of the Grand Trunk and North Bay thence C.P.R. to Winnipeg, this latter route usually taking eight or nine days. However, during the past season, both roads, the Grand Trunk *via* Grand Haven and Milwaukee, and the C.P.R. by their new line *via* Sudbury, have given us a service of four days and a half to Winnipeg. This, I consider a very fair time, but only what we ought to have had years ago.

As I pointed out in a discussion upon this question in the House of Commons, some five cars were taken from St. Catharines to Winnipeg by North Bay, four out of the five going through in less than five and a half days, because there was a fruit grower along with the train. This only showed what could be done without any special effort whatever. It is only this year that the two companies have settled down to show what they could do. I believe the time may be still further cut down to four days. With such a service as this, it opens up vast possibilities in that market for our plums and peaches. The express rates are so extravagantly high that we cannot compete successfully with the California and Washington State products, except when the crops in those states are comparatively light and the price high. When these States have heavy crops they lay down in the cities and towns of our North-west by freight their fruit which is of a dry, mealy character in perfect condition. To meet them we have got to lay ours down by freight. With the best possible freight service this can be done to a large extent at any rate. We entirely occupy that market with our grapes, pears and tomatoes, because we can lay them down by freight, but we do not occupy that market with our peaches and plums for the reasons I have stated.

I look forward with a great deal of confidence to the future prospects for fruit-growing in Ontario. We have the natural conditions of soil and climate to produce the best fruit and the most regular crops of it of any place perhaps on this continent. Given such natural conditions, if we fail in occupying all the markets in the Dominion of Canada it is because we are negligent and careless. With proper attention to the production of fruits of quality, to the proper packing of them, to the judicious marketing of them and their rapid transportation to destination, one of the main occupations of all the best lands in Southern Ontario might be the growing of fruit of one kind or another, for the markets of this country are expanding at an enormous rate. Probably 250,000 people who are entirely consumers of our fruits are added to our population each year and will in all probability continue to be added for many years to come.

This Society, as the parent fruit-growing society of the Province, has a most important function to perform in educating and directing the energies of those who have a taste for fruit culture, and I trust it will not fail in its duty.

REPORT OF SECRETARY, 1909.

MEMBERSHIP. The membership of the Association is 793, showing a gain over the past year when the total was 718. As usual the great majority of members came in from affiliated associations. The names of the Associations, and the number sent in by each, are as follows: Clarkson F.G.A., 88; Forest F.G.A., 33; Dunnville F.G.A., 31; St. Catharines Cold Storage and Forwarding Co., 151; Niagara Peninsula F.G.A., 66; Burlington F.G.A., 34; Oshawa F.G.A., 54; Kingsville F.G.A., 25; Norfolk F.G.A., 186; Chatham F.G.A., 28; Arkona F.G.A., 18; Alvinston F.G.A., 9.

There are still quite a number of local associations that are not represented, but it seems almost impossible to get them to see the wisdom of uniting with us. The privileges of membership are of course worth many times the small fee contributed by these Associations, but even at the low figure set by the constitution there are many persons who object to paying the fee of fifty cents to join the local Association. There are many large apple-growing counties where at the present time

there are no organizations that are looking after the interests of the men engaged in the industry. Could these districts be properly organized it would mean a large increase in the membership.

COMMITTEES. The Co-operative Committee has met during the year at different times in an effort to further the interests of the existing shipping associations and to aid in the efforts put forth to organize new associations. The members have co-operated with the Fruit Branch and the Institute Branch of this Department in the arrangements for the holding of special fruit institutes. As a result a number of new associations have been started and others strengthened. Among those operating for the first time last year were Watford, Alvinston, Cobourg, and Grafton. This Committee also sent out a circular early in the spring covering wholesale prices for supplies, such as chemicals, hose, pumps, fertilizers, boxes, barrels, baskets, etc. There was also prepared a circular giving the names of the shipping associations, together with their secretaries or managers and the probable output for 1909. This was very widely distributed, not only in the West but among dealers in Ontario and Great Britain.

TRANSPORTATION COMMITTEE. This Committee has already reported at length at the time of the Annual Meeting showing what had been done before the Railway Commission in reference to express rates. The Commission has as yet given no decision in respect to this matter, so that no further action has been taken.

The action of the Dominion Express in deciding to discontinue their business at Niagara and Queenston and the raising of the rate by the Canadian Express necessitated the Chairman of the Committee, Mr. Bunting, going to Ottawa at the very busiest time of the year to protest against this action before the Railway Commission. The decision of the Board was given in favor of the fruit-growers.

HORTICULTURAL EXHIBITION. In 1908 the Horticultural Exhibition closed with a deficit of some \$275. To meet this the show was only able to pay 85 per cent. of the prize money, the balance in the fruit section being paid out of the funds of our own Association. This year by economy in the expenditure for decorating and lighting we were able to come out with a small surplus of about \$90. Our prizes have been paid in full from the show funds for the first time in the history of the Exhibition.

The financial statement of the show indicates that the attendance from outside points was considerably greater than 1908. At the same time the attendance from the city decreased very largely. Some of the Directors of the show seem to think that it is due to the unsuitability of the St. Lawrence Market for a show of this kind. There seems to be no other building, however, large enough in the central part of the city, and it is rather difficult to know just what action to take in regard thereto.

This year our apple growers complained very much about the dates of the Exhibition, claiming that it was usually impossible so early in November for them to leave their homes. The general opinion seems to be that the Show should be held about the last week in November and this opinion is also held by the vegetable growers and bee keepers. At the same time the commercial florists are in favor of even an earlier date so as to avoid all danger of injury to their pot plants from the frosts—in fact the displays of flowers have been much poorer the past two seasons owing to discontent among the flower men, and should the dates be made later it is doubtful whether we would be able to hold them with us. The question is, could the Show be made to succeed without this section? Our Com-

mittee will require some backing from the Directors if the Show is to be carried on as a purely fruit, vegetable and honey show.

Two good features of the fruit section this year were the special displays from the counties of Huron, Northumberland and Durham, and Norfolk, and the specimen apples, the prizes for which were contributed by members of the Association. The judges, in making their awards for the specimen fruits, made the following suggestion as to sizes, stating that the limit this year disqualified certain specimens otherwise worthy:

- Baldwin, to be changed to 3 to 3¼ inches.
- Greening (R.I.), changed to 3 to 3¾ inches.
- King, to be changed to 3 to 3½ inches upper limit.
- McIntosh, to be changed to 2½ to 3⅛ inches upper limit.
- Spy, changed to 3 to 3½ inches.

FINANCIAL STATEMENT OF SHOW.

The Show accounts have not yet been straightened up, but the advance financial statement of the Exhibition shows receipts and expenditures as follows:

RECEIPTS.

Grants:

Ontario Government	\$2,000 00
City of Toronto	600 00
Toronto Agricultural Society	100 00
York County	25 00
Etobicoke Township	25 00

Donations:

Toronto Electric Light Co.	100 00
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Sales:

Fruit and Flower Booth	74 62
Auction, Fruit	18 55
Auction, Flowers	62 60

Ticket Sales:

Grand Trunk Ry.	252 00
Canadian Pacific Ry.	134 75
Canadian Northern Ry.	50
T. H. & B. Ry.	3 75
Coupon tickets (Net)	358 85
Members' tickets (Toronto Gardeners' & Florists' Association)	11 00
Members' tickets (F. F. Reeves)	3 00
Members' tickets (E. T. Reed)	22 00
Gate receipts	888 80

Advertisements:

Beekeepers' Association	12 00
Foster Pottery Co.	10 00
Cranston Pottery Co.	7 00
Oakville Basket Co.	12 00
White Co.	12 00
Pilkington Bros.	20 00
Brown Bros.	12 00
Cooper & Nephews	12 00
J. A. Simmers	25 00
J. H. Dunlop	12 00
R. W. King	12 00
R. D. Harling	7 00
Steele Briggs	20 00
Cannon Floral Co.	7 00

Davis Pottery Co.	7 00
Grasselli Co.	20 00
Fruit Growers' Association	12 00
Telfer Manufacturing Co.	12 00
Stone & Wellington	12 00
Dominion Agricultural Office	12 00
Biggs' Fruit & Produce Co.	12 00
Chemical Laboratories	20 00
A. Kent	7 00
E. D. Smith	12 00
Dominion Express Co.	12 00
Ontario Vegetable Growers' Association	12 00
J. B. Smith	7 00

Concessions:

Cooper & Nephews	12 50
Standard Chemical Co.	20 00
King Construction Co.	20 00
Niagara Spray Co.	20 00
Grasselli Co.	20 00
Biggs' Fruit & Produce Co.	20 00
E. C. Brown	20 00
Batts' Limited	20 00

Special Prizes:

D. Johnson	10 00
E. D. Smith	10 00
J. A. Ruddick	10 15
J. E. Johnson	10 00
W. H. Bunting	10 00
R. B. Whyte	10 00
Ontario Fruit Growers' Association	300 00
Ontario Vegetable Growers' Association	50 00

Miscellaneous:

Ontario Beekeepers' Association	5 00
Balance from 1908	82 56

\$5,667 63

EXPENDITURES.

Decorating, Heating, Etc.:

Consumers' Gas Co., gas	\$42 30
Consumers' Gas Co., piping	418 05
Wheeler & Bain, heating	157 30
Wm. McGill, fuel	16 00
Mt. Pleasant Greenhouses, evergreens	35 00
Victoria Club, etc., evergreens	22 00
Orr Bros., meals	12 30
Russel Hardware Co., hardware	12 70
F. F. Reeves, oak boughs	10 00

Music:

Jas. Glionna	186 00
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Labor, Cartage, Etc.:

G. H. Mills, for carpenters, etc.	176 15
I. Gilmore, cartage	46 75
P. W. Hodgetts, for doorkeepers, etc.	16 00
R. Brimstin, doorkeeper	13 00
R. G. Nelson, doorkeeper	10 00
Miss Curtis, ticket-seller	12 50
Miss Rogers, ticket-seller	12 50
City Carpenters	18 91
G. H. Mills, Superintendent	60 00

Office Expenses:

G. Elder, messenger	7 50
T. Murphy, clerk	31 75
E. T. Reed, sundries	5 65
Bell Telephone, rent of 'phone	15 00
United Typewriter Co., rent of machine	2 00
Treasurer's stenographer	10 00

Staging, Tables, etc.:

J. B. Smith, lumber	62 00
Kilgour Bros., paper	36 40
T. Eaton Co., rooms for decorated tables	57 90
Adams Co., rent of tables	10 00
Harry Webb Co., rent of silver, etc.	16 00

Printing, Badges, Etc.:

J. F. Osborne, prize lists, etc.	488 25
Methodist Book Room, signs	50
A. Kent, badges	32 70

Advertising:

Reed & Day, signs	12 50
Connor Ruddy Co., bill posting	44 00
Woods Norris Co., ads.	159 85
Mail & Empire	37 80
World	22 40
Globe	37 80
Star	35 40
Telegram	38 40
News	26 60
Montreal Star	15 00
Home Journal	10 00
Canadian Horticulturist	50 00
Canadian Florist	21 00
Farmers' Advocate	40 00
W. G. Rook, Advertising Manager, etc.	100 00
W. G. Rook, commission on ads.	83 50
W. G. Rook, commission on concessions	18 00

Prizes:

Flowers	1,105 00
Fruit	1,004 25
Vegetables	391 25
Honey	256 00

Miscellaneous:

Secretary, Rugby Hamilton Club, commission on tickets	10 25
W. H. Bunting, fruit	25 70
St. Catharines Cold Storage Co., fruit and baskets	6 80
Norwich Union Assurance Society, insurance on lumber	4 00

\$5,607 61

AMERICAN POMOLOGICAL SOCIETY. Owing to the season of the year when the meeting of this Society was held in Ontario, very few of our members were able to attend. The number of American visitors was not as large as was expected, but the meetings were well attended, and much interest was shown in both the programme and the exhibit of fruit put up at the Niagara Peninsula Horticultural Exhibition, which was arranged for the same dates. The visitors were shown over the orchards of the Niagara district during two days of the time that they were in the country, and were also taken on an excursion to the Agricultural College at Guelph. Everything was done to make their visit in the country as pleasant and profitable as possible. The Secretary was much indebted to those of our Directors and members who were able to be present during the week.

PUBLICATIONS. In addition to the annual report of the Association, which was issued by the Government as usual, there was printed a small pamphlet entitled "Success in Apple Orchardng." The various articles contained therein were written by members of the Association who were considered to be best fitted for the subject under discussion. The pamphlet was well received and was distributed very widely over the Province. The Minister of Agriculture, through the members of the Legislature, placed a large number of copies, in addition to which many applications were received here at the Department for single copies in response to special notices which were put in the agricultural press early in the season. Altogether some 8,000 of this publication were distributed.

The Annual Meeting was held as usual at the time of the Horticultural Exhibition and was well attended notwithstanding that the dates were too early to get the attendance from the apple-growing sections. There were present thirty-five delegates from local associations in affiliation with this Association. Outside of speakers from Ontario we brought in three men from New York State and one from Michigan at an expense of \$113. The addresses of these men, three of whom were practical fruit growers, proved of great interest and well worth the expense to which the Association was put.

NEW WORK. The Association is in a position financially to undertake some work along new lines, and this matter could possibly be discussed more fully now, so that the Executive would have some instructions early in the season. Your President, in his annual address, made note of a number of important points, and it would be well to act along some of the lines suggested. He mentions specially the matter of legislation, schools for packers, special fruit institutes, dissemination of information as to the identification of varieties, marketing and the introduction of new varieties for seasons of the year not now covered by present varieties. It would seem that the Association might well devote its energy this year to the solving of some of these problems.

The Treasurer's report was then read, received and adopted (see page 6).

COMMITTEES.

The following committees were appointed, viz.:

NOMINATIONS.—W. Dempsey, Robert Thompson, Thomas Foster, A. Onslow.

RESOLUTIONS.—F. S. Wallbridge, C. L. Stephens, W. L. Smith, Major Roberts.

LEGISLATION.—Murray Pettit, Harold Jones, E. E. Adams, William Rickard.

SMALL FRUIT CULTURE IN ONTARIO DURING THE PAST FIFTY YEARS.

BY A. W. PEART, BURLINGTON.

The foundation of the small fruit industry was probably suggested to our forefathers by the profusion of rich wild fruits found flourishing in waste and uncultivated places. In many sections of the Province to-day there are still hundreds of acres of raspberries and blackberries growing in a state of nature. Those present of middle age and beyond will frequently recall the garden plots of their boyhood homes, and doubtless often indulge in pleasant reminiscences of the

luscious fruits grown therein. The memories are sweet and precious, but sweeter far were the fruits of the old garden. None since have tasted quite so good.

The stout-hearted, brave pioneers of the country, whose toil and fidelity have made possible the comforts and advantages we now enjoy, were not unmindful of the choice offerings of nature, and in many of their gardens fifty years ago were to be found strawberries, raspberries, red and black currants, and gooseberries. At that time were the Hovey and Hooker strawberries, the Franconia, Belle de Fontenay, Falstoff, red, white and yellow Antrolip, Brinckles Orange, Marvel of Four Seasons and the Black Cap raspberries; the Houghton Seedling, Whitesmith Sulphur, Crown Bob and Mountain Seedling gooseberries; the Red Dutch, Cherry, White Grape, White Dutch, Black English, Naples, Red Victoria, Prince Albert and Houghton Castle currants. The New Rochelle or Lawton blackberry was also grown, but except in the southern part of the Province was found too tender without winter protection.

I am informed that fifty years ago there were a few strawberry plantations in Upper Canada, that in Lincoln strawberries of many varieties were grown and sent to market, also in Wentworth, Halton and Peel. In the Burlington district William Bell, Stephen Smith and Myron Dunning were among the pioneer growers. Near the cities and large towns some currants, gooseberries and raspberries were also raised by market gardeners. It is estimated that all told fifty years ago there were in this Province fifty to seventy-five acres of small fruits grown for sale.

At a meeting of the Fruit Growers' Association of Upper Canada, held in the City of Hamilton on the 19th day of July, 1861, a Committee was appointed to prepare a series of questions in relation to fruits, to be sent to agricultural and horticultural societies and prominent men throughout the country. The replies were referred to a committee composed of D. W. Beadle, Secretary, of St. Catharines; Philip Gregory, of Louth; and J. Alexander Campbell, of Grantham. They reported that sixty-eight responses had been received from thirty different counties, which geographically were well distributed throughout the Province and that much valuable information had been gathered concerning the character and adaptability of the different kinds of fruits. Thus, fifty years ago was born in the Province of Ontario an infant industry, a child of Pomona, the birth being subsequently duly registered and accredited by the Fruit Growers' Association.

Regarding small fruits the Committee said in part: "Judging from these returns it would seem that there is no part of our Province, however severe the climate, where the settler may not enjoy some varieties of most delicious strawberries, gooseberries and currants," and further, "to these may no doubt be added the Black Cap raspberry."

In 1869, Thomas Chisholm, of Esquesing, Halton County, reported to the Association that there were sixty acres of strawberries fruiting around Oakville, that the prospects were so good that the acreage had been increased to 200, and that in one day 400 bushels had been shipped to Toronto and Montreal. He also stated that there were nine acres at Georgetown. Wilson's Albany was the favorite. The report of 1869 also refers to several acres of raspberries near Oakville. No doubt other favorable localities in the Province were also making similar progress. The tariff imposed on fruits in 1878 encouraged the grower, and placed the industry on a firmer basis and made prices more stable.

In 1879, A. M. Smith, of Port Dalhousie, in addressing a meeting of the Association, said that there had been a great advance in growing strawberries during the past ten years, but that the raspberry industry was still in its infancy.

In 1881, the Snyder blackberry, Lees Prolific, and Saunders black currants, the Sharpless Strawberry, and the Peal gooseberry are recorded. In the report of 1890 the Williams strawberry is said to have been originated by Mr. Williams near Brantford.

In the period, 1879-1889, the acreage of small fruits increased very rapidly, especially in strawberries, raspberries and currants. Blackberries and gooseberries were also beginning to challenge the attention of the grower. In raspberries the Marlboro and Cuthbert were bidding for premier positions; as also were in currants and Cherry, Fay, Naples, Lee, and Champion; in gooseberries, Smith's Improved and Downing; in blackberries, the Snyder, Lawton and Kittatiny; and in strawberries, the Wilson, Crescent and Sharpless.

The following period, 1889-1899, was marked by dark days to the small fruit grower. This was due partly to over-planting and consequent over-production, and partly to the searching trade depression which was continental in character. Small fruit plantations were all but neglected, and even growers on a very large scale were only able to reap but a very narrow margin of profit.

Towards the close of the century, however, the canning factories and a few far-seeing and progressive dealers began to relieve the congested markets and a reaction set in.

The next decade, which is closed by the present year, introduces a revival in small fruits. An important factor in maintaining prices is the large demand of the jam factories. Four years ago Mr. E. D. Smith, of Winona, built a factory which absorbs annually thousands of cases of strawberries and raspberries, as well as all other fruits, thus relieving the commission markets, and insuring better and steadier prices to the grower. Other jam factories have since been erected. These, with the constantly increasing number of canning factories—some sixty-seven at present—create a healthy demand which consumes probably one-third to one-half of the strawberries and raspberries under cultivation in the Province. Such organizations as the St Catharines Cold Storage and Forwarding Company strengthen our nearby markets by seeking new fruit outlets in the west.

Estimated acreage of small fruits in Ontario, 1909:

Strawberries	4,500	acres.
Raspberries	2,000	"
Currants	1,000	"
Blackberries	1,000	"
Gooseberries	500	"
	9,000	"
Total	9,000	"

Estimated capital invested in small fruits, \$3,150,000.

As time goes on fruits have multiplied and there are scores of varieties of strawberries, raspberries, blackberries and currants claiming recognition, some of them possessing real merit. The sifting of these was the purpose of the Fruit Experimental Stations established throughout the Province in 1895-6.

Following is the general list of varieties of small fruits recommended to be grown for market by the Board of the Ontario Fruit Stations in 1907. This list is based upon several years of experiment at the various stations:

STRAWBERRIES: Beder Wood, Splendid, Warfield, Greenville, Williams, Saunders, Sample, Irene, Buster.

RASPBERRIES: *Red*—Marlboro, Cuthbert, Herbert; *Black*—Hilborn, Older, Gregg, Smith's Giant; *Purple*—Columbian, Shaffer; *White*—Golden Queen.

CURRANTS: *Red*—Cherry, Fay, Pomona, Red Cross, Victoria, Wilder; *Black*—Victoria, Champion. Lee, Naples, Saunders; *White*—White Grape.

BLACKBERRIES: Agawam, Snyder, and for southern sections Kittatinny.

GOOSEBERRIES: Pearl, Downing and Red Jacket.

It is important to note that the adaptability of some of the above varieties is very local indeed, especially in the case of strawberries.

In the evolution of the industry new problems are constantly confronting the grower; the variety best adapted to a certain soil and locality, proper care, cultivation and pruning, how to dispose of injurious insects and fungi, lowering the cost of production, finding good markets. These and many other questions are perpetually pressing for solution.

The outlook appears promising. A better system of distribution, the increase of population in our towns and cities, and the advancing tide of emigration towards our North-West are creating a demand for our fruits, both fresh and canned, the potentialities of which are practically as unlimited as the vast areas of virgin soil that are still unpeopled.

Such is a brief record of the birth and infancy of the small fruit industry in Ontario. Are we not warranted in looking forward to a young and vigorous manhood?

MR. ROBERT THOMPSON: In regard to the Western market, Mr. Peart referred to the number of cars of fruit sent from St. Catharines to the west. Last year we sent a large number of cars to the west, nine cars going to the west alone at one shipment. Five or six years ago the Railway Commission made a test of five different makes of refrigerator cars to the western market which was not very successful. I think there is a greater future for our tender fruits than we ever had before, population increasing, North-West market growing.

A MEMBER: How far west?

MR. THOMPSON: We shipped to Winnipeg, and one car went as far as Saskatchewan. Professor J. W. Crow, who was out west last year, stated that while the berries looked a little soft, they were in comparatively good shape and canned well. We can make up a load of ten cars, supply a good crew for it, and ship right through to the west.

THE PRESIDENT: Mr. Thompson's efforts this season are highly appreciated by the fruit growers around St. Catharines, and I think that another year the benefits will be even greater than they were this year. The Cold Storage has done excellent work in the interest of fruit growers, and all those in that district should combine to send out their fruit to the west.

A MEMBER: What variety of strawberries were shipped? Did not one carry better than the other?

MR. THOMPSON: Almost all the berries were Williams. Half a dozen crates at the outside were Pan-American and one or two of some other variety. The Pan-American did not carry well. There is no trouble at all in sending out large quantities of Williams berries, if we pick them in the first half of the picking season.

THE PRESIDENT: I think that the Williams is the best variety of strawberries yet. Pick the berries on the green side and they can generally be shipped to Winnipeg with success. I gave it up for the reason that it was impossible to get growers to pick the berries in that condition. Pickers are scarce; almost always there is a scarcity of help. The rain comes on, pickers cannot pick one day, the berries ripen too fast. The ripe berries must be picked off, if we would obtain the best result. No retail dealer in Manitoba has any excuse for not having all the Ontario fruit he wants. I would guarantee to lay fruit down there sound.

THE OVERPLANTING OF STRAWBERRIES AND THE WESTERN MARKETS.

BY ROBERT THOMPSON, ST. CATHARINES.

In taking up this subject we must look at it from a disinterested standpoint. If so, I must say at once that strawberries are not overplanted, but that there is under distribution. The great consuming public, except in a few centres, have not begun to get all the berries they want, and they have, in many instances, had to pay very high prices. Of course, the man who has been induced by the fairy tales of the real estate agents, and those who have land to sell and are not over-exact in their representations of the profits derived from fruit growing, to purchase land at high prices expecting to obtain fancy prices for his fruit, will say that berries are overplanted, and that prices are too low. But we must remember that berries can be grown over a large area of our country, and if there should be at any time too large profits there will be many ready to enter into the business, and we must be prepared to sell at reasonable prices, and, at the same time, use common sense and good judgment in disposing of our crop.

The grower has many troubles to contend with in growing the berries, and if he has by good care and cultivation secured a good crop, he need not feel that he is forced to sell to the canner or the jobber at the first price offered if it is not deemed sufficient. The general market will always pay a fair average price. We have growers who always get cold feet if we have the promise of a full crop, and rush to sell at any price, and if they can sell for a fixed price and the promise of any rise in the market, they think they are making a good bargain, when, as a matter of fact, if any number sell this way they make it impossible to have any rise in price.

Take this season, for instance. The canners had sold all of their stock of canned berries and were bare, but they anticipated a good crop and put the price of berries from $3\frac{3}{4}$ to $4\frac{1}{2}$ cents per box. Many growers thought they had to take this offer and sold. Others held out, owing to the cool weather. Berries ripened late and came in a rush, prices fell for three or four days, and the factories thought they had the growers and bought at from 2 to 3 cents per box. Of course this was a ruinous price to the growers who sold. Owing to these low offers, the most of the berries were shipped and the shippers did better than factory prices. I have investigated the sales of many of our growers and find, in every instance, where they put their fruit up properly, that they made more by shipping. I will give one grower's returns from the lot, which is one of the lowest returns taken, because he shipped all of his berries to Toronto to one of the commission houses, so that he had no fancy outlet. He shipped 512 crates of 24 boxes and they netted him 4 1-6 cents per box, after paying all ship-

ping charges, crates, and boxes, and as he says, with four advantages over the factory: first, the disposal of the whole crop; second, cash every week, to some men very important; third, handling everything new; and, fourth, no canning factory abuse, most important. When the berries were pretty well picked, the factories had not enough packed to fill their orders, and the pack is again short. They dare not offer more money to secure berries, as if they had done so they would have had to pay the advance to those to whom they promised the rise.

In regard to the North-west as an outlet, I feel confident that within a few years that market will take a lot of our berries. Our growers at St. Catharines sent out three cars this season with, on the whole, fair success financially, and secured a lot of valuable information and experience. Before sending, the growers were skeptical as to the carrying qualities of the berries; the consumers in the West were doubtful. After the berries were shipped, sold and used, we found that the berries will carry safely; the buyer found that our berries were better in flavor and would stand up long enough to use and can, and they are prepared to buy Ontario berries more largely in the future.

One word as to that market. Our Association has sent out nearly 150 car-loads to the West this season of tender fruits, and there has been between 400 and 500 cars all told (as near as I can gather) sent out from the Niagara district, and our experience is that if we go after that market in a business-like manner and arrange to supply the public regularly with Ontario fruits, the people out there are ready to give our fruit the preference. But to succeed, we must pick our fruit carefully, and at the proper stage of ripeness, and use good packages, load the cars properly, and see that fruit is quickly cooled. We must also have the Railway Commission lower the rates to points west of Brandon. The rate to Winnipeg is 66 cents per cwt., while west of Brandon the rate runs from \$1 to \$1.66 per cwt., which is almost prohibitive. If we can secure rates in proportion to what we have to Winnipeg, Portage, and Brandon, to other western points, I can safely predict that inside of three years more fruit will be shipped to western points than will be shipped to Ontario and eastern markets, and we will not hear so much of overplanting.

I wish, on behalf of the growers, to thank the Minister of Agriculture for Ontario and the officials in charge, for the efforts and assistance rendered in gaining information as to the needs in shipping and in making such splendid displays of Ontario fruit at the Winnipeg and Industrial exhibitions.

SMALL FRUITS IN THE YOUNG ORCHARD.

By L. A. HAMILTON, LORNE PARK.

What would you do with four acres of land if you wanted to engage in fruit raising? It is such a question as this that one is frequently called upon to answer. Speaking to a recent enquirer my reply was, I would plant it out in young apple trees and between the rows would grow small fruits. This answer would, of course, not be applicable in every case, as the question of climate, soil, markets and like conditions must be taken into consideration. But speaking from the experience gained during the past six years in developing an orchard in the Clarkson district, this would be my answer. In giving this opinion I would at the same time sound a note of warning, viz.: that while the growing of small fruits in my

orchard has been carried on successfully and profitably, it is impossible to say yet how far the future life of the fruit trees has been impaired by this process. In other words, while the ground crop has proved a success time only will show whether the main point aimed at—the developing of an orchard—could not have been better secured by some other practice. It seems almost presumptuous for me to speak on this subject before men who have made this and like studies a life practice. But there are many amongst the members of our Association who, like myself, having led an active business life are now going back to the land; and it is to this constituency I now address myself. I would just like to say here in passing that this movement is growing, and it is to me one of the brightest features in our present day Canadian life.

For the purpose of bringing this subject before you in a practical way, let me take as an illustration one of the four acre orchards on my farm; this was planted out in standard apple trees with fillers of cherries, plums, pears, and peaches in the spring of 1904; the apple trees were set out in rows forty feet apart in a field that had been in clover the previous year. In 1905 one-third of the land was laid out in strawberries and raspberries and the remainder in a hoe crop. In 1906 an additional area was added to the strawberry and raspberry plantation; the same practice was followed in the year 1907, so that by the time the entire four acres was either bearing a crop of small fruit or was planted in readiness for the subsequent years. I estimate that the hoe crops produced from the land in these early years was sufficient to pay for the cultivation. The fruit gave me a gross selling value as follows:—

CASH RECEIPTS.		Cr.	COST.		Dr.
For 1906.....		\$ 282 68	Commission, express and cartage, 20%.....		\$606
For 1907.....		393 30	Picking.....		420
For 1908.....		1,018 90	Packages.....		175
For 1909.....		1,336 64	Fertilizers.....		160
			Plants.....		50
Total of.....		\$3,031 52	Planting.....		20
“ Cost.....		1,481 00	Trees.....		50
Net Receipts.....		\$1,550 52			
					<u>\$1,481</u>

I estimate, as stated, that the vegetable crop paid for the cultivation of all. With one exception, viz., that I spray the strawberries with Bordeaux mixture, I have followed the general practice of growers in my district. We differ from the Niagara practice, inasmuch as the strawberries are heavily mulched with straw manure for a winter covering, and two crops are invariably gathered before the plants are plowed up. The second crop on the strawberry bed in this orchard yielded this year over twelve thousand boxes from an acre and a half. They were as fine a sample as I have grown. (For confirmation of this I refer you to Mr. Hodgetts, the Secretary of the Association, who saw the patch when it was in full fruit.) Gross value about \$800 at a cost of \$75.

In the meantime how have the apple trees fared? All I can say is, that they have made a strong growth, the loss from all causes not exceeding ten per cent. This year in addition to the crop of cherries, pears, and plums on the fillers, two of the apple trees, an Ontario and Duchess, fruited for the first time, giving, although few in number, perfect samples. I have been told that the growing of raspberries an orchard is not considered good practice; I have nothing to show that they have been injurious to the young trees. This much I know that in this portion of the orchard seven old Spy apple trees were left standing after I put in the pruning

axe to the old orchard. These trees yielded twelve barrels of wormy apples in the year before the raspberries were planted, whereas this year, after living in the company of raspberry bushes for five years, they gave me fifty barrels of sound apples, while the raspberries backed them up by adding over six thousand boxes to the crop. This convinces me that apples and raspberries will feed off the same plate provided the food is there. To sum up briefly, the accounts show that by the practice of growing small fruits in the young orchard I have reared a young orchard to the bearing point without costing anything, and have a handsome profit to its credit from the ground crop of small fruits.

IS GRAPE GROWING PROFITABLE AT PRESENT PRICES.

BY MURRAY PETTIT, WINONA.

At this year's prices there is no money in the growing of grapes. The bulk of the crop sold at from 8 to 13 cents per 8 lb. basket where twenty-five years ago we used to get as much for a single pound.

The cost of establishing an acre of grapes in the Winona district is as follows:

Vineyard land per acre.....	\$125 00
430 vines at 3c....	12 90
Preparing the land and planting	8 00
136 posts at 16c.....	21 76
Setting posts at 5c	6 80
309 lbs. wire at 3c.....	11 27
Bracing end posts and stapling wire.....	6 00
Cultivation and pruning for 3 years.....	30 00
	<hr/>
	\$221 73
Interest on investment for 3 years.....	33 25
	<hr/>
	\$254 98

After the vineyard is established the cost of production on one acre is as follows:

Interest on total investment at 5%.....	12 74
Pruning and tying.....	6 00
Cultivation.....	8 00
Spraying and fertilizing	9 00
Picking, packing and delivering	13 00
Baskets, 750 at 3½c	26 25
Interest and repairs on machinery.....	16 00
	<hr/>
Total cost per acre.....	\$90 99

If the production was 750 baskets of grapes per acre selling at 10 cents net, the returns would be \$75.00, or a deficit of \$15.99. If the price was 11 cents the deficit would be \$8.49, while at 12 cents the grower would still lose 99 cents. The grower must get 13 cents before he can begin to show a profit. A fair return could be obtained by selling the Concord and Niagaras for 15 cents and the Rogers for 20 cents to 25 cents, and these prices could be obtained if all the dealers and associations in the district would co-operate.

If it were possible for the inspectors to prevent the shipping of green grapes early in the season this fruit would sell much more rapidly and in larger quantities. The past season Niagaras were being shipped west when Moore's Early and Champion were being cut.

MR. THOMPSON: I believe that we can produce grapes for very much less than the figures given by Mr. Pettit. In regard to the premature marketing of the fruit, this will work out its own cure. The man who ships the green grapes under present conditions will get less money than if he had waited a little while. Ripe Champions were certainly better than green Niagaras or Concords. We will have to continue to educate our shippers in regard to this matter.

MR. PETTIT: I believe that it will require more than education. Legislation seems to be necessary to prevent this kind of fraud.

THE PRESIDENT: I agree with some of the speakers that Mr. Pettit's figures are a little high in reference to the cost of bringing an acre into bearing. As far as prices are concerned, growers should not be discouraged because grapes sold at the end of the past season at a loss. The wine manufacturers have not been purchasing for two years, and a lot of grapes have been thrown on the market which in the past were made into wine. However, unfermented wine will likely be made in the near future in Ontario, and may take as much as one half of the total crop. We cannot expect that co-operation in itself will raise prices. The middlemen who are in the business to-day are still absolutely necessary to the collection, distribution, and sale of this crop.

MR. BASSETT: In the Association at Lanton, Michigan, they have a system of inspection to prevent any green grapes being shipped. This matter is within the control of any co-operative association, as the managers soon find that it does not pay. Immature grapes at all seasons of the year should be refused. The Lanton Association had raised the price of grapes $2\frac{1}{2}$ cents per 8 lb. basket for their members, which was a striking tribute to the value of co-operation in the marketing of grapes.

F. GORING, St. Davids: I am also of the opinion that Mr. Pettit's figures in regard to the cost of production are too high. With a lighter soil on an earlier location my figures would be much lower.

NEW YORK GRAPE GROWING METHODS.

BY D. K. FALVAY, WESTFIELD, N. Y.

The grape industry of Chautauqua County had its birth about 1818, when about a dozen roots of the Fox grapes were planted. These vines grew very rapidly, but the fruit was of inferior quality. In 1824 a plot of ground about two by six rods was planted to Isabellas and Catawbas. These varieties proved to be well adapted to the soil and climate. Very little effort was made, however, to cultivate this fruit until about 1859. At that date twenty acres of bearing vineyard would be a good estimate. At the present time there are thirty-five thousand acres in the Chautauqua Belt.

The Concord grape was introduced some time in the fifties and is the standard grape. Some Niagaras are raised, but of late years they have not found a ready market, the price rarely being equal to that of the Concord. Only a very few of other varieties are grown, and are mostly sold in local markets.

Our grapes were formerly set eight feet in a row, the rows being nine feet apart. For the past few years the roots have been set six or seven feet apart in the

row, the object being to put up fewer canes from each vine and still maintain an average. The posts should be between the third and fourth vines to prevent the wires from sagging when loaded.

The best roots obtainable should be purchased. They are now so graded that those designated "Extra Number Ones" are the kind to get. Other grades are set, but the best are always the most satisfactory. For the past few years newly set vineyards have not done as well as in former years. The cause has not been definitely determined. It is believed by some that the vitality of the grape cuttings has been weakened by the general deterioration of the vines from which the grape brush is taken for cuttings.

With all the fungus diseases, anthracnose, etc., infesting the vines, the grape root grower should use extra precaution in obtaining grape brush for cuttings. I believe no wood should be used unless taken from sprayed vineyards.

These roots are set very deep, from fourteen to eighteen inches below the general surface of the soil. As the ground is worked the high centres are gradually worked toward the roots. Corn or potatoes are usually planted between the grape rows the first year. The first year's growth is cut back to two or three buds the second spring. The third spring the canes are tied up; not more than two canes should be used. One and a half canes are better, that is, one cane to the top wire and a shorter one to the bottom wire, the shorter cane making the better wood growth for the following year. Invariably the best growth of wood is near the top of the cane, and if both canes are tied to the top wire the growth of wood will be too far from the ground to make a good shaped vine. The first wire is usually 24 inches from the ground; the second wire is from 26 inches to 28 inches from the lower wire.

The canes are tied with No. 21 wire cut about five inches long, and so twisted around the cane and trellis wire as to come off with the old wood. String is used when necessary to tie any of the canes to the lower wire. Tie a loose knot to prevent girdling. We tie but once, unless some of the vines should be broken down with wind or other causes. A good tier can tie an acre a day in a vineyard with four canes to the vine. There are from 540 to 600 vines per acre according to distance apart in the row.

It requires about six years to get a strong vineyard, that is, one that is capable of supporting from four to six canes. The constant temptation among vineyardists is to tie up too many canes on young vines and by so doing injure their vineyards seriously.

In old vineyards we usually put up from four to six canes if the vine will support that many. The judgment of the trimmer must be exercised constantly. He must treat each vine individually, and not only trim for the present year but also must have in view which canes and buds will produce wood in the proper place for the following year's crop.

An extra good trimmer will trim an acre of heavy vines in from ten to twelve hours. This work is done during the winter months. After the brush is pulled from the wires it is drawn out by a team hitched to a long pole. Two men with a team can pull out and burn the brush from ten or twelve acres in a day. The work in the vineyard is all done by horse power except the hand hoeing. The one-horse plow, the gang plow, the spring tooth harrow, and the two-horse vineyard cultivator, with the disc wheel to guide it, are the principal tools used during the season. The horse-hoe, of course, is used for cleaning out under the wire.

The Chautauqua grape grower has the method of cultivation reduced to a science. Nowhere are grapes cultivated so cheaply or rapidly as in Chautauqua County.

A vineyard should be gang-plowed twice during the season, horse-hoed and hand-hoed once, and be cultivated every ten days, at least, up to August 10th or 15th. The cost of trimming, tying, and care should be about twelve dollars per acre up to time of harvesting.

Vineyards infested with grape pests, such as the root worm and "leaf hopper," require special treatment, that is, cultivation and spraying, which adds to the expense above quoted.

SPRAYING. All vineyards should be sprayed at least twice for the "root worm," and several times if affected with rot. Poisoned Bordeaux is used for the fidia or root worm, and also for the grape berry moth, which produces wormy grapes. The first application is made when the grapes are just past full blossoming, and the second application is made about ten or twelve days later. The material costs about a dollar and thirty cents an acre for each application if poison is used with the Bordeaux; with Bordeaux only about seventy cents an acre. With water handy and a good walking team two men can spray fifteen acres in a day. From ten to twelve acres per day is however a fair average.

The benefits from spraying are many. It will control the root worm, destroy the grape berry moth, prevent mildew, check black rot, prevent grapes shelling and keep the vines healthy. Sprayed vineyards have a better growth of foliage, which stays on the vines from one to three weeks longer than on unsprayed vines, thereby fully ripening the fruit and the wood.

HARVESTING. The crop usually requires from ninety to one hundred days from date of blossoming to harvesting. Our harvest usually begins about September 25th. A large percentage of the grapes put in baskets are packed in the field in 8 lb. baskets, drawn to the fruit house and wilted 24 hours. The baskets are then refilled when necessary, covered, and taken to the car. Many pick in trays and after wilting the grapes pack them in baskets. This method insures a better grade of fruit. Poor, slack packing has done more to hurt the grape market than any other cause. We need more of the golden rule principles put into effect if we expect to realize the maximum profits from our fruit. Perhaps this rule would be all right with apple and small fruit growers. Honesty is the best principle always.

The car lots are handled by individuals, associations or grape companies. Many cash buyers buy direct from the grower and sell in car lots. Large companies and associations have representatives in all the large cities who look after the business. Very few grapes are consigned. Grapes picked in trays for wine or unfermented grape juice are delivered from the vineyard to the car or wineries.

The size of the crop has varied each year. Our banner crop was in 1900, when the shipment was 8,000 car loads. Since that date several thousand acres of new vineyards have come into bearing, and even with these acres added, the crop has been growing smaller each year, until the present year. This year we had too many.

This enormous business is handled in about thirty days apparently without effort on the part of any one, so thorough are the methods employed. From 25 to 30 per cent. of the grape crop is made into wine and unfermented grape juice. 12,000 tons are used annually for this purpose. The Welch Grape Juice Co. pressed 240 tons each twenty-four hours. The magnitude of this industry and the outlet it provides for the sale of grapes has a great influence on the whole grape producing business. The annual gross income will average two million dollars. After paying

expenses this large amount is reduced one half. Like any other line of business, not all men make a success of grape growing, and there is no reason to think they would succeed. 1,000 eight-pound baskets per acre is a very large yield.

The value of the grape business with its allied industries now surpass the twenty million dollar mark. The soil and climate are well adapted to grape growing. Very little fertilizing has been done. The meaning of the word "cover crop" is not yet fully understood by many growers, and spraying is too dirty and thought to be too expensive by an overwhelming majority of the grape growers in the Chautauqua belt. The virgin vineyards would carry from eight to thirteen canes, and the farmer tied that many up and was sorry he did not have more. He exhausted the soil and weakened his vines. He did not think it necessary to put back anything and consequently had an overdraft. Poor cultivation or lack of cultivation helped the conditions along and caused thousands of acres of poor vineyards.

The "thrip" or leaf hopper has damaged thousands of acres. This insect works on the under side of the leaf. It sucks the juice from the leaf causing it to dry and drop off. The grapes do not ripen after the leaves fall but remain red and unmarketable. The leaf hopper can be controlled by spraying the under side of the leaf with whale oil soap, using from twelve to fifteen pounds to 100 gallons of water. This should be applied before the hopper gets wings. Last season I killed 75 per cent. of the hoppers.

The most serious pest with us is the root worm or *fidia*, which has ruined thousands of acres in the grape belt. This year it was not so much in evidence. As a result of experiments by the State of New York it was demonstrated that the root worm can be controlled or at least reduced in number below the danger line. This work is performed by hoeing out the pupæ when in the turtle stage, and by spraying just before the beetles feed on the leaves.

The general work of the vineyard should be done intelligently and at the proper time. No business will run itself.

COST OF PRODUCTION. The cost of production varies somewhat, taken individually, but as a whole may be conservatively figured as follows: On vineyards producing an average of nine hundred 8 lb. baskets or three tons per acre: Labor and expense to time of harvesting \$13, baskets \$18, harvesting \$18, interest and taxes on investment at \$200 per acre, which is low value in New York, \$14; total \$63 per acre. If grapes sell at 10 cents per basket net they would bring \$80, which would leave a net profit per acre of \$17 above interest on investment. If the average yield of 600 baskets or two tons per acre be figured it would be as follows: Labor and expenses to time of harvesting the same \$13, baskets \$12, harvesting \$12, interest and taxes on \$200, per acre \$14; total \$51. If the grapes sell at 10 cents they would bring \$60, leaving but \$9 profit above interest and taxes.

Not taking the value of the investment into consideration, it costs the average Chautauqua grape grower to put an eight-pound basket of grapes on the market as follows: Labor to time of harvesting two cents, package two cents, harvesting two cents, total six cents. It is easy to figure the profits or losses if you know the size of the yield per acre.

Treating the subject in ton lots we must figure the cost per acre to time of harvest the same as in baskets, namely: \$13, packing a ton of grapes in trays at three cents per tray and sixty trays to the ton \$1.80, delivering with team and extra man, labor in vineyard \$2 per ton, total \$3.60. It requires an extra good vineyard to produce three tons per acre, the average with us being two tons. On a three ton basis per acre it costs \$11.40 for harvesting and \$13 for expenses up to

beginning of harvest or a total of \$24.40 per acre, without interest on investment included. It will be readily seen that the grower will have nothing left after paying interest and taxes with grapes selling at eleven and twelve dollars per ton. We make no charge for packages as the buyer pays for the package after deducting its weight.

CO-OPERATIVE MARKETING. The most serious condition confronting the grape growers at present is a more perfect system of marketing the crop. With all the experience of years in distributing and selling the grape crop in the Chautauqua grape belt we have awakened to the fact that it is possible for one man or association to absolutely control the grape market and force the prices downward, but not upward. This is done by simply quoting prices below the buying price, the order being subject to confirmation.

It is claimed that this method put into operation during the past season was the cause of lowering the price from thirty dollars to twelve dollars per ton in ten days.

Every grape section should be united into one shipping association and the entire crop handled by the officers. Distant markets should be found and the price made f.o.b. cars at loading point. Every grower can afford to wait for a part of his money until the season has closed and the pools made out. Every grape grower would be money ahead if he never sold to cash buyers, as such buyer is always trying to buy under the market, cash being a great temptation to resist. Every car put on the market at a cut price weakens the market for the next shipment; this can be avoided by uniting and sticking to the association.

Another mistake made by the Chautauqua growers in the past is not to provide packages for their crop. This neglect places the grower entirely at the mercy of the wine and juice companies, and prevents him taking advantage of the conditions of the market. The great scarcity of packages in the Chautauqua grape belt during the season just closed caused a loss of thousands of dollars to the growers.

The time to order packages for next year's crop is now. It is better to have and not want than to want and not have.

In conclusion, I can safely assume that personal interests, lack of a perfect organization and confidence in each other, coupled with neglect to do business on business principles and to properly treat the vineyards with care and fertilization are the causes of low prices received and the small crop grown for the past few years. Listen to the advice of the scientific men who are trying to help you and carry out their instructions as far as possible and you will surely be benefitted.

REPORT OF THE TRANSPORTATION COMMITTEE.

BY W. H. BUNTING, ST. CATHARINES.

During the year 1908-1909 several incidents that have a rather important bearing upon the transportation of fruit have occurred.

Owing to a general demand from all parts of Canada, early in 1908 the operations of the express companies were, by an Act of Parliament, brought under the supervision of the Board of Railway Commissioners. Shortly after an investigation of the various complaints that had been made against the express companies was begun by the Commission.

Your Committee prepared as full and complete a statement of their case as possible, and early in January last, aided by legal counsel supplied by the Provincial Government, presented it to the Railway Commission. As a result of this presentation the Chairman of the Commission ordered that the express companies make an effort to meet the fruit growers with a view to abate and remove many of the grievances complained of. Your Committee regret to report, however, that up to the present no agreement has been arrived at as a result of this conference held in accordance with the request of the Chairman of the Commission, the express companies being unwilling to accept the schedules and propositions as presented by your Committee. As the whole question is still an open one, it will be necessary to press for relief through an order from the Board at an early date.

Amongst the points suggested are the following:

(a) A revised schedule of rates by express contemplating a reduction from present rates of approximately 25 per cent.

(b) Improved equipment for the carriage of fruit by express.

(c) A more rigid supervision of the handling of fruit by employees of express companies.

(d) A definite arrangement as to liability for loss through delay or improper handling of fruit.

During the year an application was made by the Canadian Freight Association for an order rescinding the special commodity rate on fresh fruit to western points which was granted in 1904 and under which the trade in tender fruits to the West has greatly increased.

This application was successfully combatted by your Committee. The Board, after hearing the arguments, dismissed the application and the old rate remains in force to Winnipeg, Brandon and Portage la Prairie. Your Committee is strongly of the opinion that these rates should be extended to many other distributing points in the West in order to foster this rapidly growing trade.

Your Committee notes with pleasure the increasing attention that is being given to the transportation of fruit by the officials of the various roads interested, and as a result of that attention fruit is being landed at the points of consumption in a much more satisfactory manner.

I think Mr. C. C. James, the Deputy Minister of Agriculture, touched the keynote of the success of our business last night in his address at the opening ceremonies of the Exhibition, when he stated that it was all very well for us to devote our time to growing good fruit, that it was very necessary that we should do so, but that unless we could place it in the hands of the consumer promptly and in good condition, and at reasonable rates, our efforts would be largely in vain. The endeavor of the Transportation Committee for the past few years has been to assist the members of our Association, and the fruit growers of this Province at large, in an effort to do that very thing. That we are succeeding, and that the fruit growers are beginning to place their fruit in the markets of our country more promptly, and in better shape and condition, is, I think, manifest to any observing person who has watched the trend of trade in the last few years. Our western country has opened up almost faster than we can take care of it, and it is only necessary to get suitable transportation facilities for that vast country to enable us to control that market and hold it for ourselves for all time to come.

I commend the report which I have just read to your careful consideration, and trust that there will be a full discussion on this very important and vital question. Mr. Chairman, I have pleasure in moving the adoption of this report.

THE PRESIDENT: You have heard the report read, and it is now open for discussion. The transportation question is a very important one. Whilst we have had very many questions of late years, we are hoping to have more. One thing which has been pointed out is that whilst we have the rate which we receive to Winnipeg, Portage la Prairie and Brandon, it does not apply to other points. It is fourth class rate to these cities, but to the remaining country it is third class rate. We should impress upon the Commission that the fourth class rate on fruit should apply to all car-load lots to all points in the West.

A MEMBER: Would it not be a good thing in regard to this matter if the Committee on Transportation should itself make some move in this matter in the way of correspondence with the fruit growing people, with a view to taking this matter up and putting it in the hands of three or four men, and in that way the fruit growing people will take a personal interest in this matter, and I think we will then be more active. I think by taking the matter up in that way it will have more force before the Railway Committee.

A MEMBER: May I ask in what relation we stand in connection with the express companies?

THE PRESIDENT: It is rather unfortunate, we have been asking the Commission to give us a number of concessions, but so far the Commission has practically done nothing; it has been standing still, waiting. Mr. Bunting is in closer touch with them, but I think that we certainly should impress upon them the necessity of taking steps at once.

A MEMBER: The rates are not equal between points in this Province. For instance, they will carry a basket of cherries from Peterboro for 16 cents, and they will charge from where I live 25 cents. I think they should be obliged to make the rates more equal. Of course there is an inducement where they are getting a large quantity to make a reduction, but I think that where they have a quantity less than a carload of grapes they ought to give everyone the same chance. The difference between 16 cents and 25 cents is a large one for practically the same market.

MR. BUNTING: As far as I know no new rules have been put up during the summer. The summer holidays came on shortly after that, and I know the Railway Commission have been overburdened with business, and in all probability this matter being such a large question, has been left for more mature consideration; but so far as I know at the present time no orders have been passed in this matter, and it is still open for us to press our contentions and reinforce them as fully as we may be able to. I think it is quite in the realm of possibility for us to strengthen our case at the present day very materially in connection with this matter. When it is once settled, it will remain so for a long time to come.

I have in my hand a letter from Mr. R. J. Graham, Belleville, and with your permission I will read it:

"In reference to transportation. There are special facilities in effect for apples exported that do not apply to apples shipped west. I presume this also applies to other fruits, but we think the Railroad Commission or the Government might well take this matter up, as the western market is just as important to the producers in Ontario, Nova Scotia and British Columbia as the export market, and we think the people in Manitoba, Saskatchewan and Alberta are entitled to some consideration from them. For instance, on export apples the icing charges are paid by the Government, while western shipments have to be paid by the consumer.

"On export business there are special stop-over facilities for forty-eight hours for inspection and re-shipments. This does not apply to western shipments, and our friends in the west are particularly anxious to buy cars with an assortment of varieties that suit the needs of their customers. To do this it is necessary to assemble the fruit at some

one point to load these specific cars with the exact varieties and grades required, and we have to pay the local inward freight and the through rate out. Where the apples originate on the same line that forward them we are allowed 33 $\frac{1}{3}$ % of the inward charges on proof of re-shipment. It would certainly be a great advantage, not only to the shipper, but the consignee as well, if this special stop-over forty-eight hour arrangement were put in effect on apples going west as well as for export."

REPORT OF CO-OPERATIVE COMMITTEE.

BY JAS. E. JOHNSON, SIMCOE.

As usual, a number of meetings of this committee were held during the year, the first at Guelph College during the short course in fruit growing. The main points discussed there were the incorporation of co-operative associations and the organization of local fruit growers' associations. The Assistant Provincial Secretary was in attendance and cleared up many of the points in doubt in regard to the taking out of the charters.

The next important meeting of the committee was held on September 7th at the Exhibition grounds. In addition to the members of the Co-operative committee, representatives were present from a number of the co-operative associations, and the discussions which followed were largely along the line of selling the associations' crop, prices were suggested, and a report was sent out to all of the organizations giving the range of prices as thought right for this year. These were as follows:

Fall varieties, \$2 seconds, and \$2.50 firsts; Winter varieties \$2.50 seconds and \$3 firsts.

The matter of incorporation of associations was again discussed, and owing to a change of officials in the Provincial Secretary's Department, it was decided to again discuss with them the rate of fees, powers, etc., of the associations. This was left in the hands of a special committee.

During the year some five of the associations were organized, and it is to be hoped that the prices realized for this year's crop will stimulate organization in other sections. There is no doubt that this year the demand was such as to have taken the crop from twice as many associations as are at present organized.

The Ontario Department was asked to appoint two inspectors for this year's inspection of barrel packing, but we understand that owing to the lateness in making the appointment only one man could act.

A resolution was sent to the Dominion Department urging more strict inspection in the neighborhood of co-operative associations. The Minister of Agriculture, however, stated that as this would be discrimination in favor of those districts, he could not see his way clear to give any orders to this effect.

REPORT OF NEW FRUITS COMMITTEE.

BY W. T. MACOUN, CENTRAL EXPERIMENTAL FARM, OTTAWA.

Comparatively few seedings of merit were sent to the New Fruits Committee for examination this year, but descriptions follow of those thought worth recording in this Report. Other matter relating to new fruits is also included.

APPLES.

The following varieties were sent to Prof. J. W. Crow, O.A.C., Guelph, Ont.: *Bishop, Mr., Guelph, Ont., Seedling from*: Medium size; oblong conical; cavity medium depth and width; stem short, moderately stout; basin deep, medium

width; calyx open; yellow; predominant color yellow; seeds medium; dots moderately numerous, grey, distinct; skin thin, moderately tender; flesh yellowish, tender, juicy buttery; core above medium size, open; subacid, pleasant flavor; quality good; season evidently November and December.

Said to be a seedling of Bellflower, and better in quality than parent. It is good in quality and perhaps better than Bellflower, but too much like it to make it promising for propagation as a new sort. Worthy of further test. Described by W. T. M., Nov. 20th., 1909.

Woodhouse, J., Guelph, Ont., Seedling from: Above medium size; roundish; cavity medium depth and width, russeted; stem short, stout; basin medium depth and width, smooth; calyx open; yellow well washed with orange, red on sunny side; predominant color yellow; seeds large; dots moderately numerous, yellow, distinct on sunny side; skin moderately thick, tough; flesh yellowish, tender, moderately juicy; core medium; subacid, pleasant flavor; quality good; season evidently October and November.

Tree 10 years old. Bearing 3 years. Resembles Holland Pippin considerably. Handsome and rather promising. Specimens received from J. W. Crow, Guelph, Ont; described by W. T. M., Nov. 20th., 1909.

Woodhouse, J., Guelph, Ont., Seedling from: Medium size; roundish; cavity deep, medium width, russeted; stem short, slender; basin medium depth and width, wrinkled; calyx partly open; green washed with dull bronzy red on sunny side; predominant color green; dots moderately numerous, grey, distinct; skin thick, tough; flesh yellowish, moderately juicy, tender; core medium size, open; subacid, pleasant flavor; quality above medium to good; season evidently late November to probably through the winter.

Tree said to be twelve years old. Has been bearing five years. Parentage not known. Said to be a late keeping apple of fine quality. Not as good as Greening, which it resembles a little. Specimens received from J. W. Crow, Guelph, Ont., described by W. T. M., Nov. 20th., 1909.

The Ottawa Horticultural Society offered a \$50 prize this year to "the person who originates in the Ottawa Valley a seedling apple hardy enough for the Ottawa Valley, that shall be certified by the Fruit Committee of the Ontario Fruit Growers' Association as a desirable apple, and one worthy of propagation."

Two varieties were sent to Mr. J. F. Watson, Secretary of the Ottawa Horticultural Society, and forwarded by him to Toronto, where they were examined by the Fruit Committee. Following is the report upon them:

Graham, Thos., Wyman, Que., Seedling from: Medium size; roundish; cavity medium depth and width; stem long, slender; basin medium depth and width, slightly wrinkled; calyx partly open; yellow splashed and streaked with bright red; predominant color bright red; dots obscure; skin moderately thick, tough; flesh white, faintly tinged with red near skin, tender, juicy; subacid, pleasant but not high flavor; quality above medium to good. Season probably October.

Tree found in a field and not noticed until three years ago. This is the first year there have been many apples—about half a barrel.

An attractive looking apple, but not good enough in quality nor a good enough keeper. Evidently about the same season as Wealthy. Specimens received from Thos. Graham, for competition for prize of \$50, offered by the Ottawa Horticultural Society. Described by W. T. M., Oct. 16th, 1909.

Loney, Wm. R., Kenmore, Ont., Seedling from: Medium to above medium size; oblate flattened; cavity deep, open, heavily russeted, the russet spreading much beyond cavity; stem medium length, slender; basin open, shallow, nearly smooth; calyx partly open; pale greenish yellow, sometimes with a trace of pinkish red on sunny side; predominant color pale greenish yellow; seeds medium; dots moderately numerous, russet, conspicuous; bloom none; skin moderately thick, moderately tender; flesh white and yellowish, firm, crisp, juicy; core below medium size; subacid, sprightly, slightly astringent; quality above medium; season evidently late November to probably through the winter.

Said to have been produced from a large, red streaked apple brought from Ottawa some 15 years ago. Said to be bearing fairly "good" every year. Not attractive in appearance. Russet disfigures apple. Not good enough in quality. Entered for \$50 prize offered by the Ottawa Horticultural Society. Specimens received from J. F. Watson; described by W. T. M., Nov. 22nd., 1909.

Mr. H. S. Peart, Horticultural Experiment Station, Jordan Harbor, Ont., secured a promising seedling apple by offering a prize at the Beamsville Fair.

Seedling sent to H. S. Peart: Origin, chance seedling on farm of Ed. Boughner, Beamsville, Ont.; tree upright, vigorous; fruit medium, roundish oblate, skin waxy light yellow, splashed and marbled with bright scarlet, stem short one-half to three-quarter inch long in a moderately narrow, deep cavity; calyx open in a moderately narrow and shallow basin. Flesh white, juicy and crisp. Quality, good for dessert, excellent for cooking. Season, late September and October to follow Gravenstein. Described by H. S. P.

The following varieties of apples were received at the Experimental Farm, Ottawa:

Crown: Medium size; roundish conic; cavity deep, medium width, russeted; stem short to medium, stout; basin deep, medium width; calyx partly open; yellow well washed with crimson; predominant color crimson; seeds medium size, deep brown, numerous; dots few, small, yellow, indistinct; skin moderately thick, moderately tender; flesh markedly yellow, crisp, tender, juicy; core medium size; subacid, sprightly, good flavor, somewhat like Northern Spy; good quality; season evidently mid to late winter.

Has grown up under a Northern Spy tree. Evidently a seedling of Northern Spy. Promising, although yellow flesh is not very attractive. Said to be higher colored than Northern Spy, but is not so good in quality. Specimens received from T. H. Wootton, Wellman's Corners, Ont.

Peart, Edwin, Nelson, Ont., Seedling Apple named "Homestead" from: Fruit large; roundish conical, ribbed; cavity open, deep, russeted at base; stem medium length, moderately stout; basin deep, medium width, nearly smooth; calyx open; yellow, washed and splashed with pinkish red and carmine; predominant color carmine; seeds medium size, plump; dots few, small, white, distinct; skin moderately thick, tough; flesh yellowish, tender, melting, juicy; core medium; subacid, pleasant flavor, but after-taste peculiar; quality good; season evidently early to mid winter;

Very much like Northern Spy in outward appearance, in flesh, and slightly in flavor, but general flavor is different from Spy; after-taste not altogether pleasant. Probably a seedling of Spy. Grown on farm of Edwin Peart, Nelson, Ont., and fruited for first time this year.

Specimens received from Edwin Peart, described by W. T. M., Dec. 3rd., 1909. Promising.

Grant, H. N., Newtonbrook, Ont., Seedling from: Above medium size; roundish, conic; cavity open, medium depth; stem short, stout; basin medium width, shallow, wrinkled; calyx partly open; yellow with a trace of pink on sunny side; dots numerous, green, indistinct; skin moderately thick, moderately tender; flesh yellowish, tender, juicy; core medium; subacid, pleasant flavor; quality good; season November, probably to January.

A good dessert apple, but not specially attractive in outward appearance.

Two seedlings originated at the Experimental Farm are quite promising.

Cromer (Swayzie Seedling): Above medium size; roundish, angular; cavity medium depth and width; stem short, stout; basin medium depth and width, slightly wrinkled; calyx open; green, thinly washed with pinkish red over most of surface; dots few, grey, distinct; skin thick, tough; flesh yellowish, firm, crisp, moderately juicy; subacid, pleasant, spicy flavor; quality good to very good; season late winter.

Does not resemble Swayzie except somewhat in spicy flavor. Of Ribston type.

Melba (McIntosh Seedling): Above medium to large; roundish, slightly angular; cavity medium depth and width; stem short, stout; basin deep, medium width, wrinkled; calyx open; pale yellow well washed and splashed with bright crimson; dots few, white, indistinct; bloom slight, bluish; skin moderately thick, moderately tough; flesh white, tender, crisp, juicy, perfumed; core medium; briskly subacid, pleasant, slightly aromatic flavor; good quality; season early to mid September.

A handsome apple of good quality. Resembles McIntosh somewhat about cavity, also in character of flesh and perfume and in aromatic flavor. May prove useful as following Duchess.

About 500 new seedling apples have been fruited at the Experimental Farm, Ottawa, during the past four years, of which 127 have had so many good points about them that they have been thought worthy of propagation for further test. Of these, 22 of special promise have been named.

It is interesting to note the relative proportion of promising seedlings from the different parent varieties. Following are the figures:

	Number of Seedlings Propagated	Percentage Propagated of those which have Fruited.
McIntosh	12	55
Northern Spy.....	4	44
Langford Beauty	12	40
Golden Russet.....	3	33
Wealthy	34	32
Fameuse	6	27
Swayzie Pomme Grise.....	22	27
Winter St. Lawrence	6	27
Scott Winter.....	5	24
Salome	9	22
Shiawassee Beauty	5	16
Lawver.....	2	16
Gano.....	3	10
Total propagated	127	
Percentage propagated of those which have fruited.....		28.69

A large number of seedlings and cross-bred fruits are expected to fruit at the Experimental Farm each year, from which there should come some very good varieties.

PLUMS.

Kingston Sugar Plum: Fruit received from R. A. Marrison, Cataraqui, Ont. Heart-shaped; above medium size, $1\frac{1}{2}$ by $1\frac{1}{2}$ ins.; cavity shallow, medium width; stem medium length, moderately stout; suture a distinct line, very slightly depressed; apex rounded; green, with traces of yellow; dots indistinct; bloom moderately bluish; skin moderately thick, moderately tough; flesh yellowish green, juicy; stone medium size, oval, cling; sweet, good flavor; quality very good.

Said to be hardier than Lombard and some other sorts. A promising plum. Described by W. T. M., September 11th, 1909. Reine Claude Group.

Omaha: From C. E. F. Roundish, almost round; as large as largest Americana, $1\frac{1}{2}$ by $1\frac{1}{2}$ ins.; cavity narrow, medium depth; stem short, $\frac{5}{8}$ in., moderately stout; suture an indistinct line, little, if any, depressed; apex rounded; yellow, entirely or almost entirely covered with attractive red; dots numerous, small, distinct; bloom bluish; skin moderately thick, tough; flesh yellow, juicy, tender; stone medium size, oval, cling; flavor sweet, good except next stone and skin, when acid; quality good except next skin.

Appears to be a blend of Americana and Japanese. Fruit has perfume of the Japanese. Foliage of tree somewhat like Japanese. Promising. Described by W. T. M., Aug. 18, 1908. Americana and Triflora Group.

Snow, C. H., Cummings Bridge, Ont., Seedling of Weaver: Oval, slightly flattened; large; cavity shallow, open; suture a distinct line, not depressed; apex rounded; yellow, more or less washed with red; dots indistinct; bloom thin, bluish; skin thick, moderately tender; flesh yellow, juicy; stone medium size, oval, flattened, cling; flavor sweet, not rich, good; quality good.

A large, attractive-looking plum of good quality. Promising. Would be more so if a freestone.

Described by W. T. M., Sept. 27th, 1909.

Yuteca (South Dakota, No. 8), (Director's Garden): Received from Dr. Saunders. Roundish; large; cavity medium width, shallow; stem long, slender; suture an indistinct line, not depressed; apex rounded; yellow almost covered with lively crimson; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, moderately tough; flesh yellow, firm, juicy; stone medium size, roundish, semi-cling; flavor sweet, rich; quality good. Americana group.

An attractive-looking plum of good quality. Rather promising. Described by W. T. M., Sept. 22nd, 1909.

No promising peach, pear or cherry seedlings were received by the Committee during the year.

GRAPES.

A promising early, white grape of unknown parentage, originated at the Experimental Farm, Ottawa, has been called *McTavish*, of which the following is a description:

McTavish: Ripe September 23rd, 1908. Bunch below medium to small, broad, very compact, rarely slightly shouldered. Fruit medium size, roundish, pale green, slightly tinged with purple when exposed to sun; skin thick, tough; pulp tender but does not separate readily from seeds, which are rather large and usually three to a fruit; juicy, sweet, good flavor, slightly foxy. Quality good to very good. Productive. Owing to its earliness and good quality this should prove a useful grape in the north.

BUSH FRUITS.

The following notes on two seedling black currants were made by Prof. H. L. Hutt, O.A.C., Guelph, Ont.:

Black Currants: Seedling from Albert Hannam, Chalmers St., Galt, Ont.

"*Oldest Seedling*": Bush evidently very productive. Bunch large, mostly six berries to a bunch. Berries hang well to stem. Berry: Large as Black Victoria, fairly uniform in size; quality extra good. Berries sweet enough for good dessert fruit. Promising because of good quality and productiveness.

"*Newer Seedling*": Good, but not such high quality nor so promising.

COMMERCIAL PEACH ORCHARDING IN SOUTH-WESTERN ONTARIO.

BY J. L. HILBORN, LEAMINGTON.

With such subjects as this, it is the present condition that is of chief interest to all, and as my time is limited I will allude to the past only enough to say that in Essex County the fruit buds of the peach tree usually come through the winter in good condition, so we almost always have plenty of good buds to produce a crop.

As most of you are aware, our peach orchards in that district have been twice annihilated in ten years, by the winter killing of the roots of the trees, to such an extent that several thousands of acres of peach trees were entirely destroyed in that way, while a good share of the fruit buds and the tops of the trees were apparently uninjured. So far as I can learn this never occurred before, except once some thirty years ago, and then the destruction was not nearly so complete.

Therefore I consider it is fair to assume that with the improved methods of culture and the more general use of cover crops the chances are that those who are now planting peach orchards have a fair chance of harvesting good crops.

As so many of the growers lost so heavily by the destruction of all their orchards on the two occasions I have mentioned, most of them entirely ceased planting peaches for several years and gave their attention to the growing of other crops.

Just a few of the more optimistic ones continued planting to some extent, and those have been harvesting fine crops the past two seasons. But the acreage of bearing orchards is still quite limited in Essex County. There are perhaps only one hundred and seventy or one hundred and eighty acres in bearing in what might be called the Leamington district, including the Albuna and Olinda locations, and I know of no large orchards outside of this territory in the county. There are perhaps eighty to one hundred acres more just coming into bearing. The greater portion of these orchards are being well cared for, in pruning, spraying and cultivation and are in good condition to produce a crop next season. The San José Scale is quite bad all through this district but is being fairly well held in check.

There were probably twenty-five thousand more peach trees planted in this vicinity last spring, and so far as I can judge from extensive enquiries, there will likely be as many more planted in the spring of 1910, while numerous others are planning to heavily plant the following season. It will take several years yet, however, to get the acreage of peaches that we had in this vicinity previous to the disastrous freeze of 1899, but the great majority of trees that were destroyed at that time were not old enough to have produced fruit to any extent.

While it is apart from the subject, it might be of interest to note that scarcely any tree fruits are being planted in this vicinity except the peach.

Farther west along the shore some peaches are being planted, but to no great extent.

The varieties that are being planted mostly are: *St. John*, *Engle*, *Alberta*, *Banner*, *Golden Drop* and *New Prolific*.

For the consolation of my Canadian nurserymen friends I might state that while quite a few of the trees being planted are grown locally and some are purchased from nurseries in the Niagara district, the greater portion of them are imported from nurserymen in Michigan. The chief cause of this condition of affairs is the fact that a few years ago quite a large quantity of trees were purchased from nurseries in the Niagara district, which proved so very unsatisfactory that our growers got the idea that our eastern nurserymen thought that anything that looked like a peach tree was good enough to send to Leamington.

The past two or three years, however, some of my neighbors and myself have been getting some trees from near Fonthill which have been very satisfactory. If you will continue to send this class of trees you will possibly win this trade back again, if it is not supplied locally, which is quite probable.

In Lambton County, particularly along Lake Huron shore, north of Forest, the people are becoming quite enthusiastic over the growing of peaches.

Mr. D. Johnson, of Forest, who is well known as one of the leading fruit growers of Western Ontario, has an orchard of fifteen acres just coming into good bearing, and he intends planting ten acres more next spring.

Mr. Johnson informs me that several of his neighbors have peach orchards that are producing heavy crops annually—that there are over one hundred acres of peach orchard in that locality, about half of which has been in bearing for several years, the balance just coming into bearing. He states that in all probability there will be about one hundred acres more planted next spring with heavy succeeding plantings.

Mr. Johnson is very optimistic regarding the peach industry for that vicinity, and I think he has good reasons to be. As that is my native county I am quite familiar with the conditions there, and I consider peach growing in his immediate neighborhood should be very successful.

At Arkona, twelve miles inland, they are also growing peaches to a limited extent. Mr. E. D. Morningstar has about ten acres in bearing, also a young orchard, while several others have smaller orchards. However, the crops there are more uncertain than along the lake and it is unlikely that enough will ever be grown there to materially affect the market.

In the county of Kent, particularly along the lake shore, there is a tract of land that is well adapted to peach growing. A few are being grown there, but so far as I am aware they are not planting very extensively as yet.

FIFTY YEARS' PEACH CULTURE IN ONTARIO.

BY A. M. SMITH, PORT DALHOUSIE.

May I be allowed before commencing the subject assigned me to say a few words upon fruit culture in general and the good it has accomplished for our country during the last 50 years. I do not think there is anyone here but will admit that the fruit industry has done more in building up the prosperity of our

country than any industry we have. It has done more to attract immigration from other countries, by showing we have a climate that could produce such a variety of choice fruits. It has made us all healthier and happier and contented to have such a bountiful supply of fruits to enjoy. It has shown the world that Canada can produce fruits that cannot be excelled or equalled (particularly apples) in any country in the world. What has been the greatest factor in establishing this industry and bringing it to its present value to the country? I answer without fear of contradiction, The Ontario Fruit Growers' Association, the fiftieth anniversary of which we are now celebrating. This Association has done more to establish and maintain this industry which makes Ontario the banner Province of this great Dominion (if not of the great British Empire) than all other influences combined. Its members have taken the lead in introducing new fruits adapted to the different localities, in encouraging their cultivation, in opening up markets and establishing transportation facilities, in short, making fruit growing a success.

But to turn to the subject assigned me, "Fifty Years of Peach Culture," fifty years seems a long time if you are looking ahead, but if you are looking back over the past, not so long. Fifty years ago commercial peach growing was almost unknown in Canada. Many farmers in the peach belt grew peaches for their own use and sometimes sold them to settlers in the back townships or to hucksters who came out from cities and towns and oftener fed them to their pigs, but the idea of growing them for profit or market was not thought of. Some of our cities and towns were partially supplied with this fruit, but it came mostly from the States. Fifty-seven years ago I was working for a man who had the largest peach orchard then in western New York, and he sold most of his fruit in Canada, and I sold his peaches for him in Woodstock, Ingersoll and London up to fifty years ago, when my own orchard began to bear at Grimsby.

The first peaches of which we have any record were planted along the Niagara River below Queenston by James Durham in 1825, on the farm now owned by C. E. Fisher, where there is now one of the finest orchards in the country. Another, I am told, was planted about 1830 by Geo. Stevens, a retired army officer, on the farm which is now owned by our celebrated peach grower, Wm. Armstrong, which shows that soil planted and used for peaches for nearly a century does not deteriorate or lose its value if properly cultivated. Other small orchards were planted in the vicinity of St. David's by the Woodruffs and others. But I think the real first commercial orchard was planted by Joseph and John Brown about fifty years ago on the river below Queenston. Since then there have been numerous orchards scattered through the township. The Vroomans, Bradley and others in the southern part, Major Hiscott, the Balls, and others in the northern, have planted largely until to-day there is estimated to be 200,000 peach trees growing in the township and the present year's shipment not less than 400,000 baskets.

Grimsby, which has been considered in the past the great peach centre, had no commercial orchard until the late Charles Woolverton and myself planted about five acres in 1856. Many of the old farmers in the neighborhood (whose sons and grandsons are now shipping peaches by the carload) wondered what we would do with them when they began to bear, and prophesied our venture would be a failure, but we cultivated our trees and got the express company to establish an office at Grimsby, and just about fifty years ago began shipping our fruit to parties we had formerly supplied from the States. Others seeing there was a demand for peaches began to plant. Jacob Kitchen and John Nixon were among the first who planted on a small scale, but it was ten or twelve years before the fever began to

spread and larger orchards were planted on the east and west of us—the Carpenters on the west, John Kilborne and others east, about Beamsville. About 1870 C. M. Honsberger planted a small orchard at Jordan Station, and he informs me that there is now no less than 500 acres planted in that vicinity. Thirty years ago there were very few peaches growing in Louth or Grantham. J Broderick, in Louth, and E. McArdle, in Grantham, had some of the first commercial orchards. The present year there has likely been more shipped from these townships than any others in the country. Mr. Bunting will likely be able to give you the figures.

We used to think that Saltfleet, about Winona, had too hard a soil to grow peaches, but I am informed that J. W. Smith & Sons have picked 33,000 baskets this year from 40 acres; J. C. Henry, 15,000 baskets from 20 acres, and others had similar yields in that section and at Grimsby.

Morris, Stone & Wellington planted the first commercial orchard in Pelham, about three acres, and one season they realized \$2,900 from it. Stamford had a few orchards as early as 1865 along Lundy's Lane and vicinity, planted by the Corwins and Biggars, and later on there were larger ones in the northern part. A Mr. Dunning and Mr. Thos. Berryman were planters.

I have mentioned the principal peach growing districts, but there were quite a number grown outside, some about Barton, Hamilton and Burlington, besides the Lake Erie district which we have heard from by Mr. Hilborn.

In regard to varieties: Although there have been many new ones introduced and tested in the last fifty years, there has been nothing to excel the old Early Crawford. This, with Old Mixon Free, Early Purple, Barnard, Jaques' Rare Ripe, Honest John and Crawford Late, were planted in our first orchard. Later on came Hales Early, Alexander, Rivers, Foster and a host of others. It is well known that many varieties succeed better in certain localities and soils than in others. I think the Experimental Board in one of their reports has given lists adapted to different localities. If you have not all got them, you should do so.

In regard to insects, we knew little about them in early days, excepting the borer in the roots. We dug them out, and as a preventive, and also to protect our trees from mice, we would mound up our trees six to eight inches in the fall and leave the dirt there till the insect which produced the grub or borer had deposited its eggs (which were laid in the tree at the edge of ground early in the season) and then haul it away, which would leave eggs exposed to the birds and weather and make them more easily destroyed. The next and most serious insect pest was the San José Scale, with which you are all too well acquainted.

DISEASES. The yellows has been the most serious disease we have had to contend with. It was introduced to us about 35 years ago. My first experience with it was in the township of Stamford, where I had planted an orchard and was also growing trees for sale. A friend of mine near Lockport, N.J., wrote me he had found a new peach similar to Early Crawford, but two weeks earlier and high colored. He advised me to get some buds and propagate it. I drove thirty miles to see it and found it was an Early Crawford I had sold to the owner several years before. I had heard enough about the yellows to know what it was, so did not propagate. I know of several who did propagate from infected trees thinking they had found something new and valuable and thus helped to spread the disease. This and its kindred disease, Little Peach, has been discussed at your former meetings, and I will not trespass on your time with it further than to say, "Cut it out."

Now about the next fifty years of peach growing in Ontario, will there be as much progress as in the past? We have a great country rapidly developing and filling up with people who love fruit and consider it a necessity. Soon we shall have millions to supply. Only a small portion of our vast Dominion is adapted to fruit growing, especially peaches. Shall we, on this little, narrow peninsula, be able to supply the demand? Is there any danger of overstocking the market? I leave this question with you and future growers to decide.

After the reading of this paper, Mr. Smith was presented with an illuminated address by Mr. Murray Pettit, accompanied by some very eulogistic remarks by himself and other members of the Association, to which Mr. Smith replied as follows: "I hardly know how to express my feelings and thanks for this kind address and my appreciation of it. If I have been of any use to the country, I am glad of it; and if I have had a part in building up this great Ontario of ours, I feel proud that I have been a little help in that direction. I thank you all for your kind expressions, and I hope we will all be long spared to further this great industry of fruit growing, which has done and is doing so much for our country."

PRUNING THE PEACH.

BY J. W. SMITH, WINONA.

There is one feature which has always impressed me and continues to do so to a greater degree every year that I live. It is that the greatest and most valuable information is got by observation. When a man sees and observes, the knowledge he gains is far superior to anything he may read or hear, because it is through close observation that we are able to derive the greatest benefit from our studies, conventions and meetings. In my earliest days of fruit growing, I would travel as circumstances would permit in order to see what other men were doing, and if possible to get their reasons. These observations have been my most valuable assets in determinating and originating my ideas, and I owe to them the degree of success which I may have obtained; and right here I must urge on the young man the importance and value of close observation of the operations of the progressive growers, no matter where he may be located.

An idea which I would like to suggest to young men is to prune their trees in the summer so that they may make the buds hardier. It appears to me from what I have seen that there is a certain time of the year that if you could keep the formation of the buds back for two or three weeks that possibly they would go into the winter in a hardier state. I am not sure whether this is correct or not, but it is the idea on which I am working in order to see if I can discover anything. The question is asked what do we prune for? In reply some growers say because my neighbors are pruning; others say because some old peach grower prunes and we are following his example. We should have a reason for our methods of pruning.

I think that our pruning has been radically wrong heretofore. For instance, if we plant a peach tree and allow it to grow, it will spread out, will grow higher and expand to a great degree, smothering vegetation weaker than itself and occupying all the ground. If we prune our peaches too high it is harder to keep the ground clean. My idea, and the one on which I am working, is to keep the tree down. You will see by this photo that I can pick every peach in this orchard while

standing on the ground. This orchard was planted four years ago last spring, and we have picked an average of five baskets to the tree. They ran nearly all first grade peaches amongst them. There are 160 trees to the acre, which would make 800 baskets per acre, and I consider this a good crop.

When we used our heads from four or five feet from the ground the branches would be very high, and as the tree attained a good size and would leaf out in the spring we thought we were going to get a fine crop, but in three weeks in the centre of the tree the leaves would turn yellow and drop. I began to study this and I came to the conclusion that the cause was a lack of sunlight and I have proved that you must get the sun into the centre of the tree in order to get hardy or healthy wood. You must get a leaf first before the fruit bud will form, and if you do not get healthy foliage you will not get the buds, and naturally the fruit. Start your heads as low as possible, prune properly and you will find that you will get first class peaches from the lower branches as well as the upper, and that the picking of the fruit is very much easier.

I would like to say a word or two with regard to my plan of cultivating peaches. I do not plow as much as I used to. Our discs are gauged with rims so that they can cultivate about 2-2½ inches deep. Formerly when the discs were not gauged with rims they penetrated too deeply the soft ground and severed the roots, which I regard as very detrimental to the proper growth of the tree and maturing of fruit.

I do my plowing in the fall and plow up to the tree so as to afford drainage. My spring work is done as soon as the soil is fit, but my cultivation is as shallow as possible.

Mr. Smith illustrated his remarks by photographs from his peach orchard.

Q.—How deep would you go?

A.—Not over three inches and don't think it necessary to go deeper than two inches. You want to protect the root fibres as much as possible.

MR. WM. ARMSTRONG: There are several good reasons why a low-headed peach tree is best. First, it will increase the annual cash profit on account of a larger percentage of first class fruit; second, it will add at least five years to its life; third, minimum damage on account of broken limbs caused by wind, snow or heavy crop; fourth, the fruit can be picked by a man standing on the ground, thus saving in time and ladders; fifth, the damage caused by fallen fruit will be light; sixth, the expense for spraying material and labor will be reduced about one-third. In order to start this kind of tree the peach grower must insist in getting his baby trees from the nursery rows, not the slim five to six feet kind, but the three to four feet short stocky kind.

PRACTICAL PRINCIPLES FOR PROFITABLE PEACH PRODUCTION.

BY C. E. BASSETT, FENNVILLE, MICHIGAN.

I desire to touch upon some of the high spots in modern peach culture methods. The idea of the commercial side of the question in Michigan as well as in Ontario, is to produce, if possible, the largest number of bushels of the largest size fruit of the highest quality, and to produce the crop in such a way that it will give the greatest pleasure to the consumers of that crop. That I take it is our commercial object, and in these remarks which I shall make I will attempt to

cover some of the points which will accomplish these objects which we have in view. We desire the largest number of bushels. We want quantity because it is from quantity we expect money, but we must have these bushels of large size fruits, and they must be high-colored fruits, because I presume the people who buy our fruits will judge largely of that fruit by its size. They look for a large fruit, a fruit of high color, which is attractive, and to a large extent, I am sorry to say, they have little, if any, knowledge of the quality of the fruit. That, possibly, is more or less a matter of producing fruits of quality, and though I do not want to make any point upon that and discuss it, because it is another question, still I believe it is important that you and I should take into consideration the likelihood of producing fruits of poorer quality upon the future of an industry in which we have to trade. If a man or woman buy something which is a poor quality, or a bad taste when they put it in their mouths, it takes some little time to get that taste out of their mouths, and it is some time before they will want any more of the same article; whereas, if you give them something which is of high quality, which gives them such a delicious experience as to require more, you have increased the consumption of your products.

Now, what are the absolute essentials in producing the desired results? I might say, first of all, that as the apple is considered the king of fruits, so we delight to call the peach the queen of fruits. Now how shall we get large quantities of peaches? True, it must come, not necessarily from numbers of peaches, because if you look for numbers you will not get size, and you must get color. If you do not get this you simply fall down. Now these gentlemen have shown you very nicely the style of pruning, and that is one of the big problems, one of the essential problems, and one which I intended to touch upon. But they have so fully and perfectly covered these questions according to my views that I have nothing to say except to simply coincide with what they have said.

Why is it that we have such beautiful fruits? This is just as much an apple-growing country as a peach-growing country. Why is it that in your far western section they produce these beautiful apples, and why do we in Washington and Wyoming produce such beautiful apples? There is no more sunshine there than here. The air is freer from moisture. They have to irrigate. They have no great amount of rain-fall, and so their air is completely devoid of water, and they have no muggy, foggy days, and the result is they get the sunlight which has its effect in the color of the fruits, and which gives them a very high color. Are you and I going to get that western production? We can go a little nearer to it, if we can simply adopt the methods which have been presented here, by trimming up the tops of the trees, and letting in all the sunlight which it is possible to get. In the past our systems of horticulture have simply been systems of forestry, growing trees, not fruit. We thought we had to have monstrous great big forests in order to produce fruit. Our present methods of horticulture have to be altered. We must not only have the trees, but we must keep these trees in subjection. While we need leaves on the trees, still we do not want so many leaves that the sunlight cannot get down and color the fruit. So from the very foundation in our practice at home, we cut our trees very close to the ground, from twelve to twenty-four inches. We aim at having our trees about sixteen or eighteen inches. We will cut them a little bit lower, and possibly a little bit higher, but this is our aim. Our methods in Michigan are purely commercial. No waste time is spent unless we feel it is invested in that from which we will receive dollars and cents. We do not invest one dollar of time or money unless we feel we are going to get results.

In addition to color we want size. How are you going to get size? By holding the top in subjection, not allowing it to over-balance itself. Let me illustrate: Supposing you see a chance to use the boiler in an engine, and you need some power, and you should go to your machinist and say, "I want to get a good lot of power and I haven't much money." He would say, "How much power do you want," and you would say, "I want about 20 horse-power." "Well," he would say, "the engine will cost you so much." You will say, "Well, that's a little more than I expected to pay, I will have to economize on the boiler; I guess I won't buy more than a 10 horse-power boiler." He will say, "You are foolish to have a 20 horse-power engine, and a 10 horse-power boiler." You know, as a matter of fact, if there is a machinist in this room or an engineer, that the practice is to have the boiler larger than the engine. Your root system is the boiler, and your top is the engine. You cannot get any more power into that engine than there is in the boiler, and you cannot get any more power into the top of the tree than there is in the root. If you want to get large peaches hold them in subjection. I believe that nine-tenths of our troubles, and nine-tenths of the failures or lack of success is due to the fact that we have been growing too big crops, and have not looked to the root system to give the power. The peaches that are selling for the big money to-day are the large, high-colored peaches which come from a small top.

There are one or two points which have been touched upon in regard to the matter of pruning. I want to mention one point. There is a great waste of energy in this regard. There are parents in this room who have been blessed with the gift of children. When that little child was given to you you watched over it with all the care and tenderness that is possible. You saw that it would develop. The very first thing that develops that is wrong, or that would be liable to damage the character of the child or its growth, you take pains, and at that very moment you try to eliminate that bad point, don't you? These little trees are babies. When you see a bad thing starting out on that tree, that is in a place where it does not belong, the common practice is to pay no attention to it—let it go. Why don't you do that with your children? Why don't you say, "Of course we cannot bother to correct these things when they would injure the child." These are things which will leave great scars that will never heal. I believe you realize it as a fact as you take the baby child, so when you see the limb coming out that does not belong there it is simply a matter to lop it off, and no great scar is made.

A MEMBER: How about the difference? If you do not secure a considerable amount of wood in branches you reduce the size of your trunk.

MR. BASSETT: Our trunks are plenty large enough. There is one thing that I would like to say in regard to this question of thinning as has been mentioned by some gentlemen this evening. You recognize that it is necessary in peaches. I wonder how many of you have practiced it in apples. Do you think it is just as essential? There is one orchard which some of you know about in which the apples were thinned just the same as you thin peaches, and out on that large orchard—it was all Baldwins—they ran better than 90 per cent of No. 1 apples, and they brought \$3.65 a barrel, f.o.b. Fennville. Does it pay to thin? We know it pays to thin peaches, and I believe it is an important question as to whether we should thin apples. You say it is a hard proposition, but I am just submitting it for your consideration.

Now, in regard to the picking of apples: They have got to be picked. Does it make any difference whether you pick them early in the season? No; and as a matter of fact there is a great deal of work being done of that kind, and I want some of you who are in the apple trade to try it next year on one tree.

The matter of spraying has been a debatable question on several occasions. Your curly leaf you control the same as we do. Since we have been spraying we have found that it was a good remedy for that; there was not a hatful of curly leaves, and I am positive we did not lose a peach on account of curly leaf, and we simply use the one spraying of lime and sulphur, at the same time that we sprayed for the San José Scale. It was commercial lime and sulphur that we used this year.

There is one matter that has not been touched upon, I believe, here, and I may as well mention it, this matter of fertilizers. We have had no bad effects from the use of barn-yard manure for the simple reason that we did not have enough barn-yard manure to have much effect. The amount of fertilizer manufactured on our farms is small compared to the needs of the farm. We are using and have been using the ordinary fertilizing elements of the ground, or the acidulated bone and the muriate of potash. Our nitrogen we try to get from the use of cover crops. Some people use oats and barley and other different cover crops. The ones which are of most value and the ones which are most popular at the present time are the vetches, which have the advantage of being leguminous crops and very similar to clover. You can put them in in the spring and it makes a large amount of humus when turned under. The clovers are not suited to the peach orchard; it takes too long for the clover to make sufficient growth. If you leave it in the spring long enough you have damaged your crop, and that is one of the things you have got to look out for. You must absolutely get your growth in the spring, that is very important. Don't wait and say, "Oh, I can get my growth any time." You want to boom your growth from the start, and then stop it. When you want it to stop, you do it with a cover crop, and the time you put that cover crop in, just that minute you have a riper crop, because it takes up the moisture in the soil, it also takes up the available vitality that is in the soil, and saves it for future use.

PROFITS IN THE PEAR ORCHARD.

BY W. F. W. FISHER, BURLINGTON.

I had hoped from the programme which I saw that there would have been introduced the subject of pear growing by a review of the history of the pear during the past fifty years, the lifetime of the organization in which we are met here to-day, and it would have formed, I think, a very valuable basis for the few remarks I have to offer. But as my subject was set down and assigned to me "Profits in the Pear Orchard," I think the history of the pear, and the history of pear growing in this country, during these fifty years or more have thrown some light on the question as to whether there are or are not profits, and to what extent we may expect profits from the cultivation of the pear. I am aware that I am talking to some very extensive pear growers, and some growers of very much greater experience in pear-growing than myself. I hope that during the course of the morning I will be able to get information with regard to the pear after the subject has been introduced. I find in looking over the history of the cultivation of the pear, that during the life of this Association, between forty and fifty years, the pear was introduced to probably not as many sections of Ontario as it is in to-day. In some of the old settled portions they had tried the pear, but with very varying success both as to climate and varieties.

The history of the pear shows that there are a good many districts that are entirely unsuitable for pear growing from a commercial standpoint. I think it would be well for a person starting out to look for profit in the pear orchard to-day to see how pears have succeeded in his district. After we have found out from observation of this nature that pear growing is likely to be successful in our district, we have to look for a suitable location for a pear orchard, and that very largely resolves itself into a question of looking up a location just such as we would seek for an apple orchard.

It has been claimed that the pear is properly a clay or clay-loam fruit. I must say that some of the finest trees, and I think altogether the finest fruit that has come under my notice, has, generally speaking, been upon sandy land or sandy loam. The pear will do well on any well-drained soil, either with natural or artificial draining, that is, where other conditions are favorable to it. The drainage is a very important matter, I think, probably more so than we generally ascribe to the pear. From the fact that with some planters, in my own experience, at all events, it is desirable to plant the pears pretty deep, to plant our standard pears about six inches deeper than we do in the nursery, for this reason we require to have a pretty good depth of soil. Possibly some of the growers here will differ with me in that respect of deep planting.

If we have decided to plant a pear orchard, and have a suitable place to put it, the next question will be the varieties for commercial pear growing. I think it is desirable to keep the list of varieties within a pretty circumscribed limit, unless the person is going into pear growing on a very extensive scale, and is proposing to very largely handle the crop with the hired help he has about him on the farm. In that case he would try to extend the list of varieties fairly well and spread them over the season. I have found that an advantage both in apple growing and pear growing, where we handle our own fruit with the help we have about us on the farm. We have some three or four hundred summer apple trees, and find if we had that many more winter apple trees to handle in the fall we could not do it so well as we can by handling a proportion of them during the season as the time comes on. That would also apply to pear growing. In my judgment a person might start out in the season early for home markets with Wilder, Gifford, and Lawson, three summer varieties of pears, of moderate and saleable size, and acceptable to home markets.

Then we come, in my opinion, to the great Bartlett, which has, all through the history of the pear in Ontario, been described and known as a hardy pear, but which does not do well in the northern districts on account of the hard frosts. It is the greatest pear of its season, and the best pear we grow, take it all around, and at the same time covers a fairly long period. The Bartlett may be picked pretty green, and under proper conditions will ripen and sell to advantage. Again it may be picked at what we call the proper time for picking, and will keep a good while, or it may be left on the tree for two weeks later for particular home markets, and with very little loss. The loss in droppage is fully made up in the gain in appearance and in the size of the pears. If I were confining myself to a strictly commercial orchard, I would have left out these first three varieties, and gone to the Bartlett at once.

My next choice would be the Duchess, followed by the Bosc. We want some pears of later ripening than the Duchess, but the question as to what they will be is not, to my mind, very clearly established. The Diel, I think, is a pear that has been neglected. Now I would very strongly impress on any intending pear growers, in the cultivation of these, to grow varieties that are large and attractive

in appearance. There is no question about it, quality does not count with size and appearance on the market, no matter where the market is. It does not count right here in Toronto in the middle of our fruit-growing section, and where people are supposed to be more educated as to the merits of fruit. I think if you will ask the average house-wife in Toronto how she selects her apples when she goes to the grocer or the market, she will tell you that she always buys the red apples.

We want to grow a fairly large and attractive looking pear. However, size will outweigh attractiveness and appearance. There are a number of very large pears which have not been grown as far as my knowledge goes, in a large way, for instance, the Pitmaston and Souvenir.

Then we come to some pears that are not quite so large, but are better known. The Winter Nelis is a small pear, but on the British market the name is almost as important as the size and appearance, because the Britisher, no matter where he has been situated, if he has become accustomed to a variety of fruit, will buy it under that name, and it will take a long time to switch him off on to a better variety of some other name. The Comice and the Nelis are names that are well known to the British market. If these pears will do well in a locality, I think it would be wise to plant them to a limited extent; but I would advise persons who are planting pear orchards for profit to go very largely on Bartlett and Duchess. The Duchess is a blight resister, but in my experience does not do well as a standard. I would very well like, when talking about varieties, to hear from some of those in the audience regarding their opinion of my choice of varieties, and their experience with the different varieties.

Q.—How does the Sheldon do?

A.—I have never known the Sheldon to do well enough to recommend it. We have Sheldon trees, and there are a good many of them in our neighborhood. In my own orchard there are about fifteen trees. They are trees of twenty years of age. They have not blighted. They have been rather long in coming into bearing, and have dropped their fruit very early. I would not pass by the Sheldon for any variety I have ever had for a dessert pear. In my opinion it is very much superior to the Seckel, which is considered to be the standard of excellence as a dessert pear, but I would never recommend the Sheldon as a commercial pear.

Q.—How about the Clairgeau?

A.—That is a pear with a great deal to recommend it, of good size and appearance, and I think a profitable one. In adding to the list it would be quite safe to add the Clairgeau

Q.—Would you use that as a standard?

A.—I have never seen it as a dwarf pear, but I understand it does well on dwarf stock. I only know of one orchard of it, and the people are liking them, but the quality is not good enough to recommend it for very extensive growing.

A MEMBER: I might say that I have a tree that is doing very well, but it did not succeed on a dwarf stock.

MR. FISHER: There is another pear that I think is of much merit, and that is the Howell. In adding to the list I would certainly plant the Howell in preference to Clairgeau. It is a pear of high quality, and possibly as good in other points except in size.

Q.—What about the Clapp?

A.—I have some in my orchard. I find nothing that will compare with them. This year they sold for more money than the Bartletts did in the local market. The buyers pay more money for Clapps than they would for Bartletts all through the season. The trees are short-lived and with me they do not bear as early as the Bartletts.

Q.—Has the nature of the soil anything to do with the Clapp?

A.—When you get a Clapp, or any other pear tree, past twenty years it is fairly immune from blight from that on. The trouble is getting it up to that stage. The question is whether the soil affects the blight on the tree. I think it does indirectly in this way: soil that is conducive to very rapid succulent growth, the wood and foliage of pears planted on that land would not be blight resisting. The reverse would apply to land that did not grow the trees quite so fast. But we have some Clapp trees that will probably get past the blight stage, and may become permanent trees, but they will be very few. If I were planting pears in any number I would not plant Clapp.

Q.—In speaking to a canning factory man the other day about the different varieties of pears, he said, "Cut out the Kieffers," and in less than six weeks or two months afterwards he himself gave an order for one thousand Kieffer trees and planted them out. I want to know why the change was made.

A.—I am a grower of Kieffer trees, and I have followed the history of them all the way through, and certainly I do not call it a first-class dessert pear. This is not maligning the pear, for I do think the Kieffer really has merit as a canner. I am not ashamed to say that in our home we use a good many of them prepared in this way. They allow the fruit to steam for a considerable time in the cooking and the canned fruit compares very favorably with other varieties.

A MEMBER: The tendency of the canning business has been, in regard to the English market, that no matter what brand of pear was put up, the English market would not buy the Kieffer pear, but that if they put up the Bartlett pear they could sell it at a good profit.

THE PRESIDENT: I do not know anything about that feature of it, but if canners can get good Bartletts they do not need Kieffers. But in a year like this, when there is a very small crop and not enough to go around, they have got to take something, and a Kieffer, if it is well and properly ripened, well-grown, of fair size, will can very well.

MR. FISHER: I think we have given the Kieffer all the merit it deserves, and if anyone would like to discuss any other varieties we might do so now.

THE PRESIDENT: Have you had experience with the Pitmaston Duchess?

MR. FISHER: No, I have not had experience with it. A large-growing pear appeals to me very strongly. The French people have been in the habit of putting a good many pears on the British markets at enormous prices, and they are practically all big pears. They put on a great lot of very large pears at prices that we never dream about, pears that will grow large like the Souvenir and the Comice. I think they are worthy of trying in a more extended way in our commercial orchards.

Q.—Would you recommend planting the Wilder as a good pear?

A.—Not in a commercial way. It is about the size of the Kieffer and hardly as big as the Lawson. I like the Lawson the best of any of these small pears if it is picked green.

Q.—Is the Lawson better than the Kieffer?

A.—Not in quality.

Q.—Commercially?

A.—I think it is a little better on the market than the Giffard. It is a little larger and a little harder.

Q.—It will not stand up very well?

A.—If it is picked green. That is what we always heard about the Clapp, that it won't stand up very long, but we have really never had any better price in the Old Country than for Clapps. If picked at the proper stage they will hold up and they will stand shipping very well.

Probably we are not getting very close to the question of profit, but all these things have their bearing eventually when we go into the profits, because I do not think it is the proper thing for a person to say they have two or three good crops of pears and make a good deal of money out of them. We get at the profits in pear growing by going through the different stages, meeting with our reverses, and aggregating our expenses, and so on.

The question of the distance to plant may possibly be another question in commercial pear growing. There is also the question of the cost of production, that is the value of the land on which we put our pear trees: that enters into it too.

Q.—Just speaking in a general way in regard to the land we would want to plant pear trees on, say it was worth \$300 an acre taking it any place in the Province, and if that is the case you want to make full use of your land.

A.—I am not in favor of the new school of big spaces in either apple or pear orchards. I am in favor of very hard pruning, and not a wide planting, and in making the trees conform to the conditions you want to work under. I would not plant standard pear trees at a distance of more than 15 or 16 feet apart each way, and the dwarf pear trees I should say from 10 to 12 feet in order to give them 12 feet both ways.

Q.—How high would you let dwarfs grow?

A.—Well, as a rule the dwarf tree does not grow too high; the fruit ought to be picked off a six-foot step-ladder without any trouble. I do not think that a man can climb a twenty-five or thirty-foot ladder and make money picking either pears or apples. I do not approve of it at all myself. I think that in starting out an orchard it should be a matter that is seen to that every apple in it should be picked on a twenty-foot ladder, and starting out with the pear I think we should cut that ladder in two and pick them from a ten-foot step-ladder. I think that is where one of the biggest items in the profits of pear and apple growing comes in.

Then in regard to pruning, I might just say prune hard. The most successful pear-growers I know are very close pruners. They head back their trees freely and they grow the best and most uniform crops of any I know.

Q.—How do you carry your standard trees in regard to pruning? What system have you?

A.—I prefer a centre leader in a pear tree. That has not been my practice in an apple tree, although it is recommended. The Boussock and Howell are very free from blight with me. The best practice in my experience is to keep cutting the blight out as often as possible after it appears, to keep the disease from destroying it. It would be better on trees that are subject to blight to prune them on the branch system. Of course, if you prune on the leader system, and they are very subject to blight, and it starts to work down that leader, you will possibly lose the tree unless you take it off quickly by cutting it a foot or two below the blight.

At a meeting of this Association a good many years ago I was bold enough to raise the point as to whether the cherry and plum black-knots were the same, and some of those who were here declared they were. I have never seen a black-knot go from cherries to plums or from plums to cherries, and as to whether they are the same or not I am very skeptical; in fact my experience would lead me to doubt very much that they go from tree to tree. We have two or three varieties of apples that blight very much. The Boiken is very much like the Clapp. Then the

Greening and Stark are very bad for twig blight, and I find that that result is brought about whether they are planted with pears between them or not. I do not see any difference in my orchards. Some orchards have pears in them, and some have not, and the blight gets in some seasons, and stays away some seasons—that is the twig blight on the apples. I have no reason to think that the pear and apple blight will spread from tree to tree. The twig blight is very bad in my orchard at Burlington.

Now, getting down to the question of figures and profits, when you come to the profits of a pear orchard you deduct the value of the land. I have put the value of the land at \$300 an acre, and, of course, some people say that is a lot of money, but supposing you buy a farm of one hundred acres and you go all over that farm and you pick out the best five or ten acre field there is in it, and devote it to any crop, you have taken the cream out of your farm; so probably \$300 would not be too high to pay for the value of the land on which you have located your pear orchard. Then you want to put a good many trees on that land, that is, you want to have it occupied to the extent that it will bear good crops, mature them well, and have them a proper size. Then I would recommend moderately close planting and hard pruning. Then you have interest on that \$300, \$15 a year; also you have the cost of the trees and the planting, which will run up to \$100, and that means \$5 a year in interest to add as an annual element of expense. Then you have the cultivation and the pruning which I have put at the very low figure of \$7 per acre. Then you have the uncertainty of the lives of pear trees to contend with. You have renewals to make. You have defective pear trees, because there will be some pear trees defective, many of them. I think that will give you an annual expense of \$10 per acre. Then you have to pick and pack and market these pears, and this will cost you about \$15 per acre. That will run your annual cost up to about \$52 per acre. Now, as an offset to that, you have your crop, and planting we will say 10 x 12 you would get in the neighborhood of 350 dwarf pear trees to the acre, or 16 x 16 you would get about 140 or 150 standard trees per acre. Taking an average crop from these trees, you might count on from 200 to 250 bushels, by keeping your orchard up to a high standard, and you would get on an average up to \$100 or a little more per acre. From that you must deduct the annual expense of from \$50 to \$55, which would leave you a net profit in the neighborhood of \$50 per acre.

Q.—How many years do you count before the orchard comes to the bearing stage in paying quantity?

A.—Well, certainly not under seven or eight years. Our practice at home has been to intercrop with low growing crops. I do not like corn at all, as in the case of small trees it overshadows them, and I have had very bad results from it. I do not think any person need go into pear growing with the expectation of making such a large amount of money out of it as has been made from some other fruits.

PEAR GROWING IN NEW YORK STATE.

BY J. E. CORNELL, OF NEWBURG, N.Y.

I am afraid I am going to say a few things to-day that are not absolutely orthodox from your point of view in regard to pear growing. I am aware that I am taking up one of the most difficult problems that confronts the Fruit Grower.

Pears have been a special thing with me. My first recollection in fruit growing was the planting of a pear tree. My father had trees long before my time, and I am planting trees yet for someone else. Someone said here to-day that it was never known in this territory for a man to plant a pear orchard a second time. I look upon the pear as my specialty.

I agree with Mr. Fisher in the matter of location for a pear orchard. He spoke of well-drained soil. I would absolutely insist on a thorough drainage of the soil, because we have got some things to fight ahead of us, and we have to have dry ground. I am free to say that I believe you have a great deal of land in Ontario that is planted in pears which had better be planted in something else. This tenacious sub-soil that you get in some places will never control blight, for you cannot get the water out fast enough. On the Hudson, nature has taken our land up in a sort of rough form in places, and it did not lay the land out quite as nice as it did along Lake Ontario. I prefer land with a slope, giving natural drainage, which also gives air-drainage, which is just as important as the drainage of the soil.

In regard to the distance to plant trees apart, I was thinking of my friend here who was speaking of planting trees as close as 15 feet. I have been cutting out trees that it almost broke my heart to do so where they were planted 18 feet apart, in order to give room. The Bartlett would stand 18 feet. The Seckel I would want at least 20 feet, though I would rather have them 25 feet.

I will name the varieties in order of importance. The Seckel buds early. Now you have been speaking of a big pear. There is no pear that will bring the money in New York and Boston that the Seckel will.

Q.—What size do you get the Seckel? A.—About $7\frac{3}{4}$ inches is about as large a specimen as I have ever had. But a good-sized Seckel will run from $6\frac{1}{2}$, 7 to $7\frac{1}{2}$ in fancy grades. Now showing how the market delights in the pear, a No. 1 grade will bring \$3 a box. These pears are all graded with a mechanical grader, and they are all separated so that they are more uniform and better than can be done with the eye. The fact that I have carried them six weeks and two months in the cooler without any loss shows that the pears are not injured.

The Bartlett is a good commercial pear; but with it we get a horrible black knot down the Hudson River. In the winter of the year 1903-4 we had a winter of Arctic severity—the summer preceding this cold winter was a very cold, wet summer in the latter part of the season, and there was a large development of all kinds of the pest family, the foliage was injured, and the trees grew late, and the fruit went into the winter unripened, and then we had a hard winter, one of the coldest, in fact the coldest winter I ever recollect in that country, with the exception of one somewhere in the neighborhood of 1872 or 1873, and the result was that we lost a great many Bartlett pear trees. I suppose probably 20,000 were wiped out in the Hudson Valley. I know I lost about 300. That is the first time in my experience in pear growing that I ever had any winter injury to pear trees, and I question whether we will ever see it again, because when a man only sees it once in 50 or 60 years, he is not very likely to encounter it again.

Now, the question was taken up of crops for the young pear orchard. I would say that when you are going to put small fruit in your orchard and fertilize it, you are getting a good strong rapid growth. You are then getting conditions that you want to avoid, because if you are promoting a strong, succulent growth, you are putting your trees in the position where they are susceptible to the attack of blight, which is really the greatest thing we have to contend with in pear growing.

I have planted currants in with pear trees. In growing small fruit, I would rather grow the currant than anything else, because the currant will succeed very well in the shade, and to a certain extent it holds the pear tree back. Where you are planting raspberries and strawberries, you are fertilizing pretty heavily, and you are forcing the growth too rapidly in my judgment. We hear a lot of mulch methods in regard to the apple. We would not consider that at all in the matter of the pear, because I do not think that there is a pear grower here that would admit any growth of grass. I saw some pears as I came along on the railway that it really almost made me feel bad to look at, because I saw that the deadly effects of blight had worked destruction in them. When you can see it right from the car window, you know that they have a pretty bad attack of it.

Q.—Is leaving them in sod for a year any use as to blight?

A.—I am going to speak on that point. Is it in our power to control blight? That is really the point that the history of the success or the failure of the pear business rests on—can we control pear blight? Well, my experience says we can. I have seen some of the most terrible attacks of it, I have seen orchards practically wiped out. But the last ten years I have had very little difficulty with blight. I think there is a great deal in the matter of prevention. An ounce of prevention is said to be better than a pound of cure—and if we have anything that will prevent blight, we are accomplishing a great deal. We find that blight varies from time to time. For instance we will have three or four years in which blight is peculiarly prevalent in a certain locality, and then it dies slowly away, and we are almost immune for a few years, when out it breaks again, and the loss is continued. When we are having a blight period, we do what we can to keep as much of the moisture out of the soil as is possible, for in a young pear orchard it will take up moisture very rapidly from the trees. In Washington, where they have studied this blight question, the experiments go to show that if you can withdraw the moisture from the soil, that will immediately check the spread of the blight, blight being a bacterial disease. Now, when blight starts with us, I go through my orchard early when the trees are in blossom—you can then determine from that blackened bloom that you have got blight, and it means that the blight has already started. I commence my work as soon as those blossoms have dropped, and these little blighted twigs show up. It takes a whole lot of work and time, but it takes a good many years to get a pear tree, and we can afford to give the time. I had a Bartlett pear orchard that was showing up badly in the spring, I could see these little blighted twigs blossoming. I commenced right in on that orchard, and I followed it up for over two weeks, every other day going to see what would develop, and while before we finished I had cut down some nice large limbs, then it was but comparatively few, and I stopped the blight right there.

Q.—Do you burn what you cut off?

A.—I ordinarily do; but I am not afraid of it; when it is on the ground it is going to dry away.

Q.—Is there any danger of infection from the pruning tools?

A.—Yes. I am glad you spoke of that. They often spread it in an orchard. Blight can get into a wider area because the bacteria germ is carried from the blade on to another tree.

Now, one word further on the question of blight. The point is we want a soil that is absolutely well drained, in order to get the moisture out of it. I believe you can grow better fruit if you have a gravelly hill to put it on. The

Seckel I found blight-proof when it reaches age. The young Seckel is subject to blight troubles.

Q.—Is blight always communicated from the blossom?

A.—Largely—not invariably so. It is sometimes communicated on the very rapidly growing tree; but it is most generally and very largely communicated from the blossom. Mr. Fisher spoke of there being possibly a difference in apple tree twig blight and pear tree twig blight. The investigations at Washington show that it is identically the same thing. If you get blight, you have to watch it very closely; if they are stricken you have to get there very quickly or you are going to lose your opportunity. We have practically obliterated this trouble.

Q.—You went through every other part of it?

A.—I did. Now, generally speaking, in looking over our orchards, I have instructed my men if when they are going through the orchards when they see a case of blight, it does not make any difference what they are doing, to quit right there and get it out. I have impressed this on their minds. When you have blight there, get it out, or it will get you out of business. I do not know how it is in the Niagara district, but if you have this tenacious sub-soil, I do not believe you can get drainage rapid enough in the case of blight, and you are going to meet with a good deal of loss because you are going to get a strong growth from a strong soil. I don't believe much in dwarf pears.

Q.—What is your chief objection to dwarfs?

A.—They have not been profitable with me.

Q.—Not in having fruit?

A.—No. I have Seckel trees growing there that my father planted over 60 years ago, and these trees show just as much life and vigor, and if you were to look at them you would think they were planted only twenty years ago. The pear is a long-lived tree. The oldest trees I have are among the Seckel. They will average from two to three barrels. I have picked as many as five or six barrels of Seckels off a single tree, and when you are getting from \$6 to \$10 a barrel it is a pretty good return.

I might just diverge for a moment to say one word that comes in my mind in connection with the pear question. When they were speaking of the "Blue Condition" of 1896, when we had a great glut of apples in this country, and apples were being given away, I heard a prominent fruit grower of our city—and I guess Mr. Bassett may know him—say that the great trouble was the Baldwin apple. Everybody had planted it, and it just filled the apple market. What did it do? It increased our markets, which were taking apples where they never had apples before. It is just what you are doing with the grape business, and you may take low prices for a year or two, but you are going to put grapes in the hands of people that never had them before, and they will get into the habit of using them, and this overplus in the fruit market, whether it is apples, peaches, pears or grapes will be taken up.

MARKETING OF APPLES.

BY R. J. GRAHAM, OF BELLEVILLE.

The question of "The Marketing of Apples" is a very broad one. If one could select the kind of apples they would like to market it would be a much simpler proposition, but in Canada we have to market what the Canadian people grow. I am not speaking now from a grower's point of view, but from the point

of view of one who has nothing to market but what we find in the country. If I had the arranging I would materially change what we find in the country; but the fact is, it is here, all varieties and all qualities, and the man to market this fruit as we find it has not only to be a scientific man, but also an artist in knowing how to do the thing itself. To be successful in marketing apples we have to do two things. First, we have to find profitable customers, and then to get them we have to inspire confidence; and therefore, the man, whether he likes it or not, has to be honest. The way we do it, and the way we ought to do it, are sometimes entirely different. The man who knoweth his duty and doeth it not, they say, shall be beaten with many stripes. There are many of us that have had the stripes until we have felt the effects of it seriously. I speak from experience. If I could buy the varieties I prefer, and get them packed in the crate I would like, and did not have to take anything else, I would be delighted; but unfortunately there are too many of us in the market buying apples. I think there is room for co-operation with the buyers as well as with the growers. I don't pose as a grower. I have been through that mill, and have suffered with the rest, and also have had some benefits therefrom; but what I have to say will be from the point of view of marketing what we have in the country.

The first thing to do is to locate what is in the country, whether it is good and whether it is poor, and then we have to find the people who want that kind of fruit, and we have also to study the individual peculiarities of the people who want it. We have to learn something of the markets that require these different kinds that are grown. Then we have to study the time these people need this fruit, and the price they are willing to pay for it. Therefore, there are innumerable things we have to get into our head before we begin to do the trick itself. There are matters to be considered between the consumer and the producer. We agree that the nearer the producer is to the consumer, the nearer we reach to ideal conditions, and such a man as myself, perhaps, could be well dispensed with if the producer had the scientific knowledge and the artistic touch that is necessary to do this thing. We should have spent our time in getting this education, having, of course, a natural desire to profit; and if I were to sell my education now for what it cost in dollars and cents, I would be able to retire from business.

Last winter I spent four months in the large consuming centres of Great Britain with a view to studying conditions, and I have a proposition to make to those who are in the co-operative business, and I presume that the most of you in this meeting are interested in one way or another. This is too large a proposition for me as an individual, but I will give it to you for what I consider it to be worth. I believe there is a splendid opportunity to popularize Canadian apples in the large English consuming centres. So far as my personal observation and statistics would lead me to believe, there is a very small proportion of the consuming public of Great Britain who eat Canadian apples, and with the present condition of Importers' Associations and Buyers' Associations, and walls-within-walls, by the time the grower gets his apple to the consumer the cider is pretty well sucked out of the business. I made the statement in Manchester before the Manchester Buyers' Association, and also before the Liverpool Buyers' Association, that if they would endeavor to popularize Canadian apples we would give them apples they could sell to the consumer at two pence, and so give them 25 per cent. profit, and they said the thing could not be done. I am prepared to say that it can be done, and you are the gentlemen that can do it. I took the trouble to correspond with the officials of five or six different centres, and I have with me the conditions that control the marketing of these commodities in Birmingham, Liverpool, Man-

chester, Hull, Sheffield and Bradford, and I find there is nothing expressly in any of these cities to prevent the distribution direct to the consumers just as you deliver milk around the city of Toronto. There is no reason why a hand-barrow system could not be adopted to sell apples in three grades. You know all cities have their west end and their east end and the grading of the population is largely in sections. We find in the west end of most cities the better class of people, those who can pay the better prices, and then we have in the east end the poorer class of people, and then the slums. My proposition is to get the sale of the apples all around, to sell for three pence or two pence a pound, and by doing that we would get \$3.60 for the barrel of apples from the consumer. I found that in England good labor, reliable men and honest fellows, were willing to work for on an average four shillings a day. If such a man took a regular circuit, just as a milk wagon, and would undertake to call regularly every or on alternate days, the people would know this man would be there with the fruit. Let the man with the three penny fruit go into the better section, the man with the two penny fruit go into the east end, and the man with the penny fruit in the slums. By this means we would get all the people in these large consuming centres eating Canadian apples, by paying this man four shillings a day, and asking him to sell two barrels, which he can put on an ordinary barrow, and has done, in London.

It is not a very extravagant proposition for a man to sell two barrels of apples in ten hours. He would have to reach 100 customers to do that, and he is given four shillings for two barrels, and you have approximately what it costs to sell these apples in a Liverpool auction room. You would pay 11 pence per barrel at first, 5 per cent., and the man who comes into the sale room to buy the apples, as a rule, does it on a commission of 6 per cent. In this way you get the apple direct to the consumer there for exactly what it would cost you to get it through the auction room. If the apples are there in the way I have spoken of, and we can maintain a continuous supply of apples, they can come from cold storage warehouses and be distributed through one centre at Liverpool, and we could maintain that house on 10 cents a barrel. I claim that we could pay that sort of expense, pay the freight to those towns such as Bradford and Hull, pay our warehouse accommodation or cold storage rate, and we will have \$3.70 a barrel back. Now there would be a Fruit Growers' Association there who would be glad to contract for your whole supply at \$3.70 f.o.b. I don't think there is one of you who realizes what that means. Besides getting fair prices for your apples, you are popularizing the fruit by reaching a class of people you are not reaching to-day. If you who are in this business will co-operate in this way I am prepared to give you any assistance I can in that direction, because I believe it would create such a demand for the apples that those of us who are selling to our regular customers, as we do now, would have less difficulty than we have at present. It always has been a question, this over-production, and the difficulty in finding a profitable market for it. I believe it is practicable and feasible, and any time you want further information I shall be glad to assist you, but to make it practicable it has to be done with a continuous supply, and after you have worked up a trade you must have the apples the year round, and this can be done, I believe, satisfactorily and successfully.

Now you have two systems of packing apples, boxes *vs.* barrels. There has been a good deal of discussion along that line. There are some markets which will not take apples in barrels at all, and other markets which will not take apples in boxes. My experience is to give a man just what he wants; there is no use

trying to cram down a man what he does not want. There is no use trying to make a man buy Greenings when he wants Spys; there is no use trying to make him buy Russets if he wants Snows. That sort of thing will not work, and if we want to be successful in marketing we must give the public the kind of stuff they want. As we study the situation we will find there are people who want practically all the different kind of apples we produce. For instance, you will find one market that is specially good for one variety, and another market specially good for another variety. And so you go on until you cover the entire list of the apples we produce.

We have apples that are suitable to box and suitable to barrel. I do not think we should pack anything lower than a second grade in barrels or boxes. There are markets in Europe and in other countries as well, that will take all the surplus we have to sell in second-grade apples, evaporated apples and cider, and therefore I cannot urge upon you who are producers of apples too strongly this matter of co-operation for yourselves.

The time to sell your apples is the time that the fellow wants to buy them. Now, you may have your ideas about that, but my experience, covering a number of years, leads me to believe that the time to sell your apples is the time when there is a demand for the stuff, and to sell them in the proper season. You cannot sell apples that are out of season, no matter how well you have kept them. I had a splendid chance to test that last year. I put 60,000 barrels of apples in cold storage, and I found out that to put apples on the market out of season, even in good condition, will turn out to be an absolute failure. For instance, you take the Snow, which is the most popular apple between now and Christmas, and try to sell that apple in March; you could not do it, no matter how good it is, and you can apply that to all the varieties all along the line. You go to work and put a Ben Davis on the market now and ask a fellow to eat it; well, he will spit it out, he will not swallow it. You give him that apple next June or July and he will say it is a pretty good apple. So I think we waste our energy and lose a vast amount of money by mixing up all sorts together and putting them into a crate, and sending them to open market to be sold at one time.

Under present conditions it is very difficult for the producer to separate the few apples he has got to produce, so many different varieties in one orchard. But it is possible under a co-operative system such as I have suggested to the Chairman of the Transportation Committee. A most desirable thing to bring this about would be by securing through the Railway Commission the same facilities that are put into effect at present for other goods, allowing stopping-over privileges for loading apples that are going in one direction.

There is also no reason why the Government should allow us at the rate of \$5 a car for icing apples that are going to Montreal for export, and absolutely refuse to give us a cent for apples going to Winnipeg or western points. There is, in my judgment, unjust discrimination, and that is something that the Government might well consider. I simply bring this matter up because there is such an arrangement existing. I say there is no reason why we should not get the same allowance to the West. You all have representatives in Parliament, and if you get after them perhaps they will come back at the Government, and you will get this concession.

GETTING TOGETHER.

BY C. E. BASSETT, FENNVILLE, MICH.

This subject of "Getting Together" in any of the meetings where I have had the pleasure of speaking seems to have been an important one. How can I get more from a crop after I have raised it? I have no patience with the person who will spend any time discussing the over-production of fruit. There never was an over-production of fruit in the States, and I doubt if there ever was in Canada, because over-production means the producing of more than what people want. It has simply been a lack of distribution of that product by carefully getting it to the people who want it. There are not half the people in the States nor in Canada who have sufficient fruit or as much as they would buy if they could get it. The trouble is the distribution of it, the getting it to them in proper form, and at the price at which people can buy it. So I say I have no patience with anyone who will for a moment get cold feet on the over-production of fruit simply because he thinks there is more of it raised than ought to be. Our duty is to get that fruit to these people, because it is something which they want; it is something which will add to their life and vigor and strength; in every way it is a desirable product, something they ought to have; and it is our duty as producers, not only to ourselves as a money proposition, but as a matter of sentiment to see that such proper distribution is carried out.

I am going to treat this subject not as a concrete matter, but in the abstract, trying to apply it to some cases which have come under my own observation and experience, showing how we can get together, and get the producer and the consumer together, first by getting the men who produce the fruit together, and then afterwards the producer and consumer. I have only been a fruit grower for about twenty years. When I entered the occupation it was from a business experience and this soon brought to me the fact that one of the great faults was this lack of distribution, high transportation charges, and poor service, and that there were various other faults that must be remedied before we could expect to receive the wages which were due to the person who produced this fruit. I individually and with friends attempted to correct some of these faults, and we approached the railway companies feeling we might do or say something which would better our condition. At times we were received graciously, and at times we were not; and while we did possibly get a patient hearing, we were assured they could do nothing for us. It seemed to me that possibly, if individuals could not do anything, collectively we could, and as we were living and working in the fruit business, in a community where there was something like one thousand fruit growers, we called them together and asked them if they were satisfied with the conditions that existed at Fennville. It was generally agreed that the conditions were not such as they wished, so we organized a society with the idea that probably with this co-operative plan we could do something. I want you to follow me in this, and to figure out if you cannot adopt some of the methods which we have adopted and improve upon them and so get the benefit of what we have done and even more. I realize that I am talking to people from St. Catharines, where you have the best facilities in Ontario, and some of you are in places where similar work can be undertaken. When we organized I was one of a committee who went again to the railway company, and we asked that we be given a hearing on the matter of transportation. We were paying enormous express charges to the city of Chicago. It cost from 8c. down to 6c. per basket to carry a one-fifth bushel basket of peaches to Chicago,

and we were receiving a very poor service, our fruit was abused, and in case of shortages, a man would almost die of old age before we could get a settlement. We did not kick so much on the price, but we did want better service. We wanted our fruit to be handled better, and we wanted that it should be brought into the market early enough in the morning in order to receive the benefit of the early market. We found when we applied to the express company we could get no relief. We then tried to get to the railway company, and when the railway company was informed that the committee represented 600 of their patrons at Fennville, they listened to us, and tried to meet us. We worked out the problem how we could handle our fruits in the matter of transportation. We asked for a train of our own, a fast freight service which would leave our point at 6 o'clock in the evening, be run through on express time to reach the city of Chicago not later than 4 o'clock in the morning. We asked that we be allowed to load our own cars, and to have a man at the other end who was not only to unload but also to inspect those cars and to check the packages out to the commission houses, because we were doing all our business at that time through the commission merchants. As a result we got a rate of \$52 a car, and we could put in those cars about 2,000 of these one-fifth bushel baskets, and after paying the rate of \$52 a car, paying our loader \$2.50 a car for loading, paying our unloader \$5 a car for unloading, we were able to get the price from 6c. to 8c. down until we were handling it as low as 2c. Our ordinary rate is now 2½c. for the same service, except it is a good deal better. We pay our own shortages out of the profit. We have the fruit handled properly, because it is handled by our own people; we have had it put on the market at an earlier hour than if handled by the express people, and we have actually made a profit on top of that. Now, just think of getting it down from 6c. a basket and a poor service to a point where we handle it for 2½c., and an excellent service, all shortages paid beside, and a profit on top of that.

Now, we had no gravel in the country, so we again waited on the railway with the following explanation: "There is all that country lying equally distant between the lake and your railway, and if you will assist us by giving us some gravel to build a road into our building or to your railway, it will assist in bringing the fruit to you instead of sending it to the dump." They saw the wisdom of that, and answered: "We will deliver to you all the gravel that you will use if you will load and unload it, we will draw it for you, a distance of 38 miles." It cost labor to load it and unload it, and spread it, and cutting down the hills, etc. But what did that mean? We had as a result 8½ miles of a gravel road out of the profits from this extra fruit shipped, after reckoning good profits besides to the grower. It meant an actual dividend to every fruit grower who draws along that road because before we had those gravel roads it was very difficult for a good team over sandy roads to draw in excess of 40 bushels of fruit to the market; to-day it is a common sight to see them drawing from 100 to 110 bushels, the same team, and with less effort because we have cut down the hills. Now, that means that a man who had 100 bushels to deliver to-day would have to send two teams under the old plan and work them hard; under the present plan he can put them all on one load and deliver that amount and save that amount of time and work, which is worth at least \$2; therefore he is receiving \$2 dividend on every load of fruit he is drawing.

What else have we done? The packages at that time were different sizes. We had all kinds of packages, but decided that we must have a common package. The old package cost about 4¾c. apiece, but by adopting a common package, get-

ting all the basket makers to manufacture the one package, we are buying these now for \$24 a thousand, which you will see is about half what we paid before. As a matter of fact the first year we did business one of our largest fruit growers actually saved \$1,200 on his business in baskets alone. And that was not the only man, because as I say there were in the neighborhood of 600 men in the deal.

Now, we decided finally that we would not be satisfied with Chicago as a market, simply dumping our stuff in there on commission. We would rather have something to say as to what this fruit would sell for, than to ship it there and let them do what they like with it. We were not satisfied with the commission business. We wanted the people to come to Fennville and buy the goods there, paying us cash. How did we do it? We advertised our market, we sent out booklets from my office to every fruit and produce dealer anywhere within the range of our fruit, all the way through the northwest. As a result, commencing with early in the season and coming down to the present moment, there are always from ten to twenty buyers right there in our village, and it is very seldom we ship anything to Chicago on commission. I doubt if within the last eight years I have shipped \$200 worth of fruit this way. Occasionally you have to dump a little stuff in there, but as a rule our goods are sold outright, and we know exactly what we are to get for them. By cutting out the middle-man we are reaching a class of people who now buy in car-load lots, where they formerly bought in small lots.

Now, there is another matter, the price of berry packages. I was interested when I heard about the price you are paying, twice as much as we do in the States, yet we are yelling for the privilege of having your timber shipped over there—a ridiculous situation. Here you have the timber, and still paying twice as much as we do. I do not know what is the matter with your local conditions. Our men tried to raise the price this year, and they would have succeeded if it were not for the co-operative board. We had been paying 12½c. as the standard price, and they raised the price to 14c. this year. We asked them why they were raising it; and their answer was, because they felt as though they had to. We did not feel that way; they had the same supply of timber as in previous years. We got in touch with a concern in Wisconsin where they would let us have those same crates at 11¼c. f.o.b. We asked our own people to handle and sell us the same baskets at 12½c., but they thought that we were simply bluffing, and refused. We sent for a car of the crates from Wisconsin, which proved to be much better than the local package. They were made of nice clean white wood, whereas we had been getting beech, elm, and everything else. We brought in quite a number of these crates, with the result that the local men suddenly discovered that they could afford to sell them for 12c. Now, if we had been doing business individually, we would have been paying 14c. this year.

Then we found, in order to sell and distribute our fruit properly, we should have some system of grading, packing and selling, so we adopted the Central Packing House System, practically the same as you have in St. Catharines. We had five Packing Houses at Fennville, for instance, in 1906, run by the buyers, but we practically cut off their supply of fruit and put some of them out of commission for the time being. These houses were run by men who had no particular interest in the fruit themselves.

The Central Packing House leads up to better packing, and that means—and I call attention to this as one of the most important things—to better growing. Our packing houses have had more to do with the raising of the standard of the fruit grown in our community than all the meetings we ever held, and all the talks that were ever given and arguments advanced. Better fruit is grown, better fruit is

packed, and it is packed in such a way that they can stamp their seal of approval on it, and the people know what they are buying when they do buy. You have a model plant at St. Catharines, and a model hand at the head of it; but I tell you that one of the hardest things in the world in connection with these Central Packing Houses is to get a good man at the head of them. A good man is entitled to the wage he earns. There are not very many Robert Thompsons in the States, and I tell you there are not many in this place. The management of a concern of that kind is a business proposition that requires an able man, a business man, and a man who knows his job.

Now, I might say that we have also saved in the matter of spraying materials, having adopted the method of co-operative buying there also. We make contracts for standard articles, articles which we know are good. There are spraying materials on the market which are absolutely worthless, and there are people who are gullible enough to buy those articles. We, however, as an Association, look into the merits of these goods, making contracts for our annual supply, and the result is that we save thousands of dollars to our growers in material such as blue vitriol, paris green or commercial lime sulphur. This buying is done on a strictly cash basis. If a man wants a barrel of blue vitriol, it costs him \$4.25 a 100 lbs., 425 lbs. in the barrel. He must remit to me the actual cash amount before that order is filled. We are selling it to him at actual cost, and cannot take the chance of any loss whatever. We are saving large sums of money and getting the goods which are reliable and are just what the people want.

Now, I have presented here briefly some of the things that we have accomplished, but I realize that we have not yet done all that has to be done. I realize that we have a great many things yet which have to be worked out in future. But for pity's sake, do not get cold feet and talk about over-production. Produce all the good fruit you possibly can. There has been an over-production of poor fruit, but there never was, or never will be, an over-production of good fruit.

UNIFORMITY OF JUDGING SYSTEMS FOR EASTERN CANADA.

BY W. T. MACOUN, HORTICULTURIST, CENTRAL EXPERIMENTAL FARM, OTTAWA.

One has but to attend a number of the fall fairs in Eastern Canada to learn the great need of a more uniform system of judging fruits and the need of educating the exhibitor. At present there are many judges of fruit in Eastern Canada, some better than others, and but few of them having the same ideas on how fruit should be judged, and the value which should be placed on the different characteristics of the fruit. One judge may place too much importance upon size, while another lays too much stress on color and too little on freedom from blemishes, while a third may think little of the uniformity and trueness to type of the specimens, providing they are free from blemishes. All this is very confusing to the exhibitors, and the result is that there has been very little improvement during recent years in the quality of the fruit shown, especially at the smaller exhibitions. In some cases exhibitors have been so disgusted that they stopped exhibiting, while in other cases they change the character of their exhibits each year to meet the views of a particular judge, and if there is a new or unexpected judge, as frequently happens, they lose on the very points which awarded them the prize the previous year. Too often exhibitors blindly take their chance, not knowing, or apparently caring what the judges look for in exhibition fruit.

It seems to me that this could all be changed by having a circular with score cards for plate fruit and for collections and with explanations as to what is meant by "freedom from blemishes," "color," "uniformity," "size," "form," "quality," and "correct nomenclature." This circular could be incorporated with all the prize lists for fruit published in Eastern Canada, so that both the judge and the exhibitor would know what in the judgment of the different Provincial Associations is the relative importance of the different points in fruit. It would not be necessary for the judge to use score cards when judging, but if he had a score card before him he would know how he was expected to judge. If such a plan were generally adopted I feel sure that there would be a rapid improvement in the character of fruit shown at exhibitions and a marked improvement in the general effect. This result is very marked at the large fruit shows in Nova Scotia, where, owing largely to the efforts of Mr. R. W. Starr, Wolfville, N.S., exhibitors have been educated to the point that they must know what kind of fruit a good judge expects to see.

Last winter, when attending the Annual Meeting of the Prince Edward Island, Nova Scotia and New Brunswick Fruit Growers' Associations, I brought up and discussed the question of a more uniform system of judging for Eastern Canada, and what I had to say was very favorably received. A committee was appointed by the Nova Scotia Fruit Growers' Association to take up the subject, with the result that this provisional circular has been prepared.

I trust that the Ontario Fruit Growers' Association will see the great importance of this subject and do its share in forwarding the good work.

SCALE OF POINTS FOR JUDGING FRUIT PROPOSED BY THE FRUIT GROWERS' ASSOCIATION OF NOVA SCOTIA, 1909.

Score Card for Single Plates named.		Score card for collections.	
Points.		Points.	
25	Freedom from blemish.	20	Freedom from blemish.
25	Color.	15	Color.
20	Uniformity.	10	Uniformity.
15	Form.	10	Form.
15	Size.	10	Size.
		10	Commercial value.
		10	Quality.
		10	Nomenclature.
		5	Arrangement.
<hr/>		<hr/>	
100		100	

EXPLANATION OF TERMS.

Freedom from Blemish. Any injury by insects fungus, bruises, loss of stem or other cause, lessening the value or appearance of the exhibit, may be called a blemish.

Color. Bright, clear, well-developed color, characteristic of the variety preferred.

Form. Represents the perfect or normal type of the variety.

Uniformity. Specimens should be as nearly alike in size, form and color as possible.

Size. Indicates care and skill in production, and usually, other points being equal, size wins.

Commercial Value. Standard, known market varieties as grown in and suited to the district, preferred.

Quality. To be considered in collections, seedlings, new varieties on trial, or other sorts in competition.

Nomenclature. Exhibits must be correctly named according to the nomenclature adopted by the Society, Association or Exhibition at which they are shown.

Arrangement. Taste and skill in staging, so as to attract attention and add to the general appearance of the exhibit.

SPRAYING TEN ACRES OF APPLES—COST, EQUIPMENT AND RESULTS.

BY MAX SMITH, BURLINGTON.

I figure that an orchard of ten acres would probably contain on an average of 400 trees. I figure on the labor of three men to operate a power outfit, two men to handle the spraying rods—one on the tank, one on the ground, and one to drive the horses: I figure two men at \$1.50 per day, \$3.00, and a team and man at \$4.50—that may be a little high, but that is what we have to pay in our country—making a total cost of \$7.50 a day for help. Now the capacity of a power outfit should be about 1,500 gallons. Some days we would run more than that and some days less. That would give us a cost per gallon of one-half a cent.

Now, regarding the material, I wish to give you the results of the material I use. For my first spraying, I use the commercial lime and sulphur for scale or aphid or fungus. I use it at the strength of 1 to 11, and try to use it just before the buds are opening. As to the average price of commercial lime and sulphur, I figure it at \$10 a barrel of 40 gallons, and one barrel diluted at 1 to 11 would make 480 gallons of spraying mixture, which would make a cost of 2.08 cents per spraying gallon. Now, at a cost of labor of .5 and cost of material at 2.08 would make a total cost of 2.58 cents per gallon. I figure on an ordinary sized tree 5 gallons to a tree—some trees will take a little less and some a little more—but I believe by judgment and care 5 gallons can be made to do the work. Now, at 5 gallons at tree, and 2.58 cents per gallon would make it cost 12.9 cents per tree for the first spraying. For the second spraying, for codling moth principally, and fungus, which I give just as the blossoms have fallen, I use commercial lime and sulphur at the same cost per barrel, but dilute it at 1 to 30 and that would make 1,240 gallons or a cost per gallon of .83 cents. I add with that arsenate of lead, which I figure at an average price of 14 cents a lb. in small packages; it would probably cost less in larger packages. I figure 2 lbs. of arsenate of lead to 40 gallons of water, or 5 lbs. to 100 gallons, making the arsenate of lead cost .7 cents per gallon. The labor will cost you just the same for your second and third sprayings, the lime and sulphur would cost .83 cents and the arsenate of lead .7 cents, making a total of 2.03 cents per gallon spraying mixture. At 5 gallons per tree that will make the second spraying cost 10.15 cents per tree. Now as to the third spraying which, in my opinion, should follow ten days to two weeks after the first, would take the same material and the same labor and the same cost, so for third spraying it would cost 2.03 per gallon, and at 5 gallons to a tree it would cost 10.15 cents per tree. Now, the first spraying at 12.9, and the second and third sprayings at 10.15, make a total of 33.2 cents per tree, for three thorough sprayings. Therefore, 400 trees would cost at that rate \$132.80; at 4 gallons per tree it would reduce the cost one-fifth, making a cost of 26.56 cents per tree, or a total cost for 400 trees of \$106.24. If you eliminate the third spraying, which is not necessary in all seasons, and I have seen excellent results with two sprayings, and taking 5 gallons to a tree, it would cost 23.05 cents per tree, or \$92.20 for two thorough sprayings; or for two sprayings at 4 gallons to a tree, would cost \$18.44 cents per tree or \$73.76 for the 400 trees in a ten-acre orchard.

In regard to power, I use a 150 gallon tank and a gasoline engine. I prefer a 150 gallon tank to a 200 gallon tank. In one of the orchards it is very hilly and I find no trouble in getting around with a 150 gallon tank. I do not believe in horse power for spraying big trees. I do not think it is practicable. You can only

generate power when your wheels are in motion; I prefer gasoline engines to hand outfits for several reasons. I think first that they are far cheaper to operate. You can operate a gasoline engine for 10 to 15 cents a day for gasoline and you can get a higher and more even pressure.

Q.—What pressure do you use?

A.—I prefer a pressure of over 150 pounds. I have experimented this past season on different pressures, and I found that I got much better results from a pressure of 150 to 200 lbs.—an average of 175 lbs. As I say, high pressure is more economical in spraying. You can get where you want to more quickly, and you do not waste so much material. I think that high pressure is very essential for the second spraying, after the blossoms have come out. You cannot drive the spraying material into the calyx end of the blossom with 60 or 70 lbs. of pressure. I find it can be done better with a 150 or 200 lbs. or an average of 175, and high pressure for blossom spraying in my opinion is very important, and much better results can be attained with high pressure at that time than any other time.

Now, as to the matter of a pump. I would want to buy a pump that would give me that pressure. Some pumps will not; the capacity is not sufficient. You want a pump that will give you sufficient pressure and one that will give you sufficient capacity for the kind of nozzles which you propose to use. I would want a pump that would carry at least four large nozzles, two for each line of hose. I have in my work discarded the small nozzles altogether. I use a nozzle of the Friend type, of which there are a dozen different makes, and I find that I have less trouble and better results.

I think the question of hose is one of the most important. It is absolutely necessary that you get good hose. More time and money can be lost with poor hose than with any other part of the outfit; that part generally breaks down first. I would always buy a good hose fitted with large plugs and clamps. A good many of the hose plugs that are sold have only one. Have them made with long shanks so that you can put two clamps on them. I have quite a lot of trouble with those single clamp hose plugs. I used on one outfit this year four different lots of hose before I got a good hose. I would sooner pay 50 cents a foot for good hose than pay 5 cents a foot for cheap hose, as I would save it in loss of time. I think it pays nearly every time to buy the best you can. I recommend gasoline engines for another reason. They are always useful to a man on the farm. They can be easily attached to other things, generally by undoing three or four bolts, and they can do lots of little things on a farm. When I was through with my spraying I took it to my home and attached it to a little pump which I have there and it is now supplying water to three families. They do not need much looking after by any one who has any head and who can follow the instructions given and avoid trouble. I believe in thoroughness, as I think that is one of the most important features. There is an old saying that if you spare the rod you will spoil the child; I think that if you spare the material you will spoil the fruit every time. I believe in spraying the whole tree right from the root up. It does not pay to be stingy with spraying material at all.

As I have said, I have sprayed this year about 100 acres of fruit, practically covering all kinds but peaches. We do not grow any peaches in our section. I sprayed apples, plums, pears, cherries, grapes, red currants, and gooseberries, and I have had very gratifying results in all cases. I used just the same material on the grapes as I did on the others. I might instance the red currants. We have about five acres of red currants, and we generally figure to get from \$600 to \$1,000 for them. This year I sprayed them very thoroughly, at the same strength,

and about the same time as I sprayed my apples for the first and second spraying. We had in our district this year a very large crop of currants and a bulk of those currants in that district were harvested at 4 to 5 cents a quart. With my spraying this year I noticed that I had a very heavy foliage, the heaviest foliage I ever saw on red currants. So I decided that while other people were picking their currants I would leave mine, and did not pick a currant until I think every currant in the district had been picked and shipped. Then I started picking my red currants, and never got less than 10 cents for a single quart, and I never had a blistered currant in the whole of the 600 and some odd crates. I could instance that of the thousands of baskets of cherries in our district only those cherries which were thoroughly sprayed were worth buying at all. I know of different growers there who grew from two to three thousand baskets, and it was almost impossible to find a bad cherry in the whole pack. There were some men who did not spray their cherries and the following morning after they were picked they were rotten. I buy large quantities of cherries and I know that from experience, because I have had some of them refused where they had been shipped out, and I have kept them in my own office for my own investigation. I spray the cherries just before the buds swell, and then spray with a second spraying just after the small cherry forms. I just spray twice for cherries.

Now I do not want to take up your time, but I might just instance one particular orchard of forty acres which had never been sprayed nor pruned nor plowed nor fertilized in twenty years, so you can all figure about the shape that orchard was in. I got possession of that in March, and I sent about six men there to prune it, and I put on 10 lbs. of strong commercial fertilizer around each tree; and I sprayed it very thoroughly according to the directions I have given you, and with the materials of which I have told you. I plowed that orchard and tried to keep it cultivated all season, and I harvested over 2,000 barrels of beautiful apples. I have known that orchard for the last 20 years, and for the last ten years particularly, and the apples in that orchard have been perfect rubbish; in fact a year ago I refused the orchard for the picking of it. I controlled the fungus, and failed to find any fungus of any description in the orchard. I controlled the codling moth to the extent of about 80 per cent., which I thought was very good under the circumstances.

I was going to say that I have been an apple buyer for a good many years, and I have come to the conclusion that there is more money growing apples than there is in buying them or handling them in any other way; it is surer money, it is easier made money, and you eliminate a lot of work and worry. You will never hear of an exclusive apple grower going broke, but you will hear of many an apple buyer going broke. I would ask for no nicer inheritance than 100 acres of good apples. I like apple growing, and I would just as soon grow apples as anything I know of, as I think there is more money in them than there is in any other branch of horticulture or farming.

I will just say that I think a farmer who neglects to take care of his orchard is penny wise and pound foolish. I do not think any part of his farm will pay him one quarter as well as his apple orchard will pay him. There is a great future for apples in this country; the North-west has developed into a great market, and in a very short time they will take all the apples we can give them. They want good apples, and they are willing to pay high prices for them. I myself could have sold thousands of bushels more apples than I did if I could have procured them and would have gotten very good prices for them.

Q.—What do you call good prices ?

A.—I call \$1.50 a moderately good price. I have paid \$1.75 to \$1.85.

Q.—When you paid that you had a profit ?

A.—Yes. I would pay \$2 for 10,000 barrels of good apples, and could sell them at a profit.

In conclusion, I would like to draw one or two comparisons of what 33 cents a tree means. It might appear to some a big item of expense to spend 33 cents a tree. A bushel of culls is worth 15 cents and a bushel of good apples is worth 50 cents ; therefore the difference between a bushel of culls and good apples is 30 cents in the present market. Now, on an average a tree should produce 10 bushels, which is not a big average—some would produce 20 and some 5—and if you convert one bushel of culls at 15 cents into one bushel of good apples at 50 cents you are making 35 cents. If you have a tree of apples bearing 10 bushels and do not spray them, you will have half culls, and if you convert that 5 bushels into good apples, you will make \$1.75 profit on that one tree, or on 400 trees a net profit of \$700. That is not the profit on your orchard, but that is over and above what you would get if you did not spray. Take the cost of your spraying off that, and it means a net profit of \$567. Besides all that you will do a tree a lot of good, you will strengthen it, and stimulate it and produce a better crop another year, and you would also help your neighbors by getting rid of a lot of pests.

THE APPLE ORCHARDS OF THE LAKE HURON SHORE.

BY S. E. TODD, GUELPH.

During the past summer, in company with Mr. T. B. Faulds, also of Guelph, I was employed by the Fruit Branch of the Ontario Department of Agriculture and by the College Department of Horticulture to do orchard survey work in what is known as the Lake Huron District. I have here a chart showing something of the geographical position of the territory, comparing it with other sections. The 43rd parallel of latitude runs a little north of Sarnia, but just south of Forest. To show you the position of the other fruit belts of the Province, St. Catharines comes through about five or six miles north of Forest. A line from Hamilton would run through Grand Bend, a little post-office at the extreme north end of Lambton County. You see, therefore, that Lambton County, geographically is south of the great peach district. Up here in the centre of this great apple district, we have the line passing through within about 12 miles of Galt, and a little further north we have the 44th parallel of latitude ; then about 6 miles south of Kincardine you have the Blyth line. Now, a few miles east of Blyth, east north-east, is about the limit, I understand, of the Baldwin and King for commercial purposes. But we found the Baldwin and King growing north of this point.

The counties we covered were portions of Lambton, Middlesex, Huron and Bruce, working in about 15 to 18 miles from the lake shore. I do not mean to say by any means that that was the limit of the apple-growing section eastward, but that was the limit we were told to work on. This district is, I may say, practically unexplored as a fruit-growing region. Such men as Mr. Johnston and Mr. Sherrington have exploited certain portions, but to a very great extent it is as yet untouched. There is a lot of fruit in the country, and some few sections as

stated are being farmed very well indeed. But the facts as they stand at the present time give no indication of the possibilities of the industry.

On this chart we have marked out temperature lines. You will remember that yesterday there was considerable discussion about what temperatures obtained in Lambton County. These temperatures were not got from Government reports, because there are none available for that section, but they were secured from the people, and are only approximate. We tried to secure as nearly as possible the maximum winter temperatures of the average winter, not the extreme of an extreme winter, but rather the extremes of an ordinary winter. There is a little section in the south which may extend down to Sarnia where the thermometer goes down in winter to about zero, just along by the lake shore. This is right in Mr. Johnston's own section. In Huron County, at Drysdale, a little north, it goes down to about 10 degrees below zero, and you will notice how that line follows the lake shore for a piece and then gradually extends inward. Then at Bayfield, in Huron County, going down towards the shore and running up to Goderich it goes down to somewhere about 16 degrees below zero. You will see how it leaves the shore and gets further inland as you get up around Kincardine, where they tell me it goes down to about 20 degrees below and that the line then recedes inland. The reason that it recedes inland there to a certain extent, is because of the difference in elevation which is continually rising. At Forest it is about 600 feet above the sea level. Lake Huron is about 581 feet but it rises rapidly as you go north to 800 feet, then 900 feet, and finally to 1,000 feet. You will note by the map how the country is rising as it leaves the lake shore and rising very rapidly.

In the northern section of Lambton county there is a considerable controversy, as you know, going on at the present time as to whether this will ever be a great peach section. From what we have observed we can say there is no reason whatever why this part of the country should not be producing the very finest of peaches, and, in fact, nearly everything else that can be grown in a tender fruit section. There are peach orchards there of twelve, fourteen, fifteen years of age that have come through the great frost of 1904 without any bad results. Of course the nearer the lake shore the better the orchards. Now this gravelly ridge that runs through here is important in this regard, in that it is four or five miles from the shore, leaving a big section right close to the shore that has soil quite suitable to peaches. There is a man up at Drysdale who has planted a small peach orchard for experimental purposes. At Goderich I found a ten-year-old peach orchard with about 500 trees that were bearing well this year.

THE PRESIDENT: How frequently had they borne?

MR. TODD: These trees had been utterly neglected for a great many years. The owner said that they had borne about every second or third year, and he told me that what is being done there gives no idea of the possibilities, because the orchard had not been properly handled.

Now, coming more directly to the subject of the orchards, the first thing, of course, is the question of the nursery stock that is used in that section. In regard to the apple stock, it seems to have been fairly good, but what astonished us was the numerous complaints of the substitution of varieties by nurserymen—order one thing and get another. In peach stock these men have been ordering what they thought was very fine stock, four to five feet high. Nowadays you want stock three to four feet high, but these people have been paying a high price, because they

thought they were getting an extra good article. Realizing now that they have been fooled, they are a little bit sore on the subject. Of course that can be all cured by proper handling.

As to the quantity of land suitable for apple culture in that section, it is only limited, in fact, to the extent to which drainage can be practised. The whole country, with one small section, can be made one great orchard as far as that is concerned, but the question of drainage is very important. Some of the most profitable orchards I have seen were on this land, which was properly drained. One man said he had an orchard of four acres which had been drained but never cared for. He started to look after that orchard about five years ago, and had at that time a \$2,000 mortgage on his farm, and in the next four years the orchard paid off the mortgage and left his farm clear of all debt. This mortgage had been running for twenty or twenty-five years.

In Lambton county there is a large number of trees in and around Wyoming, and containing some very fine orchards. The best I have seen this year is the one of Mr. E. V. Morningstar's. He is a great cultivator, sprayer and fertilizer, and he certainly gets results.

In Middlesex there is a section that is planted largely, but is utterly neglected. Perhaps the most extensive planting there is in Huron in one spot is right in between Goderich and Bayfield, a district of about ten miles long and four miles wide, containing about 500 acres of orchard. As you go up towards Blyth there is quite a section in there again that has big plantations. Nearly all the big orchards, excepting around Forest, are east of this gravelly ridge I mentioned. The reason is that they have not had sufficient drainage in other sections excepting around Forest to get good results from apple culture. Wherever they have practiced drainage, however, they are getting good returns.

It is a strange thing the number of insects that you will find in an old orchard that has been uncared for. We would go into a man's orchard who had been years ago getting good crops, and to-day was getting nothing. We would ask him what was the matter with his orchard; he would say that he guessed the orchard had got too old, (35 or 40 years), and it was of no use. On examination we have found as many as twenty cigar-case bearers on one leaf, and along with that there would be everything else that you could name in the shape of insects. The owner would see caterpillars, but because these were small insects he was unable to locate them by just walking through the orchard, and so had no idea what was the matter with the trees. These insects were sapping the life out of his orchard. Quite a number of men who are spraying find they are still troubled with these small pests because they are not spraying at the right time. I find that there is a great deal of educational work that needs to be done as to the time to spray, the history of the insect, etc.

Oyster-shell bark louse is not common in the southern end of the district. In Lambton county, for instance, there was not much bark louse, but as you went further north the insect was more noticeable. I have seen some splendid results this summer with the application of lime sulphur to orchards that were badly infested with insects, but they were so bad that they were not entirely cleaned out with the one application.

In that section this summer they told me the codling moth was not so bad as it has been, but in Middlesex county we found that about 80 per cent. were affected. In Mr. Morningstar's orchard at Arkona, and Mr. Johnson's orchard at Forest, you would find trees on which it was difficult to find apples that were affected at all by

the moth. These orchards, of course, had been thoroughly sprayed. Mr. Morningstar's manner of treatment is to spray with lime sulphur first before the buds open, and spray them with Bordeaux just before bloom, and again after bloom. That was all he sprayed, but he certainly sprayed thoroughly and used an excess of lime.

Aphis in that section this summer were extremely bad. The question as to whether lime sulphur will control aphis when applied in the winter time was one that was not determined, but we got some information upon it. We found one man in particular who had sprayed part of his orchard with lime sulphur, but it got so late that he did not spray the rest of his orchard. That part which was sprayed was much freer of aphis than that which was not.

In Lambton county winter injury is practically unknown. Once in a while you will find a tree that is very high headed, an open top tree that is affected by sunscald. I found two orchards alongside of one another, the first with high-headed trees, and the other with low-headed trees. The high-headed trees were all sunscalded, while 95 per cent. of the low-headed trees were not affected at all. All the way up sunscald is practically unknown, except in places where the trees are headed very high and the tops kept wide open. There you will get sunscald on all the trunks and on the big limbs. Just east of Goderich there is a section of country very much exposed to the lake which is affected. Wherever there was a tree that was in any way high headed or inclined to be open, you would get sunscald.

As you go further north there seems to be very little winter injury. In certain localities we found some apple canker. There was none of it that seemed to be very serious anywhere, not at all like what they had down in Prince Edward county or down along the Lake Ontario shore. We found in and around Forest some apple canker, but in orchards that were being thoroughly sprayed by the owners they did not know what the canker was. I was talking to a buyer, who mentioned the fact that this section north of Goderich is being affected by the San Jose scale. I do not know how that report spread, as I saw absolutely no sign of it, and the report is unfair to that section.

Twig blight in the whole section was very bad this year. I saw one most remarkable instance of the effect of insects in carrying the disease. In Mr. Johnson's orchard there was a pear tree badly affected by twig blight. There were four Holland Pippin trees around, one side of which had bloomed in the spring and the other did not. The side of the trees that had bloomed was a complete brown mass as a result of the twig blight. The opposite side of the trees, where there had been no bloom at all, was entirely free. I should think that this was conclusive evidence that the blossoms are one of the very worst means of carrying disease, and that one tree in an orchard affected by blight at blooming time is sufficient to affect the whole orchard. In the varieties of trees that were affected by twig blight we found the Holland Pippin, Tolman and Greening about the most affected. I think that some men in other districts have found it different. We did not consider the St Lawrence bad at all, nor did we find the Alexander very bad, as we took particular note of the trees as we went through.

Now the effect of the aphis in carrying twig blight is, I think, quite marked on the water sprouts of the trees, and with the aphis, late in the summer you would find twig blight when you would not find it in other places. The aphis congregated on these sprouts.

With reference to spraying, there was a lot of poor work done in different

sections. The men did not know, or did not take sufficient trouble to spray properly. I think a great deal of educational work should be done in bringing people to a knowledge of how to spray and what to spray for to get the best results. Men have said to me that they feel spraying is all right, but that they do not know how or when to spray.

In conclusion, I think the opportunities in this part of the country are as good as in other places in the Province, if not better. You have here a great section of country which is very favored in regard to its position climatically. You have all kinds of land—gravel and clay loam and a deep loam soil. You have the kind of land that is wanted to grow the different kinds of fruit. The climate is probably equal here to the best that there is in the Province, and it is only a question of time until this country must become one of the finest fruit sections in the Province of Ontario.

LIME-SULPHUR *Vs.* BORDEAUX FOR SUMMER SPRAYING OF APPLE AND PEAR ORCHARDS.

BY L. CAESAR, O.A.C., GUELPH.

Before proceeding to the discussion of the value of lime-sulphur as a summer spray for apple and pear orchards, let us first briefly call to mind the main fungus diseases of these orchards that require a summer treatment. In apple orchards the main one is clearly Apple Scab or Black Spot, as it is sometimes called. Less important diseases are the Leaf Spot and Baldwin Spot. Black Rot Canker is a very serious disease attacking the trunk and branches, but its main treatment must be before the buds burst; yet as the summer treatment is also important, we shall include it in our list. In pear orchards we shall only deal with Pear Scab, omitting the different kinds of leaf spot, because these are not often serious and lime-sulphur has not been tested on them. Pear Blight, Twig Blight or Fire Blight, which are all the same disease, is not caused by a fungus, and apparently cannot be controlled to any appreciable extent by spraying, so it is omitted.

In spraying for any of the above-mentioned diseases it is clear that no mixture can be given a fair chance unless it is applied at the right time and in a thorough manner. Hence a word or two about these points.

To prevent most fungus diseases the spray mixture must be applied before the disease gets any chance to make headway; in short, it should be applied early enough to prevent the spores getting a chance to germinate. Hence the date of the first application is usually of special importance. For Apple Scab the first spraying should be shortly before the blossoms open. If left until the blossoms fall the disease gets a great start; for the first signs of it are on the leaves about the time of the opening of the first blossoms. The second spraying should be just after most of the blossoms have fallen, which is the time to spray for codling worms; the third either two or three weeks later. Of these three applications, the first and second are by far the most important and should never be omitted.

Leaf-spot and Canker are controlled by the same sprayings as the Scab, except that Canker requires a special spring application in addition to these. It should be noted that Leaf-spot is usually caused by the same fungus as causes the Canker, namely, the Black Rot.

Baldwin Spot appears much later in the season, and so requires separate treatment. The first spraying for it should be about July 1st, and the second about two weeks later. It is seldom, however, that it is so severe in Ontario as to make spraying necessary.

Pear Scab begins earlier than Apple Scab, and so requires that the first spraying should be made just as the buds are ready to burst. The second application should be just before the blossoms open, the third at once after the blossoms have fallen, and the fourth about three weeks later. The early first application seems to be necessary for even fair results.

We all know, however, that it is not only necessary to spray at the right dates, but also to do it thoroughly. Most of us who have done much spraying know that it is very seldom that a really thorough job is done. The trees are often only half sprayed. Perhaps this is, in a number of cases, due to the old motto to "Stop spraying just before the leaves begin to drip." This is not a safe motto, and our first rule should be: "*Make sure that every leaf and fruit is thoroughly covered*"; and second, "*Try to do this with as little waste as possible.*" One cannot emphasize this thoroughness too much. No man deserves real good results without it, nor indeed is he likely to get them.

Now let us pass to the mixture and the results. Bordeaux has for so long been the standard fungicide for all the above-named diseases of the orchard that it sounds almost startling to us at first to hear that it has a close rival in lime-sulphur. This wash, either in the commercial or self-boiled form, has been considerably experimented with in apple orchards as a summer wash, especially the last two years. The results given are sufficiently good to show that it has much merit as a fungicide for apple diseases. They do not, however, show that it is a better fungicide than Bordeaux, so that those who "Swear by Bordeaux" may still continue to do so.

Taking up first the results upon Apple Scab: Prof. Scott, of Washington, D.C., and Dr. Brooks, of New Hampshire Experiment Station, have each made a good many careful tests of both the self-boiled and commercial lime-sulphur upon this disease. Each report the commercial wash as giving almost as good results as Bordeaux. The self-boiled in last year's experiments did not give quite so good results, although it showed a fair degree of merit. It was, however, made with cold water instead of hot, which would almost certainly have given better results. I have not seen the reports of this year's work, but from Dr. Waite's remarks at the American Pomological Society, recently held at St. Catharines, I infer that Prof. Scott has been much pleased with the way the self-boiled mixture has also controlled the Scab.

In experiments conducted by myself at Guelph this summer I sprayed eight fairly large Snow apple trees with the Vanco brand of commercial lime-sulphur. The west side received the three applications at the times mentioned above; the east side, owing to my enforced absence, had to go without the middle spraying. For the first application a strength of 1 to 25 was used. This burned the leaves slightly, so 1 to 40 was used for the other sprayings, and no injury resulted. The spraying was very thoroughly done. In September the fruit was examined, and on the west side, where three sprayings were given, less than 1 per cent. of it was scabby; on the east, where the important spraying just after the blossoms fell had to be omitted, nearly 15 per cent. of the apples were scabby. The fruit, moreover, was free from russetting, and the surface smooth and glossy. Similar results have been reported to me by correspondents lately, so that there is practically no doubt that lime-sulphur, especially commercial lime-sulphur, can control Apple Scab in a very satisfactory way—in fact, just about as well as Bordeaux.

One point, however, has scarcely been recently well tested yet, viz., whether as good results can be secured in wet seasons. The last two summers have been dry and have given the wash a good chance. It is almost certain that a soluble substance like commercial lime-sulphur would wash off more rapidly than Bordeaux. If so, its efficiency would be lessened unless an extra application was made.

On Pear Scab I have not got definite data from any experiments except my own. In the College orchard at Guelph there are six or seven Flemish Beauty trees near each other in three rows. Two trees in the middle row were chosen. The fruit and leaves of these were both very scabby last year. They were sprayed this summer at the proper dates mentioned above with Vanco lime-sulphur. The first application was of the strength 1 to 9, the second 1 to 25, but as this burned the foliage considerably the other two were each made 1 to 50. In September, when picked, the pears were absolutely free from scab, as were also the leaves. All the surrounding trees, which had received three applications of Bordeaux, had considerable scab on both the fruit and leaves. Probably, if they had got the first application (the one omitted) they would also have been quite clean. However, the experiment showed clearly that commercial lime-sulphur would control Pear Scab even on Flemish Beauty trees.

As for Leaf-spot, Dr. Brooks has been making a close study of the cause and remedy for this disease. He finds that the regular sprayings with either Bordeaux or lime-sulphur will control it quite satisfactorily. This is valuable information, because Prof. Scott and Dr. Brooks have both demonstrated that the disease which causes most of these small round spots on the leaves is also the cause of the Black Rot Canker, and so a wash that will control it in one form will also control it in any other. The Leaf-spot seldom does much damage to the leaves, but its prevalence will help to spread the cankers, which are very serious and require special care. Therefore its control is of importance.

There is not time here to discuss the proper method of treatment for cankers, but, as said above, the first spraying must be in the spring before the buds burst, as the spores spread very early and must not get a chance to germinate. Lime-sulphur of the regular home-boiled type has been well tested this year for the spring application, and those who have used it think it vastly superior as a spring treatment to Bordeaux. The summer applications, as said above, should be the same as for Apple Scab, and either Bordeaux or lime-sulphur, preferably the commercial form, may be used. As the cankers occur on the trunks and branches, these will require to be very carefully sprayed in districts where cankers abound. Badly infested orchards treated in this way this year show no new infections and a great improvement in the health of the trees.

Tests made by Brooks showed that Baldwin Spot could also be controlled by these forms of lime-sulphur or by Bordeaux if applied at the proper dates mentioned above.

We have now seen that there is very little or no doubt that lime-sulphur, either of the commercial or of the self-boiled type (hot water being used in making the latter), but preferably commercial, will control the ordinary diseases of the orchard almost as well as Bordeaux, the difference being very slight, if any. But there are still several very important points to take into consideration, and the first of these is whether we can use an arsenical with the lime-sulphur to kill biting insects, such as the Codling Worm. If not, there are very few fruit-growers who will have time to make the extra applications necessary. We all know that with Bordeaux we can use arsenate of lead, or Paris green, or arsenite of lime, and not fear that any evil

effects will result from the combination. With the self-boiled lime-sulphur, where there is a great abundance of lime, there is no doubt that any of the above poisons may be used with safety. I have myself used all three, and seen not the slightest sign of injury, although I purposely drenched the foliage and used the poisons stronger than required. With the commercial lime-sulphur arsenate of lead has been tested many times and very little injury has in most cases followed, so that this poison may be used. Paris green, on the other hand, has caused considerable burning in a number of cases, although not in all, and its use therefore cannot be recommended. Arsenite of lime was thought to be the safest form of poison for use with the lime sulphur, but recent investigations show that it is apt to injure the foliage. Arsenate of lead, then, is the only form of arsenical poison which can be recommended for this purpose.

There is still one more point to take into consideration, namely, the comparative cost of the lime-sulphur mixture and of Bordeaux.

If the materials used are bought in large quantities they can be obtained at the following prices:

- Sulphur \$1.50 per cwt., or 1½ cents per lb.
- Lime 25 cents per bushel of about 60 lbs.
- Bluestone (copper sulphate) . . 5 cents per lb.

At these figures one barrel of the self-boiled lime-sulphur of the strength of 10 lbs. lime and 10 lbs. sulphur to 40 gallons of water will cost: Lime, 5 cents; sulphur, 15 cents; about 2 cents for the fuel used to boil the water required for slaking the lime; total, 22 cents.

One barrel of Bordeaux, 4-4-40 formula, will cost: Lime, 2 cents; bluestone, 20 cents; total 22 cents. The Vanco brand of commercial lime-sulphur costs \$8 a barrel or about 20 cents per gallon. If we use it at the strength of 1 gallon to 30 gallons of water, which is probably as strong as the foliage will stand, it will cost approximately 27 cents per barrel of diluted spray.

From these figures we see that the difference in cost is very little, the commercial wash being 5 cents a barrel dearer, but requiring much less labor to prepare it.

One other point should be mentioned before closing. The lime-sulphur washes have considerable value, much more than Bordeaux, as insecticides in destroying the newly-hatched San José or oyster-shell scales. A thorough application of the commercial wash last summer just after the oyster-shell scale eggs had hatched killed a very large percentage of them, and therefore added to the merits of the wash.

Now, in conclusion, the question comes up: Which are we to use for a summer spray, lime-sulphur or Bordeaux? Each man will have to answer this question for himself now that he has heard the "pros and cons." If his orchard is infested with San José scale, or if he has not got the oyster-shell scale under control, I should advise him to use the lime-sulphur wash, preferably the commercial form; if these insects have not to be combated he might experiment with this wash on a few rows, but should not be in a hurry to give up Bordeaux, as the latter is, on the whole, slightly the better fungicide.

THE COLD STORAGE OF APPLES AND OTHER FRUITS.

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER, OTTAWA.

A good deal has been said in recent years about the possibilities of cold storage as an aid to the fruit-growing industry in Canada, and interest in the subject is growing rapidly.

As the subject is a comparatively new one, on which it is not yet possible to bring very much authoritative data to bear, it is not surprising that there should be some difference of opinion concerning it, and that superficial and sometimes erroneous views should be put forward by perfectly honest and well-meaning persons. Your humble servant does not expect to say the last word on the subject on the present occasion, or on any other occasion for that matter, but it is possible that exceptional opportunities for studying the whole question of cold storage in relation to the preservation and handling of food products may have enabled me to acquire some information which I hope will be useful to the members of this Association. Anyone who has followed the matter closely must be convinced that there is a fine opportunity to improve the fruit trade of Ontario by the intelligent employment of cold storage and refrigeration in transit. I could quote many instances where the value of apples stored or shipped in cold storage, has been greatly enhanced. As an instance, a sales catalogue from Glasgow of recent date, shows that cold storage Kings SS. "Pretorian," fetched thirty-one shillings, while the highest paid that day for the same variety shipped as ordinary cargo in the same steamer was twenty-four shillings and six pence. Other varieties show similar differences: Wealthies in cold storage sold for twenty-four shillings, as compared with fourteen shillings and six pence for those carried as ordinary cargo, and so on.

I quote these figures merely to indicate the possibilities of shipping early apples in cold storage and not as an attempt to prove that such results could always be obtained.

As fruit growers, rather than shippers, you are more interested in cold storage on land, and I shall confine myself to that phase of the question, and get as near to the orchard as possible, for that is where cold storage will be the most effective.

There are, however, some things which cold storage will not do, and it is just as well that we should have at the beginning, a clear understanding of its limitations as well as of its possibilities. Reference has frequently been made to the large quantities of apples which are wasted every year in Ontario orchards, especially when there is a heavy crop, and it has been urged that if cold storage was available, all this enormous loss would be avoided. I need hardly say to experienced fruit growers, that such an assumption is an absolute fallacy; that it is not cold storage which is needed primarily, but better orchard methods and management. The fruit grower who depends on cold storage to preserve windfalls, worm-eaten, bruised and skin-punctured apples from early decay, will be grievously disappointed.

The lowest temperature which it is possible to employ does not absolutely stop either the life processes of the apple or all of those destructive changes which include various forms of rot, etc. It only checks them, but some forms of decay are checked more effectively than others. Experiments at Geneva showed that Pink Rot, Black Rot and Bitter Rot developed very little in cold storage, but that

the ordinary Soft Rot, which is due to the growth of the common blue mould (*Penicillium glaucum*) and which is probably the most common form of apple decay, is not prevented to any marked extent. Fortunately, the apple resists the attacks of this mould, unless there has been some puncture or weakening of the skin due to fungus or bruising, until it begins to deteriorate with old age. The injury need only be of the slightest character—a mere pin prick, for instance—to provide an open door for the entrance of the spores of the destroying mould.

If you place over-mature or ripe apples in cold storage, they are bound to go down in a short time. Let me here digress to make myself clear on the two terms, "maturity" and "ripeness." I would call an apple mature when it is fully grown and well colored for the variety, and call it ripe when it reaches its best condition for eating. The length of time which elapses between maturity and ripeness varies greatly according to variety. In some earlier or quick ripening varieties, it is only a matter of days, while in others it becomes a question of weeks and even months.

The foregoing is probably more of a practical definition than a scientific one, for I suppose nature intended all apples to ripen fully on the trees, but man with his perverseness, has shifted things around that he is growing many varieties in latitudes and climates where they cannot possibly do so. I do not say there is anything wrong in that. We call such apples mature when they reach the stage in which we are accustomed to find them as taken from the tree.

EARLY VARIETIES SHOULD NOT BE HELD. The earliest varieties should be rushed to the market as quickly as possible to take advantage of the early trade. Prompt chilling before shipment is all that cold storage should be expected to do for apples of this class. Even with varieties whose qualities would commend them in competition with others past their regular season, some caution is necessary, because if an apple is carried much past the time when experience has taught every one that it has reached its best and may be expected to "go down," dealers would hesitate before handling it.

KEEPING QUALITY OF VARIETIES OF APPLES IN COLD STORAGE. It is not an easy matter to determine experimentally as to the relative keeping quality of different varieties of apples in cold storage, because of the difficulty of securing the different varieties at exactly the same stage of maturity, and unless that is done, any test is unreliable and the results are misleading. Generally speaking, those varieties which ripen most slowly will keep the longest.

Some varieties hold their quality much better than others. That is to say, certain varieties retain their crisp, juicy texture and characteristic flavor almost to the end, while others become mealy and insipid long before the structure of the apple breaks down. Of course, they act the same way in any kind of storage. This, it seems to me, is a rather important consideration.

LENGTH OF TIME APPLES MAY BE KEPT IN COLD STORAGE. It is safe to say that any variety of apples may be kept as long as it is commercially desirable to do so. Late winter apples may be kept a year without difficulty; fall and early winter varieties, from two to four months. Canadian Fameuse of the previous season's growth were shown in good condition at the Dublin Exhibition in the month of August. Of course, only a percentage of those originally stored were sound at that time, and the circumstance does not prove that it would pay to keep the Fameuse to that date.

COLD STORAGE OF APPLES MAY BE OVERDONE. The cold storage of apples might easily be overdone. It would be quite practicable, for instance, to pre-

serve any of the early fall apples if placed in storage at the proper time, for several weeks or even months, but it would not be good business to do so, because the trade would be shy of such varieties out of season. It would be unbusinesslike to attempt to carry inferior varieties into the season for better ones.

SEASON MAY BE EXTENDED. By degrees, however, the season for superior varieties might be considerably extended. The Rhode Island Greening is a good type of this class. The season for the Greening has been extended for six weeks or two months in the United States by means of cold storage, with the decided advantage that it misses the competition of cheaper varieties. The question of variety should be carefully considered in selecting a stock for cold storing.

THE FUNCTION OF COLD STORAGE. The proper function, then, of refrigeration in connection with our fruit trade, is two-fold. First, the rapid chilling of early apples and tender fruits, and their preservation in transit; and second, the storage and early checking of the ripening process in late apples intended for long keeping. When the cold weather comes on, natural temperatures can be utilized, but the damage is done before that time arrives, especially in those seasons when warm weather prevails late into October or November.

In these two fields, there is a great opportunity. Of course, there is always the further advantage of being able to carry surplus stocks over a period of glut in the market. There is particular need for cold storage in those warmer localities where late apples approach more nearly the stage of full ripeness on the trees. There is this to be said also, that apples which are well matured and highly colored keep better in cold storage than greener and more immature ones do.

But it would be a mistake to suppose that all Canadian apples require cold storage. In the cooler districts at least a portion of the late or slow maturing varieties may be preserved for early marketing if properly handled in ordinary frost-proof warehouses. While cold storage would lengthen the season of all apples, the gain in value would not be equal to the expense in all cases.

As one whose duty it is, as a public officer, to give all reasonable encouragement to the use of cold storage, I feel that it would be unfortunate if these things were not well understood and clearly recognized before there is any large expenditure made in this connection.

PACKAGES IN COLD STORAGE. The question of package is of some importance in the cold storage of apples. In the case of the early varieties, for which quick cooling is important, the box package, on account of its smaller size, and, therefore, greater extent of surface as compared with bulk, and the openings at the edges, undoubtedly facilitates the attainment of the object in view. With later varieties for which quick cooling is not so important, the barrel carries no serious objection.

WRAPPERS AND COLD STORAGE. All apples will keep better if wrapped in paper. The wrapper helps to prevent the bruises which may result from the handling and the pressure of tight packing, and it also prevents the spread of mould spores or other forms of decay from one apple to another. The wrapper offers the further advantage that it prevents, to some extent, the collection of moisture on the surface of the apple when it is changed from a low temperature to a comparatively high one.

The wrapper is obviously more useful on early and tender varieties than on later and firmer ones. Circumstances and labor resources must guide the individual in determining how far it will pay to carry the matter of wrapping.

PRE-COOLING. The so-called pre-cooling of fruit, vegetables, or other pro-

duce, consists of an arrangement whereby the circulation of air which is chilled with a refrigerating machine, is directed through a loaded car by means of temporary and adjustable pipes or ducts. That is to say, the car is placed in the same relation to the refrigerating machine for the time being as an ordinary chamber in a cold storage warehouse.

My attention was first drawn to this system by the work of the Bureau of plant industry of the United States Department of Agriculture in California where they experimented in connection with the shipment of citrus fruits and vegetables in conjunction with the Pacific Fruit Express Company, a subsidiary company of the Southern Pacific Railway System, and by correspondence with Mr. L. A. Roy, of Chicago, who is interested in the promotion of the idea.

Two years ago, I fitted up the necessary connections at the St. Catharines Cold Storage and Forwarding Company's warehouse, but we were never able to give it a fair trial on account of the small size of the plant. The partial cooling which was effected was undoubtedly of some benefit, but hardly worth the time and trouble. It would take too long with the six-ton machine in use there. The pre-cooling of a car load of warm fruit in addition to the chilling of the car itself, which is a considerable item, takes about two tons of refrigeration, and as it should be accomplished in about four hours, it is equal to a machine capacity of 12 tons in 24 hours. If two cars were to be cooled at one time, it would require a plant of at least 25 tons capacity. Further, in order to be effective, the cold blast should have a temperature of not more than 20 to 25 degrees, and that precludes the possibility of using the same circulation in the warehouse where the temperature in fruit rooms must not go below 32 degrees. As long as the fruit in the car is warm, the cold air blast can safely be reduced to several degrees below the freezing point, but this is not permissible in a warehouse where the contents are already reduced to the minimum of safety.

During the past summer I had an opportunity of inspecting the large plants which have been erected by the Southern Pacific Railway in California. They have spent a million and a half dollars on two plants, one at Roseville in Northern California, and the other at Colton, in the southern part of the State. I would like to take this first public opportunity of saying that I received every courtesy at the hands of the various officials, from the Chief Trade Director down to the superintendent of the works, and I was given every possible facility to get what information I wanted.

These two plants are at interior points where the traffic converges for the overland journey. The one at Colton has 500 tons of refrigeration and can handle a whole train of cars at one time. In addition to the cooling facilities, there is a large equipment for making the ice with which to fill the bunkers of the cars.

You will observe that these cooling facilities are being provided in California by the railway company, and I am of the opinion that it properly falls to them to do it. In the first place, they benefit by the saving of ice, and a plant erected by the railway can be made to serve a whole district at very much less cost than the aggregate cost of erecting and operating a number of smaller plants. Moreover, it should be the business of the railways to carry the freight which is entrusted to them in the best possible manner, and if pre-cooling comes to be one of the necessary aids to the transportation of Canadian fruit, it seems to me that it is up to the companies to furnish it.

I can see the possibility, or I might say the practicability of operating a plant, say at Hamilton, to serve the district between Niagara and that city in

connection with western shipments. With some system of prompt movement of the cars from loading points to the cooling centre, they could be started on their overland journey without serious delay and with the best possible chance of reaching their destination with the contents in good condition.

It will be evident from what I have said that pre-cooling does not differ in principle from the cooling which is effected by placing the goods in a cold storage warehouse, but if it is conceded, and it certainly may be, that immediate and rapid cooling is important in the handling of perishable produce, then it must be admitted that, under certain circumstances, pre-cooling has decided advantages. One advantage over cooling in a warehouse is that it saves handling the fruit and the consequent exposure to warm air while being transferred from the warehouse to the car, a thing to be avoided as much as possible. With proper equipment, a car load of fruit may be cooled in this way as much in four or five hours as it would be in two or three days with ice only in a refrigerator car. A more rapid circulation of air at a much lower temperature than can be secured with the use of ice removes the heat in a comparatively short time.

I have dwelt at some length on this matter of pre-cooling, because it is one which has attracted some attention, and there is likely to be more or less enquiry concerning it.

THE COLD STORAGE WAREHOUSE. Any treatment of this subject would be very incomplete without some reference to the cold storage warehouse. I am in favor of making the cold storage of fruit a special business, as a rule. Large general cold stores at important centres should have provision for handling apples and other fruit, but in many cases, it will be more economical and more satisfactory all round to have warehouses built and equipped for the handling of fruit only. Cold storage is needed for fruit in localities where little or no other kind of produce will be offered. Non-freezing temperatures only are required and that chiefly during the coolest part of the summer and in the winter months. This permits of lighter insulation and lower refrigerating power than is necessary for general storage where freezing temperatures must be provided.

The period of fruit storage covers only a part of the year. A special fruit cold storage need be operated only when fruit is in storage.

CONSTRUCTION OF THE WAREHOUSE. There are, of course, many different plans on which such a building may be constructed and different materials may be used for insulation. I shall not attempt to describe all of them, but I shall endeavor to give you some idea of the kind of a warehouse which would be suitable for a co-operative fruit association, because it is chiefly in connection with these organizations that I expect to see cold storage applied to the fruit trade in Ontario.

If the warehouse is to be on a railway siding, the ground floor should be on the level with the car floor, with a basement beneath, and as many floors above the ground floor as may be considered necessary. My preference would be, except in the case of very large warehouses, to have only a ground floor and basement with an attic for the storage of boxes, etc. Such a warehouse, 75 x 45 feet, with a one-storey addition for machine room and office, would be sufficient to store between 7,000 and 8,000 barrels of apples, or the equivalent of about 10,000 barrels if packed in boxes. **Fig. 1** is a diagrammatic longitudinal section of such a warehouse.

The ceilings need not be over 8 feet high to accommodate five tiers of barrels, which is high enough for piling.

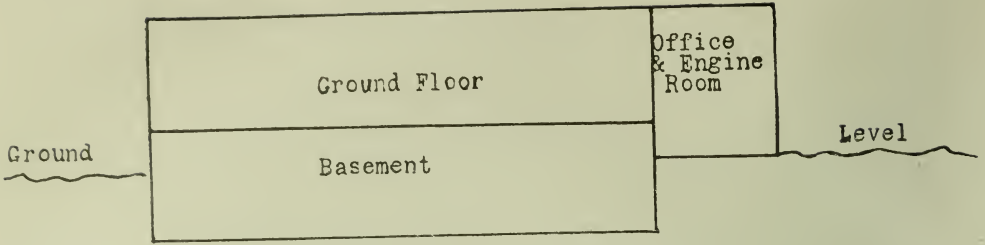


Fig. 1.—Diagram of Section of Cold Storage.

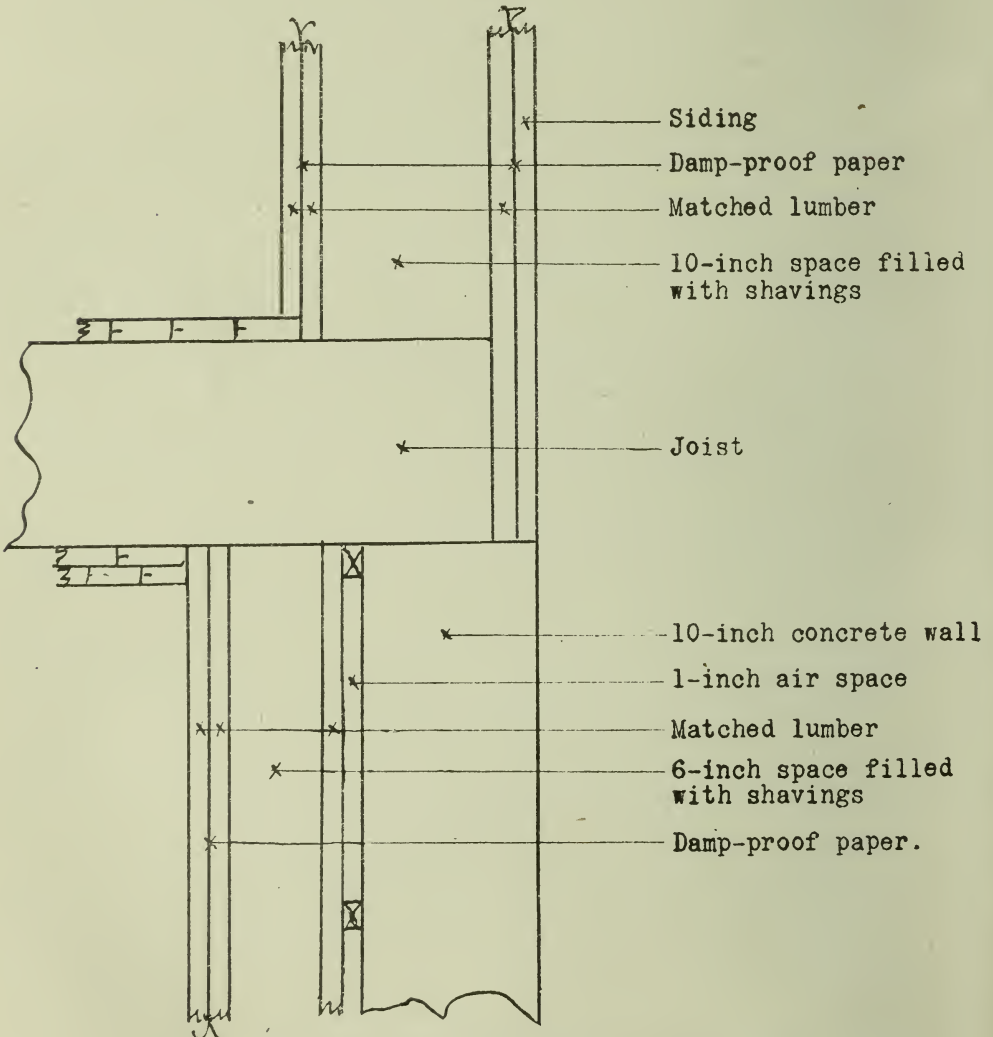


Fig. 2.—Section of wall at ceiling of basement of Cold Storage.

Tar paper

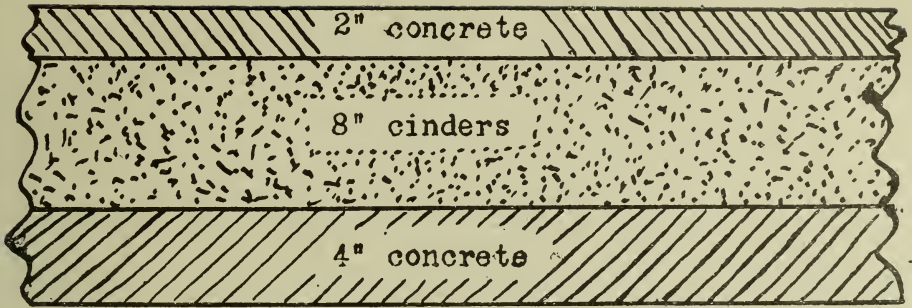


Fig. 3.—Section of floor of Cold Storage.

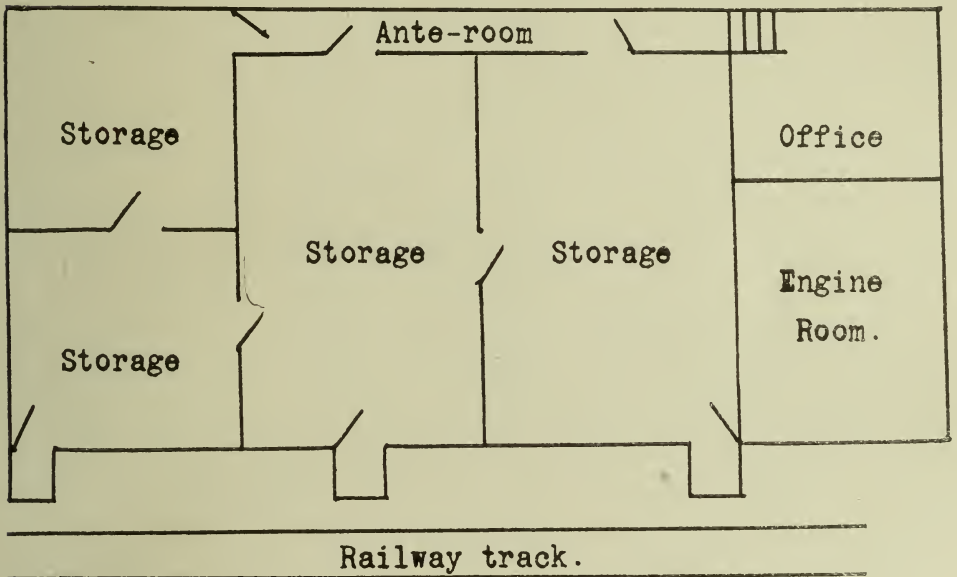


Fig. 4.—Arrangement for ground floor of Cold Storage.

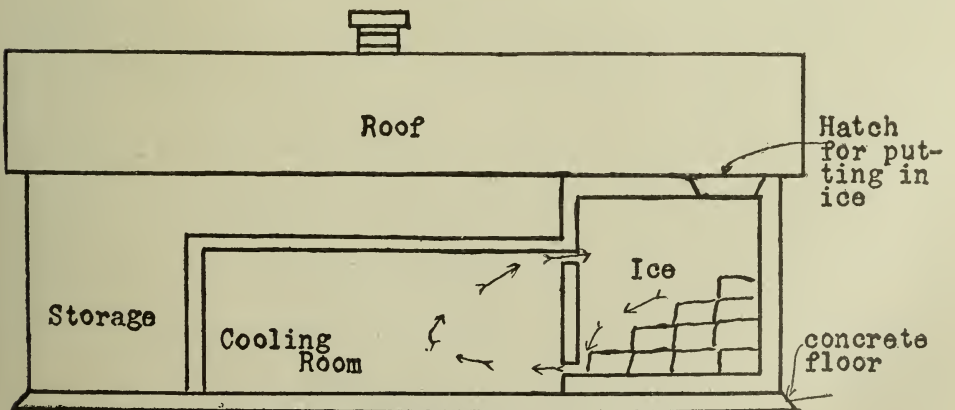


Fig. 5.—Section of Fruit Growers' Ice Cooler.

I think I may take it for granted that the cheapest possible construction, consistent with reasonable efficiency, is the one which will be most popular. I cannot say that I agree with the policy which prompts the erection of more or less temporary buildings in connection with an industry so well established, and with so much promise for the future as fruit growing has, but as we are dealing with a condition rather than a theory, I am prepared to take things as I find them.

For the basement of this building, there is probably no cheaper or better material than concrete. The upper storey can be built of wood more cheaply than with other materials, because the structural parts can be combined with the insulation material in the most economical manner. Planer shavings make the best and by far the cheapest insulation, for wood construction. The empty air space, miscalled a dead air space, is an obsolete form of insulation. Absolutely dead air is, next to a vacuum, probably the best insulator known, but experience has taught us that air in wall spaces is not "dead," and that it circulates within the space and carries heat from one side to the other. Hence the practice of filling these spaces with some light, non-conducting material like shavings, which confine the air on the same principle as the air is confined in the fur of animals, or in our clothing, to prevent the passage of heat. Saw-dust is sometimes used for filling spaces, but it should not be unless it can be kiln-dried, because it normally contains a great deal of moisture. It is always cut from green or water-soaked timber, and this moisture destroys its insulating value and at the same time encourages the growth of moulds which soon give rise to mustiness. Dryness is the first principle of successful insulation and must never be overlooked. Think of the difference between dry and wet clothing on a cold day.

Considering cost and efficiency, I would recommend the following combination for the walls of a building of this class. For the basement, a 10-inch concrete wall, water-proofed on the outside and finished on the inside with a one-inch air space, one course of matched lumber, a six-inch space filled with shavings and two courses of matched lumber with damp-proof paper between. The object of the narrow air space is to prevent moisture from getting into the insulation from the concrete wall. For the upper storey, 2 x 4 inch studs covered on the outside with one course of matched lumber, two-ply of damp-proof paper and either metallic or wood siding; a space of 10 inches filled with shavings, finished on the inside with two courses of matched lumber with two-ply of damp-proof paper. This inside sheathing would require an additional row of 2 x 4-inch studs, which should be placed zigzag with the outside row. The ceilings will be sufficiently insulated with the spaces between the joists filled with shavings.

A very important precaution in the construction of the concrete-wall is to give it a coat of pitch or other waterproofing on the outside, especially below the surface of the ground.

A section of the wall and ceiling of this warehouse which we are trying to describe would have the following detail. (Fig 2.)

The basement floor is an important detail of the construction, and probably the most difficult part to insulate, because we have to contend with the moisture from the earth. Cold storage engineers are not agreed as to the best combination of materials for ground insulation. Wood in any form is unsuitable, owing to the tendency to absorb moisture, which destroys its insulating value and promotes decay. Shavings, then, are out of the question. Impregnated sheet cork, laid between two layers of concrete, or asphalt and concrete, are being used in some of the more expensive plants. I have recommended for cheaper construction, such as we are considering, a combination as follows:

First a 4-inch layer of concrete, then 8 inches of clean dry coal cinders, well rolled or rammed, a layer of tar paper and a finishing surface of 2 inches of concrete. A course of hollow brick (square tile) can be substituted for about half the depth of cinders. The tar paper is put over the cinders to prevent the wet concrete from filling the air spaces in the cinders. This combination will be improved by coating the first layer of concrete with roofing pitch to keep the earth moisture from the cinders. It is the cinders which provide the insulation. Concrete is a poor insulator. Fig. 3 gives the details of such a floor.

As for the arrangement of the rooms much will depend on circumstances. In most cases, the basement would be as well in one room, or two at the most. For the ground floor, which would be used for cooling small lots during the active shipping season, the division as shown in Fig. 4 is only a suggestion.

A building such as I have described should be erected and equipped with refrigerating machinery at a cost, exclusive of site, of from \$1.50 to \$2 per barrel of capacity on a total of \$12,000 to \$15,000.

I shall not dwell any longer on this point, because I intend to have detailed working plans and specifications made before next season and blue prints of these will be sent to anyone who applies to me for them.

ICE STORAGES ON FARMS. So far, we have been dealing with mechanical refrigeration and central storage, and I propose to finish, in a very few words, with a suggestion concerning small iced cooling rooms for the use of individual growers and to be located in or near the orchard. (Fig. 5.)

I believe that a small room where berries and tender fruits could be cooled, held over Sunday, etc., would be a very useful adjunct to many fruit farms. I would not advocate a low temperature for such rooms, possibly not lower than 50 degrees, because of the damage which would result from "sweating" when the fruit was removed for shipping if lower temperatures were employed. At a temperature of 50, it would be practicable to have a cement floor and to get some cooling from that source which is a great advantage. The walls should have one course of matched lumber and siding on the outside, with damp-proof paper between, and double boarding and paper on the inside, with a space of 12 inches between the inside and outside sheathing to be filled with shavings. About one-third of the building should be set aside for the ice chamber with a partition between the ice chamber and cooling room having the same insulation as the outside walls. An additional course of matched lumber on the inside, making a one-inch air space, is advisable for the ice chamber. The air space in this case is to prevent moisture from the ice penetrating the insulation. The floor of the ice chamber should be constructed in the same manner as the floor in the basement of the cold storage (see Fig. 4), with a slope of one inch in four feet to a gutter at one side to provide drainage from the melting ice. The drainage outlet must be trapped to prevent the passage of air. The floor of the ice chamber should be covered with a wooden grating on which the ice will rest. No covering or packing material is used on or around the ice in such a chamber. Provision is made by means of openings in the partition between the ice chamber and the cooling room, at the ceiling and near the floor, for the circulation of air through the cooling room and over the ice. As the air is chilled, it deposits some of its moisture on the surface of the ice, thus making a fairly dry storage. Neither the ice chamber nor the cooling room should be ventilated. The air is changed sufficiently by the occasional opening of the door. Ventilation means the introduction of warm moisture-laden air, which causes dampness. The circulation over the ice tends to keep the air purified.

It is permissible to have small windows in the cooling room, but they should be located at the ceiling and have at least double sash each double glazed. There should be an ante-room which can be used for storing empties, tools, etc.

Fruit growers will be able to determine individually whether one of these cooling rooms would be of use to them or not.

RESOLUTIONS.

The following resolutions were then presented and adopted:

1. This Association heartily recommends the extension of the co-operative system of marketing fruits amongst the fruit growers of the Province of Ontario in as much as this system has proved of immense value during the past few years.

2. This Association desires to express its appreciation of the value of the work done by Mr. McNeill, Chief of the Fruit Division in the crop reports issued during the season of production. It strongly recommends, however, that these reports be made more comprehensive so as to cover more fully than they do now crop conditions in other countries as well as our own and that they may be issued more promptly and at fortnightly instead of monthly intervals during the principal part of the season. Further that the Dominion Government be requested to adopt some method whereby the fruit growers may be able to ascertain more definitely the acreage of the different fruits planted in the Dominion, and also a statement of the output from year to year.

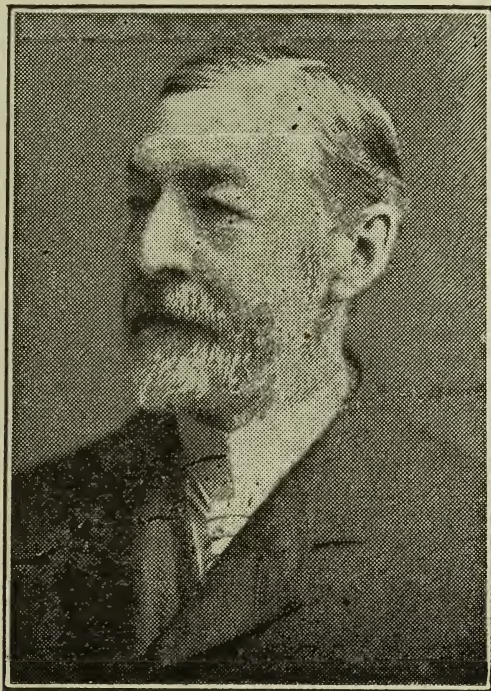
3. This Association recommends that a committee be appointed, of which the Secretary shall be one member, to consider the advisability of using liberal space in the daily papers of Toronto for advertising from time to time during the season of heavy fruit production. A free use of advertising space when a rush of any one variety of tender fruit is coming in with a view of informing the city householder of the expected arrivals should be the means of greatly increasing the buying and thereby relieve the glut which now occasionally takes place.

4. This Association recommends that the proposal of Mr. Graham that measures be taken with a view of securing from railways the same assembling privileges for apple shipments to the west that are now available for export be strongly approved and that the transportation committee be urged to act accordingly. Also that the demands for lower rates on shipments by express referred to by the same committee be vigorously pressed and that an early order by the Railway Commission be called for.

A SHORT SKETCH OF THE LIFE OF MURRAY PETTIT.

BY F. G. H. PATTISON, WINONA.

By the death of Mr. Murray Pettit, at the age of 67, on the 3rd of March, 1910, at his home in Winona, the Ontario Fruit Growers' Association, in common with fruit growers all over the Province, has sustained a very heavy loss. In the affairs of the Association Mr. Pettit took a very prominent part, having been a member since 1872. In 1885, at the annual meeting held in the town of Wingham, he was elected director for District No. 7, which comprised the counties of Wentworth, Wellington, Waterloo and Halton. This office he held for a great many years, and at the annual meeting held at Orillia in 1894, he was elected president—the highest office in the gift of the Association.



THE LATE MURRAY PETTIT.

Mr. Pettit filled this office with honor to himself and great benefit to his brother members for a period of two years. At the annual meetings held in different parts of the Province, and then centralized in Toronto, Mr. Pettit was a very prominent figure, and he from time to time contributed very valuable papers and information on the different branches of fruit growing, with which he was so well acquainted. He was also a large exhibitor of fruit, especially grapes, at the different shows held in conjunction with these meetings, and his services were in great demand on the various committees appointed by the Association.

Mr. Pettit belonged to a family of United Empire Loyalists who came over from the United States to Canada shortly after the Declaration of Independence,

and settled on the south shore of Lake Ontario at Winona, then called Fifty Mile Creek. As a reward of his fidelity to the English Crown his grandfather, Mr. John Pettit, received a free grant of 468 acres of land in the township of Saltfleet, county of Wentworth, and there, on March 13th, 1843, Mr. Murray Pettit was born.

On reaching manhood Mr. Pettit took up farming upon the old homestead, and in the year 1872 began to take up fruit growing as a special business, in which he was destined to be so pre-eminently successful. His first experience was in peaches, of which, in the year referred to, he planted an orchard of about eight acres. From this he obtained a few crops of excellent peaches, but in 1879 that fell disease called "Yellows" made its appearance and soon destroyed the orchard. Undaunted by this mishap, however, Mr. Pettit took up other branches of fruit growing—apples, pears, plums and grapes, and became particularly distinguished as a grape specialist.

In the seventies Mr. Pettit had already begun planting grapes, chiefly Concord, but the introduction of the Niagara grape into the district by the Niagara Grape Company, of New York State, in the year 1880, gave a great impetus to the grape industry, and Mr. Pettit was one of the first to plant Niagara grapes, paying \$1.50 each for the young vines, notwithstanding which he found it a very profitable venture, as for some years these grapes sold for high prices, and Mr. Pettit made a profit of from \$1.00 to \$2.00 per vine annually.

Encouraged by this success, Mr. Pettit extended his vineyards rapidly, and at the time of his death had over thirty-five acres in full bearing, and was considered one of the leading authorities on grape growing. He had also twenty-five acres devoted to pears, apples, plums and some peaches. For some years Mr. Pettit experimented in the different varieties of grapes and other fruits on his own account, maintaining an experimental row of about 100 different varieties of grapes alone. Recognizing this fact, in 1894 the Ontario Government appointed him director of the Experimental Station at Winona, which office he held till his death. In this, as well as in everything else relating to the fruit industry, he was of great assistance to his brother fruit growers, being always ready to work for them in a most unselfish way. In every new movement for the advancement of the fruit industry he was in the van, and in 1884 he began spraying, being actually the third man in Ontario to use a spray pump. Mr. Pettit was director and then president of the local Fruit Growers' Association at Grimsby for a long period, and in 1884 was one of a deputation to the Ontario Legislature which secured the passing of the "Yellows" Act of that year, and he was appointed by the township council of Saltfleet as the first inspector of "Yellows" and "Black-Knot."

On the formation of the Niagara District Fruit Growers' Stock Company in 1880 he was chosen a member of the first directorate, and served on the board until the company voluntarily wound up business only a few days before his death, at which time he was president and had been so for some years.

In 1893, when Ontario astonished the world by its magnificent exhibition of fruit at the World's Fair, Chicago, Mr. Pettit was entrusted with the onerous duty of gathering up the fruit from this district and forwarding it to its destination. This duty he fulfilled in his usual efficient manner, and much of Ontario's success at the Fair was due to him. He also sent a fine collection of fruit to the Pan-American Exhibition at Buffalo in 1901, and was awarded a silver medal for the same.

Mr. Pettit was in great demand as a judge at the various fruit shows held at Toronto, St. Catharines and other places, and his decisions gave great satisfaction to both the public and the exhibitors. The writer had the privilege of assisting him in this work on one or two occasions, and willingly bears tribute to his great ability in this direction.

Shortly previous to his death Mr. Pettit was elected president of the Niagara Peninsula Fruit Growers' Association, the leading organization of the district at the present time. He was also one of the organizers of the Fruit Growers' Publishing Company, Limited, and was a director and vice-president of the company.

Nor was it only in fruit growing that Mr. Pettit obtained distinction. For several years he was a valued director of the Central Farmers' Institute. He served five years as reeve of the township of Saltfleet, and was elected warden of the county of Wentworth in 1899. In politics he was a lifelong Conservative, and took an active interest in all that belonged to the welfare of the party. He had been repeatedly president of the County of Wentworth Conservative Association, and only a few days before his death he was re-elected president once more. Nominations for both the Provincial and Dominion Houses had also been repeatedly tendered him.

Truly it may be said of him, as was said of King David of old, that a man full of years and honors has gone to his rest. Mr. Pettit was twice married, and leaves a widow and three daughters to mourn his loss.

REPORT
OF
FRUIT BRANCH

Department of Agriculture
ONTARIO

1909

Published by the Ontario Department of Agriculture, Toronto

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



TORONTO
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1910

Printed by
WILLIAM BRIGGS,
29-37 Richmond Street West,
TORONTO

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., ETC., ETC., ETC.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Fruit Branch of the Department of Agriculture for 1909.

Respectfully submitted.

JAMES S. DUFF,
Minister of Agriculture.

Toronto, 1910.

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REPORT OF THE FRUIT BRANCH

1909

To the Honourable JAMES DUFF, Minister of Agriculture.

DEAR SIR,—I beg to transmit herewith for your approval my report of the work of the Fruit Branch of the Department of Agriculture for the past season. It will be noted from the expenditure, as given below, that the work of this Branch is expanding rapidly. Practically all of the appropriations voted by the Legislature were used in full and some special investigations were also carried out under the general vote of the Department of Agriculture for that purpose. A great awakening seems to be taking place along horticultural lines in Ontario, and we may expect increasing demands on this Department for aid in all branches of orchard work.

The expenditure for the ten months ending October 31st, was as follows:—

Grants to Provincial and district associations	\$ 5,791.00
Grants to spraying associations and cost of inspection.....	3,975.41
Inspection of apiaries	2,841.50
Fruit exhibits	2,943.37
Horticultural Experiment Station maintenance	13,027.56
Horticultural Experiment Station expenditure on buildings	12,269.58
Maintenance of fruit stations	1,468.49
Orchard and nursery inspection, spraying experiments, etc..	3,875.54
Special orchard investigations	1,224.81
Apple packing demonstrations	278.85
Salaries	2,002.00
Office contingencies	955.32

A slight increase will have to be asked for in some of these items for the coming year to cover the extra expense entailed by the growth in the work.

Your obedient servant,

P. W. HODGETTS, *Director.*

REPORT OF THE FRUIT BRANCH

WORK OF THE FRUIT GROWERS' AND BEEKEEPERS' ASSOCIATIONS.

In addition to arranging for the entertainment of the American Pomological Society, a report of which follows, the Ontario Fruit Growers' Association has followed up this year's efforts by issuing another pamphlet entitled "Success in Apple Orchardling." This was very widely distributed through the officers of the Association, the members of the Legislature and the Department of Agriculture. Such was the demand for this little book that a second issue was found necessary.

The pamphlet treats of the various orchard operations, such as pruning, spraying, cultivation, manuring, thinning and packing by some of the most successful apple growers in the Province. The work was thoroughly practical and undoubtedly owes its success to this fact.

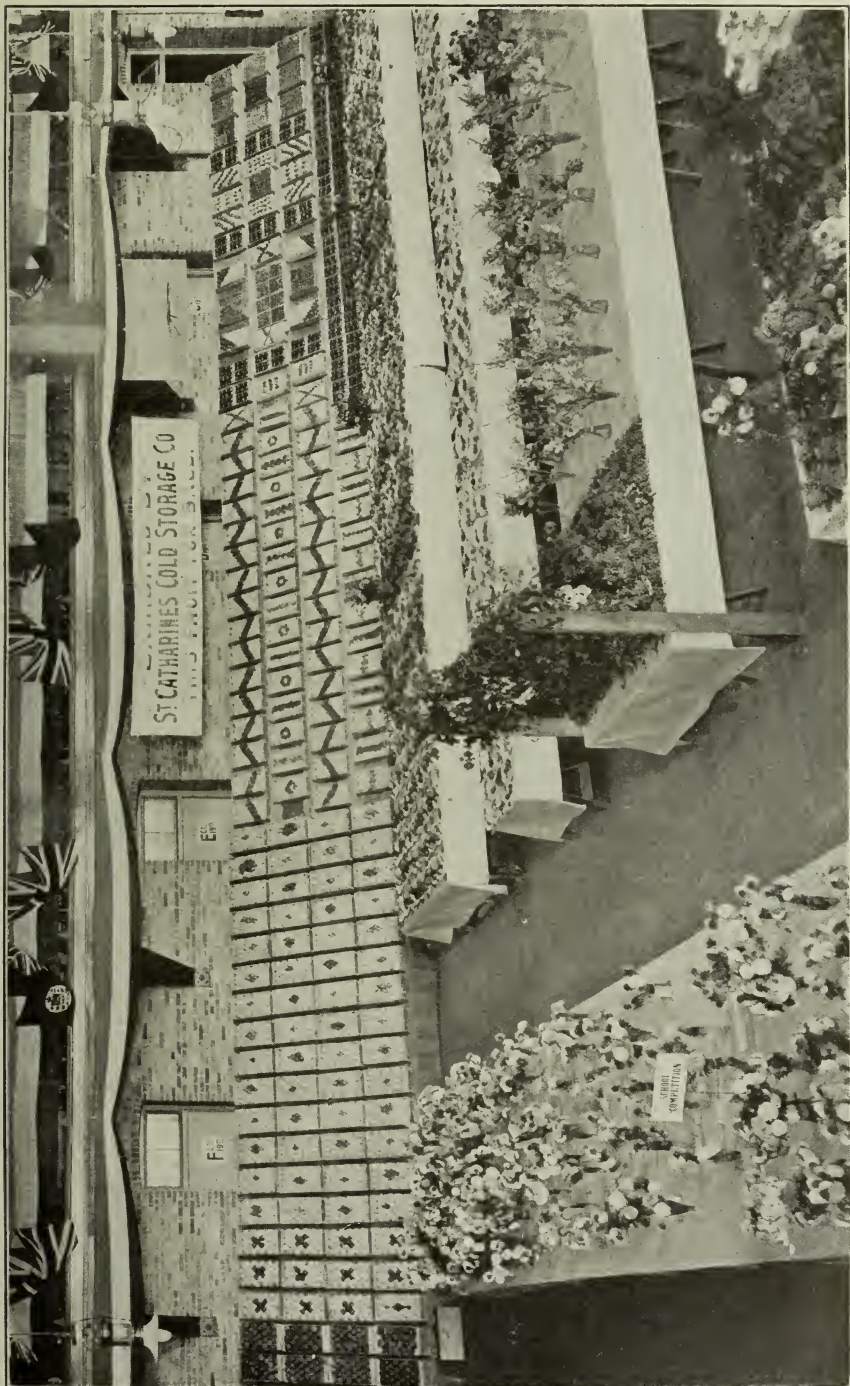
The Fruit Growers' Association again made a great effort to put up the best display of apples possible at the Horticultural Exhibition in November, a full description of which is given elsewhere in this report.

A very successful convention was held in November in Toronto and a very representative body of the fruit growers was in attendance. Several well known fruit growers from New York and Michigan were brought over to address the gathering.

Other lines of work were carried out, and that the Association continues to actively represent the fruit growers of the Province is shown by a decided increase in membership.

The Ontario Bee-Keepers' Association has again devoted a considerable portion of its time to the consideration of the foul brood situation in the Province. The appointment of additional inspectors has in most districts effected a decided improvement of the situation and it is hoped that before many years the disease will be materially checked, if not eradicated. An outbreak of the European Foul Brood in the eastern part of the Province has, however, caused some dismay among bee-keepers there as this type of the disease has done a great deal of damage in New York State and seems more virulent in its work of destruction. Further information in reference to methods of treatment, etc., will be found in the annual report of the Bee-Keepers' Association which is published by the Department.

Small grants were made by the Department to the Gardeners and Florists' Association, and to the Niagara Peninsula Fruit Growers' Association. The latter Association has expended its money for the holding of special fruit meetings in March of each year. These meetings have been well attended and addresses delivered, not only by the best local men, but also by prominent fruit growers from the United States. The Association is doing good work in organizing the fruit growers of the Peninsula, and is always active in taking up matters of importance to the industry.



Portion of box fruit exhibit at the meeting of the American Pomological Society. St. Catharines, 1909

THE AMERICAN POMOLOGICAL SOCIETY.

A special grant of \$1,000 was made to the Ontario Fruit Growers' Association for the entertainment of this distinguished horticultural body which met in St. Catharines in September of 1909. The appropriation was used in providing excursions through various parts of the fruit section from Hamilton to the Niagara River and in showing the visitors the Agricultural College at Guelph. A large number of practical fruit growers, as well as experiment station men from all parts of the United States, were in attendance, and the five days' sessions of the Association were undoubtedly of great value not only to the visitors but to the fruit growers in the Niagara district. A great many of the latter joined the American Pomological Society for the benefits to be gained therefrom through the annual report and special reports issued from time to time.



Exhibit of United Counties of Northumberland and Durham at Ontario Horticultural Exhibition, 1909.

To show the visitors the fruit and vegetable resources of the district a special effort was put forth by the Directors of the Niagara District Horticultural Exhibition, which was open during the week of the convention, to make a finer display than usual of these products. The illustrations shown herewith will give some idea as to the results, which were indeed very gratifying to any resident fruit grower of the Province.

Special note should be made of the magnificent display of boxed fruit of all kinds put up by the St. Catharines Cold Storage & Forwarding Company, the largest co-operative association of fruit growers in the Province. This Association has been in existence for twenty years and has been very successful of late years in the shipping of fruit in car lots to the Canadian North-west.

A number of medals were awarded by the American Pomological Society to such exhibits as were worthy of special notice. These included among others the boxed exhibits mentioned above, a farm exhibit made by Mr. Albert Pay of

St. Catharines, an exhibit of preserved gooseberries shown by Mr. R. B. Whyte of Ottawa, a display of new varieties of apples by Mr. Macoun of the Central Experiment Farm, and an exhibit of fruits of various kinds preserved in jars by Robert Thompson for exhibition purposes.

ONTARIO HORTICULTURAL EXHIBITION.

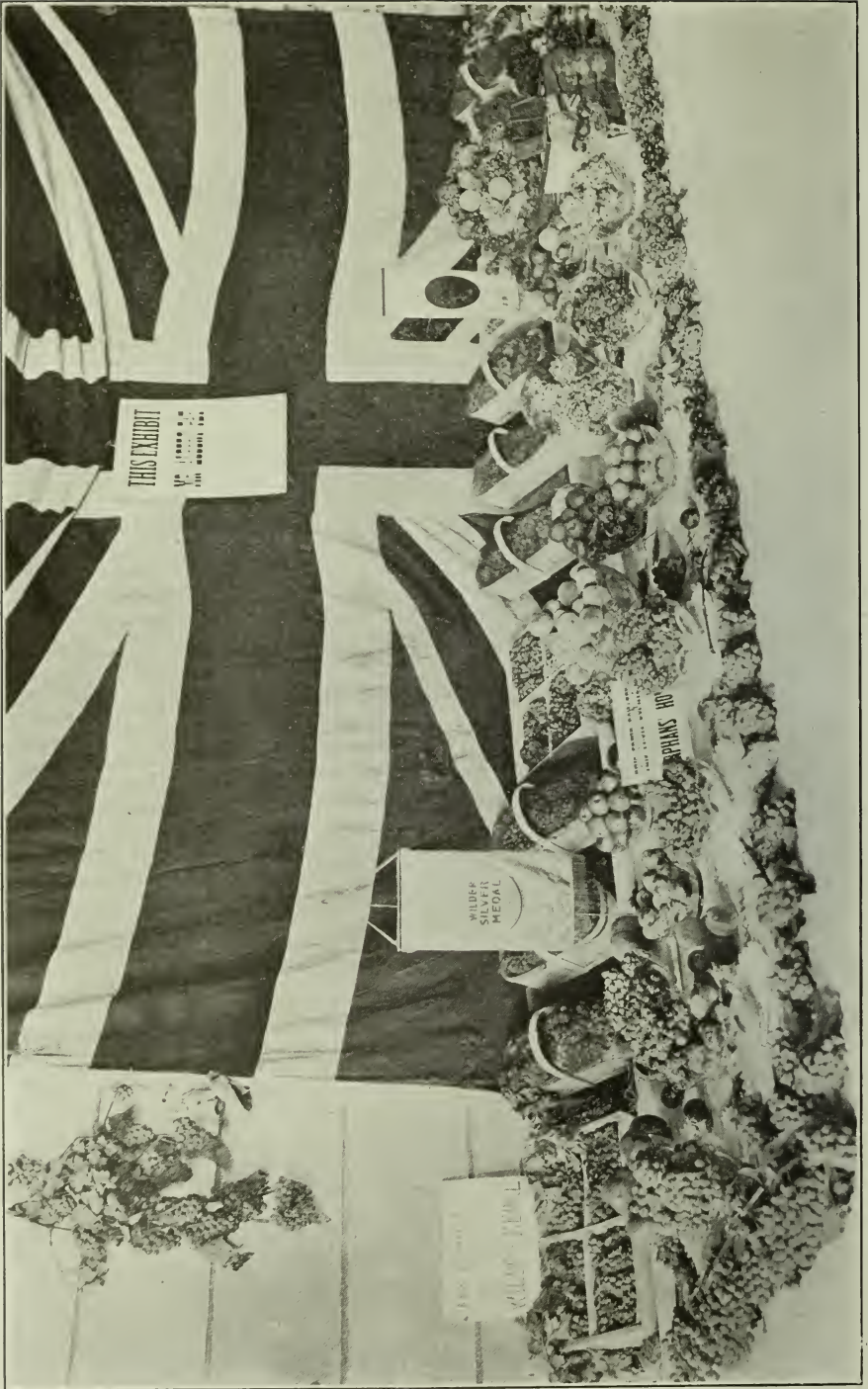
The Exhibition of 1909 proved to be the most successful in the history of the Association. There was a record attendance from all points outside of the city, while the number of entries in the fruit section far surpassed any of the previous Shows. Perhaps the most attractive individual exhibit was that of the Norfolk Fruit Growers' Association put up in the form of an immense pyramid of apples. This Association deserves a great deal of credit for its unique display, and the men in charge certainly deserve all of the praise which they received through the Toronto press. Norfolk County, as a result of the exhibits in Toronto during the past three seasons, has obtained a reputation for fruit growing which has resulted in a large number of outsiders making their way there to engage in the business.

Other special exhibits worthy of mention were those of the Northumberland and Durham Counties, the St. Catharines Cold Storage Company, and the displays put up by the two provincial fruit experimenters, Messrs. Harold Jones of Maitland and A. E. Sherrington of Walkerton.

An exhibit of individual apples was made possible by the contribution by six of our leading fruit growers of a large sum of money for the prizes, which were \$10 for first and \$5 for second best apple in the following varieties: Spy, Baldwin, Greening, King, Fameuse, and McIntosh. A full description of each variety was given with a limit as to the size of the fruit. A large collection was shown which aroused a great deal of interest. The idea was to draw out a type of apple which would be a standard for each of the varieties called for.

Another section of the prize list called for box or barrel brands. A number of the best of these are shown in one of the accompanying cuts. A neat brand is something that every fruit grower and association should aim at, and a number of our prominent growers have already intimated that they will make a change for the coming season so as to secure something that will be attractive and at the same time neat in design.

The exhibit of boxed apples and pears was again the leading feature of the exhibition. There is no doubt that this package will prove to be a popular one in the local Ontario markets as a result of the displays made at this Show and at the Canadian National Exhibition. A record price for the boxed apples was obtained at the close of the Show, and these were distributed by one of our wholesale fruit firms among some of the best homes in the city. One of our largest associations is now planning to place some of their best product on the markets of Toronto, Montreal, Hamilton, Ottawa and Quebec as an experiment. If successful, there is no doubt that quite a big business will be worked up in this line which will replace the great bulk of the poor trashy apples which one sees in the stores of the city.



Display of fruit from farm of Mr. Albert Pay, St. Catharines, shown at meeting of the American Pomological Society.



Exhibit of boxed apples at Ontario Horticultural Exhibition, 1909. Single box competition.

CO-OPERATIVE SPRAYING.

The Department of Agriculture decided to continue the bonusing of co-operative spraying during the season of 1909. The terms regulating the granting of a bonus were somewhat altered so as to limit it to those farmers who had not previously taken up spraying or who had not benefited by any previous grant and also to those who had only started in 1908. In the inspection more stress was laid on the number of sprayings given and the thoroughness of the work. To show that the assistance of the Department was greatly appreciated there were eleven new societies that applied during the year with a total membership of 138. This does not include the new members of old associations. In this class there were 329 new members, making a total of 469 new members who had received no previous assistance from the Department out of a total of 689 applicants, or nearly 68 per cent.

The acreage was also greater, from 4,234 acres in 1908 to 5,697 acres in 1909, an increase of 1,463 acres. The greatest increase was in apples and peaches, while there was a slight increase in pears, cherries and grapes. The following columns show the acreage for the past three years during which the system of bonusing was in operation:—

—	Apples.	Peaches.	Pears.	Plums.	Cherries.	Grapes.	Total.
1907.....	1,478½	604	167½	334½	40	574¾	3,199¼
1908.....	1,740½	881½	236	518¼	98½	853½	4,328¼
1909.....	3,371	1,283	234	339½	80½	389	5,697

The following is a table showing the approximate amount of spraying material used in the past three years in these orchards:—

—	Copper Sulphate.	Sulphur.	Lime.	Paris green.	Arsenate of lead.	Arsenic.
1907	33,760	76,551	156,980	1,466	565
1908	42,912	154,070	219,900	2,157	3,540	1,205
1909	51,484	200,000	301,400	015	8,119	2,200

The above figures indicate a great development in spraying amongst the fruit growers of the Province. A noticeable feature is that arsenate of lead is gradually taking the place of paris green as an insecticide, and every indication points to a further decrease of the latter and a corresponding increase of arsenate of lead or arsenite of lime.



Exhibit of Norfolk County at the Ontario Horticultural Exhibition, 1909. Display put up by the Norfolk Fruit Growers' Association.

The commercial or concentrated lime sulphur was used this year to a very great extent, and many farmers who had previously used the home-made mixtures changed to the prepared. The chief reason for this is that it saves delay at a busy time. In plants where six or more growers get their mixture a great deal of time is lost in going to and from the central cooking plant and also in waiting their turn. This saving of time together with the general approval given by many experimental stations in the States and the energy of the companies in pushing the spraying material has caused a wide use of the commercial mixture. The results have been quite satisfactory in many sections. The apple growers commenced for the first time to use this material as a winter wash, and a lot of it was also used in the Georgian Bay as a summer spray. In fact the use of the lime sulphur wash, as a summer spray for apples, may become more common owing to the fact that Bordeaux mixture is liable to cause some russetting of the fruit as well as spotting of the leaves, the degree of injury depending largely on the humidity of the season during the early stages of the growth of the apple. Those growers who have secured good results from the Bordeaux should not yet abandon its use as a spray after the buds open. It has yet to be proved that the lime sulphur is a better fungicide, and there is a great deal to be learned in regard to the combining of the arsenical poisons with the mixture. It is stated, however, that paris green should not be mixed with the lime sulphur or burning of the foliage will result.

There are two firms manufacturing prepared lime sulphur in Ontario: The Chemical Laboratories, Toronto, and the Niagara Spray Company, Burlington. The former company started to manufacture for delivery in the spring of 1909, while the latter company built their plant in the fall of 1909. Previous to 1909 the material was shipped in from the United States, and owing to the duty was rather expensive to use. The price has dropped from \$12.50 to \$8.00 per barrel at the factory, and may be procured by Associations in car lots at still lower figures. A number of American brands are still offered in Ontario, but the two Ontario companies will handle practically all the trade this year.

HOME MADE LIME SULPHUR.—This mixture continues to give uniform results and will always be used by the growers to a greater or less extent, but the co-operative method of boiling the mixture is apparently losing its popularity for the reasons previously stated. Small plants using direct heat are now being erected on the farms of all growers who have any extent of orchard. The quality of mixture produced has been more than satisfactory, while at the same time there has been a considerable saving in cost, which has been reduced to from 50c. to 60c per barrel, including all charges.

The use of the lime sulphur mixture is becoming more and more universal. Its value has been thoroughly demonstrated by the growers in the Niagara district as an insecticide for San Jose Scale, aphids, etc., and a fungicide for peach leaf curl, gooseberry mildew. The growers in south-western Ontario who have allowed the San Jose Scale to continue its ravages unchecked have commenced to spray with the mixture, and if they continue as have the growers in the Niagara district the results should be just as marked.

BORDEAUX MIXTURE.—Bordeaux Mixture, despite the occasional injury resulting therefrom, is still used more generally than any other and so far has been proven to possess the greatest fungicidal properties. A great trouble at the present time is the lack of uniformity in the formulæ. Many farmers continue to use a large excess of lime. Some of our most successful growers recommend



A bad sample of leaf-curl, a destructive peach disease which can be controlled by thorough spraying.

this practice, claiming that the excess of lime will cause the mixture to stick better and will itself kill some of the scale insects, especially the oyster shell. Extensive experiments prove, however, that an excess of lime is detrimental to the efficiency of Bordeaux mixture because the percentage of free copper is in ratio to the amount of lime used in the mixture. When moisture, dew or rain comes in contact with the Bordeaux it acts on the copper salts, setting free copper which acts on the spores of the scab and other fungus diseases. If, however, there is a great excess of lime, the copper is immediately taken up again, so hindering the action of the mixture. Growers should adopt some standard formula such as 3-3-40, and should pay more attention to the weighing of the ingredients, realizing that the use of more than what is required is a waste of money. There are a few growers who are using a formula that is made with the minimum amount of lime. It is prepared as follows: About 40 lbs. of stone lime is slaked in a barrel in the usual way and water added to make 40 gallons. After slaking, the whole mixture is thoroughly agitated for a few minutes and allowed to settle. The formula used is $2\frac{1}{2}$ lbs. copper sulphate and 4 gallons of the clear lime water to 40 gallons of water. The tank is partly filled, the dissolved bluestone added, followed by the lime water and the whole mixture is made up to 40 gallons and tested with potassium ferrocyanide. Should the mixture show any discoloration more lime water is added. This type of Bordeaux has only been used on grapes, but the results have been satisfactory. The mixture is very fine and there is absolutely no clogging of nozzles.

INSECTS.

The Codling Moth is still the most injurious insect enemy of the fruit grower, and continues to damage a large percentage of the apples and pears, but in sections where the growers are realizing the value of thorough work and are becoming more informed with regard to the life habits of the insect we find that the injury from this insect is greatly lessened. Many of the most advanced growers have practically controlled it.

The Blister Mite is rapidly increasing in eastern Ontario. Every orchard east of Toronto was infested to a greater or lesser degree last year, there being some very bad cases where the leaves got quite yellow and dropped prematurely. However, the lime and sulphur sprayed just before the buds commenced to open gave splendid results and the growers in this section realizing the amount of damage that might be done by this pest will undoubtedly treat their orchards accordingly.

The Pistol Case and Cigar-Case Bearer were very prevalent in some sections, especially eastern Ontario.

Bud Moth continues to do considerable damage to young as well as old orchards.

The Apple Aphis was exceptionally bad throughout Ontario. Its appearance was very sudden and it did a tremendous amount of damage to the apple crop. Feeding on the young leaves and stems of fruit, it checked the growth of the fruit and as a result it was a common thing to find in almost every orchard bunches of useless, undeveloped apples.

The Tussock Moth appeared to some extent on the apples in western Ontario, but it is being kept well in check by the use of arsenical poisons applied late in the season.

The San Jose Scale is still very prevalent in south-western Ontario, but the growers have commenced to spray for it in many localities. In the Niagara district it was even better combatted this year than previously, and as lime and sulphur is now being used by nearly all the growers and the township inspection is becoming more thorough, that district has little to fear from this pest.

The Oyster-Shell Bark-Louse is very injurious in eastern Ontario, but the farmers having become more conversant with its habits are treating it successfully with lime and lye. Many orchards have been completely rid of the scale.

The Pear Blight continues to destroy a great percentage of pear trees, and this year did a considerable amount of damage to the young apple twigs also. This was especially noticeable between Oakville and Burlington.

The Apple Canker is still prevalent in eastern Ontario, but the apple growers knowing its appearance and treatment will soon have it under control. The treatment now generally adopted is to remove the injured or diseased portion of the tree and paint the wound with white lead. After the diseased portion has been cut away the wound should be thoroughly disinfected with a 1 per cent. solution of corrosive sublimate before being painted with the lead.

The Apple Scab was present as usual in unsprayed orchards, but owing to the more efficient spraying of our commercial orchards it is being kept in check there.

APIARY INSPECTORS FOR SEASON OF 1909.

The provisions of the Foul Brood Act were enforced last year by fourteen inspectors, an increase of six over the previous year. The names and districts of these inspectors are given herewith:—

1. J. S. SCHRANK, Port Elgin; Bruce, and Huron.
2. D. CHALMERS, Poole; Waterloo, and Perth.
3. JACOB ALPAUGH, Eden; Wellington, and Gray.
4. W. A. CHRYSLER, Chatham; Lambton, Kent, and Essex.
5. JNO. NEWTON, Thamesford; Middlesex, and Elgin.
6. JAS. ARMSTRONG, Cheapside; Oxford and Norfolk.
7. MORLEY PETTIT, Jordan Harbor; Brant, Wentworth, Halton, Haldimand, Lincoln, and Welland.
8. H. G. SIBBALD, Claude; Simcoe, Dufferin, and Peel.
9. J. L. BYER, Mt. Joy; Ontario, York, Victoria, and Durham.
10. W. SCOTT, Wooler; Peterborough, Northumberland, Hastings, and Prince Edward.
11. M. B. HOLMES, Athens; Lennox and Addington, Frontenac and Leeds.
12. A. A. FERRIER, Renfrew; Lanark and Carleton.
13. J. LESLIE McNAUGHTON, St. Raphael West; Russell, Prescott, Glengarry.
14. HOMER BURKE, Tayside; Grenville, Dundas, and Stormont.

Perhaps no one part of the work has shown such rapid growth as has taken place in the action of the Department for the suppression of disease among bees. For a number of years one inspector was supposed to cover the whole Province. In 1907 the Department, after consulting with the Bee-Keepers' Association, decided to make a change in the inspection system. The Province was subdivided and six inspectors appointed. At the close of the year their reports

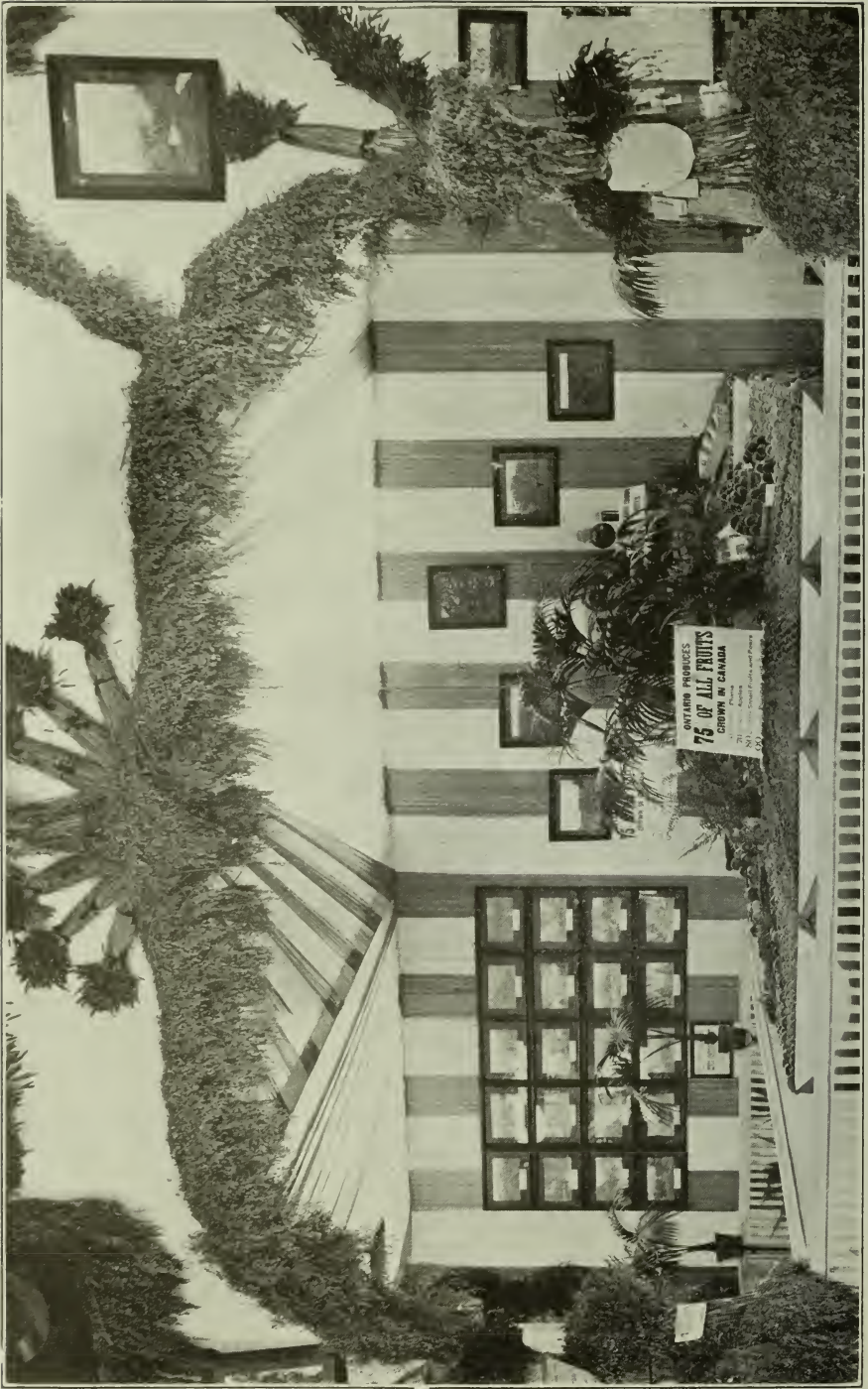


Exhibit of the Fruit Branch at Canadian National Exhibition, Toronto, 1909



Exhibit of the Fruit Branch at the Canadian National Exhibition, Toronto, 1909

showed that foul brood was present in a great many of the apiaries. To properly cope with the situation it has been found necessary to rapidly extend the field of inspection until during the past season, as shown above, the Province was divided into fourteen districts with a man in charge of each. In addition Mr. Morley Pettit of Aylmer West was appointed to the position of Provincial Apiarist with the idea of encouraging still further the care of bees and the production of honey. Mr. Pettit was given an experimental apiary at the Horticultural Station at Jordan Harbor, and provided with considerable equipment for his work. At the close of the season last year it was felt that better work could perhaps be accomplished from the Agricultural College at Guelph, to which the apiary and experimental work has been transferred. A small bee yard will still be kept at Jordan Harbor for experiments with the fertilization of fruit blossoms.

It would be of decided advantage to the fruit growers of the Province if small bee-yards could be maintained throughout the fruit districts. At the present time there are fewer bees in the Niagara Peninsula than in any other section. This is, however, one district above others where their presence is needed by the fruit growers, as shown by those orchards in which bees are kept. This has been very noticeable during the past few seasons, as owing to the cold, wet springs there has been a limited time for the fertilization of bloom. If the bees are present right in the orchard they will work on the blossoms during the limited time between showers and cold weather when the blossoms are in shape for the fertilization of the pistils. A colony or two of bees, if properly looked after, will prove of immense value in the setting of fruit.

CANADIAN NATIONAL EXHIBITION.

This year the exhibit of the Fruit Branch was combined with that of the Agricultural College, the Agricultural Societies, the Corn Growers' Association and the Colonization Branch to make one large agricultural exhibit for the Province of Ontario. Owing to lack of room the fruit exhibit was not made as large as in 1908. It was found necessary to cut out almost entirely the exhibit of boxed fruits. It is hoped that in 1910 it will be found possible to again make such a display, so that we can compare our fruits with those from British Columbia, which were shown altogether in the packages.

The exhibit as shown consisted of the best varieties of fruits which were ripe during the time of the Show. The display consisted of peaches, plums, apples and pears, which, owing to their perfection at that season of the year, aroused a great deal of favorable criticism. Much interest was shown by visitors and considerable information regarding fruit growing was imparted to those who inquired about the same. A large placard giving the percentages of the various fruits raised in Ontario read as follows:—

ONTARIO PRODUCES 75 PER CENT. OF ALL FRUITS GROWN IN CANADA.			
60	per cent.	of the PLUMS.	
70	“	“	APPLES.
80	“	“	SMALL FRUITS AND PEARS.
99	“	“	PEACHES AND GRAPES.

The tendency has been, on the part even of our own people, in the past to belittle Ontario fruit growing and to claim great things for other provinces. The facts as given above surprised a great many people. It would seem necessary for Ontario to adopt some of the up-to-date advertising methods for its fruit industry as followed in the western states.

WINNIPEG EXHIBITS AND THE WESTERN MARKETS.

The Fruit Branch was again represented by an exhibit at the Winnipeg Industrial Exhibition held in July. Boxed apples in quantity were held over from the previous season and proved a very attractive addition to the Show. The standard varieties for winter markets were shown as well as some varieties that were out of season. The McIntosh Red proved to be one of the best keepers that we have put into storage. Other varieties shown were Cranberry, Spy, Canada Red, Stark, Ben Davis and Baldwin.

A leading feature of the exhibit last year was the display of small fruits and cherries. Encouraged by the favorable shipments of the previous year much larger quantities were shipped out in 1909. These were received daily, and the previous day's shipments were then retailed to visitors at a low price. In this way the exhibit was maintained in fresh condition until the close of the Show. Cherries, raspberries, currants, American and English gooseberries arrived in excellent condition. A nice display was also made of tomatoes, cucumbers, early cabbage and other vegetables which are now going forward from Ontario to the western markets.

The western markets are undoubtedly to be of immense importance to the fruit growers of this Province from now on. The growth of the trade westward in fruits has been phenomenal, as shown by the shipments from the Niagara district alone in tender fruits last year. The following figures show an interesting comparison:—

From the entire district to Western Canada:

1909	500 cars.
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From St. Catharines Cold Storage Company to Western Canada:

1904	1 car.
1909	125 cars.

In addition to these freight shipments very large quantities went forward from the middle of July by express, and from reports received these arrived in excellent condition and brought fairly good prices.

The St. Catharines Cold Storage and Forwarding Company after considerable hesitation, decided to attempt the shipment of strawberries to the Winnipeg market in carload lots. Most of the growers interested were interviewed personally by the manager of the Association and by the Director of this Branch in regard to the stage of ripeness at which the berries should be picked. Three cars were made up and sent forward—one by freight under refrigeration and the other two by express in what is known as the "blower car." This latter car is cooled

when the car is in motion by the pressure of air through a large number of hoods on the roof of the car. The returns as given by the Manager of the Association were as follows:—

"I desire to give you some details *re* the strawberry shipments to western Canada, as your Department took an active part in helping the growers to get together the three cars of strawberries sent forward from St. Catharines. Had it not been for the help given by the Department of Agriculture in securing information as to the condition in which the southern and western berries are forwarded we would not have been successful. The growers are very grateful and feel that the venture was a success, first that the car sent from here by freight on June 26th arrived in good condition and netted an average of \$1.51 per crate, while berries shipped the same day to Toronto only netted from 70c. to \$1.04 per crate. The car sent on June 28th by express netted \$1.24 per crate, while Toronto berries the same day only averaged \$1 per crate. We had to pay at the rate of \$5 per cwt. to get the express car shipped June 30th from St. Catharines and sent via Welland and Hamilton. The car got into Winnipeg too late to sell to advantage before Sunday. We still had the berries sell fairly well. Following these shipments through advices received from you while in Winnipeg our Association have shipped about 2,000 baskets of cherries and a lot of red currants, these going through in good condition, demonstrating the fact that our tender fruits can be shipped safely if properly packed. We also have many inquiries from parties who saw the Ontario exhibit at the Winnipeg Exhibition."

First car shipped by freight to Winnipeg via Chicago, June 26th.

Lowest price received \$2 per crate; highest price \$3.05 per crate.

Second car shipped by Dominion Express via boat to Toronto, June 28th.

Lowest price received \$1.82 per crate; highest price \$2.90 per crate.

Third car shipped by Dominion Express in ventilated car from St. Catharines via Welland and Hamilton, June 30th. Lowest price received 90 cents per crate; highest price \$3.

Owing to the arrival of the freight car on a holiday the berries had to be sacrificed, and the returns did not cover much more than the cost. The Association, however, feels satisfied that our berries can be successfully transported to this market, and intend the present year to follow up their previous attempt by putting in some carloads of the earliest berries. Other associations will likely follow the same course this year.

From observation made while in the West both by Mr. Thompson of the Cold Storage Company at St. Catharines and by other parties it would seem necessary for our growers to adopt a different box and crate for berry shipment. The minimum load in a car will also have to be reduced as it was found that where the crates were piled to any great height in the car the top layers were almost invariably moulded and consequently sold for a low price. One carload which was sent last year from Jordan Station to Winnipeg was over-loaded and not iced until some time after the berries were placed in the car. As a result it reached Winnipeg in bad order and was condemned by the city health authorities.

The past season a number of new associations were organized in the Niagara district for the better handling of fruit for the western markets. As a result it is likely that very large quantities of our tender fruits will be shipped through to the west the coming season. It would certainly be advisable for both associations and dealers in that section to come to some agreement as to the proper distribution of the shipments or there is likely to be a tremendous glut of fruit

in the large centres and a scarcity in the many smaller towns and villages surrounding these cities. Such a glut was witnessed last year in connection with the grape shipments with a consequent falling in prices almost below the cost of raising the fruit. That this market will undoubtedly take a tremendous amount of good fruit is true, but our shippers will have to watch carefully both the distribution and the quality until Ontario has regained her reputation in the west.

ONTARIO FRUITS IN EUROPE.

Ontario made no provincial exhibits at any of the Old Country shows the past season. It was decided by the Government, after special investigation, that more good could be obtained by keeping up a permanent exhibit in London than by showing a great quantity of fruit for a few days either at the Royal Horticultural Society Show or at some of the other large exhibits throughout the country. Owing to the changes made in the London offices of the Ontario Government, which are now situated on the Strand, a great deal of advertising can be obtained by the keeping up of an attractive window display of fruits and other Ontario products. With this idea in view the Fruit Branch sent over in storage 100 cases of our best varieties of apples. These will be on display there by the Colonization Branch until the arrival of this year's crop of early apples. In addition to the London shipment 15 cases of apples were also sent to Italy. Owing to the establishment of a direct steamship line from Italian ports to Canada it was thought desirable to endeavor to attract to the country some of the better class of Italian laborers.

EXPERIMENT STATIONS.

The usual appropriations for experimental work in horticulture were made by the Legislature. The experimenters in charge of the work report in full in the last part of this report. The expenditure on capital account for the station at Jordan Harbor was considerably less than the year 1908, as the larger buildings were practically completed. The administration building, superintendent's residence and teamsters' cottages were finished early in the year 1909, including the heating, lighting and plumbing. The greenhouse was completed, but owing to a very severe storm part of the work had to be done over. However, the outfit is now in good shape. The cottage on the lake front was entirely remodelled, so as to accommodate some of the additional help needed on the farm and for which there is no proper boarding house in the vicinity. An appropriation of \$550 was expended in the construction of a breakwater to prevent any further damage by the washing away of the soil on the lake front. A lighting plant was installed to light the main buildings on the farm.

THE SUMMER INSPECTION OF NURSERY STOCK.

During the past summer the Department took up the systematic inspection of all the nursery stock for San Jose Scale and other insects and fungus diseases. This work had not been carried out since the retirement of the first provincial inspector of San Jose Scale, Mr. George E. Fisher, in 1903. It was found, however, that the scale was on the increase in and around some of the best nurseries

and that a thorough inspection was necessary. Four experienced men were engaged on this work from early in August to the end of November with instructions to make an examination of all stock, keeping an accurate record of insects and diseases found and to make notes on the general conditions of the nurseries and their surroundings. This was done in order that the Fruit Branch should have a definite idea of the existing conditions in respect to the nurseries of the Province, thus enabling them to give the nurserymen any assistance in their power in cleaning up infected surroundings and at the same time protect the interests of the fruit growers from the spread of pernicious insects and fungous diseases by means of infected nursery stock. It is hoped to make such inspection annually from now on.

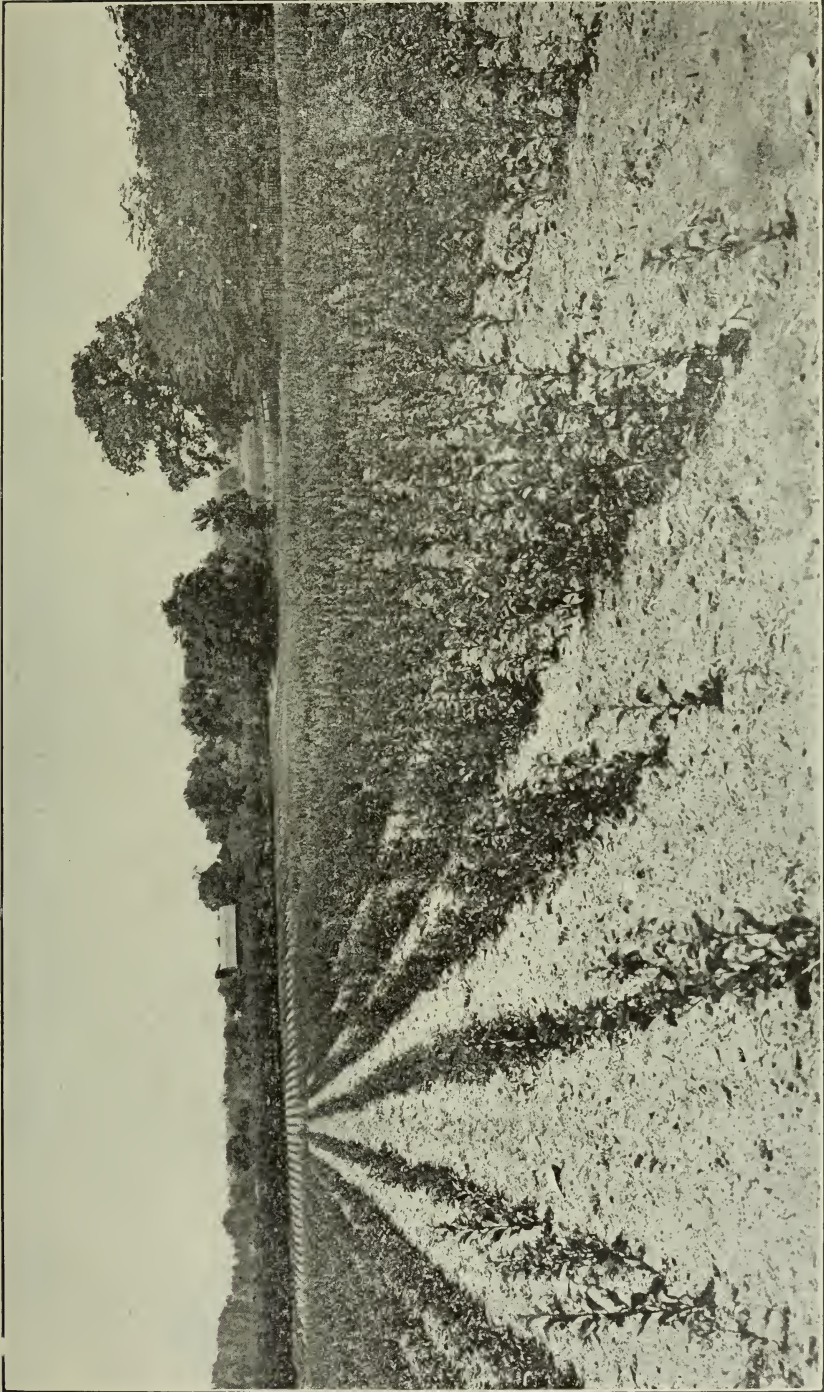
In this work our inspectors found that a great many of the orchards in the vicinity of nurseries were badly infested and that in some instances very little was being done to eradicate or keep the scale in check. In many cases the sources of infestation in nurseries were undoubtedly these orchards. With such constantly present and the lack of proper and effective treatment by their owners, it was forcibly impressed upon the Department that in order to protect the fruit grower and the nurserymen, special attention must be given to these orchards by the Provincial Inspector. The San Jose Scale Act gives this Branch direct power to act in such cases, and appreciating the great danger from dissemination of the scale into uninfested sections through nursery stock, they intend to do everything in their power to lessen the probability of such infection. Such inspection of orchards in conjunction with the fumigation and the summer inspection of the nurseries will practically insure clean trees for the grower to start out with.

The following report regarding insects and fungous diseases was submitted to the Department by the Inspectors, Messrs. R. C. Treherne, R. W. Bartmann, Harry Arnold and N. Foster.

INSECTS.

1. SAN JOSE SCALE, *Aspidiotus perniciosus*, Comst.—But few nurseries can boast that they are completely free from the attacks of this pernicious insect. For the reason that birds are very largely instrumental in the spread and dissemination of this pest, it is almost impossible to certify any nursery free from attack for an extended length of time. It is peculiar that often, and indeed it appears to be general, that but one tree in a row would be completely encrusted from the twigs to the ground and yet no sign of scale would be found on nearby or neighboring trees, unless possibly these be touching. Presumably the reason for this is that a bird was instrumental in transporting the insect from one place to another and in choosing a nursery tree to perch upon at termination of flight left one or more insects on the crotches of that tree. The bird probably flew some distance before again alighting. The female insect, being of course wingless and not adapted to travel, consequently becomes localized. In the case of a group or groups of trees found infested with scale it is probable that at one time a flock of birds had chosen those trees to light upon and in so doing had caused the scale to spread over a greater area.

The San Jose Scale was found on apple, pear, peach and plum as well as on various ornamentals such as Thorns and Mountain Ashes. A difference of immunity of course exists in the various varieties of nursery stock, but no notes were taken in this regard. It was noticed, however, that the Bartlett pear, the Ben Davis apple and the Japanese and Damson plums were the most susceptible of the various classes of stock they represent.



Block of one-year apple stock in the nursery of Morris and Wellington, Fonthill.

A red coloration of the underlying epidermis is usually indicative of the San José Scale, but often this red color is masked by the nature of the bark of some trees. In plums especially it is quite difficult to discern even by a close examination, and a hand microscope is then necessary for identification.

2. PEAR TREE SLUG, *Selandria Cerasi*, Peck.—This well known slimy dark brown slug was found to be very prevalent this year, and present in every nursery examined. The larva of the insect itself was either found or else the marks of its injury were in evidence. The larvae were reported on November 2nd. The leaves of the pear, quince, cherry and plum were all attacked. By skeletonizing the leaves and consequently by reducing the required amount of leaf surface the young trees lose a percentage of their vitality proportional to the extent of defoliation. The wintering pupal state is passed beneath ground.

3. RED SPIDER, *Tetranychus ap.*—This animal is probably of universal distribution in the nurseries. It is entirely leaf feeding, causing discoloration and the curling of the leaves. It is usually found in conjunction with the Leaf Hopper (*Empoasca*) to which the curling of the leaves is principally due. It was found on the under side of the leaves of plum, grape, apple, pear and various ornamentals.

4. OYSTER-SHELL BARK-LOUSE, *Mytilaspis pomorum*.—This insect has not been observed in every nursery nor has it appeared in alarming numbers where it has been found. Several trees were completely encrusted with it, but the sum total of these trees is yet an infinitesimal percentage of the number in the nurseries. It would appear to be more of an orchard than a nursery pest. It is parasitised rather freely by a small pale yellow chalcid fly (*Aphelinus Mytilaspis*). On August 20th this parasite was observed in considerable numbers.

5. WOOLY APPLE APHIS, *Schizonura lanigera*, Hausm.—Possibly next to the San José scale this insect is most to be feared. Especially is this true in climates that are warmer than our own, when the insect has greater opportunity to thrive and multiply. The identification of this insect in the nursery is made possible by the typical erection of a downy, cotton-like covering. When present, it is found in cracks and crevices of the bark, in pruning scars, and on the tender, young twigs. It derives its nourishment from the sap of the tree, and, when numerous, causes swelling and severe punctures in the bark and tender epidermis. Damage to the stock caused by this aphis above ground is probably secondary in nature. That is to say, by continual punctures the access of fungal and bacterial diseases is made possible. Death of a tree may, however, in severe instances result from the effects of this insect alone. Such a case was not observed. Winter is passed in the egg stage on the bark, and also possibly in the adult condition. Early in November of this year some of these insects were found on the roots of an apple affected with Crown Gall. According to reports of nurserymen, this insect in some years is very frequently found in and around the roots of apple. This year, they say, they have not often been noticed. The season thus far has been mild and temperate.

6. APPLE TREE APHIS, *Aphis mali*.—The oval jet black eggs and the green adults of this species are sufficiently well known not to warrant description. It is well distributed in the nurseries, and according to report not as prevalent this year as some years previous. The injury caused is again principally secondary. It is supposed that fire blight gains access to a nursery tree through the medium of this insect.

7. PEACH TREE BORER, *Sanninoidea exitiosa*, Say.—While this insect is one of the worst with which the peach grower has to contend, fortunately it has not been found in excessive numbers on peach trees growing in the nursery row. From the fact that it is present, however, it is worthy of attention. Peach orchards are often severely attacked, but it would appear that entrance to an orchard is more easily effected by the female moth itself rather than by transmis-



One-year sweet cherry stock, showing good type of tree to plant.

sion in nursery stock. In peach trees its presence is noted by the gummy exudation on the trunk at the surface of the ground.

8. PEAR TREE BLISTER MITE, *Eriophyes pyri*, Pagnst.—The discoloration on the under side of pear leaves and the rough appearance of the same is caused by the above named insect. Beyond its devitalizing activities it is not dangerous, but nevertheless quite prevalent in nurseries.

9. APPLE LEAF HOPPER, *Empoasca mali*, LeB.—One of the most noticeable and at the same time one of the most easily distributed of the nursery insects, it is found in every nursery, attacking apple, plum and various ornamentals. It causes a curling and shrivelling of the leaves and in consequence exerts a dwarf-

ing effect on the tree itself. Adults were noticed late in November of this year, usually around the trunks of the trees.

The following insects have been observed to be present in a lesser degree in the nurseries:—

10. CURRANT STEM BORER, *Aegeria tipuliformis*, Linn.
11. APPLE TREE TENT CATERPILLAR, *Malacosoma Americana*, Fab.
12. SHOT HOLE BORER, *Scolytus rugulosus*, Ratz.
13. PUTNAM SCALE, *Aspidiotus ancylus*, Putnam.
14. FORBES SCALE, *Aspidiotus Forbesi*, Johnson.
15. LECANIUM SCALE, *Eulecanium cerasifex*, Fitch.
16. CIGAR CASE-BEARER, *Coleophora fletcherella*, Fernald.
17. RED HUMPED APPLE TREE CATERPILLAR, *Oedemasia concinna*, Sm. & Abb.
18. FALL WEBWORM, *Hyphantria textor*, Harris.
19. CECROPIAN MOTH LARVA, *Samia cecropia*, Linn.
20. PLUM TREE SPHINX LARVA, *Sphinx drupiferarum*, Sm. & Abb.
21. TUSsock MOTH (Larva Eggs), *Orygia leucostigma*, Sm. & Abb.
22. UNICORN PROMINENT, *Caelodasys unicornis*, Sm. & Abb.
23. APPLE BUCCULATRIX, *Bucculatrix pomifoliella*, Clemens.
24. TRUMPET LEAF MINER, *Tischeria malifoliella*, Clem.
25. CHERRY APHIS, *Mysus cerasi*, Linn.

FUNGI.

1. POWDERY CHERRY MILDEW, *Podosphaera oxycantha*, DeBary.—Found on both surfaces of the leaves of the cherry. Some varieties of stock suffered worse than others. It is well distributed and very plentiful. We have, however, no basis for comparison. It appears that the chief injury resulting from this disease is its effects on the tender young leaves and unfolding buds—preventing maturity and hindering development. Its presence is noted by the thin coating of white threads spread over the surfaces of the leaves.

2. BLACK ROT OF GRAPE, *Guignardia bidwellii*.—Prevalent, but possibly owing to the dry season this disease has not shown itself overabundant. Its presence is noted by the brown blotches on the leaves of young grape cuttings.

3. PEAR SCAB, *Fusicladium pirinum*.—May be mentioned as one of the diseases of fairly wide distribution. The dry season evidently controlled it.

4. MELIOLA SP.—This fungus is saprophytic on the "honey dew" of plant lice. It is very common on the bark and leaves, especially in the fall. Probably no injury results beyond disfiguration. It is shown by the black powdery appearance on the bark.

5. BLACK KNOT, *Plowrightia morbosa*.—Trees badly affected were, as a general rule, destroyed. For the reason that nursery stock only remains in the ground but for a limited time, this disease does not make much headway, in consequence of which at no time were many trees found affected in a single nursery. In advanced stages the fungus becomes so pronounced that there is not much possibility of spread to young orchards by transmission in nursery stock. The mycelial threads may, however, be dormant in the tissues and not observable.

6. TWIG MILDEW.—The whitish appearance of the tips of twigs has not been determined. It is either due to a form of Meliola or else it is separate mildew fungus.

Among other fungi noticed to a lesser degree may be mentioned:—

7. GOOSEBERRY MILDEW, *Microsphaera*.
8. CURRANT LEAF SPOT, *Gleosporium venetum*.

9. LEAF CURL, *Ectoascus deformans*.
10. GRAPE MILDEW, *Plasmopara viticola*.
11. ROSE MILDEW, *Sphaerotheca pannosa*.
12. NECTRIA FUNGUS.—Found only on dead or dying trees.



A good type of 2-year sour cherry tree growing in the nursery of W. O. Burgess, Queenston.

PLANT DISEASES.

1. FIRE BLIGHT, *Bacillus amylovorus*.—This bacterial disease resulting probably from insect injury is common to most classes of nursery stock. It is quite prevalent, with the extent dependent on the class of stock. Severe cases will kill the trees in one season's growth and the diseased tree can be easily observed even when all leaves are gone. Slight cases, while easily noticed when trees are in leaf, might possibly be overlooked in shipping. Injury resulting to a tree after spraying with kerosene and water may be easily mistaken for the effects of the blight organism.

2. CROWN GALL.—It is impossible to overestimate the importance of this disease with regard to the nurserymen. To the nurseryman, who in some cases may have to destroy two-thirds of his apple stock, it is a serious foe and one upon which we have as yet no reliable knowledge. Various theories are advanced and it is customary to accept these as fact, but as yet no definite cause has been assigned and until further authoritative study is given this subject we shall remain in doubt. Whether this Crown Gall is a disease or a physiological effect on the tree itself, the fact nevertheless remains that numerous trees are yearly discarded by the nurseryman merely from the fact that they are unsightly and unfit for sale.

During this summer this condition of root enlargement has been observed on apple, peach, plum, sweet and sour cherry, raspberry, mountain ash. According to diagnosis of a nurseryman, it is reported also on American ivy. The extent and prevalence of this unsatisfactory condition of stock appears to be dependent on variety and soil. Some varieties show greater inclination to produce Crown Gall and some soils, chiefly the sandy soils, appear to contain more affected trees.

3. BLACK HEART.—Presumably winter and late spring injury resulting from frost. Too close trimming, it is said, will cause this undesirable condition of trees.

THE REPORT OF THE INSPECTOR OF SAN JOSE SCALE. BY R. H. LEWIS,
HAMILTON.

In my capacity of Provincial Inspector of San Jose Scale I have examined the qualifications of three new local inspectors and have recommended the appointment of two of these applicants. The third applicant in my opinion did not present the proper qualifications and knowledge which would make an efficient inspector. I visited and inspected the work of the local inspectors in those municipalities that have availed themselves of the opportunity of appointing one, and after having ascertained as to the efficiency of their work and correctness of their accounts, I certified to them according to the Act. On some occasions I was called out by local inspectors in instances when the owner of an orchard refused to spray and observe proper treatment in order to control the scale. In some instances I was forced to have the orchards destroyed or sprayed immediately, and in every case my instructions were carried out.

The San Jose Scale has spread very rapidly this season owing to the favorable conditions and very dry weather. In southern Ontario where the scale is doing its greatest damage spraying is being carried on more extensively and thoroughly than in the past, especially in the vicinity of Leamington, and it would seem that more and continued instruction in the preparation and application of lime and sulphur would not only be beneficial but very much appreciated by the growers.

From my observation of the infestation of our nurseries I feel that the nurseryman should be protected as much as possible from any source of dangerous infection such as neglected fence lines and infested orchards. I would recommend that the owners of these orchards and fence lines be made to observe such conditions as will minimize the probabilities of infection.

THE DISTRIBUTION OF SAN JOSE SCALE IN ONTARIO.

It is now nearly sixteen years since the scale made its appearance in the United States, and thirteen years since its first appearance in Ontario.

The first specimens were received from near Chatham in January, 1897, and shortly afterwards scale was found in orchards near Niagara-on-the-Lake and St. Catharines. In 1900 it was reported to have been located at East London by Mr. J. Dearness, and Professor Lochead discovered it at Essex Centre.

In 1902 by an amendment of the San Jose Scale Act township councils on application of fifteen ratepayers were empowered to appoint inspectors subject to the approval of the Minister of Agriculture, the Department paying half the expenses. The townships of Saltfleet, North Grimsby and Clinton took advantage of this and as a result several infections of scale were discovered and the distribution was proved to be greater. From now on the scale area gradually increased.

In the Niagara District the distribution of the scale may be said to be general. It is found in every locality and also above the mountain wherever fruit growing is practised. In the Fonthill district nearly every apple orchard is infested. It is found around Burlington, but the infestations are light and not general. The scale has made inroads into some of the other counties. In 1907 it was found in Elgin, near St. Thomas, and in Peel County near Lorne Park, in 1908 in Oxford and Norfolk, near Tillsonburg, and in 1909 in Prince Edward County, near Picton and in the northern part of Ontario County near Zephyr. In all these cases the infested areas were promptly inspected and proper precaution taken to prevent its spread.

In western and south-western Ontario the scale seems to be spreading. It has taken a firm hold near Tillsonburg in the Township of Middleton, Oxford County. In the report of the township inspector we find there were twelve cases of infestation. Half of these were bad and three very bad. The scale may have a wider distribution in western Ontario than intimated in this report as a good deal of the territory is admirably adapted to its best development, but as the Department is largely dependent upon accidental discoveries where no local inspectors exist a more accurate description of its limitations is not possible.

The scale may be said to be doing most damage in the Counties of Essex and Kent. Here but few of the orchard owners are spraying and giving their trees proper attention and it is getting a stronger hold from year to year. A great many orchards have already been taken out. The same conditions exist in the Fonthill district, where the scale is thoroughly disseminated and is doing a lot of damage to the apple orchards. Little, if any, attention is paid to it in such orchards, but on the other hand those farmers that raise any of the tender fruits spray, and as a result have the scale well in check.

In the Niagara district the scale is no longer looked upon as a great obstacle, for spraying with the lime sulphur solution is almost universal. From Hamilton to Jordan it may be found almost everywhere, but it never got a very strong hold in any township except perhaps in one or two isolated orchards. In the Township of Grantham the scale secured a good footing before the farmers fully appreciated what could be done in controlling it by a little attention and thoroughness. However, within the last few years spraying has been carried on by every fruit grower with the result that there is practically no scaly fruit now shipped from the township.

In Niagara Township the scale has done considerable damage. It has wiped out nearly every apple orchard in the neighborhood of Niagara-on-the-Lake. Nearly all the old fruit trees, both apple and peach, in that section have been destroyed and their owners must have had heavy losses. Within the last few years a great many new orchards have been put out, and to-day Niagara Township has the

largest and best peach orchards in the district with practically no trouble from Scale. A few remaining apple orchards still constitute a serious menace to the new orchards and should be cleaned out without delay.

One of the important factors in the control of the scale which has not yet received proper attention is the method or lack of method adopted by the cities, towns and villages in which there are hundreds of trees badly infested, and back yards in which one may find fruit trees encrusted with scales. It would seem that the authorities in charge should adopt some thorough inspection and treatment of infested trees.

The number of municipalities which have appointed inspectors under the provisions of the San Jose Scale Act is slowly increasing. This year the Fruit Branch adopted a system of supplying the inspectors with blank report books



A fine apple orchard in Niagara Township dying from attack of the San Jose Scale.

consisting of duplicate sheets, one of which is returned to the Department and the other kept by the municipality. By this method the Department is able to keep a record of the spread of the scale in townships having inspectors and of the work done by such inspectors.

The following is a list of municipalities and inspectors:—

Township.	County.	Inspector.
Barton	Wentworth	Harry F. Burkholder.
Saltfleet.....	Wentworth	Walter E. Biggar and J. P. Van-Wagner.
N. Grimsby	Lincoln.....	H. L. Walker, Wm. A. Coon and E. J. Biggar.
Cinton.....	Lincoln.....	John Read and Chas. Watson.
Pelham.....	Welland.....	Harry Arnold.
Mersea.....	Essex	J. R. Johnson.
Pelee Island.....	Essex	Wm. Stewart.
Middleton	Norfolk	J. C. Herron.
Thorold	Welland.....	Albert Nelson.
Niagara	Lincoln.....	Fred. Sheppard.
St. Catharines	Lincoln.....	Wm. Elliott.
Thorold	Welland.....	Sam. Martin.
Leamington.....	Essex.....	J. R. Johnson.
Walkerville.....	Essex.....	J. B. Forest.

SPREAD OF THE SCALE IN ONTARIO.

This year the San Jose Scale was reported from two points which had hitherto been free from this pest. In August, Dr. Hewitt, Dominion Entomologist, advised the Department that a specimen of scale submitted by Mr. Thomas J. Murray, Zephyr, Ontario, was identified as the San Jose Scale. On inspection the scale was found on one Japanese plum tree, which was very badly infested. This tree was planted in the spring of 1908 and the insect had, therefore, passed through one winter in a section where it was supposed it could not live.

The farm is located in the township of Scott in the County of Ontario and near Lake Simcoe. The orchard in which the scale appeared consisted of some young trees two years planted and a few older apple and peach and was in an isolated position with regard to other orchards. The infested tree has in this case been destroyed and the remaining trees will be sprayed with lime and sulphur in the spring. This tree was undoubtedly scaly when sent out by the nurseryman. Fortunately the nursery from which it originated was inspected by order of the Minister of Agriculture in the spring of 1908 and all the stock destroyed.

The second appearance of the scale was in Prince Edward County, one of our best apple producing sections. Mr. F. M. Powers, a farmer living east of Picton, noticed the unusual appearance of some of his young trees planted in 1908 and notified Mr. A. P. MacVannel, the District Representative of the Department of Agriculture, who examined them and found the cause to be the San Jose Scale. Samples were sent to the Entomologist of the Agricultural College, Guelph, who confirmed Mr. MacVannel's identification. The Fruit Branch being notified of the infestation detailed one of its inspectors to make a thorough investigation of the condition of the infected orchard and others in the neighborhood purchased through the same agent. Mr. Treherne reports that Mr. Powers had purchased 625 trees consisting of the following varieties: Ben Davis, Pewaukee, Gano, Delaware, Tolman and McIntosh, which were planted in the spring of 1908. It was not until September 1st, 1909, that the owner noticed the appearance of the infected trees. The variety on which the scale was found was the Ben Davis. Five trees in all were attacked, one of which had only a slight infestation. It would appear from the condition of the scale on the infested trees that the San Jose Scale will live in this section although its increase would be much less, owing to the severe winters, than in the southern parts of the Province.

Mr. Treherne visited the farm of Mr. Tom Wright, who had also purchased stock in 1908 from the same source as Mr. Powers. One tree was found to be slightly infested with the scale and was destroyed. Ten other farms on which stock from the same nursery was planted, were visited and inspected and the trees were found to be free from any trace of scale. In both these cases of San Jose Scale in new sections in the Province the infection has been conclusively traced to nursery stock. The percentage of infested trees has been small, but nevertheless these few trees would have in all probability introduced this terrible pest into one of our best apple growing sections. These instances prove that an annual inspection of nurseries, control of infested orchards in the vicinity of nurseries and the fumigation of all stock must be rigorously enforced.

In conjunction with the above inspection in Eastern Ontario the Department has obtained a list of local agents who distributed stock from the same source,



Elberta peach treesprayed with lime-sulphur. Note heavy crop of large fruit and absence of leaf-curl.



Four-year-old peach tree sprayed with home-boiled lime-sulphur. Note healthy foliage and absence of leaf-curl.



Leaf curl overcome by spraying with home-boiled lime-sulphur wash on farm of F. Blaikie, St. Catharines.



Four-year-old peach tree, unsprayed, showing effects of leaf-curl on the foliage.

and all young orchards planted therefrom are being inspected. This is slow and expensive work and should not be necessary if all of the nurseries will cooperate with the Department in carrying out the regulations.

LIME SULPHUR AS A FUNGICIDE.

The use of the lime sulphur mixture for the destruction of the San Jose and Oyster Shell scales, as already shown, has increased enormously in all districts during the past year. The fact that this mixture is also very useful as a fungicide has perhaps had a great deal to do with its popularity. In the



Elberta peach tree unsprayed, showing defoliation and loss of fruit from leaf curl.

peach districts where applied early in the season leaf curl was practically controlled and a good set of fruit was obtained. In unsprayed orchards the disease was so bad the past season that the first crop of leaves, together with the young peaches, was almost entirely lost.

Some growers reported that the lime sulphur did not control the leaf curl, but it was found on investigation that this was due entirely to too late an application. The men had put off the spraying until the buds were opening, with the result that the fungus had already secured a foothold in the tissues of the leaves. The illustrations given herewith show very clearly the difference between the sprayed and unsprayed trees. On the farm of Mr. George A. Robertson, St. Catharines, two old Elberta trees stood off by themselves from the balance of the orchard. One was sprayed and the other was left untouched, with the result as shown in the photos. The crop of fruit on the sprayed tree was enormous, while practically nothing was obtained from the other.

The other illustrations were taken in the orchard of Mr. Frank Blaikie of Port Dalhousie. Mr. Blaikie's orchard was sprayed with the exception of five trees in one corner of the orchard where the men ran short of material. These trees despite the fact that they were in the pink of condition, were practically defoliated, while the balance of all of Mr. Blaikie's orchards was almost entirely free from the leaf curl.



Fruit and foliage from sprayed Elberta peach tree on farm of Geo. A. Robertson, St. Catharines

REPORT OF EXPERIMENTS CARRIED ON IN ESSEX COUNTY. BY A. MCKENNEY, OF
THE DEPARTMENT OF AGRICULTURE.

Our Spraying Demonstration work in Essex County has been confined chiefly to testing the efficiency of home boiled lime sulphur and different com-

mercial sprays for controlling the San Jose Scale. The following is a brief outline of the work done.

Nine trees badly infested with scale were sprayed in April, 1908, with home boiled lime sulphur, 20 lbs. lime, 18 lbs. sulphur, and 40 gallons of water with good results, and again in April, 1909. Some of the trees are absolutely free from scale now, while those that have any are only slightly infested.

Nine trees previously sprayed in April, 1908, with V 1, and still badly infested with scale, were sprayed in November, 1908, with home boiled lime sulphur. None of these trees were sprayed in the spring of 1909. Only a portion of the scale was killed, but these are not nearly as badly infested as the check tree.

Eighteen trees previously sprayed with V 1 in April, 1908, without giving any results whatever, were again sprayed with V 1 in April, 1909, with absolutely no effect on the scale. The solution was carefully applied and mixed according to the instructions, 1 to 100.

Eighteen trees badly infested with scale were sprayed in April, 1908, with Niagara Brand lime sulphur, 1 to 10, with pretty good results, and again in April, 1909, with Niagara Brand 1 to 10. There is still a little scale on the trees, the work not being quite so marked as where the home boiled was used.

Nine trees badly infested with scale were sprayed with Grasselli lime sulphur 1 to 10. A large portion of the scale has been killed, but the trees are still slightly infested.

Nine trees badly infested were sprayed with Grasselli Brand 1 to 7, giving better results than where it was used 1 to 10, as nearly all the scale was cleaned out.

Conclusion.—Home boiled lime sulphur, 20 of lime, 18 of sulphur, and 40 gallons of water boiled for one hour will control the San Jose Scale. The Niagara and Grasselli brands if sprayed according to the directions are not quite strong enough to do the work as well as the home boiled, but if used about 1 to 7 they will kill the scale. Fall spraying is not as effective as spring spraying.

REPORT OF FUMIGATION.

The work of inspection of fumigation appliances was carried on as usual. The condition of the houses was not so good as the previous year, no doubt due to the wet spring. However, all were repaired and made air tight before being used. This year duplicate reports were made of the condition of these houses. One of these reports was retained by the inspector and the other given to the nurseryman. In both the repairs necessary before the buildings could be used for fumigation are specially mentioned, and the nurseryman must make such repairs before the return of the inspector.

This year the following local inspectors superintended the fumigation: A. E. Jones, district from Stoney Creek to Hamilton; R. W. Bartmann, St. Catharines and Queenston; Harry Arnold, Fonthill district.

The system of having local inspectors on the ground to see that all stock is fumigated is an excellent one and has worked very well. It has been found, however, that one man cannot efficiently superintend the fumigation in the Fonthill district, and an additional man will have to be appointed this spring.

The following is a list of nurserymen and seedsmen in Ontario:—

NURSERYMEN:

Morris & Wellington	Fonthill	General stock of fruit & ornamentals.
Brown Bros.	Brown's Nurseries	General stock, etc.
B. W. Secord	Pelham Corners	General stock, etc.
Jas. Page	Ridgeville	Fruits.
J. E. Crow	Ridgeville	Fruits.
A. G. Hull & Sons	St. Catharines	General stock.
J. E. McCombs	Pelham Corners	Fruits.
H. Cawker	St. Catharines	Roses.
C. E. Secord	St. Catharines	Peaches.
E. Morden	Niagara Falls	General stock.
W. B. Bridgeman	Queenston	Peaches and cherries.
Frank Walker	Virgil	Peaches.
E. D. Smith	Winona	General stock of fruit & ornamentals.
C. W. F. Carpenter	Winona	General stock of fruit & ornamentals.
J. W. Smith	Winona	Peaches.
W. B. Bridgman	Winona	Peaches.
J. E. Henry	Winona	Peaches.
J. E. Foran	Winona	Peaches.
G. M. Hill	Fruitland	General.
Jos. Tweddle	Fruitland	Small Fruits.
Brock Galbraith	Bartonville	Peaches.
Canon Floral Co.	Hamilton	Ornamentals.
C. E. Woolverton	Grimsby	Ornamentals.
W. H. Bunting	St. Catharines	Strawberries.
H. P. Van Wagner	Stony Creek	Dahlias and gladioli.
Thos. Rowley	Leamington	Peaches and grapes.
Frank McLean	Brigden	Fruits.
N. E. Mallory	Blenheim	Small fruits.
McDowell Bros.	Tillsonburg	Small fruits.
John Downham	Strathroy	Strawberries.
J. Gammage & Sons	London	Ornamentals.
C. A. Baker	London	General.
R. C. Chrysler	St. George	Strawberries.
W. H. Vanderburg	Poplar Hill	Strawberries.
M. Milgau	Bright	Evergreens.
Hunter & Sons	Scotland	Fruits and dahlias.
J. McAinsh	Wellburn	Evergreens.
Mitchell Nursery Co.	Mitchell	Evergreens.
Campbell Bros.	Simcoe	Cannas, dahlias, gladioli, paeonies.
Jas. E. Johnson	Simcoe	Strawberries.
Wm. Fleming	Owen Sound	Small fruits.
J. H. Wismer	Port Elgin	Fruits.
Estate John Stewart	Ben Miller	Fruits.
J. W. Johnston	Campbellford	General.
L. K. Shourds	Wellington	Apples.
W. C. Reid	Belleville	Ornamentals.
McIntosh & Smith	Mountain	Fruits.
J. W. Thompson	Napanee	Strawberries.
Ottawa Nursery Co.	Ottawa	General.
David Tait	Iron Bridge, Algoma	Hardy fruits.
R. Breckon	Toronto	Small fruits and ornamentals.
Colin McDonald	Toronto	Small fruits and ornamentals.
Thos. Manton	Eglinton	Ornamentals.

SEEDSMEN:

Steele Briggs Seed Co.	Toronto & Hamilton.
J. A. Simmers	Toronto.
Wm. Rennie Co.	Toronto.
John A. Bruce & Co.	Hamilton.

ORCHARD SURVEYS.

During the summer of 1909 this Branch, in conjunction with J. W. Crow, Professor of Pomology at the Agricultural College, carried out a survey of a number of districts in the Province to ascertain the status of the fruit industry therein. The Department of Agriculture had in previous years done more or less of this work for special crops throughout the entire Province and reports of such work have been published to cover such crops as tomatoes, beans, potatoes and tobacco.

The surveys of 1909 were limited to certain well defined districts with the idea of getting definite figures as to the orchard crops within these districts. The men in charge of this work were instructed to visit every farm where fruit was grown and give a detailed report thereon in respect to the following points: Size of orchard, site, planting plan, aspect, varieties of fruit, with the number of trees, their age and distance apart, type and depth of soil, sub-soil, drainage, tillage, cover crops, fertilizers, pruning, spraying, insect and fungous diseases, yields of fruit, where and how sold with prices, where possible, for a number of years.

The information obtained has been compiled and will be published as an appendix to this report under a separate cover. Fruit growers in any locality in the Province would do well to secure the report and to study carefully the results shown there from a large number of orchards in different parts of the Province.

The sections reported on and the men carrying out the work are as follows:

Lake Huron district, including parts of the Counties of Lambton, Huron, Middlesex, Perth and Bruce, in charge of Messrs. T. B. Faulds and S. E. Todd.

Kent County, in charge of Mr. Norman Foster.

Simcoe County, in charge of Mr. A. D. McIntosh.

The Townships of Barton, Saltfleet and North Grimsby, in the County of Wentworth, in charge of Mr. W. D. Jackson.

In addition there will be published in the same report a special survey made of the Township of Murray, in Northumberland County, by Mr. T. B. Revett of this Branch, and also a soil survey made of the entire Niagara District by Mr. H. H. LeDrew.

INSTRUCTION IN PACKING.

This work was continued along similar lines to 1908. One expert only could be engaged, owing to lack of funds. This man spent his whole time in September, October, and November visiting the packing houses and orchards of co-operative associations throughout the Province examining the work of the packers and giving them instruction in the proper grading and barreling of their fruit. This work might well be extended to all of the orchards and packing houses of the Province, as it would seem that there was still a great deal of room for improvement in the proper packing of our apples especially. The federal inspectors under the Inspection and Sales Act report that the basket packing is now in excellent shape. The presence of a special inspector for the past few seasons in the Niagara District has resulted in a decided improvement in the condition of the fruit in this kind of package.

The past season serious complaints were made as to the packing of apples both in barrels and boxes. This was perhaps mainly due to the increased activity on the part of the federal inspectors. At the same time we have reason to believe that there are still enough dishonest or ignorant packers in the country to seriously injure the reputation of our Ontario fruit. An extension of the instruction in the packing of this fruit should go a long way towards eliminating the excuse of ignorance.

LEGISLATION.

A year ago a special Committee of the Fruit Growers' Association of Ontario drafted a bill covering the inspection of orchards and spraying of trees for insect pests. This bill was based on the San Jose Scale Act, which had proved of great value in checking the ravages of that insect. On the advice of the Minister of Agriculture the Committee appeared before the Agricultural Committee of the House and explained in detail what was aimed at in the proposed legislation. Owing to the lateness of the session the matter was left over until the next session of the legislature with the advice from the Committee to submit the bill to provincial and local fruit growers' associations for criticism. This was followed out, and after some changes had been made the bill was introduced into the legislature as a government measure and was adopted with one change. The disease known as Crown Gall or Root Gall was suggested to be included within the provisions of the law. It was found, however, on consultation that the best authorities on the continent thought as yet not enough was known concerning this disease to place it in the same class as peach yellows, black knot, etc.

It will be noted in the clauses of the Act, which is printed in full herewith, that the matter of enforcement rests largely with the fruit growers themselves, as was the case with the San Jose Scale Act. On a properly signed petition being presented to the council of any municipality such municipality must enforce the Act. Spraying may thus be made compulsory in any section provided there is enough public opinion behind such action to see that the proper inspection takes place and that the other provisions of the law are enforced.

AN ACT TO PREVENT THE SPREAD OF INSECT AND FUNGOUS DISEASES INJURIOUS TO VEGETATION.

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. This Act may be cited as *The Fruit Pests Act*.
2. In this Act

"Minister" shall mean the Minister of Agriculture for the Province of Ontario.

"Plant" shall mean any tree, vine, shrub or plant.

"Disease" shall mean the following insects and diseases in any stage of development: Codling Moth, San Jose Scale, Yellows, Little Peach, Black Knot, Pear Psylla and Pear Blight.

3. On the recommendation of the Minister, the Lieutenant-Governor in Council may appoint one or more competent persons to act as inspectors, whose duties shall be to enforce the provisions of this Act.

4. No person shall import or bring, or cause to be imported or brought into the Province of Ontario, for any purpose whatsoever, any diseased plant or fruit.

5. No person shall keep or have, or offer for exchange or sale, any diseased plant.

(a) All persons owning, leasing or managing any orchard or collection of plants, other than a nursery, shall, when any plant therein becomes diseased and forthwith on becoming aware, whether by notice or otherwise, of such disease, destroy such plant by fire or shall effectually treat the disease by fumigation or spraying with such material as may be prescribed by the Minister.

(b) The council of any city, town, township or incorporated village may, and upon the petition of twenty-five or more fruit growers who are ratepayers, shall by by-law appoint at least one inspector to enforce the provisions of this Act in the municipality and fix the amount of remuneration, fees or charges he shall receive for the performance of his duties. All such appointments, as well as such remuneration, fees or charges shall be subject to, and be only operative on, the written approval of the Minister, communicated by him to the clerk of the municipality. The by-law shall not take effect unless and until approved by the Minister of Agriculture, and shall remain in force only for the calendar year in which it is passed. The clerk of the municipality shall transmit a certified copy of every such by-law to the Minister of Agriculture before the first day of May after the passing thereof.

(c) Upon the report of the inspector to the reeve or mayor that there is disease upon the plants on any lot within the municipality, the reeve or mayor shall direct the clerk to give notice personally by the inspector or by registered letter to the owner or occupant of the lot to have the plants forthwith sprayed, and in case the same are not sprayed within ten days, the inspector may cause the spraying to be done and the cost of the same shall be charged on the lot and be collected as a special tax in addition to the other taxes imposed by the municipal council on the lot.

(d) All such inspectors appointed shall be subject to and observe the regulations and directions of the Minister, and shall be subject and subordinate to the inspector appointed by the Minister, and in case of any neglect of duty such inspector shall be subject to the penalties prescribed by this Act.

(e) The council of the city, town, township or incorporated village shall pay the remuneration, fees or charges of such inspectors and shall be entitled to receive from the Department of Agriculture one-half of the amount so paid upon furnishing the Department with statements of the sums so paid, certified to by the inspector appointed by the Minister, provided that such statements are submitted to the Minister on or before the fifteenth day of December of the year to which they apply.

6. The owner or proprietor of any nursery shall not send out or permit any plant to be removed from his nursery without the same being first fumigated by hydrocyanic acid gas in accordance with regulations prescribed by Order of the Lieutenant-Governor in Council.

7. No person shall sell or dispose of or offer for sale any plant obtained, taken or sent out from a nursery unless the said plant has been previously fumigated by hydrocyanic acid gas in accordance with the above regulations.

8. In case the inspector finds disease in any nursery, and so reports to the Minister, the Minister may thereupon inform in writing the owner or proprietor or manager of said nursery of the existence of disease in his nursery, and the owner or proprietor or manager of said nursery shall not thereafter permit any plant or plants to be removed from the said nursery until he is notified in writing from the Minister that the inspector has reported to the Minister that it is safe in the public interest to permit the said nursery stock to be removed after fumigation.

9. For the purpose of scientific investigation the Minister may from time to time, by writing given under his hand, except such persons as he may deem proper from the operation of the two preceding sections, and while acting under such permission such persons shall not be subject to the penalties imposed by this Act.

10. Any person having reason to suspect that any plant in his possession or in his charge or keeping is diseased shall forthwith communicate with the Minister in regard to the same, and shall furnish the Minister with all such information in regard to the source or origin of the said infestation and nature of the same as he may be able to give.

11.—(a) Whenever disease exists or is supposed to exist on any plant, the Minister may direct a competent person to make an examination and inspection, and may order that any plant so infested, or such part as he may deem advisable, shall be immediately destroyed by burning, either by the person appointed to make the inspection or by the person owning or having possession of the said plant, or some other person so directed in writing, and the person so directed shall make a full report to the Minister in writing as to the nature and extent of the work so performed, together with a fair estimate of the value of the plants destroyed.

(b) If, in the case of an orchard or collection of plants, the inspector finds disease on plants located in several different parts of the orchard or collection, and decides that it is advisable in the public interest to destroy all the plants in such orchard, or in any part or parts thereof, and so reports to the Minister, the Minister may direct that an examination or inspection shall be made by an additional inspector, and upon their advice in writing he may direct that all the plants in such orchard or such collection of plants or in such part or parts thereof shall be destroyed without requiring that every plant in the said orchard or collections shall be first examined.

12. Any person appointed under section 3 of this Act to inspect or destroy any plant for the purpose of enforcing the provisions of the Act, and any inspector appointed by the council of any municipality, shall, upon producing his authority in writing, have free access to any nursery, orchard, store-room or other place where it is known or suspected that any plant is kept.

13. Any person neglecting to carry out the provisions of this Act, or any person offering any hindrance to the carrying out of this Act, shall upon summary conviction be liable to a fine of not less than twenty dollars nor more than one hundred dollars, together with costs, and in default of payment thereof shall be subject to imprisonment in the common gaol for a period of not less than ten days nor more than thirty days.

14. The Lieutenant-Governor in Council may, by Order, direct that other diseases than those mentioned may be included in the provisions of this Act, and thereafter during the continuance of such Order-in-Council the word "disease" in this Act shall include all such other diseases. Public notice of such Order-in-Council shall be given by publication in two successive issues of "The Ontario Gazette."

15. The Acts known as *The Yellows and Black Knot Act*, *The Noxious Insects Act*, and *The San Jose Scale Act* are hereby repealed.

CO-OPERATIVE ASSOCIATIONS.

Continued activity was displayed in co-operative work among the fruit growers. A number of new associations were organized, while some of those that had proved a failure in the past were re-organized. The shipping season proved to be fairly successful for those associations that sold their crop early. A number who continued to consign to firms in the Old Country received poor returns for the early part of the season when the bulk of their crop went forward. These associations had been receiving considerably higher prices, however, during the previous two seasons and will probably feel that taking the past three years into consideration they will have received about as much for their apples as the associations following the other plan of selling direct.

The continued success of the Norfolk Fruit Growers' Association is undoubtedly due to the energetic action of the manager, Mr. James E. Johnson, and the other officers of this Association in consistently holding up the quality

of their fruit above the government standards and adopting up-to-date advertising methods for their goods. The following returns were made by this Association to their members for the last year's crop:—

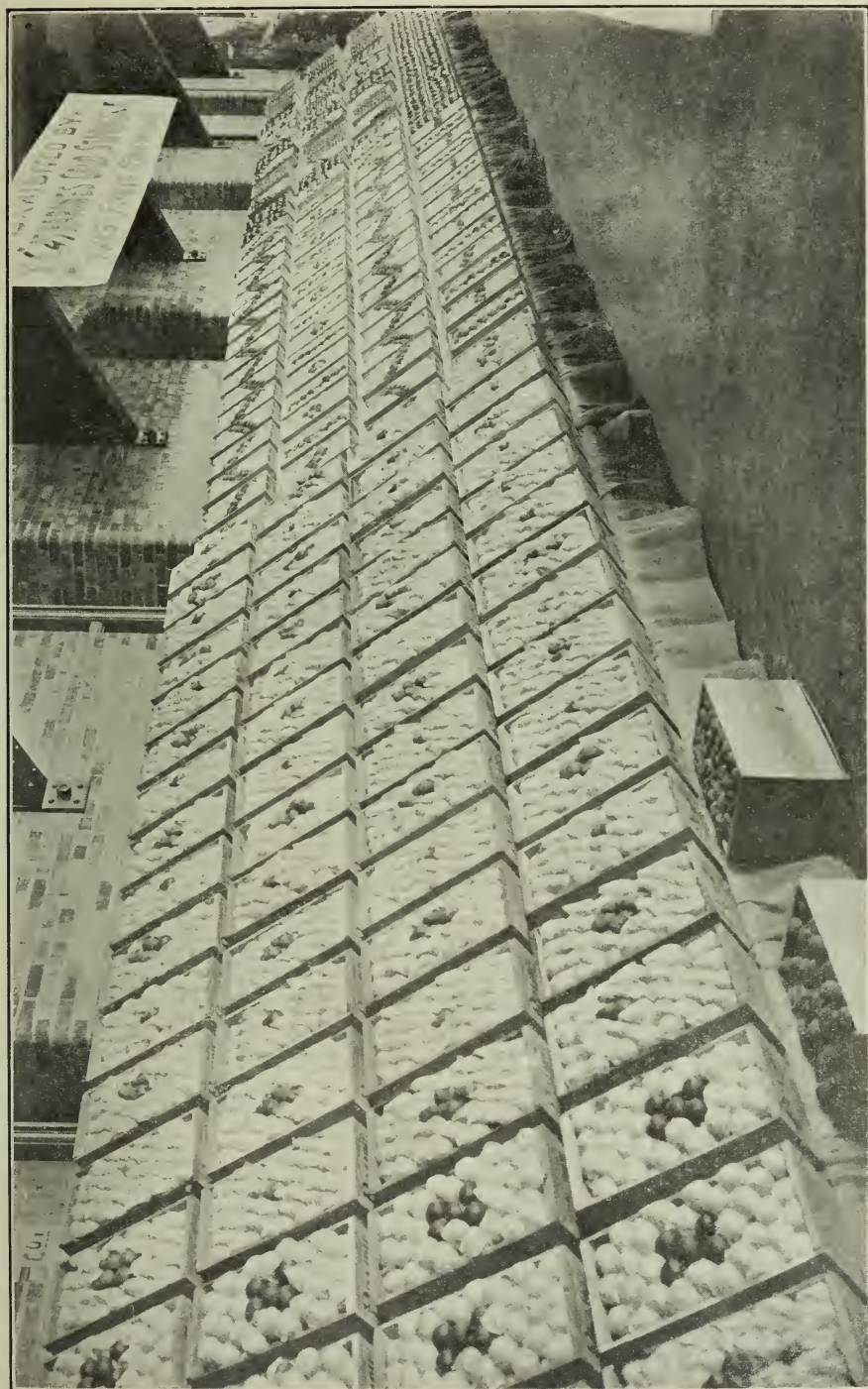
<p>Class 1, \$3.30.</p> <p>No. 1's Spy. King. Spitzenburg. Snow. King Pippin. German King. Hyslop Crab. McIntosh Red.</p> <p>Class 2, \$3.00.</p> <p>No. 1's Baldwin. Russet. Blenheim. Canada Red. Newtown. Cranberry.</p>	<p>No. 1's Greening. Ribston. Hubbardson. Wagner.</p> <p>Class 3, \$2.65.</p> <p>No. 1 Odd Varieties. Fall Varieties. No. 2 Hail pecked.</p> <p>Class 4, \$2.35.</p> <p>No. 2 Varieties of classes 1 and 2.</p> <p>Class 5, \$2.00.</p> <p>No. 2 Odd Varieties.</p>
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CO-OPERATIVE FRUIT GROWERS' ASSOCIATIONS.

Arkona Fruit Growers' Association	T. A. Lampman, Arkona.
Belleville Apple Growers' Association	F. S. Wallbridge, Belleville.
Brant Packing Association	F. M. Lewis, Burford.
Chatham Fruit Growers' Association	W. D. A. Ross, Chatham.
Georgetown Co-operative Association	F. J. Barber, Georgetown.
Georgian Bay Fruit Growers, Ltd.	G. H. Mitchell, Thornbury.
Gore Fruit Growers' Association	B. J. Palmer, New Durham.
Ingersoll Fruit Growers' Association	J. C. Harris, Ingersoll.
Newcastle Fruit Growers, Ltd., and Forwarding Association	W. H. Gibson, Newcastle.
Norfolk Fruit Growers' Association	Jas. E. Johnson, Simcoe.
Oakville Fruit Growers, Ltd.	T. Garner, Palermo.
Oshawa Fruit Growers' Association	Elmer Lick, Oshawa.
Owen Sound Fruit Company, Ltd.	Adam Brown, Owen Sound.
Sparta Fruit Growers' Association	J. A. Webster, Sparta.
Watford Fruit Growers' Association	D. G. Parker, Watford.
Grafton Fruit Growers' Association	J. G. Wait, Wicklow.
Alvinston Fruit Growers' Association	E. F. Augustine, Auhrim.
Arran and Amabel Fruit Growers' Association	J. Davidson, Skipness.
Arkwright Fruit Growers' Association	A. Gammie, Burgoyne.
Burgessville Fruit Growers' & Forwarding Co.	W. H. Kneal, Burgessville.
Burlington Fruit Growers' Association	W. F. W. Fisher, Burlington.
Canadian Apple Exporters, Ltd.	Frank Mallory, Frankford.
Clarkson Fruit Growers' Association	W. G. Horne, Clarkson.
Cobourg Fruit Growers' Association	S. W. Staples, Baltimore.
Dunnville Fruit Growers' Association	Chas. H. Weaver, Dunnville.
Hatchley Station Fruit Growers' Association	W. F. Robinson, Hatchley Station.
Ilderton Fruit Growers' Association	E. T. Caverhill, Ivan.
Mount Nemo Fruit Growers' Association	R. M. Spence, Nelson.
Orona Fruit Growers' Association	E. J. Hamm, Orona.
Paisley Fruit Growers' Association	Wallace Megraw, Paisley.
Forest Fruit Growers' Association & Forwarding Co.	D. Johnson, Forest.
Jordan Co-operative Association	J. A. Wills, Jordan.
St. Catharines Cold Storage & Forwarding Co.	Robt. Thompson, St. Catharines.
Grimsby Fruit Growers' Association	H. L. Roberts, Grimsby.
Winona Fruit Growers' Association	E. J. Henry, Winona.
Ontario & Western Co-operative Fruit Growers' Co.	C. J. McCollum, Grimsby.

MODEL BY-LAWS.

The following set of by-laws will serve as a guide to Associations who are organizing for educational purposes largely. The Clarkson Association, however, is also interested in the purchase of supplies.



Part of exhibit of boxed fruit put up by the St. Catharines Cold Storage and Forwarding Co., at the meeting of the American Pomological Society, 1909.

1. The organization shall be known as the Clarkson Fruit Growers' Association.
2. The annual membership fee shall be one dollar, and the same shall be payable on or before the second Saturday in January in each year. Any member failing to pay the fee shall cease to be a member, and can only rejoin the Association by paying two dollars. New members can be admitted at any time during the year by ballot on payment of a fee of one dollar. All memberships shall terminate on the thirty-first day of December in each year.
3. The officers of this Association shall be: President, first and second Vice-President, Secretary, Treasurer, and nine Directors, all of whom shall constitute the Board. They shall be elected annually, and continue to hold office until their successors are appointed. In case of urgency, when it would be impractical to call a general meeting of the members, the Board shall have power to act for the Association.
4. There shall be elected annually two Auditors to audit the accounts of the Association.
5. The annual meeting of the Association shall be held on the second Saturday in January, at such place and hour as the Board may decide.
6. At the annual meeting the election shall be by ballot, unless the majority of the members present decide to hold the same by open vote. No person shall be eligible for office or be entitled to vote who has not paid his fees in full for the current membership year.
7. At the annual meeting the Board for the past year shall present in writing a report of the proceedings of the year, including a statement of the financial condition of the Association. The financial statement shall first be audited and certified by the auditors.
8. The annual meeting shall be advertised by mailing to each member at least five days before the date thereof an announcement calling the members together; said announcement shall specify the date, place, and hour of meeting.

9. ORDER OF BUSINESS.

- a. Reading and confirmation of minutes of previous meeting.
 - b. Communications.
 - c. Reports.
 - d. Election of officers, directors and auditors.
 - e. General business.
10. Ordinary meetings shall be held on the first Saturday in each month.
 11. At all meetings of the Association ten members shall form a quorum. At meetings of the Board five shall form a quorum.
 12. Any member who shall have been proved to the satisfaction of the Board guilty of any act liable to affect the credit, good standing, or in any way work against the interests or welfare of the Association, may, upon due notice, be dropped from the roll and barred from membership.
 13. The constitution and by-laws may be amended at any regular meeting by a two-thirds vote of the members present, due notice having been given at previous meeting.

EXPERIMENTAL SHIPMENT OF PEACHES TO ENGLAND.

On the return of the Deputy Minister of Agriculture from England it was suggested to the Branch by the Minister of Agriculture that a small shipment of peaches be sent to the London office of the Department of Agriculture as an experiment. Thirty cases of Elbertas were selected on September 22nd, and packed as carefully as possible with the present peach case and the kind of packing material at hand. The fruit that was selected was fully developed and well colored. Color was given a preference to size and a medium sized peach was required, as it has been found by our experiments that the large fruits will not stand shipping as well as the medium sized, and that highly colored fruit carried much better than the less colored specimens.

The fruit was picked very carefully and taken from the orchard to the St. Catharines Cold Storage plant where it was slightly cooled. Each peach was then wrapped in tissue paper and packed as follows:

The box was layered at the bottom with about an inch of the finest grade of excelsior, upon which was placed a layer of cotton batting. The peaches were then placed one layer in a box. These were covered with cotton batting and a thick enough layer of excelsior was put in so as to make the box tight. Five boxes were then placed one on top of the other and crated together with two-inch strips at the sides and three-inch strips at the ends. This type of case made a good protection to the boxes and fruit and did not hinder ventilation.

Twenty-five boxes of peaches were packed and shipped by ordinary express to the Toronto Cold Storage warehouse. The shipment should have gone forward on the 23rd September, which was a day after the fruit had been packed, but owing to some mistake of the express company it had to be delayed until the week following, the peaches thus being in storage for ten days before they were started on the road. The express company, owing to the size of the consignment, could only provide cold storage on the ocean, the distance from Toronto to Quebec, and again from Liverpool to London, being covered in the ordinary express car in Canada and freight car in Great Britain.

The fruit arrived in London on October 12th, having been again delayed between Liverpool and London. Some of the peaches were displayed in the windows of the London office and samples were put on display at the Dominion Immigration office, the Grand Trunk and Canadian Pacific Railway offices. A case was also sent to each of the following stores in order to ascertain the value of the Ontario peaches on the London market: Army & Navy Stores, Fortnum & Mason, Picadilly; Whiteleys and Harrods & Company, Brompton Road. These firms reported at length upon the condition and quality of the fruit.

It appears from some reports that there is a doubt if a profitable market for the Ontario peach will be established in England. Others, again, think there is a good market to be opened for this fruit, but they emphasize the need of special attention to packing and lay much stress on the probability that very high prices need not always be expected.

With regard to this shipment of peaches there are one or two important points that must be taken into consideration. The fruit was delayed from a week to ten days from the time of picking before they were started on their journey, and it was a marvel that they arrived in fair to good condition. The shipment was decided upon at short notice, and no special information could be obtained as to the best packages and material for packing. In future shipments the boxes should not be more than from $3\frac{3}{4}$ inches to 4 inches deep, and the very finest grade of Aspin wool should be used to replace entirely the cotton batting which evidently heated the fruit. The London office has submitted a sample of excelsior used in France for packing fruit and known to the trade as aspin wool. This is an exceedingly fine grade of excelsior, which is bleached to a beautiful white color and adds considerably to the appearance of the package as well as offering the softest of material for packing.

Two shipments were made by private parties during the season, one of which, as reported by Mr. Fleming, of Grimsby, was a complete failure. The other was more successful, and, with the results of the Department shipment, give the growers some hope of ultimately opening up a new market for the product of our rapidly increasing peach orchards. The fact that Cape Colony, South Africa, is placing regular supplies of peaches, plums and apricots upon the London market should also encourage the Ontario grower, as the distance these fruits are shipped is greater than we have to contend with.

It is the intention of this Branch to experiment further this season, and the co-operation of the growers of the Niagara Peninsula will be asked for. Somewhat larger shipments will be sent forward at regular intervals, and, with improved packing and transportation, should determine the value of this market.

REPORT OF HORTICULTURAL EXPERIMENT STATION,
JORDAN HARBOR.

BY H. S. PEART, DIRECTOR.

In preparing this, my second annual report on the work at the Horticultural Experiment Station, I shall endeavor to give a concise review of the work which has been inaugurated.

The season of 1909 has been one with many peculiar meteorological conditions. It was generally very unfavorable to plant growth and development. After a comparatively mild winter, the spring was cold and backward. On the well-drained land at the Station we commenced work on April 15th, but on the 16th heavy rain came, and until the 20th we had rain nearly every day, coupled with cold and dull weather. As a result of the cold wet weather our seeding proper did not commence until the 4th of May, which is very late for our locality. To make conditions even worse, the weather throughout the first part of May was dull and cold.

The following statement of the rainfall for each month during the growing season may be interesting:

	1909.	1908.
April.	2.03 inches	1.66 inches
May.	3.68 "	2.71 "
June	1.88 "	2.77 "
July.	2.67 "	4.61 "
August.	1.79 "	2.27 "
September	2.35 "	.62 "

Just here a little explanation may be needed, else one may not see how these amounts of precipitation affected the growth of plants. After the wet weather in April and May, a severe drouth set in, and the first part of June was very dry, and the ground, after so much wet weather, seemed to bake very hard. The next drouth was in the first two weeks in July, when we had very warm and very dry weather, with the result that strawberries and the crops requiring a maximum of moisture at that season were reduced in yield from one-half to two-thirds of a normal crop.

The tile drainage put in in the summer of 1907 gave us very marked results in increased production of plant growth and in the reduced labor required to fit the ground for the reception of crops. On the sandy land and on the clay loam the results were most marked, while on the heavy clay the full benefits have not yet been apparent, as the nature of the soil prevents the water from reaching the drains readily, yet on these same lands the crops were planted and had made good progress before an adjacent field of the same soil was fit to be ploughed.

FRUITS.

The following list of fruits was added to our plantation during the spring:
APPLES.— Carolina Red June, Marengo Crab and Yankee.

BLACKBERRIES. Early King, Blower, French Lawton, Himalaya, Kenoyer, Mammoth and Ward.

CHERRIES. Abesse d'Oignes, Anglaise tardive, Anna Spath, Belle d'Orleans, Belle d'Franconville, Bing, Black Bigarreau, Brusseler Bruane, Bohemian Black, Baldwin, Choque, Dykeman, De Vaux, Early Lyon, Early Rivers, Florence, Gros Gobet, Jeffrey's Duke, Lambert, Mount Stark, Mercer, Mongui Mezel, May Duke, Ontario Preserving, Olivet, Paul, Reverchon, Rockport, Sylva d'Palluau, Terry, Timmie and White Heart.

CURRENTS. *Red and White:* Comet, Red Defiance, Wentworth Seedling and White bar de Luc. *Black:* Buddenborgs Black Prince, Carter's Champion, Gondouin, Ismay's Prolific and Ogden's Black.

GOOSEBERRIES. Alma, Broomlure, Chautauqua, Catharine, Companion, Criterion, Eagle, General Gordon, Lancashire Lad, Merriton, Preston Seedling, Red Champagne, Roaring Lion, Railway, Surprise, Shiner, Speedwell, Telegraph, White Swan, Warrington and Wilmot's Early.

GRAPES. -Black Alicante, Black Hamburg, Brilliant, Captivator, Chasselas avec Royal, Chasselas Vibert, Chasselas dou de Fontainebleau, Chasselas Gros Caulard, Cynthia, Colerain, Dodrelabi, Elvira, Eaton, Early Ohio, Frankenthal, Feher Szagos, Forester's White Seedling, Flame Tokay, Gromier du Cantal. Gamay de Juillet, Lindley, Muscat Blanc, Muscat Noir Perkins, Precoce Malengo, President, Pense Malaga, Sanvignon Juane, Telegraph, Thaus, Victoria and Woodruff Red.

PEACHES. Alexis Sepere, Admiral Juane, Belle de Bordeaux, Belle Dauce, Belle Imperiale, Beauty, Coulombier, Cumberland, Cardinal October, Charles Ingouf, Dagmar, Dymond, Edward Andre, Exquisite, Earliest of All, Gold Mine, Gov. Hogg, Gladstone, Hills Chili, Illinois, La Vainqueur, Lovell, Louis Grognet, Madeline de Courson, Opoix, Red River, Rouge de Mai, Sea Eagle, Stearns, Stephens, Susquehanna, Townsend, Vilmorin, Waddel, Wilder and Willet.

PEACHES ON PLUM STOCK. Admiral Dewey, Captain Ede, Elberta, Niagara, Smith's Late, Crawford, Triumph and Yellow St. John.

PEARS. Admiral Gervais, Albertine, Alexander III. of Russia, B. S. Fox, Bordeaux, Bergamont d'Esperen, Chaumondel, Clarksville, Catillas, Col. Marchand, De Parennes, Durondeau, Doyenne Madame Th. Levavassen, Doyenne George Boucher, Fin Juillet, Fame, Fred Baudry, Gen. Stoessel, Gansels Bergamont, General Todleben, King Charles of Wurtenburg, King Karl, La Lectier, Louis Pasteur, Marguerite Marillat, Margaret, Notaire Lipin, Onondago, Ozark, Princess Copie, Passe Colmar, Princess, Pres. Heron, Pres. Casimir Perier, Pres. Roosevelt, Riehls Best, Reliance, Sir de Jules Guindon, Stark's Winter, Snyder, Souviner du Pres. Carnot, Van Mons Leon Leclerc, Winter Bartlett.

PLUMS. - Abbaye Tartan, Belgium, Belle de Louvaine, Belle de September, Belle de Paris, Cox's Emperor, Curlew, Daisy, Darwin Peach, Des Bejonniere, Femmonzie, Goliath, Gisborne, Hunt Hybrid, Improved French Prune, Omaha, Pitmaston, Poole Pride, Pearl, Pacific Prune, Robe de Sargent, Reine Claude, Gabriel Combes, Sugar Prune, Silver, Sultan, Stella, Spondor, Uncle Ben, World Beater, Wydale.

RASPBERRIES. Antwerp, Austin, Baumforth Seedling, Black Diamond, Cumberland, Columbian, Conrath, Clark, Carter's Prolific, Craigmiller Giant, Eaton, Eureka, Fastolf, Fillbasket, Gideon Queen, Gregg, Haymaker, Herbert, Iceberg, King, Kansas, Marlborough, Norwich Wonder, Northumberland, Ohio, Older, Premo, Pheonix, Plum Farmer, Red Antwerp, Sargent de Brune, Semper Fidelis, Superlative, Thwack, Stones Hardy, Souhegan.

STRAWBERRIES. Barrymore, Cobden Queen, Commonwealth, Clarke Seedling, Dew, Dornan, Enormous, First Quality, Fairfield, Fendall, Golden Gate, Green-

wood, Good Luck, Hummer, Heritage, Jim Dumas, Joe Wheeler, Kittie Rice, Mary, Mascot, Meton, Missouri, New York, Paul Jones, Pomoka, Phillips Seedling, Red Bird, Stahelin, Shipping King and Taylor.

In addition to these, a block of dwarf pears and peaches were set early in November, for the purpose of ascertaining the advantage or disadvantage of fall versus spring planting.

ORCHARD CULTURE.

The orchard culture test, mentioned in last year's report, was again continued this year. The results were even more marked, owing to the dry season, than we had anticipated, and visitors examining the orchard could at once tell the different blocks in experiment. The section on which the land was spring ploughed and sown to cover crop in July produced the healthiest and most vigorous trees and foliage, while the block in sod looked quite sickly in comparison.

FERTILIZER EXPERIMENTS

The fertilizer experiments commenced last year in conjunction with the Potash Syndicate were continued, and gave us very similar results.

Plot I.....	No fertilizer.
Plot II.....	Complete, 5 pounds potassium sulphate. 10 " superphosphate. 5 " sodium nitrate.
Plot III.....	5 pounds sodium nitrate. 5 " potassium sulphate.
Plot IV.....	5 pounds potassium sulphate. 10 " superphosphate.
Plot V... ..	5 pounds sodium nitrate. 10 " superphosphate.

The following is a brief summary of results, which will show that the yield may be increased by the use of fertilizer.

TOMATOES. Decided increase in yield by use of complete fertilizer, also slight increase where potash and phosphoric acid were used over no fertilizer. But in plots where potash and nitrogen, and phosphoric acid and nitrogen were used, the increased vigor of the plants lessened the yield of fruits materially.

POTATOES. While the result was somewhat misleading, it is evident that the plots where potash was used were better than those without it.

CORN. The plots where potash and phosphoric acid were used gave the largest yield of ears, the complete coming next. The use of nitrogen in this test also appeared to make the stalk at the expense of the ears.

ONIONS. The plots on which potash was used gave the heaviest and best bulbs. The plot having no potash, but with phosphoric acid and nitrogen, gave a very poor showing.

CABBAGE. The complete gave the heaviest yields, while the one with potash and phosphoric acid came next. The plots on which potash and nitrogen, and nitrogen and phosphoric acid, were about equal.

VEGETABLES.

The following varieties of vegetables are some of the most promising we have tested. Some are old standbys and need no word of praise; others are new, and growers may do well to give them a trial as to their relative merits when grown alongside of old varieties.

CORN. Thomas Early, White Perfection, Early Champion, Country Gentleman, New White Evergreen, Zig Zag, Pearce's Early Evergreen, Golden Justice and Golden Bantam.

SQUASH. Summer Golden Crookneck, Dons Extra Early White Bush Scallop, Warted Hubbard, Golden Hubbard, Delicious and Long White Bush Marrow.

MUSK MELONS. Defender, Montreal Green Nutmeg, Dominion, Burrel Gem and Hamilton Market.

WATER MELONS. *Early*: Watson, Sweetheart. *Medium*: Black Boulder, Sugar Stick. *Late*: Seminole, Alabama Sweet.

CARROTS. Half Long Scarlet Nantes, Rubicon, Scarlet Intermediate.

BEETS. Blood Turnip, Edmand's Turnip, Early Model, Black Red Ball, Egyptian.

POTATOES. The following are the fifteen varieties giving us the largest yield of potatoes during the season of 1909 on plots of 1-100 acre, with a few notes on the same:

Variety.	Total Yield in lbs.	Market Tubers.	Small Tubers.	Per cent. of Scab.	Color.	Amount of Blight.
1. Davies Dunion.....	303	267	36	5	White	Slight
2. Davies Warrior	282	246	36	25	White	Slight
3. The Howard	267	239	28	75	Yellow	Touched
4. American Wonder	261	248	13	4	White	Touched
5. Robertson's Champion	252	206	36	15	Rose	Some
6. Rural Blush.....	250	218	32	15	Rose	Slight
7. Early Sunrise (Hewer).....	244	223	21	90	Pinkeye	
8. Up-to-Date (Hogg & Robertson)..	243	228	15	12	Yellow	Slight
9. Queen of the Hebrons	241	221	20	5	White	Slight
10. Seedling Miss Rose	223	203	21	15	Yellow and P'nk	Touched
11. Wellington.....	213	193	20	10	Bluish	Some
12. Extra Early Sensation.....	211	188	23	90	White	Some
13. Early Sunlight.....	209	184	25	98	White	Some
14. Empire State.....	205	180	25	90	White	Some
15. New Main Crop.....	203	152	51	70	White	Some

TOMATOES. The following twelve varieties are those which gave us the largest yield of fruits this year from sixteen plants on uniform plots, with notes on first ripening, size, shape, color, smoothness and total yield:

Variety.	Seedsman.	Total Yield.	Date First Ripe.	Size.	Shape.	Color.	Smoothness.
1. Bruce's Dominion Day.....	Bruce	Lbs. 214	28/7	Med. to Large	Round Flat	Red	Poor
2. Early Jewel.....	McCalla	204	18/8	Med.	Round Flat	Bright Red	Fair
3. Freedom	Simmers	196	3/8	Small	Round	Brick Red	Fair
4. Redfield Beauty.....	Bolg.	192	18/8	Med to Large	Round	Pink	Good
5. Ignatum	Bruce	186	3/8	Med.	Round Flat	Red	Fair

Variety.	Seedsman.	Total Yield.	Date First Ripe.	Size.	Shape.	Color.	Smoothness.
6. Livingston's Royal Red.	Bruce	Lbs. 182½	18/8	Med.	Round Flat	Clear Red	Fair
7. Chalk's Early Jewel	Burpee	174	26/7	Large	Round Flat	Red	Fair
8. Duke of York.	Bolg.	170	26/7	Med. to Large	Round	Pink	Poor
9. Extra Purple Advance	Maule	165	26/7	Small to Med.	Round	Pink Red	Good Fair
10. Livingston's Hummer	Maule	162	14/8	Med.	Round	Pink Red	Fair
11. New Queen.	Bolg.	161	14/8	Med.	Slightly Flat Round	Bright Red	Fair
12. Prize Taker.	Bolg.	159	3/8	Large to Med.	Flat	Pink	Fair

IMPROVEMENTS.

With the completion of the Administration Building, with its offices and work rooms, we are in much better shape to conduct our work. We are looking forward to remodelling a barn which is on the place into a first-class fruit house, where we will be able to handle our various crops from time to time in a satisfactory and up-to-date manner.

The decoration of the grounds about the place is partly completed, and we hope that our surroundings will be in keeping with the best horticultural interests of the Province.

BEEKEEPING.

During the season of 1909 a small apiary has been added to our Station, and its work will be fully reported on by Mr. Morley Pettit, who has been in charge.

In closing, I wish to express my appreciation of the services rendered by those in connection with our work, and also to thank the fruit growers and farmers in this vicinity who have so willingly allowed us the use of their orchards for testing, and for specimens in connection with the work of plant improvement.

The following review of the progress in plant improvement has been prepared by Mr. A. J. Logsdail, who has this work in charge.

PROGRESS OF PLANT BREEDING AND IMPROVEMENT.

BY A. J. LOGSDAIL, HYBRIDIST, JORDAN HARBOR.

Before summarizing the work carried on in plant breeding during the past year at this Experiment Station, I thought it might be advisable to review briefly the subject of plant breeding with relation to this particular phase of work, namely, the improvement of tree and bush fruits.



A Promising Seedling.



A Bed of 3,000 Seedling Strawberries. Plant-Breeding Work.

At the very outset of this work, during the summer of 1908, I endeavored to obtain from many fruit growers a more or less concise idea of a perfect fruit, whether strawberry, peach, plum, pear, grape or apple. I also endeavored to find out which two varieties together of these several fruits possessed the greatest number of the desirable qualities enumerated. The replies I received were numerous and varied, but throughout all there was a definite realization of the qualities necessary to a perfect fruit. The cross fertilizing (to secure seedlings) was carried out during the summer, with this information as a basis.

The information thus gleaned from expert practical opinion demonstrated the fact that, although the conception of an ideal fruit was fairly constant, the means of obtaining such were practically unknown. Realizing the possible variation in soil and other physical conditions in materially affecting the characteristics of certain varieties of fruit, it cannot be denied that the need of definite knowledge in this line of work is very great.

Plant breeding as a science is scarcely fifty years old; indeed, it is only within the past decade that it has actually attained to such a degree. The mass of literature upon this subject is rapidly accumulating, but up to the present investigators have devoted their energies chiefly to the improvement of cereals and other seed crops.

It is indeed doubtful whether the methods employed in the breeding of improved cereals are at all applicable to the improvements of plants grown from vegetative portions. Nevertheless, the time required to reach maturity by such fruits as the pear, apple, peach, grape and strawberry considerably lengthens the period of experimentation.

The improvement of fruits is by no means a modern endeavor. Horticultural records prove that many of the varieties of fruits now grown were first introduced more than a hundred years ago; but their appearance was doubtless due to fortuitous variations of such a distinct character as to attract attention. With our more modern appreciation of a possible scientific basis, and the present lack of definite knowledge regarding the character inheritance in successive generations of plants vegetatively reproduced, it is to be hoped that greater encouragement and support will be given to this most valuable branch of science.

The plant breeding at this Experiment Station may be conveniently classified under two headings.

The first or practical phase, comprising more than four-fifths of the entire work along this line, consists in the raising of large numbers of seedlings, from which improved or promising types will be selected. These seedlings are the result of systematic cross pollination. In strawberries and tomatoes, promising strains have been selected; this selection will be maintained for several seasons, when they will be tested beside the standard variety from which they were originally selected. We now possess about fifteen thousand seedling strawberries; about three thousand five hundred of these are now planted in the hill system under field conditions, the remainder are yet in the nursery frames.

A number of seedling peaches, pears and apples have made satisfactory progress during the past summer, and will be planted under field conditions in the early spring.

The second phase of the work may be said to be more technical, though as yet this branch has received but little attention, owing to the immediate and urgent attention required by the former. This second phase, I trust, may be developed considerably in the near future, dealing as it does with the essential principles of the work.

LAKE HURON FRUIT STATION.

BY A. E. SHERRINGTON, WALKERTON.

THE SEASON. The winters of 1908 and 1909 were comparatively mild, with very little snow during the whole winter, but owing to the mild weather during the winter all plants and trees came through in excellent condition. The spring opened up fairly early, with heavy and frequent rains until nearly the 1st of June; after this we had about two months of very dry weather. The rainfall during the spring and summer months was 24.77 inches, which was eight inches more than the season of 1908. The last killing frost occurred on April 10th, and the first killing frost on October 21st, 1909. The highest temperature during the summer was 91 deg. in the shade, and the lowest temperature during the winter of 1908-1909 was six below zero.

INSECTS. Insects were not so prevalent this season as formerly, with the exception of the green aphid, which was pretty bad on the apple trees. Codling moth was not nearly so destructive as in 1908, even in unsprayed orchards. In our own orchard the percentage of wormy apples was very small. This is no doubt owing to the materials used and the methods of spraying. As I have stated previously, I practise the method of clean cultivation. The May beetle is continuing to cause considerable damage to strawberry plantations and grass fields. Tent caterpillars and a few tussock moth were noticed, but they are kept well under control by spraying.

FUNGI. The apple scab or black spot caused considerable damage in the unsprayed orchards throughout the district, but orchards that were properly sprayed showed a very small percentage of scab, and what there was, was found principally on the Fameuse and Early Harvest. The pear or fire blight was not nearly so destructive as last year. Some twig blight was noticed in Greenings and Alexanders. Fungi, on the whole, were not very prevalent during the past season.

EXPERIMENTS. No planting was done at the Station this season, except where undesirable varieties and damaged trees were removed and the blanks were filled in with better varieties. One hundred cherry trees were added to the commercial orchard.

EXPERIMENTS IN COMMERCIAL FERTILIZERS. Five plots, containing quarter of an acre each, were laid out. This experiment was supposed to be conducted for five years, but as there is only one crop of strawberries taken from a plantation, the experiment cannot be carried on more than one year in strawberries, but can be carried on for a number of years in the raspberry plots. On May 8th the fertilizers were applied, with the exception of nitrate of soda, which was applied on the 12th. Plot No. 1 had no fertilizers. Plot No. 2, 40 lbs. muriate of potash, 75 lbs. of acid phosphate, and 30 lbs. of nitrate of soda. Plot No. 3, 75 lbs. of acid phosphate and 30 lbs. nitrate of soda. Plot No. 4, 40 lbs. muriate of potash and 30 lbs. nitrate of soda. Plot No. 5, 40 lbs. muriate of potash and 75 lbs. of acid of phosphate. The results have not been very satisfactory, perhaps largely owing to the very dry spell during the months of June and July. There appears to be no benefit from the application of those fertilizers, whether on strawberries or raspberries; in fact, we thought there had been some injury done to plants in the strawberry plots, as a large number of the plants dried up and were killed out completely, but this may have been from the excessive drouth. On the raspberry plots no improvement would be noticed either in plants or fruit.

STRAWBERRIES. The strawberry crop here was a failure this year, owing to the dry weather during the fruiting season. The varieties grown are Brandywine and Williams.

RASPBERRIES. The raspberry crop was never better, as we had plenty of rain while the berries were ripening. The varieties grown commercially are Marlboro, Herbert and Cuthbert. The Herbert is doing well, but we find it too soft for shipping any distance. The Cuthbert still holds first place as a commercial berry.

CURRANTS. The currant crop was excellent this season; nearly all varieties did well. We have now between forty and fifty varieties of red and black. Some varieties are not fruiting much yet. Red Cross, Fay, Cherry, Wilder and Perfection are the best varieties of red currants. Perfection is promising well. Champion and Naples are the best among the blacks.

GOOSEBERRIES. Gooseberries, of which we have now about 1,000 bushes, with nine varieties, Pearl and Downing are the only two varieties that are proving satisfactory commercially.

CHERRIES. The cherry crop was excellent this season; all varieties did well. Among the sweet or eating cherries, Yellow Spanish and Windsor have proved to be the best; of the sour or cooking varieties that are giving the best results are Early Richmond, Olivet and Montmorency, given in order of ripening, but the Early Richmond and Montmorency are the best commercial varieties, Montmorency being the best of all.

PLUMS. The plum crop was very good this season, with good quality. Among the best varieties are Bradshaw, Purple Egg, Quackenbos, Imperial Gage, Burbank, Yellow Egg, Monarch and Grand Duke. We have about twenty seedlings; some of these fruited this season, and a few of them promise to be of good value.

PEARS. Pears are not doing well. The blight has destroyed quite a number of trees. All the French varieties are gone. The young trees made good growth this season, and we are in hopes that the blight will not be so bad in years to come.

APPLES. The apple crop in this district was quite a heavy one this season, but the fruit was small, in unsprayed orchards quite scabby. It was difficult to get 50 per cent. No 1's. The apples at the Station were not large, but clean; still the percentage of culls was large owing to size, the Spys being too heavily laden. The experimental orchard is coming into bearing nicely, but there are a great many undesirable varieties that will either have to be grafted or removed. Quite a number of trees of different varieties have already died, showing lack of constitution. Canada Baldwin, Wine Sap, Ontario, Cranberry Pippin, have died or are dying. We are working over a number of trees to better varieties. The varieties that are doing best are Hulbert, Peter, Wealthy, McIntosh, Shackleford, American Pippin, Scarlet Pippin, Stark, North-west Greening. We did not keep a record of the yield of any variety, but that can be done if thought necessary.

ST. LAWRENCE FRUIT STATION.

BY HAROLD JONES, MAITLAND.

The winter of 1908-9 was very even in temperature, but very little or no snow to protect the ground from freezing during the cold months. Ploughing was continued up to December 3rd, the ground remaining frozen from that date to April 10th. The lowest temperature recorded was 15 deg. below zero on January 13th.

The months of April and May were cold, wet and stormy; seeding did not become general until May 20th, and apple trees were in full bloom on May 30th, or 15-18 days later than normal. Apple trees came through without injury to wood or bud. European plums were injured in fruit bud. Cherries had a few buds injured, but a fair crop set fruit. Pears are nearly all dead. Russian varieties and Flemish Beauty set fruit that came to maturity.

For spring planting I received from Prof. W. T. Macoun, Central Experimental Farm, Ottawa, twelve apple trees two years old, and eight varieties of plums. I have now planted in 1908 and 1909:—

Apples: Allen's Choice, Langford Beauty, Mendel Newton, Patten's Greening, Pesaukee Russet, Stone, Walter.

Plums: Bestovall, Bomberger, Don, Fitzroy, Gloria, Lisher, Mollie, Sunrise, Golden Queen, Consul, Swift, Bixby, Odegard, Mankata, Aitkin, Cheney, Smith, Admiral Schley, Lunn, Howards, Yellow, Ockheda, Hawkeye. These give a very representative collection of some of the best of the American type of plums.

INSECTS AND FUNGI.

Insects gave very little trouble. Codling moth was controlled with one or two sprayings. Tussock moth was controlled at the spraying following the falling of the blossom, care being taken to spray well into the centre of the tree, reaching the tender foliage and tips of the water sprouts, where they are usually found in greatest numbers. Oyster shell is on the decrease where spraying with Bordeaux is continued from year to year. There was very little "spot" on apples; many unsprayed orchards gave crops of clean fruit. The fire blight appeared on some varieties of apples. Canada Baldwin, N.W. Greening, Blunt and Switzer suffered most.

APPLES.

The apple crop this year was not large, but the quality was very fine. The bloom was scattered on the trees and fruit set very evenly. Wealthy blossomed and set a scattered crop, which resulted in fruit of much better size and quality than I ever before raised. Next year, if there is a heavy setting of fruit, I will do some severe thinning to compare results. The Fameuse orchard, grafted on McMahan with scions from the parent tree of solid red type, are starting to bear, and are proving true to type so far as fruited. McIntosh at twelve years of age are yielding a barrel to a barrel and one-half to the tree. They commenced bearing at nine years planted, and have gradually increased. On heavy clay loam they do not get the high color obtained on sandy soils or light loams.

The Wealthy is another apple that succeeds best on light soils. The fruit is better flavored, higher colored and larger sized than anything I have ever seen on heavy clay loams.

Of the newer varieties that fruit this year, with me the Milding is the most promising. The tree is healthy, vigorous, with large dark green foliage and appears quite heavy and free from disease at eleven or twelve years of age. The fruit large, 3 inches across the core, oblate, stem $\frac{3}{4}$ -inch, cavity narrow, deep, calyx closed in a broad shallow basin. Color bright yellow streaked and splashed bright red. Flesh, light yellow, breaking, juicy, brisk subacid, good, season January-February. This apple may find a place here in the east where a bright crisp apple is in demand in midwinter.

Winter St. Lawrence is vigorous and hardy but is a very shy bearer, and would not prove profitable where Fameuse and McIntosh will grow. Milwaukee gave a light crop this year, but the trees remain healthy and vigorous. This apple last January and February brought good prices on the local market for cooking purposes.

Shiawassie "top-graft" fruited with me this year and gave some very handsome specimens. The tree seems hardy and vigorous and may prove of value. Canada Baldwin at one time promised very favorably, but the trees have been suffering with blight (twig blight) for two years and are now on the road to decay. It is a showy apple of low quality but sold fairly well. I cannot recommend the planting of this variety.

My notes on varieties published in previous reports are in the main correct.

PEARS.

None of the Experimental work has been so disappointing as the pears. Out of over forty varieties planted at this station for test, there is only one Flemish Beauty and a few worthless Russians living at present. The climate is decidedly too severe, and I am satisfied they will never be a commercial success. For amateurs the Flemish Beauty and Clapp's Favorite will give the best results when planted in a sheltered position and kept in sod.

PLUMS.

European Plums have been a failure to the same extent as pears. All varieties are dead except Glass Seedling and this variety has never borne a crop, the fruit buds being injured every winter. Lombard and Gueii will give one crop and then die. I have three varieties of European type from the Island of Montreal that are growing nicely but have not fruited yet, viz., Raynes, Mount Royal and Lunn.

American Plums are hardy here and I now have a representative collection of twenty-one varieties, one and two years old, some of which will come into bearing at an early age, when I hope to be able to report something of value to the fruit growers and gardeners of this section. Hammer has been giving regular crops since 1899 but is beginning to show signs of age and decay. The fruit is light red, medium, thick skin, fair for cooking.

CHERRIES.

The cherry crop was fair. Montmorency gave a fair crop of good fruit. English Morello a light crop, Orel a fair crop, but the fruit is too small and not desirable where Montmorency succeeds. Ostheim is a healthy tree but has never borne a crop. It has proved worthless to me. Olivet is tender in fruit bud and has only given a few specimens once in twelve years. May Duke, Rhene Hortense, Black Knight, Dyehouse and Gov. Wood are all tender.

CURRANTS.

RED. Cherry, Raby Castle, Versailles are all good, profitable varieties. Fay breaks down too much and is too short in the bunch. Pomona makes too thick a bush and requires too much thinning. Wilder is too late with foliage too heavy and is very subject to Aphid.

BLACK.—Victoria, Lees and Champion are all good, giving good bunches, ripening early down the stem. Champion gives the largest fruit.

RASPBERRIES.

The Herbert is proving a very hardy and prolific variety, the only red raspberry that will stand our climate without protection. All other varieties have killed back to the snow line every winter. Older is the hardiest of all black caps, a handsome fruit and prolific but of a sprawling habit.

COMMERCIAL ORCHARDS.

My commercial orchards consist of about 21 acres, viz., Fameuse, 11 acres; Duchess and Wealthy, 3 acres; McIntosh and Scott's Winter, 2 acres; Scarlet Pippin and mixed, 5 acres; total, 21 acres. This acreage runs in age from 29 to 8 years of age.

From a careful record of sales made from the product of four acres of Fameuse planted in 1881, dated from 1894 to 1903, a period of nine years, I received an average net return of \$800 per annum after paying all expenses except the cost of barrels.

The largest gross returns any one year was \$1,310 in 1903. In 1903-4 the orchards were injured by the severe winter, and since that time my gross receipts have been \$400 to \$900 per annum from the same four acres. The average yield of a mature Fameuse under high cultivation runs from 4-12 barrels per tree. Scarlet Pippin has proved with me quite as profitable as Fameuse, but the trees suffered more in 1904 than the Fameuse and require very prompt harvesting as soon as ripe to avoid dropping. McIntosh takes longer to come into bearing than Fameuse or Scarlet Pippin but give excellent yields when they attain age and are hardier than either of the above.

These three varieties have so far proved to be the money makers for the St. Lawrence valley. Following these in order of commercial value come Wealthy, Baxter and Tolman—all good trees that live to an old age and the fruit finds a ready sale.

To keep the trees in a healthy vigorous condition and secure large crops of full sized fruit, it is necessary to maintain a thorough system of cultivation with fertilizers. Cultivation, if continued late in the season produces a late succulent growth that is subject to injury the following winter, but cultivation in the early spring and continued through May and early June and then the ground sown to a cover crop keeps the orchard in a vigorous condition with well ripened wood and fruit buds in the fall. In other words, early cultivation with early sown cover crops produce vigorous trees with fully developed fruit with fall conditions similar to sod, which experience has taught us, produces a well ripened and finished terminal growth. Moderate application of barnyard manure applied every second year produce the very best results, but where this material cannot be obtained in sufficient quantities good results can be secured by the use of muriate of potash and acid phosphate and cover crops of clover or vetches.

Orchardists must not forget the very important fact that in a heavy crop of apples there is a greater drain upon the available plant food in the soil in the production of seeds alone than there would be in producing a full average crop of wheat from the same area.

When we consider the care and consideration given to rotation in our grain and other farm crops to maintain the fertility of our soils and produce the best results, a little thought will convince the most thoughtless that fertilization is most necessary, or trees in bearing will soon be standing in impoverished and exhausted soil.

SOUTH-WESTERN FRUIT EXPERIMENT STATION.

BY J. L. HILBORN, LEAMINGTON.

The season of 1909 has been an unusually favorable one for the Fruit and Vegetable growers in Essex County. The previous winter was favorable for fruit trees, bushes and plants of all kinds, and as we had no spring frosts to damage the blossom, peaches were an excellent crop.

FRUIT.

The trees planted for variety test were too young yet to bear much, a few of the trees had failed but the majority have made a good growth and a few of them showed some samples of fruit this season but not enough to report on.

Should the season be favorable I hope to be able to report on some of the newer sorts next season. I have somewhat over twenty acres of peaches planted for commercial purposes, the majority of which were not old enough to bear much this year. But these young orchards as well as many other young peach orchards, in this vicinity, made a big growth, and with favorable seasons will soon be producing a good quantity of fruit.

The San Jose Scale is widely distributed through this section, and although nearly every grower sprayed with the Lime-sulphur solution last spring, some growers complain that the scale is very numerous again this fall.

At the station farm we used Commercial concentrated solution this season, but the majority of growers used the home boiled article and I think it gives better results at a lower cost. Although I had very good success with the Commercial brand I think it more expensive and not as reliable. I diluted it one to eight, and when used early enough it completely controlled the curl leaf but was not satisfactory in killing the scale.

PEACHES All our peach trees produced a good crop except a few trees which I have of the St. John, which will not bear for me, and about one hundred large trees which I have of the Garfield—it is a good grower and produces a few fruits of very large size and fine appearance but does not bear enough to be profitable.

The Dewey did well, it is very hardy and a great bearer—is best of its season.

Barnard, when thoroughly pruned and cultivated, produces a fair sized fruit of excellent quality, but this season we had heavy rains followed by very warm weather at ripening time and received complaints of the fruit not keeping well in baskets.

New Prolific and Engol ripened together this season, picking from September 14th to the 24th. Both these varieties do exceedingly well here, being large, well colored, of good quality and producing heavy crops. They are easily the two best varieties of this season and are much alike.

Elberta comes in just after them and also does well here but has not been planted much of late years.

Kalamazoo which ripens with Elberta does so well here that it has been much more planted in the new orchards than the Elberta, being a stronger grower, less subject to leaf curl and for these reasons a heavier yielder.

Banner and Golden-Drop ripened together this year and while the other varieties were a week later this season than they were last year, these two sorts

were about a week earlier than they were last season—a peculiar incident which I cannot account for. These two varieties if well pruned, thinned and given good cultivation grow to a good size here, and yield an immense crop but the Golden-Drop does not take as well in the market on account of its lack of color.

The Lemon about ends the season here—it is still one of the best for canning purposes.

Salway is grown to some extent but is too late as a rule to be as profitable as other varieties.

I am still practising the method adopted five years ago of using a mulch of old straw around each tree as a preventative of root freezing, should we get another severe winter: On my bearing orchards this is allowed to remain and we cultivate all space not covered with mulch.

A portion of one young orchard was sown to hairy vetch on July 24th, 1908, this grew very rapidly and made an excellent cover crop, was allowed to grow until late in May, at the time it was plowed under it had grown to such a size that it was difficult to cover. By using a disc cutter and a heavy chain we were able to get a fair job done. After plowing it was thoroughly pressed down with a roller and kept well cultivated until July 23rd, when it was sown to a mixture of corn and oats as a cover crop.

Both trees and cover crop on the portion of the orchard where the vetch was used (about two acres) made a very rapid growth, and if one can judge by this and the very dark green foliage of both trees and cover crop would say, the hairy vetch is a great nitrogen gatherer.

As the corn sown this season where the vetch was turned under grew to the height of seven or eight feet—we had more cover crop than we thought necessary so cut a goodly portion of it for feeding purposes.

PLUMS. The plum trees planted for variety test are mostly growing well but have not borne yet. I have some two acres of Burbank Plums (old trees) which blossomed heavily but produced no crop. The few European Plums that are planted here produced a good crop this season.

BLACKBERRIES. Several varieties of Blackberries are being grown at the station for experimental purposes also for commercial purposes. Another season is needed before reporting in full. This season Mersereau, Kittatinny, Elderado and Snyder did best in order named.

RASPBERRIES. A dozen plants of each of the following varieties were planted as variety test on this soil, they were in full bearing this season: Gregg, Cumberland, Galt, Eureka, Hilborn, Kansas, Conrath, Alder, Palmer, Marlboro, Golden Queen, Cuthbert and Columbia. Most of these produced a good crop, the exception being Cumberland which does not have enough seeds to make a compact fruit. And Alder, which is so poor a grower here as to be worthless. Kansas, Hilborn, Palmer and Galt were best in order named—the two former produced an excellent crop of fine fruit of good quality and did best of any this season. I think a plantation of either of these sorts would be profitable in this vicinity. Columbia is the strongest grower of any berry I know, it has immense canes and produces a big crop of purple fruit of good quality for home use but too soft for market.

CURRANTS. The following varieties of currants are being tried here: LaVersaillis, Wilder, Cherry, Fays, Chautauqua, White Grape, Black Champlain and Black Victoria, all of which made a good showing for this the third year from planting. Another season is needed to judge which is best suited to this soil. Cherry, Fays and LaVersaillis all made an excellent showing, also Black Victoria.

Judging from this season I would say that Red Currants of these varieties would be a very profitable crop to grow here.

PEACHES ON PLUM ROOTS. In the spring of 1909 I received from your Department some forty peach trees that had been budded on plum roots in the hope of getting trees that would be better able to withstand the severe test that the roots of our peach trees are sometimes subjected to when we get severe freezing, as we sometimes do when we have no snow to protect them.

The majority of those trees made a good growth, fully as good as one could expect from any peach trees the first season. These trees had been budded some eight or ten inches above the ground and the portion of the stock below the union does not grow as fast as the peach stock above it, but as the plum wood is much firmer and stronger this may not be much objection, except its odd appearance. My impression is, however, that they would be more satisfactory if budded as close to the ground as possible. These trees will be watched with interest as they acquire age and come into bearing.

GOOSEBERRIES. Six plants, each of five varieties of English Gooseberries were planted in the spring of 1908. As the plants had been imported and had apparently been heated on the way, quite a number of them failed to grow and the others did not start well. All that grew bore fruit this season, all of which were clean and a nice sample, but it is yet too early to say much of their relative value. The White Smith did best this season, the best plant yielding one quart of very large fine berries. The plants were thoroughly sprayed in the spring with the lime-sulphur solution, which is claimed will keep the plants free from mildew, a disease which heretofore had prevented the growing of these fruits in Canada.

VEGETABLES. The season of 1909 was a record year for the vegetable growers of the Leamington district. While the spring was rather wet and backward here it was much worse in other places, and as our soil dries very quickly our crops were about as early as usual. Early tomatoes produced an immense crop of much better than average quality, and as they came in much ahead of the crops in other parts of the country the price was better than usual and held up longer, making this the best season on record for the average grower of early tomatoes. The old reliable Earliana still holds first for profit. This season we grew some two acres of a new variety called I.X.L., procured from J. Bolgiano & Son of Baltimore, Maryland. They are said to be much earlier than Earliana, with me it was about as good but no better. A strain of seed selected by W. T. Macoun of the C.E.D., Ottawa, was tested, which proved to be a stronger grower and heavier cropper of fine fruits than anything else at the station farm.

We had about six acres of Musk Melons again this season. As usual most of the plants were started under glass and twice transplanted before going to the field. For a portion of the crop the seed was planted where it was to grow, both methods did well this season.

A few years back the melon growers were badly handicapped by the ravages of the Melon Louse or Aphids, which were so numerous some seasons as to destroy much of the crop. There were very few last year and scarcely any this season. It was very noticeable that there were a very large number of Lady-bugs or Lady-birds on the plants both seasons, and I give these the credit of destroying the first broods of the Aphids, and if these are destroyed there is no more trouble for that season.

Early Cabbage and Cucumbers did well again this year—it is quite evident that this district is destined to keep the lead in supplying Ontario markets with

certain varieties of early vegetable for which our soil and climate are peculiarly adapted.

ASPARAGUS. About two and one-half acres of Asparagus was planted at this station in the spring of 1908, part of which was set with plants bought from an Asparagus specialist in New Jersey, but the greater portion of the field was set with plants grown from seed, started in the greenhouse and removed to the field early in June. Both plantings grew well and give promise of a good crop next season.

VEGETABLES UNDER GLASS. The Tomato seeds for this purpose were sown December 19th, 1908, twice transplanted and were benched on March 11th. At this time they were large, strong plants, showing considerable bloom. Although we attempted to keep the blossoms well fertilized much loss was sustained from the plants dropping their blossoms, they did this to such an extent that the crop was not very good, especially on some varieties. One variety, a very fine, smooth, pink colored fruit, secured at Grand Rapids, set well and produced an excellent crop. Of the others, Chalks Jewel, Best of All (Dreers), Earliana and Wealthy did best in order named.

The seeds for the cucumbers were started January 20th, were twice transplanted, last time in six-inch pots, one in a pot, and grew well. These were benched on March 19th, and were then about twenty inches high and showing a few blooms. These grew well and produced a fine crop.

A specially selected strain of White-spine secured in Grand Rapids did best, followed by Burpee's Extra Early White-spine, Arlington and Klondyke. There is a good demand here for these crops at good prices.

As I have never been able to make satisfactory returns from the growing of lettuce in winter I have this season undertaken the growing of carnations, but so far am not at all sure that they will be any more profitable than the lettuce.

CABBAGE. Seeds for our crop of early cabbage are started about first of March. They are grown at a lower temperature than are the other plants, for if given much heat they grow tall and soft and do not stand handling well. I prefer to transplant the plants twice while under the glass, giving more room each time. Some growers, however, transplant but once before going to the field. I like to get the plants out into the cool frames soon as hard freezing is over in April to get them well hardened off and to remove to the field as soon as the land is in good condition for planting. The Jersey Wakefield is grown almost exclusively for this purpose, and if good plants are grown and planted on good soil that has been well enriched satisfactory results are usually attained.

CUCUMBERS. For the cucumber crop that is grown under glass after the other vegetable plants have been removed to the field, the seeds are started in flats in April and are twice transplanted, so we have large stalky plants which are benched in rich soil and given good heat and plenty of water and should be trained upon trellises of wire or binder-twine, and if properly looked after usually produce a good crop. Almost any of the varieties of the whitespine type are good for this purpose. Each grower has his favorite. As a rule any of the medium sized varieties do about equally well.

TOMATOES. For the crop that is grown in the field for first early, the seeds are started same as described for the other vegetables about March 1st and are transplanted three or four times, giving more room each time, and the last transplanting they have reached such a size that it is necessary to give them each a space of 5 by 5 or 6 by 6 inches.

I like to get them well hardened off by the time weather conditions are such that we can remove them to the field, as the earlier they can be got into the field after the last frost the earlier the crop will be. In preparing the land for planting I mark out the field 4 by 5 or 4 by 6, some plant closer, but I prefer this distance. We cultivate and hoe frequently as long as space will admit of it.

If the land is not already rich enough a light dressing, say about one teaspoonful of nitrate of soda applied directly around each plant and hoed in soon as possible after planting will help to start them off quickly.

MELONS. For this crop I prefer to get the land well filled with humus and brought up in a good condition the previous season. Plough in early spring and work down well. Some prefer to mark out both ways and fix up a hill at the intersection by working in some rotten manure or commercial fertilizer. I seldom practice that method, preferring to have the land all well fitted, and if not quite good enough add a little around the plants after planting, or hoe in a little when putting in the seeds.

Where seed is planted directly in the field I like to get it in about May 1st, also start seeds under glass about same time. The latter come more quickly, but as they are transplanted twice and held back a little in that way they come in about right. The seeds are started in flats or trays and each time are transplanted into other flats giving more room each time. The last setting we put enough for eight hills (two plants each) in each tray or flat which are 12 x 22 x 4 inches. By setting them in pairs and being careful when removing to the field they usually do well. Our best commercial varieties are the different types of Hackensack, also Rocky Ford for green flesh, and Orange, Hoodoo, Burrel's Gem and some others in the yellow flesh sorts. We have tested many different packages for shipping melons, and find the bushel basket answers the purpose fairly well, but prefer a crate made 12 x 12 x 20, holding one bushel. We are able to buy the stock in the flat from the local basket factory and make them up during winter. We are at present making up 2,000 of these crates to be ready when the season arrives.

ESSEX VEGETABLE STATION.

BY E. E. ADAMS, LEAMINGTON.

I have to report to you in regard to the work carried on at the Essex Vegetable Experimental Station for the past season, that the work as laid out has been carried on as per instructions, and that in all probability good results will be obtained in the near future. The varieties under test for seed selection are: Peppers, Chinese Giant, Neapolitan Early, Ruby King, and Long Red. Potatoes, Manistee, Early Ohio, Early Rose, Bovee and Burpee's Extra Early. Sweet Potatoes, Gold Skin, Yellow Nansemond and Jersey Sweets. Seed from all these has been selected for next season's growing, and all of which will receive careful attention as to future selection in order to demonstrate that careful selection will increase the crop both as to quantity and quality.

The main idea in selection of seed of the above, is to make selections from each crop, selecting only the smoothest and best shaped specimens and taking them for or taking seed from them for a series of seasons, in order to show beyond a shadow of doubt the desirability of selecting only the very best types for re-

seeding. This has been amply shown, I believe, in selection of seed corn, and there is no doubt that the same may apply to the seeds on which I am at present working. Tomatoes as a rule are grown for seed by large growers, but no attempt is made to improve the quality of the seed but rather to produce a crop of seed and no particular pedigree attached to it. We find a large proportion of the seed sown produces tomatoes rather too rough to be considered good marketable stuff, and in consequence growers lose considerable money each season from this rough fruit. If the quality of seed can be improved with proper and careful selection, not only selection of the smoothest fruit, but due consideration as to the type of plant from which the fruit is taken, I have no doubt that a much more desirable strain of seed will be produced, and which will in return produce much more desirable crops both in quality and quantity per acre.

The past season here has been a very good one for almost all crops, but onions suffered from heavy rains early in the season, and in consequence the crop was about one-half as compared with 1908, and the quality also is not up to the required standard. A considerable portion of the crop ran to thick necks, caused, we think, by late planting. We note this year that where seed was sown early, and not washed out by heavy rains, that the crop is first class, and where sown late the crop was thick necks to a great extent, but while we think that this is the cause of so many thick necks, yet it might be caused by some other conditions of which we are unaware, but it appears that the late sowing is a cause which should not be lost sight of.

The potato crop is one of the largest and best raised here for several seasons, and other crops have turned out very well.

Skinner irrigation was tested on carnation growing in the field, and it goes without saying that had water not been applied when absolutely needed, that the crop would not have turned out as well as it did. This means of irrigation is one of the safest investments as well as one of the surest methods of growing large crops, that it must come into larger use here in Canada as soon as a practical demonstration is made for vegetable growers.

It was my privilege last winter to look over a great many irrigation plants in the State of Florida, where I went to inform myself at first hand, and what I saw there fully convinced me of the great utility of this method of growing garden crops. The cost for installing this system will run from \$250 to \$300 per acre for piping and nozzles, valves, etc., beside the cost of pumping rig of some description. Some of this system is now working here in Green House work, as well as some outside and is very satisfactory.

I should have noted above that Tomatoes are also under selection. The Earliana, Stone, Bonny Best, Early Jewel, First of All and Maule's Extra Early, all of which do well in this district.

ALGOMA FRUIT EXPERIMENT STATION.

BY CHAS. YOUNG, RICHARD'S LANDING.

The past season has, on the whole, been favorable. Spring was rather late with some hard frosts, but vegetation was not far enough advanced to be materially injured. Perhaps strawberries uncovered suffered the most from freezing and thawing, and I think it would have paid this year to have covered them the

previous fall, specially so, as the stand of plants was with many varieties rather thin. There was no new stock planted here for experimental purposes. A quantity of scions and plums failed for some reason to come to hand. Experimental work was chiefly confined to making use of and disseminating information already obtained.

In the latter, I think this station has been fairly successful judging from the number of inquiries sent in and letters answered, some of which were from British Columbia on the west and Parry Sound on the east. A noticeable feature in correspondence was that in the newer districts failure was conspicuous, while in the older settled parts when suitable varieties are planted and when fruit growing is more of a science and almost every farm has its little orchard, and when one man tries to grow a little finer fruit and a little more of it than his neighbor across the road, and last but not least when fruit of all kinds meet with a ready sale direct to the consumers at prices 25 to 50 per cent. above what could be obtained in Toronto, failure, unless in experimenting or some other reason the cause of which is seldom difficult to find out, is very rarely spoken about.

I do not mean to say that we have a perfect climate or soil for growing fruit. Far from it. We have some disadvantages here that growers to the east and south of us know but little about. These are being gradually overcome, and I sometimes think and oftener say that fruit growing like wheat growing is moving west to find a more congenial climate. Be that as it may, we certainly know little or nothing of many of the difficulties encountered in what is called the more favored districts. Injurious insects, and fungi, such as black-knot, are scarcely known here. True, we have the oyster-shell bark louse, far too much of it, and the aphid. But these are both easily controlled. Given suitable varieties as far as apples, cherries and small fruit are concerned, I see no reason why a stretch of country of some hundreds of miles along the north shore of Huron and part of Superior should equal if not excel any other part of Ontario. This may seem a doubtful statement, but I am quite satisfied it is a correct one. Unfortunately as far as apples are concerned, we have nothing to take the place of the Spy. I have tried and failed to grow it as a top-graft, I cannot get the wood well enough matured in the fall. I had some hopes of succeeding with Ontario as a substitute. I had the trees bearing, but a hard winter a few years ago killed them down to the snow line. They have started to grow again and promise to make better trees, being lower headed. The tree bears, and even if its lifetime is short, is well worth further trial in filling a space that is now blank. It is no use top-grafting on the Tolman as the Tolman as a stock is not sufficiently hardy. And although it is absolutely necessary that the stock should be as near as possible proof against sun scald I am quite satisfied that it imparts little or nothing of extra hardiness to the top, that is, as far as frost resisting power is concerned. The winter of 1908-9 only went once 30 below. In some previous winters over 40 below was registered, but while such a low temperature may kill a peach it has little or no effect on an apple, but think two or three days of drying wind with the thermometer at zero to be more dreaded.

In my old orchard, planted twenty-seven years ago, I spray for scab and find it necessary in ground later planted, part of which is reserved for experimental purposes. There are several McIntosh and Louise that have never been sprayed. We are using them now, January 1st, and not a spot can be found on an apple. The old orchard is surrounded by a belt of spruce 35 or 40 feet high, which was planted far too close to the trees, while the newer part has no shelter for a considerable distance. I do not say that this is the reason for these trees being clean, I am only stating facts which I point out to interested visitors.

Now, in regard to raising an orchard from the start, supposing the hardiest kinds are planted, we may safely count on having a larger proportion than in more favored districts, even if given the best of care. When a tree has arrived at bearing age it is comparatively safe, that is, an apple tree, not so much with a plum. They seem to thrive vigorously until coming into bearing, when all at once the whole tree dies right to the ground. This is specially so with Japans. The Europeans, those that survive that far, will carry a few crops and then die, but by selecting the hardiest among them I would prefer to plant European rather than Japans. As to markets, I have never seen a glut in fruit of any kind yet. We can pretty well supply local markets, beginning with strawberries and ending with apples, up to the New Year, after that imported apples will be wanted. Strawberries this year had to find a new outlet. We had previously depended on local trade. New markets were not hard to find, and thousands of crates more could have been sold at highly remunerative prices.

The above is a summary of progress at this station and requirements of the district, and to this I may add that our local fruit still commands a much higher price than the imported article. While we are not any more honest, our fruit as a rule is cleaner and better and worth the difference in price.

The question of adaptation is not yet finally settled, but hardiness is the first quality to look for. I think that the advice given to fruit growers has been as a rule too general, and that now attention should be given to the special conditions which prevail in different districts, so that any advice or suggestions that I may give will only apply to this locality. For instance, I would advise planting low headed trees; give clean cultivation until they come into bearing; do not prune the head too open; protect the trunk and lower limbs with building paper or a thick coat of lime wash applied about the middle of March to prevent sunscald. Seed down thickly with red clover so long as the clover stays in the ground. The varieties that we can depend upon are mostly of little value in the older districts, but the quality and general appearance is better and our market has and will take all we give for years to come. A fair sized apple, if clean, has always found a ready purchaser, even if marketed in 11 quart baskets. This entails some work, but the difference in price pays. What we have been and are still looking for is a long keeping winter apple of fair appearance and size. Those we have at present have serious faults. Scott's Winter is small, Wall-bridge although a good cooking apple is a poor dessert apple. Pewaukee drops its fruit badly, and has a poor appearance in the package. Another is too small or shrivels in the cellar if kept dry, and so on through the whole list. I think we should pay more attention to the individuality of fruit trees, especially in the north, and propagate from those which have proved themselves hardier than others of the same variety. The difference may **not be very noticeable** in more favorable climate, but is very evident here in all tree fruits and especially so in the apple.

APPLES. Apples were perhaps the heaviest crop we have had for some years. Owing to the early part of the season being very dry it looked at one time as if the fruit would be undersized, but with the exception of Yellow Transparent all others were large and clean. Crab apples especially were an enormous crop and no more of them could be planted. There is enough to fill the demand. Among these Isham, a variety not extensively planted, stands prominent in regard to quality. The original tree came from Prof. Budd. This is probably the finest crab as well as the handsomest, but it scabs readily, and to obtain clean fruit has to be covered with Bordeaux until the fruit is fully grown. I have thirteen varieties, and this is the best in appearance and quality. Not quite so

heavy a bearer as Hyslop, which is the principal crab grown for the market. Although I have advocated top-grafting trees of kinds not suited to this climate and would do so still, the results have not been quite what I have expected, and it is just a question with me if it would not be better to dig the whole thing out and plant something hardy from the ground up. Winter St. Lawrence and Baxter are two apples that have done well with me, and for variety should be more extensively planted. Of course the money-maker is the old Duchess. It may always be depended on, and the fruit is off the tree before the rush of packing begins. North Star extensively planted is a good apple and follows the Duchess and many prefer it. Alexander is much inquired after. With me it has not been one of the most profitable. The tree may carry a heavy crop but seems to then want two or three years to recover. Wolf River a little later seems to bear more regularly but the trees here are just well into bearing.

Louise, not extensively planted, is a very fine dessert apple, and sufficiently hardy to stand the winter. Godwin extensively planted is very hardy, an hardy bearer of good sized fruit, not so apt to rot at the core here as it is when grown further south. Longfield very extensively planted. I am top-grafting. It is an early bearer, but the fruit is too small and a slight bruise shows up very quickly on the fruit. Would not plant any more of them, although on good rich soil and the fruit well thinned out a fair sized apple may be had.

Wealthy and Peter fill in the season from late fall to early winter and are reliable—none better in this season. Pewaukee I have not found so thoroughly hardy as is usually supposed. Scalds badly on the south side of the tree. Scott's Winter has the same fault. The fruit is rather too small and needs to be cared for in order to obtain fair sized fruit.

These are only a few of most extensively planted apples, probably as many more could be given, and unless there is something specially good a better cooker than Duchess and a better dessert than McIntosh or Fameuse, there is no need to multiply varieties. The hardiest variety that I know of is Charlemoff, rather a handsome fruit coming in just before Duchess but its season is very short. I have fruited Milwaukee. As a top-graft it certainly makes a fine growth, but I have been so often mistaken in giving an opinion from the first fruit that I cannot say much about it, only it is well recommended when it is grown as a winter apple, the top seems to be quite hardy, and if a top-graft should be put on such a stock as McMahan. Perhaps this may be our future winter apple until we get a better.

PEARS I may set down as a failure or very nearly so. The varieties that we can grow are of very little commercial value. There are a few good trees grown under favorable conditions, but they are an exception. Some had a few fruits before they died, but with the exception of one Goodall, they were all killed to within a foot of the ground. Nearly all made a new growth from the stump, and are now from three to five feet high and look healthy, but I do not expect they will amount to anything. Flemish Beauty appears to be the hardiest, the few that I know of have had a fairly regular crop. I would not advise anyone to plant pears. I have a few growing from scions sent me said to be of good size, but think the quality is inferior. The fruit of the Russian that I have is of no use.

PLUMS have been more of a success. Just let me say that experimenters should be very careful in recommending any particular variety. For several years I said plant Japans. Now I say let them alone. I made a mistake which cost a few men a little money that might have been turned to better advantage. Among the Europeans, Glass has been perfectly hardy. Lombard a close second

with Pond's Seedling and Reine Claude following up. A few years ago I top worked some scions said to be Russians (I have lost their names). These have fruited the last two seasons, the tree healthy and vigorous. The fruit has some resemblance to Glass and is a very fair plum to eat out of hand. I have also a yellow plum found growing wild here on St. Joseph's Island. The tree is an upright grower somewhat like Abundance. The foliage has all the appearance of a European which it may be escaped from cultivation. The fruit has much the appearance of the old Yellow gage, only the skin is slightly tougher. About the same size, but more one-sided, half-cling. Eating good, cooking fair. This plum, whatever it is, is worthy of cultivation outside the best plum sections. It propagates itself from suckers freely and is quite hardy and found growing wild shortly after the first settlers came. The Americanas, some of which are rather late in ripening, show signs of decay. Those planted had been worked on the peace stock, and possibly not planted deep enough. For general planting in the north, this variety should have further trial. They make good preserves. The principal faults are brittle top. Color of the fruit is against it for market. We may look for improvement in this plum. I have found some very good fruit among our native plums but so far have never made a selection from any.

For this locality I would recommend Glass, Lombard, the Americana, budded on plum stock and the Yellow plum mentioned.

CHERRIES. Situated as I am under the influence of a large body of water, cherries have always been a success. I cannot recollect ever having less than half a crop. If I can keep the tree alive I am sure of a crop of fruit. Bursting of the bark is the principal trouble, otherwise sour cherries may be said to be a sure crop anywhere near the water. They are not so further back. There they have to depend on the old Canadian. Although a sure crop we do not consider them a profitable one. The demand is limited and the cost of picking is more than with other fruits. I cannot improve upon the old selection, viz., Early Richmond, Montmorency, English Morello, to which may be added Oriel 24, Ostheim nearly approaching a sweet cherry when fully ripe is not a profitable one to grow. Montmorency is perhaps the best of the lot and just as hardy as any. Sweet cherries are of no use here. I have only one left and that is covered with snow every winter.

CURRENTS. The crop any year has been quite satisfactory, bushes strong and vigorous and the fruit of fine quality; given plenty of manure, kept clean of weeds, cutting out the old wood and shortening the new meet all requirements. I cannot say among the reds which is the best. The old Red Dutch is possibly as fine a quality as any. Saunders, Champion and Black Victoria are among the best of the black.

GOOSEBERRIES. Were good. There was no mildew among the English berries. We are clean of that here. Golden Prolific has this year again given the heaviest crop and is a satisfactory berry to sell. Red Jacket was nearly as good. Pearl and Downing come next. The only failure was in six plants of White-Smith grown to one stem and imported from England. They have never amounted to anything. Pearl and Red Jacket I would recommend as the two best all round berries taking quantity and quality into consideration. I like to keep the bush rather open and renew the wood frequently.

RASPBERRIES. Cuthbert was again this year a failure. It is so seldom we get a good crop that they are scarcely worth growing. This is no doubt a fine berry but it is not hardy enough for here. Marlboro for early and Loudon are quite sure. Brinkle's Orange, which I have always recommended for private use,

has for the last few years shown so much weakness in the cane and will have to be discarded. It is not advisable to plant this fruit here. The wild fruit is so plentiful and many prefer it for canning.

GRAPES. Commercially there is no use growing them as better fruit can be purchased cheaper than we can grow it.

STRAWBERRIES. Strawberries have always been by all odds the best paying fruit crop here. The climate seems to suit them exactly. I plant four feet between the rows and eighteen inches in the row. Some varieties might be planted closer, but I do this to facilitate more cultivation. We let all the runners grow, only are careful with the poor plant makers to keep them in the row. Formerly I used to take only one crop and turn them under. Now I prefer to take two crops. By keeping them clean the second will be nearly, if not quite as good as the first. We never cover in the fall, the snow usually is sufficient protection, but put the fine tooth cultivation between the rows in the spring. This I find suits my conditions, but only the fruit may get a little soiled after a rain. Strawberries are being extensively planted in this section. I may state that out of one acre that I had raised to plant from I gave away so many that there was not enough left for my own use. They have all sold for \$3 a crate of twenty-four boxes. The cold, wet spring kept them back in the beginning. The first picking, only a few, on the 18th June, and lasted a little over four weeks. I am just as ignorant as ever which is the best berry, but the following have been satisfactory or otherwise with me. Texas was the leading berry this year, and has a long fruiting season, and withstands dry weather well. Haverland easily affected by drouth; with a moist season is a first-class berry, weak fruit stalk. Prolific is too easily affected by drouth; makes plenty of plants, with plenty of moisture; good. Parson Beauty has the same disadvantage as Prolific, otherwise is a more profitable berry and a good plant maker; quality good; some years has done well; Splendid, withstands drouth better; a profitable berry, and makes a good row; one of the best for market. Crescent makes too many plants if left to itself, but a fairly profitable berry. Senator Dunlap, somewhat affected by dry weather, but good; recommended. Bubach stands drouth; a poor plant maker, but one of the most profitable all-round berries. Van Deman discarded. Climax only fair; there are better. Sample a good market berry; strong, healthy plant. Grenville not profitable this year compared with some others; a good plant maker and, under more favorable conditions, a good berry. Clyde, which used to be our best berry, seems to be going back fast; poor foliage; will have to be discarded if it does not turn out better. Millar not so promising as some others. Wm. Belt—there are better berries of the same season. Glen Mary, one of the best berries I have; a strong, healthy grower, dark green leaf. Brandywine, not quite as good as Glen Mary, still good enough to be kept, but is not so good as it used to be. Ion is a magnificent berry every way, possibly the best I have; firm quality; strongly recommended. Corsican—this is a berry with several names; with me the fruit is subject to rot; fruit is large, a good fancy berry; would not recommend extensive planting. There are a few that I have specially experimented on; some not mentioned have been discarded. Altogether our best market here is for a late berry.

APPENDIX "A."

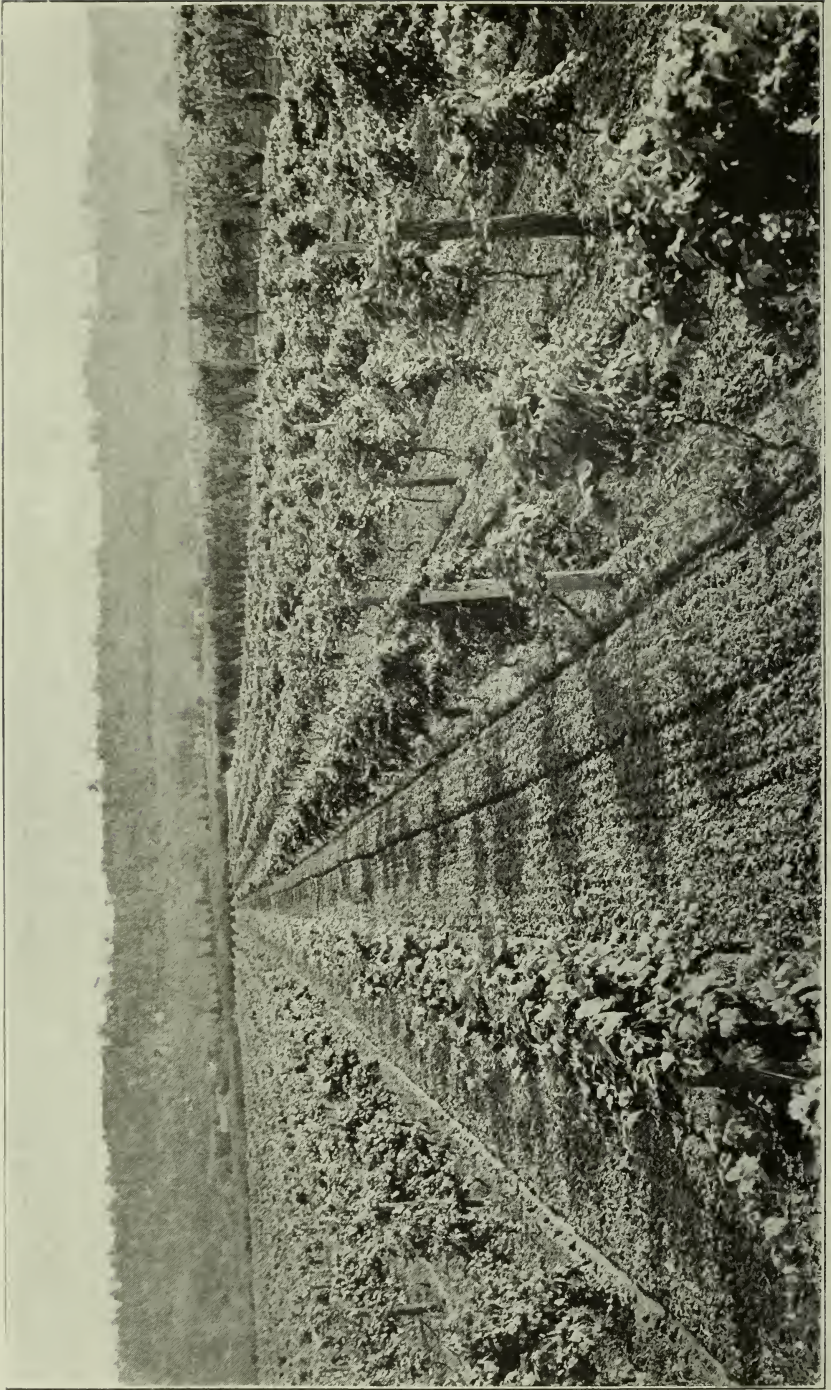
THE GRAPE GROWING INDUSTRY IN THE NIAGARA PENINSULA.

BY T. B. REVETT, DEPARTMENT OF AGRICULTURE, TORONTO.

It is almost impossible to get any definite idea of the early days of the grape in the Niagara District. There seems to have been a few men who had planted two or three vines prior to 1860. In that year three plates of grapes were shown at an exhibition of native products held in Hamilton. These were supplied by Mr. Jonathan Pettit and Mr. W. D. Kitchen and a gentleman whose name could not be ascertained. These grapes attracted a great deal of attention, as they were probably the first Ontario-grown grapes ever shown at the exhibition. About 1857 some grapes were planted on a farm belonging to Mr. Porter Adams situated in Niagara Township. In 1858 Mr. W. D. Kitchen and Mr. J. R. Pettit planted some grapes at Grimsby. In 1862 Wm. Read, of Port Dalhousie, planted three acres of Concord, Hartford Prolific and Delaware. In the same year Peter Wright, of Stamford, planted three acres of Isabella grapes. In 1863 Messrs. Lusee, on the mountain near Winona, and J. M. Stewart, Henry Lottridge and Christopher Biggar, below the mountain, all planted small vineyards. In 1868 F. G. Stewart, of Stamford, planted 2½ acres of Concord and Delaware, and P. Prest, of the same place, planted an acre of Delaware, Concord and Hartford Prolific, and in 1869 Walter Kerr, of Drummondville, planted 2 acres of Concord and Delaware, and Mr. Lowin, of St. David's, planted 2 acres of Concord. For the next six or seven years, as far as could be ascertained, very few grapes were planted. About 1880, however, by the introduction of the Niagara grape, a strong stimulus was given to the grape industry. Vines of this variety were sold at \$1.25 apiece, and the purchaser had to repay the company out of the first three crops, and was bound to sell all the wood from these vines to the company, and was not allowed to plant a single cutting, under a heavy penalty. In spite of these high prices and binding regulations, the vines yielded a profit of from \$2 to \$3 per vine for several years.

According to the late Mr. Murray Pettit, who was one of the earliest to grow grapes commercially, and who planted a Concord vineyard in 1872, and who was considered an authority on grapes, there were only about 400 acres of grapes in 1880. In 1890 it had increased to 2,400 acres, with a production of 3,318.27 tons. In 1901 the acreage had increased to 5,750 acres, with the crop valued at \$20,000.00. From 1901 to 1909 the planting increased very rapidly, and after careful calculation the approximate acreage of grapes in the Niagara District was found to be in the neighborhood of 10,000 acres. This tremendous increase was not due to any abnormal prices, but to the increase in number of fruit growers, and to the fact that it was found that grapes had proven to be a staple crop. The prices ranged from \$20.00 to \$22.00 per ton in 1909, as there was a tremendous crop, and as a result very few grapes are being planted this spring.

THE EARLY MARKETING OF GRAPES. It is interesting to note the gradual trend and development of the markets for grapes. Mr. F. G. Stewart, of Homer, told the writer that in the "seventies" he used to ship by boat from old Niagara-on-



Vineyard of J. W. Smith and Sons, Winona, showing good methods of cultivation and trellising.

the-Lake to Toronto. Freight, wharfage and harbor dues at that time amounted to 18½c. per basket. These baskets had a capacity of twenty lbs., were made by Indians and sold at from 22c. to 25c. apiece, and used to be returned free from Toronto by the steamship company. Mr. Stewart said that in the "eighties" he netted as high as \$210.00 per ton for Delawares and \$140.00 to \$150.00 a ton for Concords. Mr. E. D. Smith, of Winona, who has been a long time in the business and is perhaps the largest grower and shipper, recalls the time when a few baskets of grapes were enough to supply the market, and it was thought that a few acres would glut the market. In 1872 the express companies started to handle the grapes and the fruit growers began to ship to Toronto and Montreal, and the tendency was to find new markets. After the introduction of the Niagara grapes the price for these grapes was 10c. per lb., or \$200.00 per ton. Since that time, as the acreages have been increased and distribution better handled, the consumption of grapes has been increased, yet the price has gradually been falling until it has reached the present low level, which varies from \$16.00 to \$22.00 per ton.

The gradual development of the markets, the better and more attractive baskets, the general keeping qualities of the grape and the progressiveness of some of the shippers and co-operative associations have all lent themselves to developing the grape industry. In order to get some idea of the magnitude of the grape industry and its wonderful development in the last forty years one has only to consider that grapes are shipped by freight from the Niagara District to Vancouver in the west and Halifax in the east. The St. Catharines Cold Storage Company, which is a co-operative organization of growers in that section, shipped grapes to the West in 1904 under this Department's supervision; in 1905 Mr. R. Thompson, the manager, went West, and as a result of his trip 18 carloads were shipped; in 1906, 30 carloads were shipped West; in 1907, 45 cars; in 1908, 45 cars, none on consignment; in 1909, 90 cars were shipped to the western markets. With the development of the grape industry we also had a development of the wine industry. There are five wineries in the Niagara Peninsula, which used 2,400 tons of grapes in the fall of 1909. There are also three or four factories situated in Toronto, Montreal and Sandwich, which are also supplied with grapes from this district. It has been found that under normal conditions about one-third of the crop of grapes is manufactured into wine. The buying for this purpose has usually been very brisk except during the last two years.

SOILS. The grape will thrive on a great variety of soils. In the State of Michigan the soil of the grape sections is a sandy one. In Southern Ontario and Pelee Island the grape soils are mostly sandy. In the Niagara district the grapes are grown on every variety of soil, from a light sandy soil to a very heavy, flat, red clay. In this district, however, the best grapes are grown on the mountain wash soils. This is of a loamy clay. It is a very deep, strong soil, and from year to year is kept fertile by the washing from the mountain. There is a strip of this mountain wash soil from Hamilton to Queenston, and its width varies from 100 to 500 feet. Towards St. David, in the township of Niagara, we find the greatest width of this mountain wash soil, and with its advantage of earliness it must rank as the most ideal location for the growing of early grapes in the peninsula. The best soil for grapes, outside of special locations, etc., is a deep, rich clay or clay loam. When grapes are planted on these heavy soils they ripen their fruit better, and the flavor is much more pronounced and color better developed than grapes grown on sandy soils.

Grapes will also do well on a variety of the lighter soils, but it is hardly



AGAWAM.



VERGENNES.

advisable to devote such lands to grapes, as these lands may be employed to a very much greater profit for production of other crops.

The soils for grapes in the Niagara district may be said to be the clay soils, as they are cheaper and better adapted to the most profitable production of grapes.

PREPARATION OF SOIL PREVIOUS TO PLANTING. The kind of treatment given to the cropping of land prior to the fall before planting is not very important. The chief factor to be kept in mind is the condition of the land to facilitate planting. A sod is not desirable because, in plowing out the furrows in spring, the result is that the sod is turned up. Grain or hoed crops are perhaps the best to use on land that is to be planted to grapes.

The land should be thoroughly plowed in the fall, and furrowed so as to insure good surface drainage. In the spring this land should be thoroughly worked down with disk and cultivator, and should be gone over twice. While the vines may do well on the land that has not been thoroughly worked, yet the grower should always endeavor to have the soil in the very best shape possible.

TIME OF PLANTING. Vines should not be planted until the soil is dry enough to work without puddling. If the vines are planted when the soil is wet, the soil will become caked around the vines from planting, which is very undesirable. Planting may be done from the 1st of May to the 24th. Many of our best growers prefer to be late in planting and have good soil conditions, and they claim that the vines do just as well as early plantings.

DISTANCES APART IN PLANTING. The distance apart in planting a vineyard, or the amount of feeding space to be allotted to each vine, depends almost wholly on the kind of soil and, to some extent, on the method of pruning. In rich, deep clays—in fact, in all the deep, heavy soils—the space required by vines is much less than in sandy or lighter soils. In light, sandy soils it is recommended to plant your vines 10 feet apart each way, *i.e.*, the rows will be 10 feet apart and the vines 10 feet apart in the rows. This gives adequate room for the development of the vine.

In the heavier type of soils some of the growers recommend the rows to be 10 feet apart and the vines 9 feet apart in the row. This is a good conservative distance, and, for the average fruit grower, is perhaps more adaptable. In instances, however, where a grower has land which by some outstanding feature is peculiarly adapted to the production of grapes, such as would probably be situated at the foot of the mountain, and the grower has made up his mind to give some special attention to this vineyard, it might even be advisable to plant his rows 10 feet apart and have the vines 7 or 8 feet apart in the row. With this close planting it would be possible to get the most out of the vineyard, but at the same time a great deal more attention would have to be given to the pruning.

One of the best grape growers in the Winona section said that he thought it would be a very good plan to set out a vineyard closer and to remove the intermediate vines after a period of five to six years, thereby increasing the yield per acre up to the time of removal, which would considerably lessen the cost of establishing a vineyard.

This method, however, could be practised only where the vines were planted 9 to 10 feet apart in the row and when vines could be purchased at $2\frac{1}{2}c.$ apiece, and it is a question whether it would be advisable to recommend it, as the grower would find it very hard to remove the intermediate vines, and if they were left too long a lot of injury might be done to the vines which would eventually form the permanent vineyard.

KIND OF VINE TO PLANT AND ITS PREPARATION. Nearly all the fruit growers buy their vines from the nurserymen, and very few, if any, grow their own. The nurserymen gather the wood from the vineyards as soon as they are pruned, and make the cuttings from the good, thrifty wood with sound buds. The base of the cutting is clipped off just below the bud, and the end just an inch or so above the third bud. This gives three buds to a cutting, and the cutting is about one foot long. These cuttings are tied in bundles of from 100 to 300 in a bundle and layered in the soil, standing on end with the buds turned upside down. This is done to stimulate the callousing and formation of roots. In the late spring, when the soil is in good shape, a deep furrow is made, and the cuttings are set in this furrow from three to five inches apart, in rows four to six feet apart. These cuttings are cultivated and kept free of weeds, and make an excellent growth. Those cuttings that have made a strong growth are sold the following spring as No. 1 one-year-old vines. Those vines that are not sold are replanted, and are sold the following year as two-year-olds. There are perhaps some cases where the cuttings are allowed to grow two years and then sold as two-year-olds.

With the above knowledge the grower will be able to decide that the one-year-old vines are the proper ones to plant. This is the consensus of opinion amongst the best vineyardists, for they claim that a two-year-old is nothing but a one-year-old cull that has been replanted. However, there is one factor which has been suggested by one of the growers which would have some influence on the age of vines to be planted. He claims that some varieties are slow growers, and that better results are got from planting two-year-old Worden instead of one.

The usual precautions should be taken in ordering, *i.e.*, the varieties should be given, and you should request that no substitution should be made. The order should be mailed as early as possible, as the nurserymen fill their orders according to the date of receipt of same. The quality of stock required should be plainly stated and the age given. If these precautions are taken there should be no trouble in obtaining your stock. As soon as the vines are received the bundles should be cut open, and the vines heeled in and mounded up to three-quarters of their length. Care should be taken to keep varieties separated, and any simple device will do this. The place in which the vines are heeled should be protected, if possible. When the soil is ready for planting the vines may be trimmed up by cutting back the wood to three buds. There is some diversity of opinion in regard to the cutting back of the roots. Some growers believe in cutting them back two-thirds. This may be done with sharp spade or hatchet when the vines are received in bundles. In this way a lot of time is saved, and the slight difference in the evenness of the roots does not appear to make any difference. One very successful grower told me that he only removed the injured parts of the roots, except in cases where they happened to be over twenty inches in length, and he claims that he could not desire better results. Another grower claims that he cuts back the roots liberally, but he finds that with the system of planting by a furrow the roots take a long time in getting hold of the middle of the row, and that most of the energies seem to be spent in the direction of the furrow. In order to obviate this he cuts two of the roots that are opposite to short spurs from one to three inches long, and in planting these roots should extend towards the centre of the rows or at right angles to the furrow, and he claims by so doing the roots develop in all directions.

SPRING PREPARATION OF LAND FOR PLANTING. As soon as the land is dry enough to work, disk it thoroughly and go over it with a spring tooth cultivator



CAMPBELL.



CONCORD.

and work it down until it is in good shape. It is almost necessary to go over it twice. When the land is in shape and the time has arrived for planting, the marking out has to be done. This is a very simple task, and requires a good plowman and a steady team. The rows are staked out at the proper distances apart at each end of the field, and by the use of two or three rods, depending on length of row, the plowman strikes out a deep furrow of about six inches deep and returns in the same furrow. This plan has been found to be very successful by many growers, and all that is needed in planting. On the other hand, some of the growers prefer to strike out a furrow, and on the return strike out another, leaving a dead furrow between. This is plowed out on the third turn and deepened on the fourth turn. This method is longer, more expensive, but gives a somewhat better condition for planting. It is, however, a question which the grower must decide for himself, and will depend entirely on the amount of time at his disposal.

PLANTING. As soon as the furrow has been made the planting should be started, and should follow up the plow all the time. A rod cut to the desired length, which is the distance apart of the vines in the rows, is used to show the position of vines. A boy carries a bundle of vines which have been trimmed for planting, and one man does the planting. In planting, the root should be arranged carefully and the earth firmly tramped. The vine should be set so that the two or three buds are just above ground. One cannot be too careful in having the earth firmly packed around the roots, as perhaps more dead vines are due to this defect than anything else.

When a lot of vines are to be planted, two men are used, and a boy supplies them with the vines. By utilizing the second man the work may be more quickly and efficiently done. In some instances another man follows up the planting and fills in the earth to a distance of about eighteen inches on each side of the vine. Some growers have found that by applying a couple of handfuls of bone meal at the time of planting better results were obtained. The bone meal is not thrown on the roots, but is scattered about them before the earth has been completely filled in. When the field has been planted the furrows are filled in by using a disk. The disks are set at such an angle that each section will pass on the side of the row of new planted vines. This is by far the best machine to use, as it pulverizes the soil and fills in the furrow beautifully.

FIRST YEAR MANAGEMENT OF VINEYARD.

As soon as vineyard is planted it should be kept cultivated, either with a disk or spring tooth cultivator, and the ground should never be allowed to bake or crust. Cultivation should continue until about the 1st of August, when the vines should be left to mature their wood. In the fall it is well to plow and furrow out the vineyard in order to afford good surface drainage. However, all that appears to be necessary in the way of fall plowing in so young an orchard is two or three furrows on each side of the row. By this I do not mean to imply that the fall plowing of the whole vineyard is not to be recommended. In hilly lands or any lands situated in such a manner that there is a considerable wash in the spring, I think it would be greatly advisable to abandon the plowing of the whole vineyard and only plow two or three furrows up to the vines, whether the vineyard be young or old.

There is one vineyard I know of which is situated at the foot of the escarpment, and the water runs straight down the rows. In this vineyard the above practice is, and has been, followed for several years with excellent results.

MULCHING OF YOUNG VINEYARDS. Mulching of young vineyards is practised by a great many growers, and seems to be a commendable practice, because, besides manuring the vines, it acts as a protection and mulch. Good, strawy manure is used, and two forkfuls are generally applied to each vine.

CROPPING OF ONE-YEAR-OLD VINEYARD. The question that naturally arises is, will a systematic cropping injure a young vineyard? It seems almost obvious that the plants do not require the whole of the feeding surface for their development during the first year, yet nearly every grower seems very sceptical on this point and almost invariably ends by giving his opinion, which is not very favorable to cropping, and his ideas must have been formed either by personal experience or observation. However, it stands to reason that if the land is needed it will in no way injure the grapes if the vineyard is cropped, but a distance of three feet should be left on each side of the row, and only those crops which will not shade the vines and are hoed crops should be used. I would not recommend the use of corn, as it does not permit free circulation and shades the vines too much. Tomatoes, potatoes and roots are probably the best to be used in cropping a young vineyard. I have always observed that the great drawback to inter-cropping was the lack of appreciation by the grower of the fact that if he inter-crops he must also fertilize and endeavor to carry on such a rotation that will improve rather than deteriorate the soil. If this factor were more faithfully observed there would not be so many discouraging opinions with regard to inter-cropping.

SPRAYING. It is not usually found to be necessary to spray a one-year-old vineyard, but should any insect attack it, poisoned Bordeaux mixture should be used. It is very little trouble to spray such a vineyard, and the expense is almost infinitesimal, and it would be a good precaution to spray the young vines after they had made their first growth.

RUBBING OFF OF BUDS. Two buds were left in the first instance, in order to insure a sprout, and in case one sprout was destroyed there would be another to take its place. As soon, however, as the growth has attained a length of from 10 to 15 inches, select the best shoot and remove all others. This will strengthen the growth.

PRUNING.

SECOND YEAR MANAGEMENT. The method of cutting back in the second year varies greatly. Many growers desire to maintain their first year's straighter growth. However, taking all things into consideration, I would advise following out the method of cutting back to the second bud. By doing this the growth is greatly stimulated, and, as a general rule, the wood that is formed is of a strong, healthy texture.

CULTIVATION. As soon as the ground is dry enough it should be plowed about three inches deep. In many cases it may be noticed that some plowmen, while doing this work, will hold their plow at an angle. This is a very bad practice, because the work done is very uneven. The heel of the plow is up and the point down. This makes the furrow to a small degree V shaped—one part of the furrow being deeper than the other. The plow should be held squarely and an even furrow plowed, and your work will be more thorough and uniform. A gang plow is the best for this work. It does the work more evenly and with greater rapidity. After plowing it will be necessary to use the grape hoe, in order to get as near as possible to the trunk of the vine. While the young vines have not yet taken full hold of the ground allotted to them it is not wise to plow very deeply,



MOORE.



WORDEN.

and thereby cut the surface roots. This is especially so in well-established vineyards, as in these the roots have extended very far and should not be ruthlessly destroyed by deep plowing. After the vineyard has been plowed it should be disked and cultivated, and the cultivation should be kept up until the 1st of August, and in the fall it should be plowed as in a one-year vineyard.

CROPPING. While it may prove successful if a proper method of cropping was carried on the first year, I think it is highly undesirable to crop during the second year, as I believe that full attention and every advantage should be given the vineyard from now on.

MULCHING. The system spoken of in the first year's management is a good one to follow and is giving good results.



Ends of grape trellis showing method of bracing posts.

TRELLISING. The work of putting in your posts and starting the trellis should be started.

POSTS. Good cedar posts should be used. For the end post the post should be longer than others and not less than five inches in diameter, while the intermediate posts should be about three inches up. The posts should be well cured and not dead. If your posts are good they should last at least twenty years. If the butts of the posts are painted with tar they will keep very much better. The posts should be set about thirty feet apart and from 2 ft. 9 in. to 3 ft. in the ground.

SETTING END POSTS. The end posts have to be set more firmly, as they have to bear a greater strain. There are several methods of setting and guying the end posts. The usual method is to make the post hole deeper and larger, and to nail a cross bar on butt of post. This is done to keep post from heaving. Some heavy stones, if handy, are advantageously used as the first filling. Care must be taken.

that the filling is well rammed. The post is then guyed with strong wire (galvanized). The wire is secured to the post about a foot from the top; the other end is attached to a large stone, which is buried about three feet deep and as near to the post as possible without decreasing the relative ratio of the purchase. This distance is about four to five feet. The wire is tightened by using a stick and twisting the wire. The greatest objection to this method of guying the end post is the waste that is occasioned. The wire interferes with cultivation, wastes a lot of land and is conducive to slovenliness. However, this method is the best method of guying or giving the necessary strength to the end post by use of an outside support. Many of the new vineyards have been guyed on this principle, only the wires have been attached from the top of the end post to the base of the first post. In some cases a wooden brace between the end and first post is used, and is very effective.

Another method of setting an end post which has been strongly recommended by one of our best growers, and which appears to be evidently acceptable as it does away with the guying, is "setting the post in cement," and is done in the following way: A large hole is dug, the bottom of which is made very much larger than the top, and the ratio of increase of diameter of hole increases very rapidly at the bottom. This is done with the idea that if the soil is not disturbed the rigidity is greater, and by shaping out the bottom the cement foundation will be more rigid. In preparing the post for setting a cleft is cut on each side, in order to give the cement some hold on the post. It may even be beneficial to attach a cross bar to the bottom of the post. The post is then set in position, and the cement is filled in and well rammed, in order that it will thoroughly fill the hole. The filling is continued until you have a cement foundation about a foot thick. The cement is left exposed for a few hours, and then the hole is filled in usual method. This method of setting in cement is more expensive, but the headrow of the vineyard is easily kept clean, as there are no wires in the way, and again we invariably have the rusting and breaking of guy wires, which are tedious and expensive to replace.

WIRE AND WIRING. It is a good plan to get the best grade of galvanized grape wire. No. 9 staple wire is the usual size in use.

Wiring: It may not be necessary to put on all the wires that are necessary for the system of training that is to be followed, but a job that is half done is unsightly and detracts from the appearance of the young vineyard, and is likely to give a bad impression to casual observers, and if it is at all possible to complete the wiring it is strongly advisable to do so.

The wiring of the posts is a very simple thing. In wiring of end post one of the many plans for tightening the wires has to be followed. There are some simple devices which are attached to the post, and the wire is tightened by turning a crank. A very simple method in use is a piece of hardwood about an inch square and six to eight inches long. The wire passes through a hole in the post and is attached to the stick, and to tighten the stick is just turned round, and the tautness of the wire, together with the shape of the "tightener," keeps it in place. In stretching the wire the spool is placed on a spindle at one end, and a man takes the wire to the other, where it is tightened and fixed in the same method as the first post. The wire is then fastened to the post by staple.

DISTANCE APART OF WIRES. The distance apart of wires depends entirely upon the system of pruning. When only two wires are required, the first wire should be $2\frac{1}{2}$ ft. from the ground, and the second or top wire $2\frac{1}{2}$ ft. from the first. Where three wires are used the first wire is generally 18 inches to 2 ft. from the ground, and the top wire 5 ft. from the ground, while the third wire is

halfway between. In cases where four wires are used, the first wire is from 15 to 18 inches, and the other wires evenly spaced off, the top wire being 5 ft. from the ground.

TRAINING OF TWO-YEAR-OLD VINES. In many cases the training of these vines is neglected; but this is very wrong, as it is desirable to obtain as straight a trunk to the vine as possible, and this can only be done by training during the second season. The chief training to be done is that of the main shoot, which should be tied up to second wire as soon as its growth permits.

SUMMER PRUNING OF VINES. The only summer pruning to be done in a two-year vineyard is to rub off all the buds or shoots from the main stalk from the ground up twelve or fifteen inches of the trunk. This is done to strengthen the trunk and keep it clean and even.

MANAGEMENT OF A THREE-YEAR-OLD VINEYARD.

In the third year a vineyard commences to bear and the general routine of work is practically the same as all other years, the cultivation, which consists of fall and spring plowing, and a thorough harrowing of the soil. The use of the grape hoe becomes more necessary, and some of the growers attach a small one-horse cultivator to the grape hoe, the cultivator taking the place of the shear of the grape hoe. This makes a very handy tool for working up to the vines. In the fall the soil is plowed up to the vines and in spring away from them. It, however, cannot be too fervently expressed that proper and frequent cultivation must be given the vineyard in order to get the best results, and the cultivation must stop about the latter part of July in order to induce the vines to ripen their fruit and mature their wood. The most important thing in the third year of a vineyard, and perhaps of all the preceding years, is the pruning and training and this feature will be taken up after the discussion on the different methods of training grapes as the pruning closely hinges on the methods adopted.

METHOD OF TRAINING GRAPES. There are six methods of training and trellising grapes to be found in the Niagara Peninsula. They are as follows:—

1. The Kniffen system.
2. The Arm system.
3. The Fan system.
4. The High renewal system.
5. The Arbor system.
6. The conglomerate and do as you please system.

THE KNIFFEN SYSTEM. This system of training grapes is perhaps the most common, especially in the neighborhood of St. Catharines and towards St. Davids and Queenston. It consists of a central cane with four arms and is trained on two wires. This system is greatly recommended by some of the best growers, especially in cold sections and on sandy or light soils. Its chief advantage is that it permits of thorough ventilation. It is generally cut back to seven buds to each arm and four arms to a vine which gives fewer bunches than other systems, but these fill out and ripen better, and there is not as much tying up. The Kniffen system is admirably adapted to the production of market grapes of the best quality but the yield of bunches is not as great as in the other systems.

In pruning for the first and second year the vines are cut back to two or three buds as previously described. In the third year one arm is trained along

the first wire, and if possible a second arm is trained on the same wire. The second arm is generally from the first. The probability of securing a second arm may be increased by leaving a spur at the proper point during the second year pruning. The main shoot is carried up to the second wire. The grower should endeavor not to crop his vineyard too heavily, and from twelve to fifteen buds are quite sufficient to be left, the others should be rubbed off. With this system there is virtually one central trunk with a side arm at the first vine from which



Old Kniffen System.

the two arms are eventually taken. It is claimed that in this way the flow of sap is straight to the top of the wire while the canes on the first wire do not get as much nourishment and they do not as a general rule give the best possible results. This argument may be substantiated if the size of the trunk is any criterion by which one may judge the ratio of the flow of sap, because it is invariably noticed that the size of the trunk from the first wire to the top of vines is a great deal larger.

In order to ameliorate or equalize conditions, Mr. F. G. Stewart, of Homer,

devised the plan of dividing the main trunk below the first wire, carrying one trunk to the first wire and continuing the other up to the top wire, and he claims he has accomplished the act of more evenly distributing the flow of sap over the whole bearing surface of the vine. The division is got by allowing two canes to grow at about fifteen inches from the ground. In the fourth year the vine should have conformed itself to the Kniffen system, and in pruning in the spring there should be two arms on each of the wires and seven buds should be left to each arm. The Kniffen system is a very desirable form for training grapes and is highly recommended by a great many growers.

THE ARM SYSTEM. This system is best adapted to the production of a quantity of grapes and is used more for wine production, but in Ontario there is no specialization of growing grapes for wine, and the growers only adopt this



Improved Kniffen System, showing the method of dividing trunk of vine.

system because it appeals to them. It consists in having two main trunks along the first wire, and from each of these trunks five canes with from seven to eight buds are left. These canes are tied up to the wires at almost right angles to the arm. Three wires are used, the top wire being about five feet from the ground and the middle wire evenly spaced. In the second year the vine is trained in two arms along the first wire and in the third year it is cut back two or three buds to the arm, and the fourth year four or five canes are left which are cut back to five or six buds.

FAN SYSTEM. This system is admirably adapted for the production of a quantity of grapes. It is easily pruned and gives an even distribution of wood, and next to the Kniffen system is more generally used in the district than any other. It is not advisable, however, to adopt any system which has the tendency to induce over bearing, especially in late ripening varieties, as this might result disastrously in cases of early frosts. Besides, when over-production is prevalent

we have an improper ripening of wood, and as a result, winter killing of the canes. This system is very prevalent between Hamilton and Grimsby, especially in the Winona District.

HIGH RENEWAL SYSTEM. This system seems to be a moderated type of Fan and Arm systems. Its chief value is the evenness of distribution of wood, the apparent simplicity in pruning and the excellent results it has given around Winona, especially on the mountain wash lands. It is used by Mr. E. M. Smith, who recommends it very highly. In the first year the vine is pruned to two buds. After they have grown about ten inches break off one cane. The second



Arm System.

year cut back to two buds again (if vine is weak only save one cane); train to first wire. Third year train to first wire and tie the vine so that it is taut (vine should be twenty to twenty-four inches from ground). Rub off all buds below one foot from ground. Fourth year run out two canes along first wire and centre cane to second wire and cut off all canes to six or eight buds.

ARBOR SYSTEM. In this system the vine is cut back in the first and second year to two or three buds, one shoot being retained each year. In the third year the vine is run up to the top of arbor, which is built about five to six feet high. The vine is then trained along the top of arbor, and every year the wood is renewed and about thirty buds left to bear. Outside of home vineyards, which are trained in this manner in order to lend an appearance of beauty to the garden,

there is only one commercial vineyard trained in this manner and the grapes are grown for wine. This vineyard is situated at St. Catharines and is the property of one of the large wine-making companies.

THE CONGLOMERATE AND DO AS YOU PLEASE SYSTEM. This system, I am sorry to say, appears quite frequently in the Niagara District and the adjacent country where grapes are grown. It may or may not be the result of carelessness, but the chief cause is the lack of definite knowledge of the methods of training, and also the employment of trimmers that are not conversant with any definite methods or reason for methods which they may practise, the chief idea



Fan System.

being to remove a portion of last year's growth. In these cases we invariably find that too much bearing wood is left on the vine and the net result from such conditions is that the vineyard presents an uncared for appearance, the fruit is much harder to pick and the bearing wood recedes further each year from the main trunk. There is no special method of training these vines, as this system is liable to be found on any kind of trellis.

PRUNING. Pruning is one of the most important factors in successful grape growing. On it depends the even distribution of wood, the limitation of the crops, the quality of fruit, the development of bunches and the ripening of same and the general appearance of vineyard. The majority of growers understand the importance of pruning. They realize that wood must be renewed but have not arrived at some specific ideal of training, which goes hand in hand with

pruning. Too often men are hired to prune the vineyard, and probably a different man every year, with the result that the best results are not achieved, and in many cases the shape of vines destroyed. No definite plans can be laid down for pruning, and several things have to be taken into consideration which are local and call for personal observation and experience. The ultimate object of pruning is to produce the best fruit, to keep the vines in a desired shape, to control the factor of bearing and to facilitate all necessary operations in the production and harvesting of fruit. The vineyardist must bear in mind that it is within his control to limit the number of bunches to be produced by any vine in his vineyard. With this factor under his control he should use his judgment in pruning. He must study his varieties and their methods of bearing and ripening. For instance those varieties that are late in ripening should not be allowed to bear too heavily for this is conducive to late ripening, and very often we find late ripening and productiveness hand in hand. The amount of fruit which a vine can bring to maturity with the best results depends upon the fertility of the soil. This is another factor which receives too little attention by the growers of the Niagara District, and it too often happens that because somebody, who may have entirely different soil both in regard to physical character and fertility, leaves so much bearing wood on his vines it must be right for somebody else to do the same. The only way to determine the amount of bearing wood to be left on your vine is by observing the crops and their quality. A vine that is young and inclined to be small and lacking vigor will not improve by over-bearing and should be cut back more severely. It must be borne in mind that the proper number of bunches to a vine should be just what the plant will be able to fill out properly and mature. It is better to have fewer bunches and better ones. It is a general plan to allow from twenty-eight to thirty buds to a well grown vigorous vine. One factor which must bear strongly on the number of buds to the vine is the distance. Vines that are planted closely should not be allowed so many, but the aggregate production to the acre will be more. The fundamental principle of pruning grapes is based upon the following fact that the fruit is borne in a few clusters near the base of the growing shoots of the season which spring from wood of last year's growth. The number of bunches that are borne on these growing shoots vary from two to five, according to the variety. This feature will be taken up in the discussion of varieties.

The feature next to the importance of the proper proportion of bearing wood to the vigor of the vine is securing the desirable growth for the following year and to obtain this growth in position desired. All successful vineyardists endeavor to have the bearing wood spring from as near the centre part of the vine as possible. In order to get this it is customary to leave a spur with two or three buds in the desired position, and the growth resulting from this is the bearing wood for next year. Sometimes it is not possible to do this and on the other hand shoots may start from the stem of the vine which may be more adaptable than those from the spurs.

THE KIND OF CANE TO SELECT FOR BEARING WOOD. It is not an uncommon thing to have extremely well developed canes which appear plump and most desirable. It will be noticed, however, that the joints of these canes are abnormally long and the buds are wedge-shaped instead of being round and plump. The best growers avoid the selection of these canes, which they call "Bull canes," and claim that they do not produce as good bunches. One grower, however, informed me that he tried an experiment with some of these bull canes and could find no difference in the productiveness and quality of fruit. It would

be advisable, however, to retain those canes which are characteristic to the variety and well developed and have round plump buds.

TIME OF PRUNING. In the Niagara District it does not seem to matter at what time during the dormant season that grapes are pruned. It has come to be an established fact that pruning of vineyards may be started in January and finished by March. It is best to have the same man do your pruning from year to year, and if more than one man is employed some responsible party is generally placed in charge of the work. After the vine has been pruned the trellises are cleared by cheap labor. Trimmings are thrown in the centre of the row and are gathered in the spring and burnt.

In gathering the trimmings a pole from 12 to 16 feet in length and 2½ to 3 inches in diameter at one end and slightly smaller at the other end is used. It is best to have the largest end, which is the one that draws along the ground, slightly curved at the end. A horse is used to drag the pole and the whippletree is attached by means of a chain or rope to a point about four or five feet from the ground end of the pole. The driver holds one end of the pole and proceeds down the row. The pole soon collects the trimmings, which are heaped at the end of the rows and burned. Some of the growers use a spring tooth cultivator for this work with a great deal of success.

SUMMER PRUNING. Summer pruning is not recommended as a general thing. Some of the growers shear back the vigorous growth if it is shading the fruit too much. In some varieties, such as Champion and Vergennes, sprouts will very often appear and fruit many small ill-shaped bunches. These should be removed. It is also a good practice to remove any vigorous growth which may sprout up from below the first wire. However, if one is about to renew his vine it is well to select one of these shoots sprouting from the collar of the vine and train it.

PRUNING TOOLS. The ordinary clippers is all that is required for winter pruning. Unnecessary growths in early summer are best rubbed off with the hand, and the pruning back of vigorous growth is usually done with a large pair of hand shears.

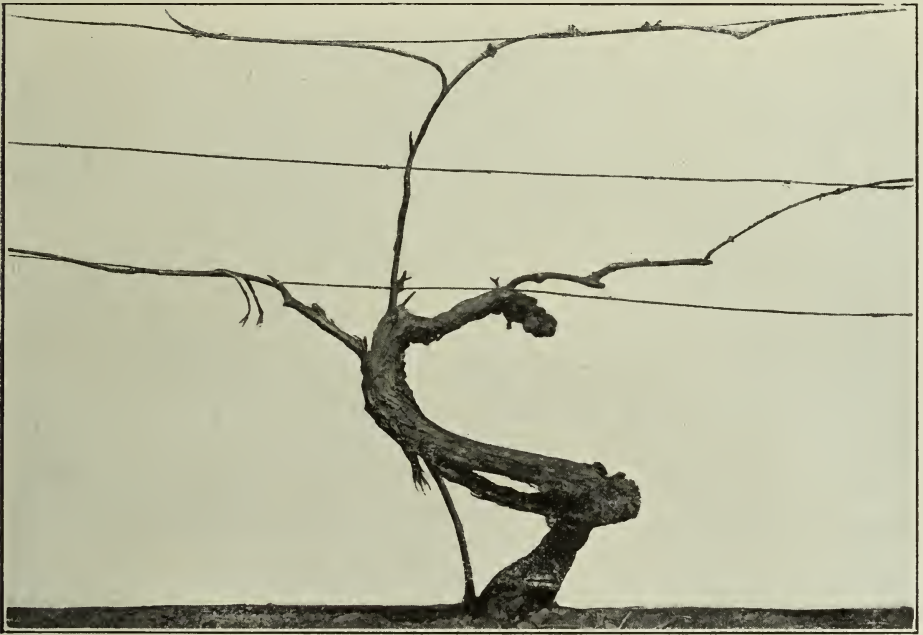
RENEWING OLD VINEYARD.

A system of renewing is sometimes adopted in vineyards that are very old or in vineyards that have been disfigured by improper pruning. In order to renew a vine a shoot coming from the ground is protected and in pruning the first year it is cut back to the first wire. The second year it is pruned according to the system of training, and part of the old vine is removed. In the third year the pruning is carried out as the second year but your wood on this new vine would probably enable you to train it on the upper wires. This year some more or the whole of the old vine is removed according to the vigor of its successor. This plan is very good because no crop is lost in the renewing of the vine, and when the old vine is discarded the new one is in full bearing. It is sometimes hard to get a new shoot from the ground, and while the majority of growers wait for their opportunity to secure a sprout one of the growers claims that he gets good results by ringing half way around the base of the old cane. This ringing causes the formation of sprouts, from which one is selected.

TYING. In the spring the vines are tied up with strong grape twine. A woman will do this work very handily. The twine should be wrapped twice to three times around the wire, make one knot and then tie up cane. This method of tying does not cause slipping and allows room for expansion of cane.

FERTILIZATION. To get the best results from a vineyard the soil must be fertile. In rich wash soil situated at the foot of the mountain the grapes do well with practically no manure or fertilizer. This is evidently due to the fact that a good deal of fertility is washed off the mountain on to these lands every spring. The majority of the heavy clay soils and the loamy soils need manure, especially the clay soils, the physical texture of which is far from being ideal, and good applications of barnyard manure would be very beneficial.

Within the last two years a great many of the growers are applying barnyard manure. They, however, make the great mistake of applying it around the trunk of vine instead of spreading it over the row where the feeding roots can get at it. While a good application of barnyard manure will give excellent results, it must be remembered that it contains more of nitrogen than of the other constituents



Method of renewing old vineyard, showing a two-year-old cane which will take place of old trunk at next pruning.

of plant food and too heavy and frequent applications would be apt to stimulate too much growth. An application of from six to nine tons per acre every three years should give good results.

COMMERCIAL FERTILIZER. The use of commercial fertilizer is becoming more common amongst the fruit growers. Many of them claim that by its moderate use good results are obtained providing the soil is in good physical condition, especially on the lighter soils. Mr. F. G. Stewart, of Homer, recommends the following application: Rock phosphate 400 to 500 lbs., potash 100 per acre sown broadcast. In buying fertilizer the grower should never buy a mixed compound but should buy the ingredients and mix it himself, and in doing this he saves money and knows exactly what he gets. There is no definite rule in regard to the amount and kind of fertilizer to use. This depends entirely on the soil and its condition. The grower, therefore, should experiment for him-

self and he will be able to know definitely what is needed and the quantities that will give him the best possible results on a minimum expenditure.

COVER CROPS. The use of cover crops is primarily to incorporate vegetable matter in the soil, and when nitrogenous crops are used they also incorporate nitrogen in the soil. The secondary function of the cover crops is to hold the snow. The greatest drawback in a cover crop is that it makes it very wet picking the fruit. Nitrogenous cover crops are not often used in vineyards. The chief crops used are rye, oats and barley. These are sown early in the summer and plowed under early in the fall to facilitate picking. In some cases rye is sown in the fall at the rate of one to one and a half bushels to the acre and plowed under in the following spring just when the grain starts to head.

HARVESTING.

Never pick your grapes until they are ripe. During the past years there were growers who have been extremely eager to obtain the highest market price for their grapes and to do this they pick their grapes without the slightest regard for the ripeness. Their whole endeavor is set on getting to the market with grapes before anyone else, and incidentally to palm off on the unsuspecting public an article not fit for hog feed, much less human consumption. If there were only individual cases of this fraud being practised it would not be so bad, but the neighbors see the grapes going to market and the temptation seems to be almost irresistible and we find growers all over shipping green grapes. Ask them their reason and they will reply that the other man is doing it and getting the high prices. What is the result of this marketing of green grapes, and who does it affect? The answer to the first question is very apparent. The consumer gets the green grapes and decides that either they are green and unfit to eat and that he has been cheated or that he has lost his taste for grapes, and what is the result? A falling off in consumption. The good prices that are obtained on an early market do not last long and the growers suffer. This regrettable feature should be eliminated and the growers should do everything in their power to stop themselves and their neighbors from selling green grapes. Grapes do not require to be picked before they are ripe in order that they carry well. On the other hand they carry better and keep longer when they are picked ripe.

The question may then be asked, when is a grape ripe? A grape may be said to be ripe when it has received its full development of color and flavor.

PICKING OF GRAPES. The picking of grapes is mostly done by women. The grapes are picked directly from the vine and put in the baskets, which are placed when full on the shady side of the vine to be picked up later by the wagon. The bunches should be handled as carefully and as little as possible, in order not to rub off any of the bloom. The bunches are severed from the vines by means of grape pleyers. This little instrument is very much like a pair of scissors, but the blades are very small. A knife should not be used as it necessitates holding the bunch more firmly and the act of cutting the stem with a knife requires a forward pull which tends to bruise the bunch. The stem of the bunch should be cut short, about an inch to one inch and a quarter. Any dried or green berries must be picked out with the fingers. The bunches are then placed in the baskets so that they are not loose. Those bunches forming the top layer of the basket are placed stem downward which gives the basket an attractive and finished appearance. The baskets are usually covered in the field and taken to the packing shed

where they are hooked. The baskets used are either six or eight quart baskets and cost about \$34 per thousand. There are several other packages which are more or less fancy and could be used to advantage for high class trade, such as the crate which holds four three-quart baskets. These make a very attractive package, but the market for such packages is very limited at the present time, though there is no doubt that it may be worked up.

MARKETS.

The markets for the grapes of the Niagara District include the whole Dominion of Canada. Our grapes are being sold from Vancouver to Halifax. The great drawback seems to be improper distribution and underselling. Like every other commodity the grapes have to be sold at a certain price in order to be profitable to the grower. It is the last crop the grower has to market, and the fruit comes in in great quantities and very rapidly, especially towards the end of the season. The result is that distribution has to be very perfect in order to market the crop without glutting any one market. The present state of marketing is far from perfect. There are six co-operative societies, three large buyers and many small buyers shipping independently, and the result is an unsteady market. The grapes have to be disposed of quickly in order to move the crop, and the buyers must sell at an advance of $1\frac{1}{2}$ cents per basket in order to make a small margin. In the face of daily increase of grapes the buyers and associations have to find a market. For instance last year's crop was marketed to the great dissatisfaction of the grower and in several cases to the loss of the buyer. The grape crop was a very heavy one. The wine manufacturers only bought about one-third of their usual purchase, and in spite of the fact that green grapes had been sold in large quantities which discouraged the early markets, the consumers were taking a tremendous quantity of grapes. The price was falling rapidly and many of the growers had to be satisfied with 10c. per basket while the average price was not above $12\frac{1}{2}$ c. per basket. Several reasons were given for this demoralizing state of affairs. The great cry was that the French Treaty had caused the wine manufacturers to curtail their purchases almost to one-third, and that there was an over-production of grapes. These factors no doubt played a very important part in producing the crisis, and the effect will tend to stop the planting of grapes to a very great extent. Some growers justly claimed that the promiscuous selling of green grapes lowered the average price to a great extent and they were unquestionably right. However, these causes do not seem to answer sufficiently for the prices of grapes. The markets did not seem to be glutted in any case, and the consumer had to pay the usual price per basket even in Toronto. While the grapes were being bought at from 10 to $12\frac{1}{2}$ c. per basket from the grower the consumer in Toronto was paying from 18 to 28c. for the same article, and yet we know that the buyers in the fruit district lost on their grapes. There seems only one explanation, namely, that the buyers have been underquoting their competitors even below the margin of cost, and that this system was greatly intensified in view of the large crop and the rapidity with which it ripened. To the average onlooker who had no knowledge of the industry a simple remedy would be to amalgamate the interests or to have some working basis on which prices should be based. The first suggestion has received a great deal of thought, but would be an extremely hard plan to consummate. In this market there are individual buyers and co-operative associations consisting of the growers themselves, while the buyer buys

the grower's produce and expects to make his profits, and it would hardly be acceptable to the buyer to have such close relations with the farmers through their associations. If such a proposition could be established it would greatly ameliorate the conditions of the grape market and would be the greatest boom to co-operation that Ontario has ever seen or even dreamed of and would mean a tremendous increase in the membership of the co-operative associations. To the average public such an organization would be greeted with a great deal of awe and disfavor and the cry would immediately arise that a monopoly existed and the price of grapes would immediately be raised and maintained. This, however, would not be the case. Grapes are perishable and have to be consumed within a short period, and the consumption decreases rapidly with the advent of cold weather. The main object of this amalgamation would be to fix a uniform price for grapes, starting from the early varieties down to the end of the season. Such an amalgamation would mean that the distribution would be more even, the grapes would be better packed and handled and the green grape nuisance would be more conveniently held in check.

The second suggestion, that the associations and buyers should get together and fix a ratio of prices which would be rigorously adhered to seems to be a very admirable one at first thought. This has been tried with the result that the quotations were not adhered to and a merciless cutting of prices was instituted and the growers had to foot the bill, especially those who had not contracted their grapes beforehand.

The different parties who are interested in definitely doing away with the present unstable and unprofitable state of the grape industry have had several meetings already with but little result, but it is hoped that some definite plan will be formulated and upheld during the coming year.

CONTRACTING GRAPES. A large percentage of the grape growers contract their whole crop of grapes either to the buyer or wine manufacturer. The contracting is resorted to in order to insure a certain percentage of grapes before the market opens. The buyers usually contract at so much per basket for the different varieties or buy the whole vineyard at a flat rate per basket.

The wine manufacturers buy at so much per ton f.o.b. Grapes are picked and put in barrels, all fruit being taken. The different colored grapes are kept separate. In selling to the wine manufacturer the grower has very little trouble in the harvesting and shipping of his crop.

COST OF PRODUCTION OF ONE ACRE OF GRAPES.

As a sequent to the prices realized by the growers last year great interest has been shown in regard to the actual cost of production. Mr. Murray Pettit, who is one of our largest grape growers, and is considered an eminent authority on grapes, not only in Canada but also in the States, gave an address at the Convention of the Fruit Growers' Association in November, on the cost of producing and maintaining an acre of grapes and also endeavored to prove that grapes were an unprofitable crop at 12c. per basket, and while there was some diversity of opinion with regard to his figures on the actual cost of production yet the consensus of opinion throughout the whole district is that the margin of profit at that price is too small to cover risks of hail or frost or variability of crop, and they all agree that the prices should be from 14 to 18c. per basket according to variety.

It must be taken into consideration in computing the cost of producing and maintaining an acre of vineyard that there are two years in which the vineyard does not yield any crop. It is true that a crop may be grown the first year, but the percentage of land that may be utilized is small. The three crops used are corn, potatoes or tomatoes, but corn is not very highly recommended as it shades the vines. Potatoes and corn do not give the very best results on the majority of grape soils. The cost of grape land varies very much but the average would be about \$125 per acre.

Land	\$125 00	
Fall preparation of land	3 00	
Spring cultivating and marking furrows	1 50	
Cost of 435 Vines at 4c.	17 40	
Planting	3 00	
Cultivating	3 00	
Fall plowing	2 00	
Interest on money invested at 5% (practically)	7 50	
Allowance for cropping		10 00
Total expenditure for first year	\$162 40	10 00
Net expenditure for first year	152 40	

Second year.

Working soil in spring	1 50	
Cultivating	3 00	
Pruning and tying	1 00	
Interest on capital at 5%	7 50	
Cost of trellising		
435 Posts at 15c. per post	65 25	
Planting 435 posts (including digging and setting posts) at 5c. per post	21 75	
Staples and Wire	10 00	
Wiring	2 00	
Interest	13 00	
Total	\$125 00	

Third year.

Pruning	1 50	
Tying	50	
Cultivating and plowing	5 50	
Fertilizing	8 00	
Spraying twice	1 00	
Interest	14 70	
		\$31 20

Average crop for third year, 435 baskets per acre.

435 Baskets at 12c.		52 20
Cost of 435 baskets at \$34 per thousand	14 79	
Picking 435 at ¾c. per basket	3 26	
Covering	1 00	
Delivery	75	
		19 80
Total expenditure for third year	51 00	
Total revenue		52 20
Net revenue		1 20

Total expenditure for first three years—above receipts:

First year	152 40
Second year	125 00
Third year	8 50
Third year	1 20
Management for 3 years at 5%	16 92

Fourth Year.

Pruning	\$3 00	
Tying	2 25	
Gathering and burning bush	50	
Spraying	1 40	
Plowing and cultivating	5 50	
Fertilizing	8 00	
Interest	15 73	
850 Baskets at 12c.		\$102 00
Cost of 850 baskets at \$34 per thousand	28 90	
Picking 850 at ¼c. per basket	6 37	
Covering	2 00	
Delivering	1 00	
	74 65	
Management	5 00	
	\$79 65	102 00
Profit	22 35	

INSECTS AND DISEASES.

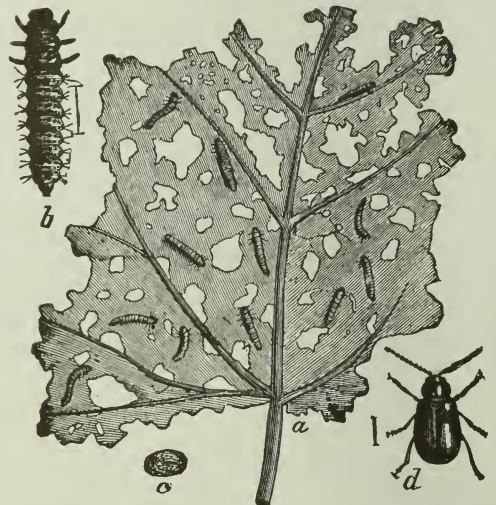
The grape is perhaps freer from the devastation of insects and diseases than any other fruit grown in the Niagara district, and it is perhaps owing to this



Grape-vine Flea Beetle (*Haltica chalybea*).



Grape-vine Leaf-hopper (*Erythroneura vitis*).

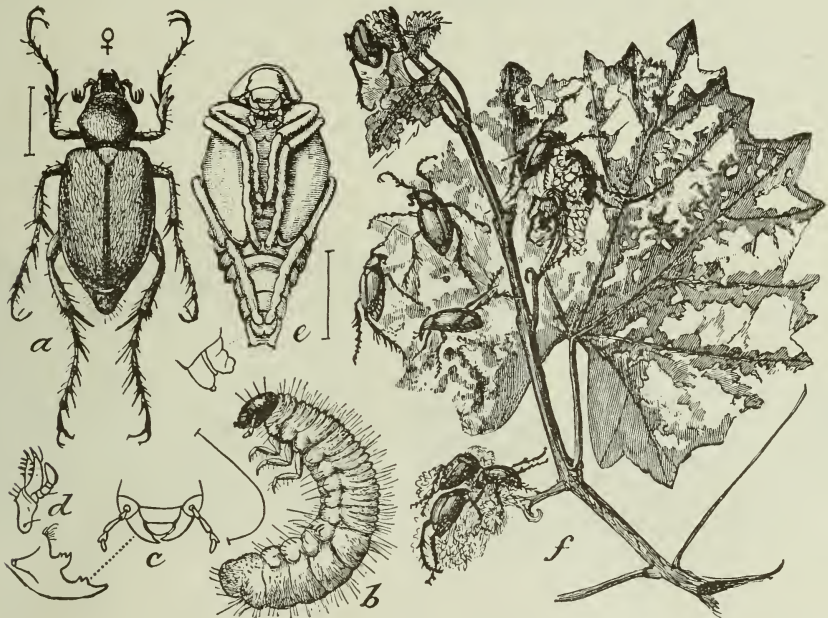


Grape-vine Flea Beetle (*Haltica chalybea*); *a*, Larvæ feeding; *b*, Larva; *c*, Pupa stage; *d*, Beetle.

factor, together with the almost assured prospect of the production of an average crop every year that the grape has been placed in the same relation to the fruit industry as grain may be said to hold in regard to general farming—namely, the staple crop.

While a good collection of insects may be gathered by a visit to all the vineyards in the Peninsula, yet I have not been able to locate any special insect which may be said to be the cause of any serious damage to the grape industry.

THE GRAPE VINE FLEA BEETLE, *Haltica chalybea*.—This is a little, shiny steel blue beetle about one-sixth of an inch long and appears during the early period of growth, and while it does not do any considerable injury in the Peninsula it is perhaps the most prevalent but is easily controlled with poisoned Bordeaux. This insect winters over under rubbish or near the roots of stumps of



Rose Chafer (*Macrodactylus subspinosus*); *a*, beetle; *b*, larva; *c* and *d*, mouth parts of same; *e*, pupa; *f*, injury to leaves and blossoms with beetles, natural size, at work (after Marlatt, U. S. Dept. Agriculture).

trees. The grower should always keep it under control as it is capable of doing a considerable amount of damage.

THE ROSE CHAFFER, *Macrodactylus subspinosus*.—This insect is a dull yellowish brown color, half an inch long, with long spiny legs. It is a very voracious feeder and will completely strip a vine or rose bush. It is not very common and seems to appear locally. I remember one case where this insect appeared on a farm near Burlington and did considerable damage to some of the vines. It is not easily controlled, as the poisons, especially Paris green, do not seem to have any great effect on it. As soon as these insects appear they should be hand-picked and destroyed.

THE SPOTTED PELIDNOTA, *Pelidnota punctata*.—This is a large brown beetle something like the June Beetle, but has three black spots on each wing cover. It appears during July and eats the foliage. It succumbs to the poison, but is so conspicuous that it is easily detected and should be killed when seen. This insect is quite prevalent but does not do any serious damage.

THE GRAPE VINE SPHINX. According to Mr. T. D. Jarvis there are five species of the insect to be found in the vineyards, the commonest being the Green Grapevine Sphinx. When the caterpillars are full grown they are about two inches long and are very noticeable. They are found occasionally in almost all the vineyards and may be hand-picked. The adult is a beautiful large moth, the fore wings expand about two and one-half inches, of a velvety green color with dark bands. The hind wings are smaller and of a dusty red color.

There are several other caterpillars that appear in the vineyards, but have not been the cause of any serious loss. The following is a list of some: Grapevine Leaf Roller, Grapevine Geometer, the Yellow Woolly Bear and species of cutworms.

THE GRAPEVINE LEAF HOPPER, *Typhlocyba vitifex*.—This insect is very prevalent in the vineyards of the Peninsula. It is very small, about one-eighth of an inch in length and may be found in great numbers on the under surface of the leaf, and when disturbed takes flight very quickly. The larvae appear in June and moult several times. The moultage may be found on the under surface of leaf. The larvae resemble the adult, only smaller and wingless. They are sucking insects and can only be destroyed by contact insecticides, such as tobacco water, whale oil soap and kerosene emulsion.



Green Grape-vine Sphinx Moth.



Cluster of Grapes affected with Black Rot.

GRAPEVINE PHYLOXERA, *Phylloxera vastatrix*.—This insect is very uncommon in our vineyards and is only occasionally found. The insect has two forms, one attacking roots, causing rotting and death, the other attacking the leaves, producing innumerable galls.

FUNGOUS DISEASES.

BLACK ROT. This is perhaps the most dangerous enemy of the grape. It is prevalent and seems to appear locally and periodically throughout the district. This, however, may easily be explained as it seems only to appear in those vineyards which are kept in sod, neglected or improperly sprayed. There are one or two exceptions to this, because I have found that in certain localities the disease seems to appear every year. One of these localities is on top of the first escarpment, near Vineland. It is the opinion of some growers that it more frequently appears on dry, sandy elevations, but the factor which seems most

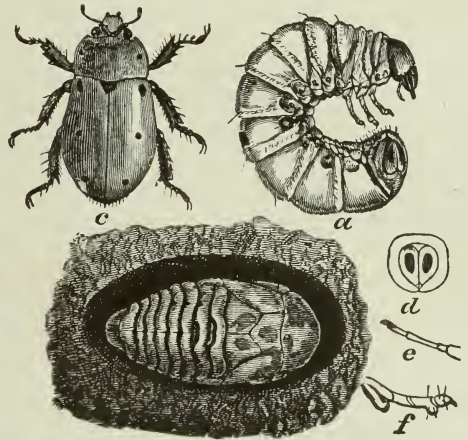
favorable to its development is lack of atmospheric circulation, and I would strongly advise that vineyards should only be established on those positions of the farm which are not protected from the winds.

The growers as a general rule are aware of the tremendous damage that this disease will do in one night, but still many of them will not spray their grapes if they look clean. I have seen vineyards with very slight infections allowed to go unsprayed. This disease might quite easily be controlled by spraying with Bordeaux, but the spraying must be done before its appearance. When spraying after the disease appears, a minimum amount of lime should be used in neutralizing the bluestone, and I would strongly recommend the application of Bordeaux which has been made by neutralizing the bluestone with clear lime water rather than with the milk of lime.

The grower will probably first notice the disease in the fruit by one or two of the berries turning brown and gradually getting black. This will happen even when the berries are half grown. The berries will shrivel up and drop. When the disease has reached this stage it will make short work of the bunches. The



Phylloxera Galls on Grape Leaf.



The Spotted Pelidnota; *a*, grub; *b*, pupa; *c*, beetle.

first appearance is shown, however, in the leaves. Yellow spots appear near the vein of the leaves. It is often apparent, however, that the sun produces similar spots on the leaves, especially when they are tender. The yellow discoloration on leaves caused by the fungus is very noticeable in vineyards which are badly affected.

The fruit grower should destroy all diseased bunches and berries and not leave them to hang on vines as is too often the case. He should also endeavor to keep the vineyard cleaner. If clean methods are adopted and the vineyard sprayed at least twice every year, very little injury should result. The red varieties seem to be more susceptible and should be carefully sprayed.

DOWNY MILDEW, *Plasmopara viticola*.—This fungus is quite common. It attacks the fruit, leaves and young shoots. The bunches and underside of leaves become mouldy, being covered with a delicate white film. The greatest damage is done to bunches. The berries do not develop so well and the appearance of the bunch is far from inviting. This disease is easily controlled by two sprayings of Bordeaux and if necessary an application of flour of sulphur, which is dusted on the vines in the morning.

POWDERY MILDEW, *Uncinula spiralis*—Attacks the grape in the same way as the downy mildew, but is more especially found on the canes. When berries are affected they show brownish or blackish spots. It is quite common in the Peninsula and the same treatment as for downy mildew is effective.

There has appeared quite frequently in our vineyards an undesirable condition of the vines, which has not been attributed to any particular cause. It appears mostly on sandy soils and attacks all bearing vines. Its first appearance is noted by a peculiar mottled yellow discoloration of the young leaves, and in the middle of the growing season the whole vine will turn yellow. The vine loses its thriftiness and the fruit does not develop so well as on other unaffected canes. This malady may or may not appear in succeeding years on each vine, but it will always be found in the locality of the vine in which it first appeared. I have noticed vines to regain their normal color the year after being affected, and the following year again will show almost an extenuated form of the malady. One vineyard which I have in mind is situated near St. Catharines. In the vineyard the vines seemed to get worse every year and this year they were removed. This peculiar malady does not seem to spread very rapidly, and its periodic appearance would tend to indicate that it might be caused by the lack of some constituent in the soil.

SPRAYING GRAPES. Every vineyard should be sprayed at least twice every season, and the most successful vineyardist sprays three times. There are, however, hundreds of vineyards that are not sprayed at all and a great many more that are only sprayed once. It is hard to explain the reason for this. The grape is considered one of the hardiest and most resistant of our fruits and the necessity of spraying depends to a great extent on the weather. Very often a grower will neglect spraying his vineyard one year and will reap a good clean crop, so he lets it go the next year without any spraying. This is done even in cases where insects and diseases are found to a small degree. The grower does not seem to realize that this infection will gradually increase until their effect is strongly in evidence and considerable loss is sustained. After such an example the grower will spray for a few years and then again become lax. There is not a single vineyard in the whole district that has not been sprayed in which it is not possible to find the mildew or other diseases and there is no class of fruit which is so easily and cheaply sprayed as the grape and perhaps no fruit which is more quickly destroyed by fungous diseases. The lack of spraying of grapes seems to be largely due to the lack of knowledge concerning diseases and insects affecting the grape, and to the extent of the damage done by such pests.

It must be fully understood, however, that only economical spraying is recommended, and not promiscuous spraying as previously mentioned. There are some seasons which require less spraying to protect vineyards and an experienced grower will take advantage of this factor and perhaps save a few dollars, but this economizing should not be instituted until after the second spraying.

SPRAYS AND SPRAYING. As grapes are not affected with the San Jose Scale it is not necessary to spray with lime and sulphur. The mixture universally used is "Poisoned Bordeaux Mixture," which is simply bluestone, lime and water, poisoned with one of the arsenical poisons. The formula generally used is 4 lbs. bluestone, 4 lime and 40 gals. water. This is poisoned with 2-2½ lbs. arsenate of lead, or 4-6 oz. paris green. The bluestone is dissolved and put in the tank, which is about half filled with water. The lime is then thoroughly slaked, diluted and poured into the mixture of bluestone and water through a fine strainer,

which removes the coarse particles. The poison is then made into thin paste, diluted and added to the mixture and the whole made up to the desired amount. Too great an excess of lime should never be used and the proportion of lime and bluestone should be adhered to.

Another form of Bordeaux Mixture which is used by one or two growers and which, I think, is greatly superior, is made in the following way: Forty lbs of good stone lime is slaked in a barrel and thoroughly stirred after it has properly slaked. Great care must be taken in slaking not to drown or burn the lime by use of too much or too little water during slaking. The formula adopted in this mixture is $2\frac{1}{2}$ to 3 lbs. bluestone, 4 gallons of the clear lime water which is got by allowing the lime to settle. The same amount of poison and water is used as in the standard Bordeaux. The mixture should always be tested with ferro cyanide solution and if any red air colouration add more lime water. The value of this mixture is deserving more attention. In its manufacture only enough lime water is used to neutralize the bluestone and no lime sediment is present to clog the nozzles. The mixture is finer and more easily applied and as there is no excess of lime the fungicidal action of the copper sulphate or bluestone is immediate and constant until the application has lost its utility by virtue of the chemical action of the moisture of the atmosphere on the ingredients of the Bordeaux mixture. I consider the availability of the fungicidal action of the copper salts a very important factor, for we may be sure that should the spores of the disease be present there will also be active Bordeaux mixture to combat their development.

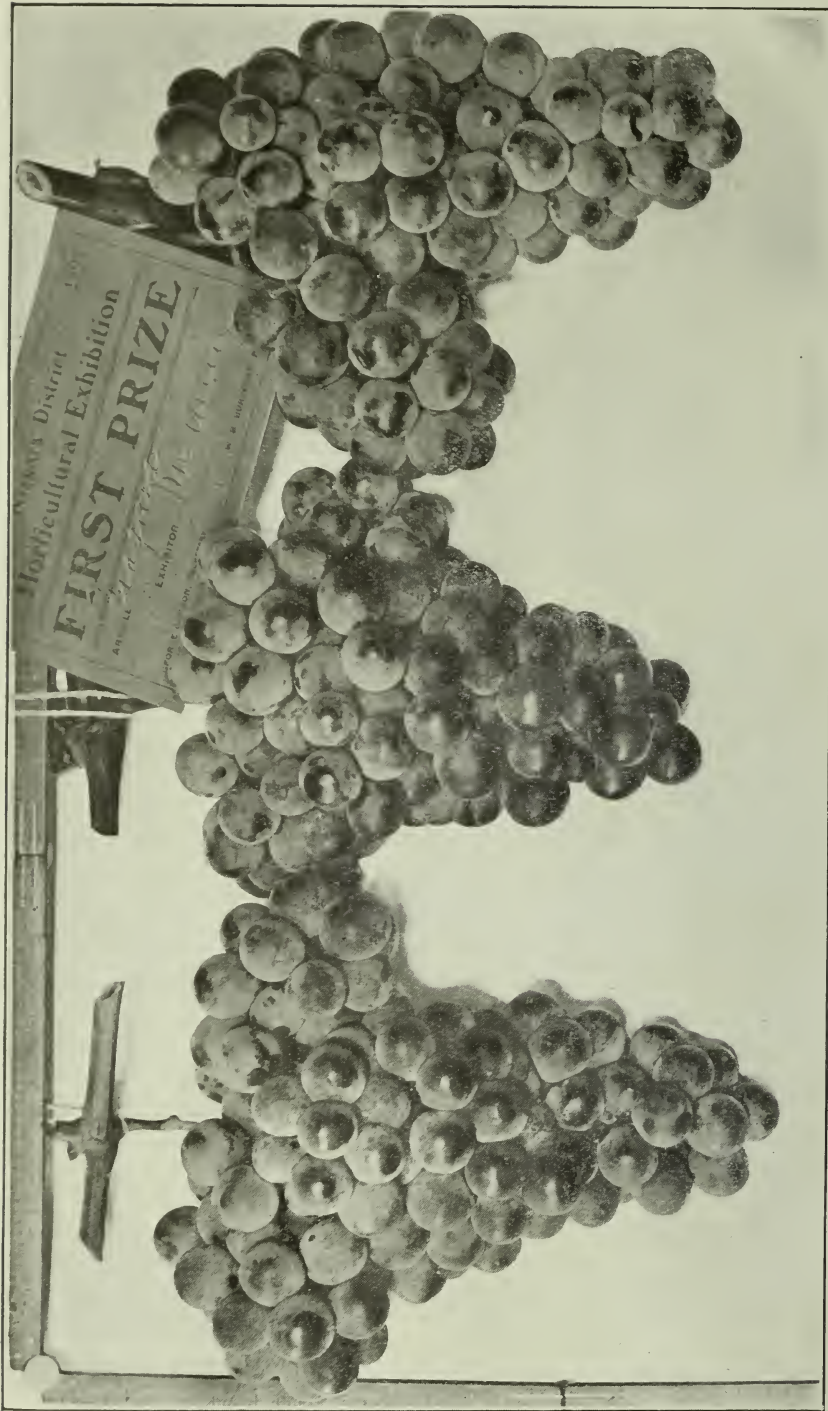
WHEN TO SPRAY. Grapes should be sprayed for the first time just before the blossoms appear, when the grapes are about the size of B.B. shot and about three weeks later and as many times after this as the grower feels it will be profitable. Under ordinary conditions, three sprayings is all that is necessary.

SPRAYING MACHINERY. There are at present several makes of grape sprayers. There are small two-wheel carts with a tank of 80-gallon capacity, wheel power with horizontal arms to which are attached nozzles which may be turned in any direction. This outfit at first looks very admirably adapted to the work. It does away with the handling of rods and all there is to be done is to drive up and down the rows. There are a lot of growers who like this machine and use it extensively, but I have never been able to convince myself that the work is done as thoroughly as when a man handles the nozzles. In the early sprayings before the foliage is fully out a great deal of spray is wasted and when the foliage is fully out the spray does not seem to reach the inner portions of the vines. I think the most thorough and effective method of spraying a vineyard is to apply the spray with a rod and nozzle cluster. In this way the man may walk behind the spray cart and can apply the mixture whenever it is most desired and the work is done with greater efficiency.

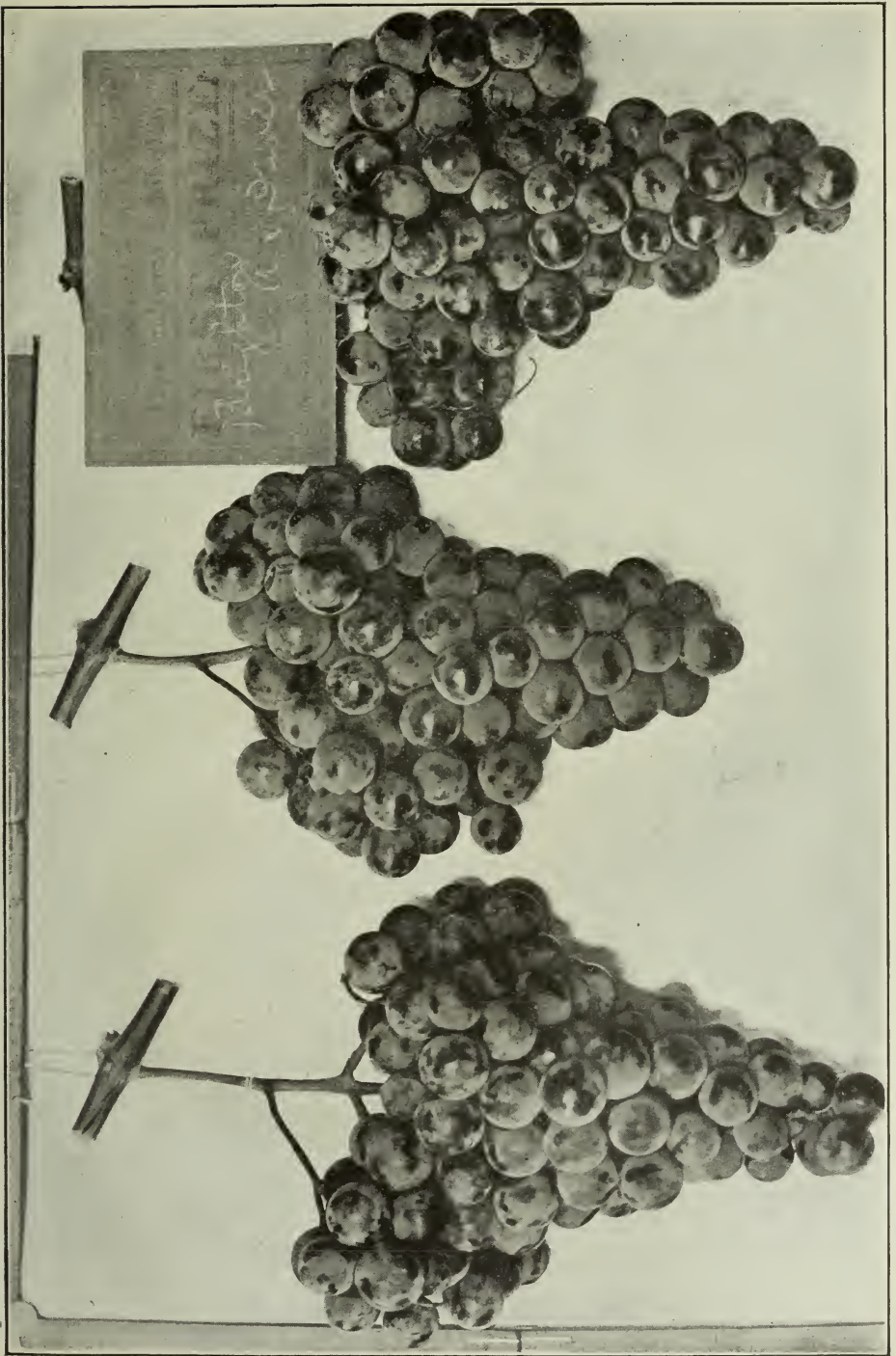
VARIETIES.

In no branch of the fruit industry in the Niagara Peninsula is there such uniformity in the varieties grown as in grape growing. There are a few standard varieties that every grower plants and they stick to these with the result that any variety of these varieties may be had at almost any shipping point. The Concord is far ahead of any other variety in popularity, followed by the Worden, Niagara, Rogers 9 and 15, Delaware and Moore Early.

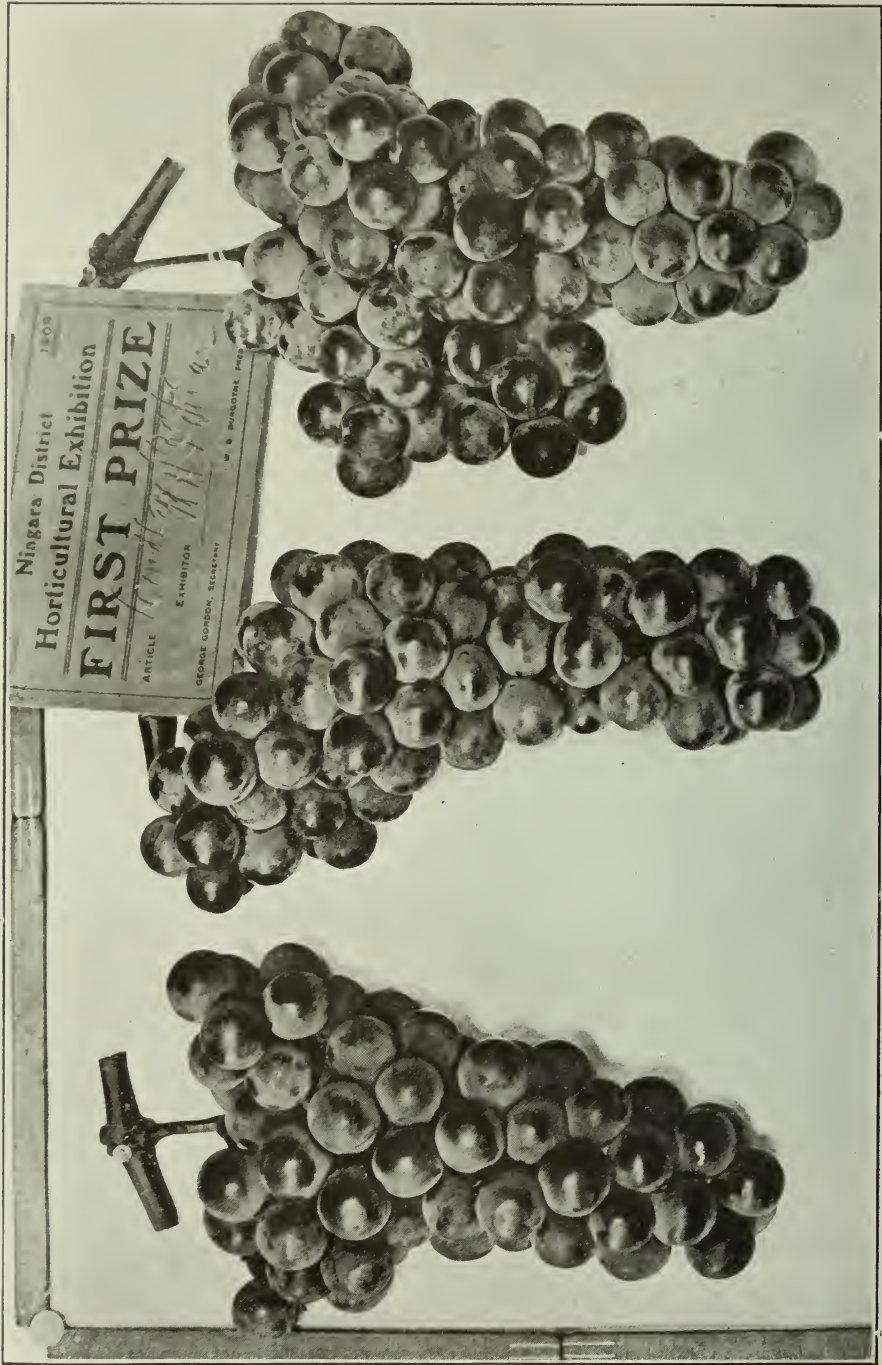
EARLY GRAPES. A great difference of opinion prevails in regard to the advisability of planting early grapes. At one time Champions were destroyed



Typical bunches of the famous white grape, the Niagara.



A fine red grape, the Brighton.



The Lindley grape as grown in the Niagara District.

because they were thought to be valueless and yet on the top of all this our best growers have always made money from their early grapes.

Location is a great factor in deciding this question. Apart from the fact that every grower should have a few early grapes there are locations which, in my opinion, are better adapted for the production of early grapes than the late ones and will every year yield a greater profit. These special locations are found here and there in the western part of the Peninsula and their presence is due to some special location, good drainage or physical condition of the soil, but in the eastern part of the peninsula, and especially in the township of Niagara, there is a large acreage of land situated on the first bench of the escarpment in the neighbourhood of St. Davids, which offers every facility for the early production of grapes. The soil is admirably adapted and the fruit ripens from 5 to 10 days ahead of any other part of the Peninsula. The result is that the early grapes command a high price. Mr. F. A. Goring goes in extensively for the production of early grapes; succeeds in putting his crop on the market ahead of the other sections and derives the benefit of a strong demand and high prices.

Of the early varieties of grapes there are three grown in the district—Champion, Moore Early and Campbell Early. The Champion is the earliest grape, is bluish black in colour, a medium sized round berry, thick skin and acid until very ripe. There is quite a diversity of opinion regarding the value of this variety. The flavor is poor, yet it is a good bearer and if left on vines until ripe, the quality is not bad.

MOORE EARLY is the best early grape; berries are large, round, black and thin skin; flavor is slightly foxy and flesh juicy. The vine is hardy, healthy and vigorous. It does best on light soils. It does not make enough wood on heavy soils. The yield is about two tons per acre.

CAMPBELL EARLY. The berry is large, black, blue bloom, tough, rich flavor, flesh sweet, tender, seeds small; bunches do not fill out; is preferred by some growers to any other early grape.

GRAPES FOR MAIN CROP.

WORDEN.—Large compact bunch, large, black, thin-skinned berry with heavy bloom; flesh sweet; berry cracks easily and is not a good shipper or keeper. Good for home market. Its flavor is superior to Concord. It is hardy and a good grower. Yield $3\frac{1}{4}$ tons per acre.

DELAWARE.—The best table grape grown; bunch small, compact and shouldered; berry small, round, beautiful red, thin skin, whitish bloom, sweet delicious flavor. Vine is healthy and of fair vigor; does well on great variety of soil and is quite hardy. Too much wood should not be left as it is short jointed. Will overload if too much wood is left, with the result that the fruit will not ripen. Yield $2\frac{1}{2}$ tons per acre.

CONCORD. The most valuable commercial variety; very prolific; strong grower; heavy, thick foliage which seems to enable it to resist the frost in the spring; less susceptible to black rot; bunch is large, compact, five to six inches long; berry large, round, black with heavy bloom; skin thick; flesh pulpy; flavor good when ripe; splendid shipper; yield $3\frac{1}{2}$ tons per acre.

NIAGARA. The best white grape; bunch very large, compact and shouldered; berry round, medium-sized with whitish bloom; skin tough; pulp soft, juicy and sweet; flavor good, possessing a delicate muskiness when fully ripe. Vine is very vigorous and hardy; does well on variety of soils, but more inclined to black rot

on light soils. Color pale yellow and whitish yellow on light soils; yield $3\frac{1}{2}$ tons per acre.

LINDLEY OR ROGERS No. 9. Large red grape, splendid flavor, thin skin, splendid shipper; does best on mountain wash soils; strong, vigorous grower; should be trimmed to seven buds to the arm. This variety is a poor fertilizer, the bunches not filling out enough. It is one of the best of the varieties. Yield $2\frac{1}{2}$ tons per acre.

AGAWAM—ROGERS No 15. Vine strong grower, productive; wood long jointed, should have long pruning; bunch large and compact, shouldered; berry large, thick skinned, brownish red; flavor very good; good shipper; inclined to be subject to black rot and mildew.

VERGENNES. The best grape for winter use, large red berry, tough skin, juicy, good flavor, medium sized bunch; like Champion it bears five to six bunches to a bud, therefore should be trimmed short to five or six buds to a cane, if not it will overload and not ripen fruit. The vine is vigorous, healthy and productive and does best on the heavier soils; yield about 3 tons per acre.

BRIGHTON. This is a beautiful red grape with an excellent flavor and of medium size; the bunch is large, shouldered, fairly compact and attractive looking. It is very hardy, healthy and vigorous, but slightly subject to mildew, very productive, but should be planted near other varieties that are good pollinizers. The season is medium and the variety only a fair keeper, but it is valuable for home markets.

In writing this article my aim was to explain as explicitly as possible the conditions of the grape industry in the Niagara District, and to describe the methods which are now in vogue. The fruit growers gave me every assistance that was in their power, and I take this opportunity to thank them, especially those whose names I take much pleasure in mentioning: Messrs. F. G. Stewart, R. Thompson, J. E. Henry, E. J. Smith and F. G. H. Pattison. On the whole, the grape industry is in splendid condition, and more uniform excellence has been obtained in this branch of the fruit industry than any other. There are three outstanding features which seem to have been neglected. First, proper attention has not been paid to the physical condition of the soil. This is especially so in the clay lands. Second, spraying has been more or less neglected. Third, much carelessness is displayed in the handling of the fruit by the growers.

While these defects may appear to be very great and would give the impression that the growers are very lax, there are, on the other hand, scores of growers that are up to date and treat their vineyards with every care, recognizing that these produce a very valuable staple crop.

APPENDIX "B."

FRUIT PRIZE LIST AT ONTARIO HORTICULTURAL EXHIBITION, 1909.

APPLES.

CLASS 1.—EXPORT VARIETIES—BARRELS READY FOR SHIPMENT.

- Baldwin*: 1st, Newcastle F. G. A.; 2nd, Dempsey, W. H., Trenton; 3rd, Oughtred, W. C., Clarkson.
Ben Davis: 1st, Chatham F. G. A.; 2nd, Oughtred, W. C.; 3rd, Sloan, R. R., Blyth.
Golden Russet: 1st, Sloan, R. R.; 2nd, Newcastle F. G. A.; 3rd, Oughtred, W. C.
Greening (Rhode Island): 1st, Norfolk F. G. A.; 2nd, Newcastle F. G. A.; 3rd, Gutthrey, J. B., Dixie.
King: 1st, Norfolk, F. G. A.; 2nd, Dempsey, W. H.; 3rd, Cunningham, Theo., Wyndham Centre.
Spy: 1st, Cunningham, Theo.; 2nd, Schulyer, Geo., Simcoe; 3rd, Newcastle F. G. A.
Any other desirable variety: 1st, Norfolk F. G. A.; 2nd, Cunningham, Theo.; 3rd, Oughtred, W. C.

CLASS 2.—EXPORT VARIETIES—BOXES READY FOR SHIPMENT. (Fruit Unwrapped.)

- Baldwin*: 1st, Cunningham, Theo.; 2nd, Schulyer, Geo.; 3rd, Watson, W. G., Dixie.
Fameuse: 1st, Watson, W. G.; 2nd, Dempsey, W. H.; 3rd, Bunting, W. H., St. Catharines.
Golden Russet: 1st, Watson, W. G.; 2nd, Thompson, Robt., St. Catharines; 3rd, Cunningham, Theo.
Greening: 1st, Brown Bros., Humber Bay; 2nd, Michael, R. T., Brooklyn; 3rd, Watson, W. G.
King: 1st, Norfolk F. G. A.; 2nd, Watson, W. G.; 3rd, Dempsey, W. H.
McIntosh: 1st, Michael, Mrs. W. W., Oshawa; 2nd, Michael, J. G., Brooklin; 3rd, Watson, W. G.
Spy: 1st, Schulyer, Geo.; 2nd, Cunningham, Theo.; 3rd, Watson, W. G.

CLASS 3.—EXPORT VARIETIES—BOXES READY FOR SHIPMENT. (Fruit Wrapped.)

- Fameuse*. 1st, Watson, W. G.; 2nd, Bunting, W. H.; 3rd, Harkness, A. D., Irena.
Gravenstein: 1st, Oshawa F. G. A.; 2nd, Schulyer, Geo.; 3rd, Norfolk F. G. A.
King: 1st, Norfolk, F. G. A.; 2nd, Watson, W. G.; 3rd, Brown Bros.
McIntosh: 1st, Michael, J. G.; 2nd, Watson, W. G.; 3rd, Harkness, A. D.
Spy: 1st, Watson, W. G.; 2nd, Schulyer, Geo.; 3rd, Michael, R. T.

CLASS 4.—DOMESTIC VARIETIES—BARRELS READY FOR SHIPMENT.

- Blenheim*: 1st, Norfolk F. G. A.; 2nd, Parker, W. C., Humber Bay; 3rd, Oshawa F. G. A.
Gravenstein: 1st, Oshawa F. G. A.
Ontario: 1st, Dempsey, W. H.; 2nd, Parker, W. C.; 3rd, Gutthrey, J. B.
Tolman: 1st, Mothersill, G. B. Oshawa; 2nd, Norfolk, F. G. A.; 3rd, Schulyer, Geo.
Roxbury Russet: 1st, Norfolk F. G. A.
Any other desirable variety not named in Class 1: 1st, Gutthrey, J. B.; 2nd, Norfolk F. G. A.; 3rd, French, W. H., Oshawa.

CLASS 5.—DOMESTIC VARIETIES—BOXES READY FOR SHIPMENT. (Fruit Unwrapped.)

- Blenheim*: 1st, Watson, W. G.; 2nd, Cunningham, Theo.; 3rd, Oshawa F. G. A.
Gravenstein: 1st, Oshawa F. G. A.; 2nd, Gutthrey, J. B.
Ontario: 1st, Watson, W. G.; 2nd, Parker, W. C.; Gutthrey, J. B.
Ribston: 2nd, Parker, W. C.
St. Lawrence: 1st, Watson, W. G.; 2nd, Dempsey, W. H.; 3rd, Brown Bros.
Any other variety not named in Classes 2 and 3: 1st, Cunningham, Theo.; 2nd, Norfolk F. G. A.; 3rd, Cunningham, Theo.

CLASS 6.—DOMESTIC VARIETIES—BOXES READY FOR SHIPMENT.
(Fruit Wrapped.)

Barter: 1st, Stephens, C. L., Orillia.
Fameuse: 1st, Stephens, C. L.; 2nd, Harkness, A. D.
McIntosh: 1st, Harkness, A. D.
Spy: 1st, Stephens, C. L.
Wealthy: 1st, Stephens, C. L.

CLASS 7.—DESSERT VARIETIES—PLATES OF FIVE.

Fameuse: 1st, Jones, Harold, Maitland; 2nd, Watson, W. G.
Golden Russet: 1st, Parker, W. C.; 2nd, Bennett, C. A., Burlington.
King: 1st, Doan, Fred, Port Dover; 2nd, Norfolk F. G. A.
McIntosh: 1st, Jones, Harold; 2nd, Evertts, Nicholas, Iroquois.
Wealthy: 1st, Gutthrey, J. B.; 2nd, Parker, W. C.
Spy: 1st, Brown Bros.; 2nd, Bennett, C. A.
Spitzenburg: 1st, Schuyler, Geo.; 2nd, Norfolk F. G. A.
Any other desirable variety: 1st, Watson, W. G.; 2nd, Oughtred, W. C.

CLASS 8.—DESSERT VARIETIES—PLATES OF FIVE.

Fameuse: 1st, Stephens, C. L.; 2nd, Robertson, W. G., Morrisburg.
McIntosh: 1st, Robertson, W. G.; 2nd, Robson, W. M., Lindsay.
Spy: 1st, Stephens, C. L.
Wagner: 1st, Stephens, C. L.
Wealthy: 1st, Stephens, C. L.
Any other desirable variety: 1st, Stephens, C. L.; 2nd, Stephens, C. L.

CLASS 9.—COOKING VARIETIES—PLATES OF FIVE.

Alexander: 1st, Watson, W. G.; 2nd, Brown Bros.
Baldwin: 1st, Challand, C. W., Marburg; 2nd, Brown Bros.
Blenheim: 1st, Norfolk F. G. A.; 2nd, Watson, W. G.
Cayuga: 1st, Parker, W. C.; 2nd, Norfolk F. G. A.
Greening: 1st, Norfolk F. G. A.; 2nd, Michael, R. T.
King: 1st, Challand, C. W.; 2nd, Norfolk F. G. A.
Ribston: 1st, Norfolk F. G. A.; 2nd, Peart, A. W., Burlington.
Spy: 1st, Challand, C. W.; 2nd, Schuyler, Geo.
Any other desirable variety: 1st, Watson, W. G.; 2nd, Stephens, C. L.

CLASS 10.—COOKING VARIETIES—PLATES OF FIVE.

Alexander: 1st, McDonald, John D., Cornwall; 2nd, Stephens, C. L.
Baxter: 1st, Stephens, C. L.; 2nd, Johnson, Asa, Cowansville, Que.
Spy: 1st, Stephens, C. L.
Stark: 1st, Stephens, C. L.
Wolf River: 1st, Stephens, C. L.; 2nd, McDonald, John D.
Any other desirable variety: 1st, Stephens, C. L.; 2nd, Robson, W. M.

CLASS 11.—CONES OF FRUIT.

Ben Davis: 1st, Chatham F. G. A.; 2nd, Trevail, S., Courtice; 3rd, Oshawa F. G. A.
Baldwin: 1st, Watson, W. G.; 2nd, Parker, W. C.; 3rd, Gutthrey, J. B.
Blenheim: 1st, Watson, W. G.; 2nd, Brown Bros.; 3rd, Whyte, David, Woburn.
Gravenstein: 1st, Gutthrey, J. B.; 2nd, Oshawa F. G. A.; 3rd, Whyte, David.
Fallawater: 1st, Dempsey, W. H.; 2nd, Stevenson, W. H., Oshawa; 3rd, Watson, W. G.
Fameuse: 1st, Watson, W. G.; 2nd, Gutthrey, J. B.; 3rd, Parker, W. C.
King: 1st, Doan, Fred.; 2nd, Norfolk F. G. A.; 3rd, McConnell, H. L., Gravesend.
McIntosh: 1st, Watson, W. G.; 2nd, Oshawa F. G. A.; 3rd, Evertts, Nicholas.
Ontario: 1st, Dempsey, W. H.; 2nd, Watson, W. G.; 3rd, Bennett, C. A.
Scarlet Pippin: 1st, Jones, Harold.
Spy: 1st, Norfolk F. G. A.; 2nd, Bennett, C. A.; 3rd, Brant Packing Association.
Wolf River: 1st, Whyte, David; 2nd, Stephens, C. L.

PEARS.

CLASS 12.—PLATES OF FIVE.

- Anjou*: 1st, Norfolk F. G. A.; 2nd, Biggs Fruit & Produce Company, Burlington.
Bosc: 1st, Smith, A. M., Port Dalhousie; 2nd, Stewart, F. G., Homer.
Clairgeau: 1st, Thompson, Robt.; 2nd, Gutthrey, J. B.
Diel: 1st, Smith, A. M.; 2nd, Thompson, Robt.
Duchess: 1st, Norfolk F. G. A.; 2nd, Thompson, Robt.
Hardy: Hector, Vincent G., Erindale.
Howell: 1st, Delworth, Thos., Weston; 2nd, Bennett, C. A.
Kieffer: 1st, Bunting, W. H.; 2nd, Bennett, C. A.
Lawrence: 1st, Smith, A. M.; 2nd, Thompson, Robt.
Winter Nelis: 1st, Thompson, Robt.; 2nd, Stewart, F. G.
Any other desirable variety: 1st, Norfolk F. G. A.; 2nd, Stewart, F. G.

CLASS 13.—EXPORT VARIETIES—BOXES READY FOR SHIPMENT.
(Fruit Wrapped.)

- Anjou*: 1st, Thompson, Robt.; 2nd, Stewart, F. G.; 3rd, Biggs Fruit & Produce Co.
Bosc: 1st, Stewart, F. G.; 2nd, Thompson, Robt.; 3rd, Bunting, W. H.
Clairgeau: 1st, Stewart, F. G.; 2nd, Robertson, G. A., St. Catharines; 3rd, Thompson, Robt.
Duchess: 1st, Thompson, Robt.; 2nd, Robertson, G. A.; 3rd, Stewart, F. G.
Winter Nelis: 1st, Robertson, G. A.; 2nd, Stewart, F. G.; 3rd, Thompson, Robt.
Kieffer: 1st, Thompson, Robt.; 2nd, Jones, F. C., Beamsville; 3rd, Bunting, W. H.
Lawrence: 1st, Robertson, G. A.; 2nd, Stewart, F. G.; 3rd, Thompson, Robt.
Any other desirable variety: 1st, Stewart, F. G.; 2nd, Thompson, Robt.; 3rd, Robertson, G. A.

GRAPES.

CLASS 14.

- Agawam*, 3 bunches: 1st, Robson, W. M.; 2nd, Thompson, Robt.
Concord, 3 bunches: 1st, Thompson, Robt.; 2nd, Bunting, W. H.
Lindley, 3 bunches: 1st, Thompson, Robt.; 2nd, Stewart, F. G.
Niagara, 3 bunches: 1st, Bunting, W. H.; 2nd, Thompson, Robt.
Vergennes, 3 bunches: 1st, Thompson, Robt.; 2nd, Robson, W. M.
Wilder, 3 bunches: 1st, Thompson, Robt.; 2nd, Stewart, F. G.
Any other desirable variety: 1st, Bunting, W. H.; 2nd, Robson, W. M.
Black Grapes, 9 lb. basket: 1st, Bunting, W. H.; 2nd, Stewart, F. G.
Red Grapes, 9 lb. basket: 1st, Bunting, W. H.; 2nd, Stewart, F. G.
White Grapes, 9 lb. basket: 1st, Bunting, W. H.; 2nd, Thompson, Robt.
Black Grapes, fancy package: 1st, Stewart, F. G.; 2nd, Thompson, Robt.
Red Grapes, fancy package: 1st, Stewart, F. G.; 2nd, Thompson, Robt.
White Grapes, fancy package: 1st, Thompson, Robt.; 2nd, Stewart, F. G.

CLASS 15.

Display of fruits in commercial packages exhibited by an Agricultural or Horticultural Society, or Fruit Growers' Association, table space limited to 60 sq. ft. for each exhibit: 1st, St. Catharines Cold Storage Co.; 2nd, Grantham F. G. A.; 3rd, Norfolk F. G. A.

Display of fruits not in commercial packages exhibited by an Agricultural or Horticultural Society or Fruit Growers' Association, table space limited to 60 sq. ft. for each exhibit: 1st, St. Catharines Cold Storage Co.; 2nd, Norfolk F. G. A.; 3rd, Grantham F. G. A.

Display of apples not in commercial packages exhibited by an Agricultural or Horticultural Society or Fruit Growers' Association, table space limited to 60 sq. ft. for each exhibit. (For competition by growers in the counties of Wellington, Waterloo, Dufferin, Simcoe and all other portions of the Province north of a line from Orillia to Kingston): 1st, East Simcoe Agricultural Society.

PRESERVED FRUITS.

CLASS 16.—QUART SEALER OF CANNED FRUIT OF EACH OF THE FOLLOWING VARIETIES:

- Blackberries*: 1st, Mrs. P. Depottie, St. Catharines; 2nd, Morningstar, S., Goderich; 3rd, Whyte, David.

Cherries, black or red: 1st, Miss J. Reeves, Humber Bay; 2nd, Miss Ettie Rush, Humber Bay; 3rd, Mrs. P. Depottie.

Cherries, white or yellow: 1st, Mrs. P. Depottie; 2nd, Stewart, F. G.; 3rd, Thompson, Robt.

Gooseberries: 1st, Thompson, Robt.; 2nd, Stewart, F. G.; 3rd, Mrs. W. H. French.

Grapes, black or red: 1st, Delworth, Mrs. T.; 2nd, Morningstar, S.; 3rd, Stewart, F. G.

Peaches, white: 1st, Miss J. Reeves; 2nd, Bennett, C. A.; 3rd, Morningstar, S.

Peaches, yellow: 1st, Delworth, Mrs. T.; 2nd, Miss J. Reeves; 3rd, Bennett, C. A.

Pears: 1st, Mrs. P. Depottie; 2nd, Bennett, C. A.; 3rd, Thompson, Robt.

Plums, blue or red: 1st, Mrs. T. Delworth; 2nd, Whyte, David; 3rd, Mrs. P. Depottie.

Plums, green or white: 1st, Mrs. W. H. French; 2nd, Miss Ettie Rush; 3rd, Thompson, Robt.

Raspberries, black: 1st, Mrs. T. Delworth; 2nd, Bennett, C. A.; 3rd, Mrs. W. H. French.

Strawberries: 1st, Bennett, C. A.; 2nd, Miss Ettie Rush; 3rd, Thompson, Robt.

CLASS 17.—PINT JAR OF JAM.

Black Currant: 1st, Thompson, Robt.; 2nd, Bennett, C. A.; 3rd, Stewart, F. G.

Gooseberry: 1st, Bennett, C. A.; 2nd, Mrs. W. H. French; 3rd, Mrs. P. Depottie.

Grape: 1st, Stewart, F. G.; 2nd, Thompson, Robt.; 3rd, Mrs. T. Delworth.

Peach: 1st, Thompson, Robt.; 2nd, Stewart, F. G.; 3rd, Mrs. P. Depottie.

Pear: 1st, Stewart, F. G.; 2nd, Mrs. T. Delworth; 3rd, Thompson, Robt.

Plum: 1st, Stewart, F. G.; 2nd, Thompson, Robt.; 3rd, Mrs. P. Depottie.

Raspberry: 1st, Thompson, Robt.; 2nd, Delworth, Mrs. T.; 3rd, Stewart, F. G.

Strawberry: 1st, Bennett, C. A.; 2nd, Mrs. P. Depottie; 3rd, Mrs. T. Delworth.

CLASS 18.—HALF PINT JAR OF JELLY.

Apple: 1st, Whyte, David; 2nd, Thompson, Robt.; 3rd, Bennett, C. A.

Crabapple: 1st, Stewart, F. G.; 2nd, Mrs. P. Depottie; 3rd, Whyte, David.

Red Currant: 1st, Thompson, Robt.; 2nd, Mrs. P. Depottie; 3rd, Stewart, F. G.

Grape: 1st, Stewart, F. G.; 2nd, Whyte, David; 3rd, Bennett, C. A.

Quince: 1st, Thompson, Robt.; 2nd, Bennett, C. A.; 3rd, Mrs. P. Depottie.

Raspberry, red: 1st, Stewart, F. G.; 2nd, Thompson, Robt.; 3rd, Whyte, David.

CLASS 19.—GRAPE JUICE.

Grape Juice, unfermented: 1st, Stewart, F. G.; 2nd, Thompson, Robt.; 3rd, Bennett, C. A.

CLASS 20.—SPECIMEN APPLES OF STANDARD VARIETIES.

Baldwin: 1st, Norfolk F. G. A.; 2nd, Thompson, Robt.

Greening (Rhode Island): 1st, Challand, C. W.; 2nd, Michael, R. T.

King: 1st, Challand, C. W.; 2nd, Parker, W. C.

McIntosh: 1st, McDonald, John D.; 2nd, Robson, W. M.

Spy: 1st, Oughtred, W. C.; 2nd, Johnson, Asa.

CLASS 21.—BOX OR BARREL BRANDS.

1st, Canadian Apple Exporters, Ltd., Trenton; 2nd, Oshawa F. G. A.; 3rd, Brant Packing Association.

SPCL SB 354.6 C2 F783 1909

