ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

ONTARIO

1916

FORTY-EIGHTH ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

Ontario

1916

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1917

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To His Honour SIR JOHN STRATHEARN HENDRIE, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present herewith for your consideration the Forty-eighth Report of the Fruit Growers' Association of Ontario for the year 1916.

Respectfully yours,

W. H. HEARST,

Minister of Agriculture.

Toronto, 1917.

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Fruit Growers' Association of Ontario

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COMMITTEES.

Horticultural Publishing Company: P. W. HODGETTS, Toronto.

New Fruits: W. T. MACOUN, Ottawa; PROF. J. W. CROW, Guelph; E. F. PALMER, Vineland Station.

Historical: A. W. PEART, Burlington; W. T. MACOUN, Ottawa.

TREASURERS' REPORT, 1916

Receipts.

Balance on hand, Dec. 31, 1915.	$307 59
Fees	246 50
Grant	1,700 00
Miscellaneous	42 24
	$2,296 33

Expenditures.

Annual Meeting	$206 00
Committees	14 85
Periodicals	299 15
Printing	9 50
Transportation	1,254 97
Miscellaneous	30 99
Balance on hand	480 87
	$2,296 33

DETAILS OF EXPENDITURES.

Annual Meeting.

G. H. Webster (Canadian Passenger Agent), deposit	$25 15
H. A. Emerson	45 25
S. O. Blunden	6 30
John Kirkpatrick	7 00
M. A. P. McFarlane	6 45
Fred Carpenter	5 30
J. R. Hastings	2 55
J. G. Wait	3 60
R. A. Stephenson	5 60
Alex. Jamieson	12 65
W. E. Palmer	12 15
F. G. H. Pattison	80
Jno. F. Donald	6 80
P. Hynd	6 40
M. E. Coo	60 00
Total	$206 00

Committees.

A. W. Peart	$3 15
A. J. Grant	11 70
Total	$14 85

Periodicals.

Canadian Horticulturist	$299 15

Printing.

College Press, letterheads and envelopes (Directors)	$9 50

Transportation.

G. E. McIntosh	$1,228 67
A. J. Grant	26 30
Total	$1,254 97

Miscellaneous.

Canadian Express Co.	$0 60
Exchange	1 89
P. W. Hodgetts, expenses	8 50
Auditor	10 00
Insurance	10 00
Total	$30 99

Audited this 7th day of February, 1917, and found correct.
D. F. Cashman, *Auditor.*

A. J. Grant, *President.*
P. W. Hodgetts, *Secretary-Treasurer.*

The Fruit Growers' Association of Ontario

ANNUAL MEETING

The fifty-seventh annual meeting of the Fruit Growers' Association of Ontario was held in the Parliament Buildings, Toronto, February 8th and 9th, 1917.

The President, Dr. A. J. Grant, Thedford, occupied the chair throughout the Convention, and the meetings were all very largely attended.

PRESIDENT'S ADDRESS.

Dr. A. J. Grant, Thedford.

As President of the Ontario Fruit Growers' Association, it affords me a great deal of pleasure to welcome you to this our fifty-seventh Annual Convention. Any organization which can boast of having passed the half century mark with a consistent record of successful Annual Conventions must surely have established its worth, and I am satisfied you will all agree with me that the Fruit Growers' Association of Ontario has established its worth in large measure, and that the efforts of our older members, many of them passed and gone, cannot be too highly commended for having laid such a true and firm foundation.

We should deem it a wonderful privilege to be enabled to meet as usual in this fair city of Toronto when our great Empire is one of the principals in the most titanic struggle that the world has ever known and it is indeed most fitting that we should discuss our problems at this time since greater responsibility rests upon our shoulders in keeping business at home in the most prosperous possible condition so that we may be the better enabled to contribute our share of the great financial burdens thrust upon us as a partner in the British Empire. Canada has done nobly in the great war and the spirit of our people is one of grim determination to see things through, regardless of the cost until our efforts in the interests of right and justice shall have been crowned by a righteous and abiding peace.

It is quite unnecessary for me to dilate upon the many advantages enjoyed by the fruit industry in general which were achieved as a direct result of the activities of this Association. It is most vital to our interests as fruit growers that these activities shall continue, and if we expect to speak as one with authority, expecting to be heard, then we must see to it that our organization is numerically strong and that it is really representative of the fruit industry of Ontario. Many of our local associations handle apples only, and owing to the experiences of the past three seasons, many of them are dormant and some have passed out of existence entirely. This has caused a decrease in the membership of our Provincial organization which has reached rather serious proportions during the past year. A good apple crop would rejuvenate many of these local associations and bring them back to the fold, but the fact remains that there exists a great field for work among these erstwhile associations. Many of them met their first discouragements as far back as the season of 1914. There was a bountiful crop of apples of good quality, but the outbreak of the war, on the eve of harvest created

such a condition of panic in the apple business that thousands of barrels were never picked and many associations received their "Baptism of Fire" in business reverses; something entirely new to the older organizations and quite sufficient to cause discouragement. Then followed the two lean seasons of 1915 and 1916 with their short crops and poor quality. I know of several associations which have not shipped any apples during these two seasons and some of them will have to be entirely reorganized. Every association should be an incorporated body, either with or without share capital, enjoying a permanent membership. New members should only be admitted by a majority or a two-thirds vote. Under such conditions members learn to appreciate the organization and will pay their annual dues even if a blank year, from a shipping standpoint, is experienced. A member wishing to withdraw should be required to give notice in writing before a certain date. I would like to see the Co-operation and Markets Branch undertake to get these associations on their feet, and then let our Provincial Association undertake an aggressive campaign for membership so that we may enjoy the affiliation of every active association in Ontario.

It was considered advisable at the last annual convention to increase the membership fees from twenty-five cents to the mighty sum of fifty cents per annum. The reasons for the increase were well threshed out at the time, the chief one being that under the old order of things we were really losing twenty cents on each member enrolled, in the fact that for an annual fee of twenty-five cents, we gave him our official paper, *The Canadian Horticulturist,* at a cost of fifty cents. The new fee simply covers the cost of putting this publication in the hands of our members, leaving us dependent upon the Government grants for carrying on our transportation and other activities. It has been suggested that the increased fee has caused some of our associations to withdraw their affiliation, but I am sure you will agree with me that to entertain this opinion would be putting our fellow growers into a very niggardly class. On the other hand, if the additional twenty-five cents has really deterred anybody from affiliation it is simply another strong reason why we should get busy upon a membership campaign in order to show the growers that our institution means something of benefit to them. The transportation work which this Association has been doing during the past few years has put thousands of dollars into the pockets of the fruit growers of this Province. We all profit by this work, both in the Association and out of it, and there are hundreds of individual fruit growers throughout the Province of Ontario who would be glad of an opportunity to show their appreciation of this work by becoming members of our Association. It is our business to get into touch with them.

Financially, we have had a very successful year, closing with a balance on hand amounting to some $480. Our big item of expenditure has been the work of the transportation department, and Mr. McIntosh will give you a detailed statement of his work in this connection. That a transportation expert is necessary is well borne out by the fact that most of the successful business associations in the world find it profitable to have men in their employ whose sole business it is to look after the placing of their goods in the hands of the trade. If manufacturers and kindred interests find it profitable as well as necessary how much more so should it be to us as producers of the most perishable of all commodities. In fact, we are absolutely dependent upon transportation. You may deliver to the carrier a shipment of fruit in perfect condition but the condition at the other end of the route is the one of most vital importance. Profitable

growing of certain varieties of fruits depends absolutely upon proper train service to certain markets. Transportation companies are willing to reciprocate in every reasonable way, but they handle coal as well as fruit, and it is our duty to have a specialist constantly on the alert who understands the vital necessities of proper fruit shipment. And, after all, "The proof of the pudding is in the eating," and the work of our transportation expert has proved to us abundantly that it does pay to have him on the job.

We in Ontario are not only interested in local markets but we are equally interested in the markets of the Canadian North-West and the various export markets. Our work in this regard should cover all these fields, but we are only a Provincial Association, and to do this would be far beyond our means. Would it not be a reasonable request to ask the Minister of Agriculture at Ottawa to appoint a transportation expert in connection with the Department of the Dominion Fruit Commissioner? I am not so sure that we could then afford to abandon our local work, but this would be a broad step in the interests of every fruit grower throughout the Dominion of Canada. I claim no originality for this idea but I might say that I have already been in touch with the British Columbia Fruit Growers' Association, through their President, Mr. Thos. Abriel, and he is heartily in accord with such a move, while we have every reason to believe that our Eastern Growers would see the advantage as readily as we do. A strong resolution from this convention would undoubtedly do much toward seeing its realization.

The season just closed has been a very profitable one for the grower who had the fruit. Business conditions throughout Canada have been exceptionally good with abundance of money in circulation. Some of the prices being paid for good apples should be a great stimulus for us to produce more really good fruit. There never was and never will be any money in producing low grade fruit, and we are only wasting valuable time when we discuss methods of marketing it. Put the high class fruit on the market and send the rest of it to the evaporators and canning factories, or feed it to the hogs. You will frequently read "high-brow" articles in the press about the many poor people in the cities who would be glad to get this low grade fruit. No doubt there is a certain measure of truth in these statements, but they should be discussed in connection with philanthropic movements and not in connection with the business end of fruit growing. That there is a growing demand for more good apples than we are producing is a well recognized fact among progressive growers. The same may be said of many other fruits. Undoubtedly, more care in the grading and packing of tender fruits would make this line more remunerative. Some of our new districts require a lot of education in the putting up of tender fruits, and until they become educated their product will certainly spoil the market to a certain extent. This is not meant to belittle the efforts of new districts, for I class my own district as new in the matter of tender fruits; but there is a lot more to learn in the putting up of a tasty package of tender fruit than many of us are ready to admit. The same line of reasoning might be applied to small fruits. Large quantities of berries are imported annually during our own market season, and only too often our Ontario grown fruit will not open up as tastily as the imported fruit which has come many times the distance. I am not in a critical mood nor am I assuming the role of a pessimist; on the other hand I am an optimist of the first order, but the fact remains that we Ontario fruit growers are not producing high class fruit in sufficient quantity to satisfy the demand. We must cater to a public which

is becoming more discriminating all the time for the standards of living have advanced in the matter of fruit as well as in other commodities. I saw apples being sold in London, Ontario, one month ago at thirty cents per dozen. Were they Ontario apples? No, they were from the Western United States, and people even in this comparatively small city bought them freely and seemed to enjoy the novelty of buying these beautiful looking apples as they had been in the habit of buying oranges. Why not get after some of this trade with our Spies, Kings, Snows, McIntosh, Wagener and other good red varieties? Ontario apples carried off the honors at Rochester, N.Y., this year, in the box class open to all comers and this is not the first time that such a thing has happened. You must get color and finish on your apples to supply this trade, and I am fully convinced that at least certain sections of Ontario can produce the necessary color and finish. We have frequently wondered why people prefer oranges and bananas for dessert instead of apples. Simply because we are not putting up an apple sufficiently attractive in appearance to fill the bill.

We have all been pained to see the retrogression of the average farm apple orchard. Thousands of trees of our very finest winter varieties in blocks of three to ten acres attached to the 100-acre farm are being allowed to grow wild because the day has arrived when the trade demands fruit of quality and to produce this requires special knowledge of spraying, etc., which the farmer only too often does not possess, and being interested in other branches of farming, has no inclination to learn. Many farmers work their apple orchard as one of the branches of the farm, and are making a splendid success of it. In fact, some of the very finest apple orchards in the Province fall into this class. But what of the orchard that is being neglected, and is sometimes producing low grade fruit, which only too often gets packed and hurts our market? There are great opportunities for progressive men in the various apple districts to lease these orchards for a term of years, thereby yielding the owner a much greater financial return in the manner of rent and at the same time rewarding the lessee handsomely for his labors. I am not advocating a gigantic scheme of leased orchards such as some of those which have already operated in this Province, but it is possible in nearly every place to find a few men who are taking care of their orchards, and who are equipped with the necessary machinery for the work. Let us endeavor to show these men that good profits can be made by leasing an orchard or two in their own neighborhood, and thus turn the low grade product of these orchards into high grade fruit which will assist our market rather than damage it. A great deal could be done in this respect if the representatives from our Provincial Fruit Branch were supplied with practical data covering the matter, and such could readily be obtained from practical growers, for the idea of leasing orchards is not new by any means. These men come across orchards such as I refer to almost daily, and are usually well enough acquainted in the neighborhood to know the men who might take hold and make a success of them. That the scheme is practical I know from a limited personal experience and a wide application of it would assist in bracing up many a local association by placing the good orchards in the hands of men well equipped and trained for orchard work.

I would like to remind our good friend, the Dominion Fruit Commissioner, that we are anxiously awaiting the proposed improvement in the Fruit Marks Act relative to the grading of apples. We must have our number two grade more explicitly defined, and we must have a third grade with the standard specified and subject to inspection. The latter would include well matured apples affected with

scab but being subject to inspection should give the consumer a run for his money. Some of the No. 3 apples packed this last season were a disgrace to all concerned in the deal and I think most of us would welcome the advent of a law making it impossible to market such trash in a closed package.

In closing permit me to thank you for your assistance and co-operation throughout the year. Fruit growers in Ontario have a glorious heritage. Providence has blessed us with the best possible conditions for the production of high class fruits. Let us make the most of these opportunities, and strive hard to reach such a standard of excellence in our products that they will win their way into the markets of the uttermost parts of the earth.

VARIETIES OF APPLES FOR PLANTING.

H. T. Foster, Burlington.

What I have to say will refer solely to my own district, as I understand there are three or four speakers to address you on this subject, and they will take up the other parts of the Province.

In speaking to the question of varieties to plant, my remarks will have to do with planting for commercial purposes, as that differs somewhat from the small planting or the home garden. I have always felt that it is a disadvantage to have too many varieties when it comes to packing and marketing, especially if some of them are not of the best. The question of varieties is a very important one for the planter to consider, for it means the difference between success and disappointment, so I say again that varieties best suited to the various districts of Ontario should be planted, also having in mind our possible markets for the fruit.

There is a considerable variety of soil in our district, running from light sand to heavy clay, but the soil that suits apples would be a sandy loam. There are one or two orchards that are on sandy loam—and not a very deep loam—with a hard bottom, and they certainly produce good fruit, plenty of it, and of a good color. A soil that is too heavy is not good for the best production of apples, but a moderately heavy clay loam will produce good fruit, there is no question about that. I am not sure that I have a choice as to what soil is best adapted to the different varieties. I hardly feel that I am qualified to go into that feature of the business.

I would first recommend the Duchess. This apple, I believe, is the best early apple, and the most profitable if handled properly. It also allows of different methods of marketing; we can put it in baskets, boxes or barrels, and it finds a ready sale.

Second, I would take the Ribston Pippin as the best fall apple. I have been told that the Ribston of our district is second to none in the Province. The Blenheim Pippin is a good second being larger in size than the former.

Third comes the King which does very well if top-grafted on some hardy stock, such as Baxter or Stark. This has a tendency to make it bear earlier and more regularly, and that is its bad fault.

Fourth is the Northern Spy which is called by some "The King of Apples," but certainly it is the best seller in Canada, although not always in the British market. The King very often outsells the Spy, and very often the Spy does not

sell as high as the Baldwin or the Greening. Some claim there is no difference in Spies, but there is certainly a great difference in them. We want to get the Spy with the color, and the nearer our nurserymen get to the point of producing a Spy variety that will give us a good rich color, the better it will be for the growers.

Fifth is the Baldwin which is one of our good standard red varieties, and is a good cropper and shipper. I understand that several people have discarded it, but in our district it has been successful, and we feel we cannot do without it.

Sixth is one of our standbys—the Greening, which is really a better quality of apple than the Baldwin, but is objected to on account of color and being subject to scab. Red apples will sell better than green apples, but for quality the Greening is ahead of the Baldwin.

Seventh is the McIntosh Red. It is in favor with many growers as a fancy or dessert apple, and if we are inclined to cater to this trade it is one that ought to be used.

Eighth is the Snow Apple, which is also a very desirable dessert apple, and is one of our oldest of this class, and a really well-matured, good specimen of Snow Apple is hard to beat.

Ninth is the Wealthy. This is a very good cropper and a good seller.

Tenth is the Wagener, which is a very desirable apple, and perhaps should be better known than it is. It is an early bearer, and the fruit is high in quality and has good keeping qualities. It seems that our local markets do not know the Wagener as well as we think they should. My own opinion is that the Wagener is just as good as the Spy for quality. For home use, we prefer the Wagener instead of the Spy.

These last two varieties can be used as fillers very profitably, as they are early bearers and the trees do not get to be a large size.

Now, while I have named ten varieties as the best for this district, it must still be decided by the grower how many of them are likely to suit his conditions as to soil, season and markets. Finally it is presumed that the most thorough cultivation, pruning, spraying, etc., will be given the trees, because it is only by combining all that the orchardist can expect to produce a satisfactory crop. And then the all important question of marketing has to be solved before the grower receives the price he should, to pay for the cost of production.

G. Mitchell, Thornbury.

The market as it is and has been for the past few years is demanding apples of good size, and we consider that nothing but the best varieties should be planted, as there are too many of the poorer classes now. For this northern section, for fall varieties would say Duchess, Gravenstein—which does well here—St. Lawrence, Alexander, Wolf River—all red fruit with the exception of the Duchess. For late fall, possibly a few Ribston and plenty of McIntosh and Snow. For winter, the Spy, Baldwin and Greening. They are standards always.

F. B. Lovekin, Newcastle.

I live down near Bowmanville on the Lake Shore. Our land down there is pretty heavy, and possibly the varieties of apples that would do well at Burlington would not do as well with us, but I can tell you which are the best apples for our district in a commercial way.

To begin with, in the commercial orchard, a man may have too many varieties. I think seven or eight varieties are enough. I have 10,000 trees, and there are too many varieties among them. If I had to plant again what I did ten years ago, I would concentrate on fewer varieties. If we are going to make any money out of apples, we have to grow the best quality of fruit to be put on the market. We do not want to take second place to the man from Washington, Virginia, British Columbia, or any place in the world. We have the variety of apples that will grow on the lake shore of Ontario and will hold their own any place.

Again, there is not much use in our district planting a great deal of summer fruit, because all this country to the west of us is three or four weeks ahead of us, and they supply the city trade, and can ship their fruit by boat to Winnipeg and the West which is a cheaper haul. So I do not think it is worth our while growing Red Astracans, because we cannot put them on the market early enough.

In my opinion the Duchess is a splendid variety, because it is an apple that will sell any time on any market, and commands a big price at any time. We are perfectly safe with the Duchess, but the principal trouble is to get enough of them together of good quality to make a carload shipment.

After the Duchess, the Alexander is a good apple, but I would not put it in the same class. It is the alternative. It is a good apple, and will always sell in the Old Country market.

Then I would take the apple which has not been in cultivation as long as the Alexander, and that is the Wealthy. I think it is a world beater as a money maker. It is an early bearer. It is as hardy as a Siberian tree, and it will bear heavy crops of fruit alternate years, that will sell at good prices. I would plant a considerable number of the Wealthy.

After the Wealthy, I take the McIntosh Red, which is another kind of Snow, and I think it is perhaps the coming apple for the man who can get it on the market in good shape. But it is an apple that has to be well cared for and well sprayed.

For my part, I think the old Snow is the best apple in the world, and I believe a good quality of Snow is better than the McIntosh.

After these varieties, we strike the winter fruit. I believe the Baldwin has raised more mortgages and cut off more debts than any other apple planted in this country, and it will continue to do so. It does well in our heavy clay soil where we can dig six or seven feet and find nothing but clay bottom.

The Spy does remarkably well with us, and they grow as large as Alexanders on young trees. The Spy is not planted as extensively as it should be. There is nothing like it grown in North America, and there is nothing that can beat it in the world, and we should have ten or fifty times more Spies than we have to-day. The Spy apple is a long liver. If you have a tree that will bear fruit when it is two or three years old, you have a tree that will die when it is young. The Ben Davis are dying out all over this country, and it would not hurt anybody if they all died. They have made a lot of money for many people, but they have not built up our reputation as growers of fine fruit, and that is what we want to do.

These are about all the varieties I would plant. I would plant nearly half the orchard of Spies, and use the Duchess or Wealthy as quick bearing varieties—or anything you can get going until your Spies are ready; and with twenty acres of Spies you have the best thing you can get. You must dig up the ground and give them plenty of air and sunshine, and the Spy tree also needs a great deal of persistent pruning.

Q.—What is your system to keep the Spy bearing?

MR. LOVEKIN: Give them light soil, and they will bear more quickly than on heavy soil. I know of Spies that will give good apples at ten or twelve years of age.

MR. W. F. W. FISHER: Has the system of pruning anything to do with the bearing?

MR. LOVEKIN: A young man came down from the College and worked for several years on some young trees of mine. I have not seen the apples, but they will come along and bear after awhile; but when the Spy tree starts to bear, you will have plenty of apples.

If you want to add to the list, you might plant the Russet, Ribston Pippin, Greening and King. I would not advise planting that many varieties.

Q.—Would you recommend planting out 5,000 Spies in one block, or would you put some other variety with them?

A.—I would suggest something with them. I would not plant them alone, because they are so long coming to bear that I would plant some quick bearing varieties with them.

Q.—If you planted them alone, would they mature and bear all right?

A.—I have no good reason to think they would not. I know a little Spy orchard that turns out $2,000 net, and there are nothing but Spies in the orchard.

Q.—Does a No. 1 Spy command more money than No. 1 McIntosh?

A.—The McIntosh would bring a pretty good price. I know the McIntosh in the Montreal market for the last ten or fifteen years has always brought a good price. Of course the market is usually at a different time of the year from the Spy. The beauty of the Spy is that it will keep, and you get the best price in March and April.

Q.—The McIntosh won't keep?

A.—Yes, they will keep.

MR. FISHER: How much do you prune?

MR. LOVEKIN: I do not prune for three or four years. Maybe I prune too much. I think myself that probably persistent pruning has a tendency to make the trees run to wood and not to fruit.

CHAS. M. MACFIE, APPIN.

There seems to be a uniformity of opinion on the part of those who have addressed you as to the number of varieties to plant. The previous speakers have referred to apples which I have on my list as being recommended for planting in the district from which I come, and our experience in connection with the marketing of these is that there is a demand for the apples which have been referred to, and that demand on the part of the consumer is one of the great factors that we ought to consider in connection with our planting. Two or three years ago last fall, when we had a surplus crop all over the Province, I might say that Mr. McCarthy, whom we all know, if not personally, at least well by reputation, was trying an experiment in his own orchard, and what he could not sell he turned over to the Association to which I belong. If the demand from the individual consumer is a criterion as to what we should plant, then what has been said with reference to the Spy is certainly true. We can make no mistake in planting the Spy now or for years to come, and need have no fear of overdoing it.

I have nothing to say in reference to the McIntosh Red. We do not know it in our immediate locality. I believe in some districts not far from us, like the county of Middlesex, there are orchards in which it is produced successfully with the care that any variety ought to receive.

We can grow the Snow successfully, athough not very many of the trees are producing. A large producer in our locality, and perhaps the largest from the commercial standpoint, is the old standby, the Baldwin. We never have any difficulty in connection with the marketing of the Baldwin, and we have perhaps less difficulty in growing them of good color than any other fruit, although I believe in the Baldwin, as in the Spy, there are different strains of fruit. My experience would lead me to believe that on the lighter soils you get a richer and better color in the Baldwin, and of course that renders selling easier.

I have a word of commendation for the Wagener, although it is not a thrifty tree, but it is a good apple in filling a young orchard. It comes to maturity quickly, and being a quick maturing tree, it is a quick dying tree as well, and goes out of production just when the Spy is coming to its best. Consequently it finds a place in the orchard.

As far as our personal experience is concerned, we use the Wealthy and find it a splendid apple for home use, and it is too bad for the sake of the variety that it is not better known among the consuming public.

I have made a list, as the former speakers have, of the varieties in the order of their production. The first is the Duchess, then the Wealthy, the Alexander, the Blenheim—which is a good producer with us and a good seller, and an apple that is more easily kept clean than any other variety in our locality. Then follows the King. One great objection to the King is the fact that it is not as prevalent a producer as some of the other varieties. For the quality of the apple and from the standpoint of production, I think the King has not in the past commanded a sufficient prominence on the market.

We have one other apple that is perhaps not very widely known, and that is the Jonathan. It is an apple of rich color, is a splendid dessert apple, a good producer and a very attractive apple in every respect to put on the market. The man who buys it will come back for it.

So far as individual requests for apples to-day are concerned, I might say that some of those to whom we sold apples two or three years ago have come back, and it might interest you to know what have been the requests from the individual consumer. I have just taken a list from our list of sales: Spy, Rhode Island Greening, King, Baldwin, Golden Russet, Tolman Sweet, Milwaukee, Bellflower and Snow. We did not get very many requests for the Bellflower, yet there are some people who seem to like it and think it is a splendid dessert apple. There is a prejudice against it because of the tenderness in the way of marketing. Our own experience is that a long-stemmed apple will remain on the tree perhaps longer than any other apple in the orchard, and should not be pulled until the last apple in the orchard, and it does not become so tender and presents a better appearance in packing. However, I would not recommend it as a commercial apple for packing.

There is one other apple in connection with these varieties and that is the Chenango. With us it is an apple beautiful in appearance, superb in its quality, and once placed on the market will lead the consumer back to it. It is almost as good as the Wealthy in its keeping qualities. It has a little tendency to grow in clusters, and it responds to thinning admirably. It is an easier apple

to produce than the Wealthy, and you will get more Chenangoes from year to year than Wealthies.

With reference to the Wolf River, I think they have been pulled too early in the season. There is a little tendency on the part of the Wolf River to decay on the tree, but that can be overcome by cultivation. I have seen an orchard that looked to me to be deliberately neglected and yet produced an abundant crop of Wolf River of uniform size, and it happened in a season when the grower had no room for them. They were holding to the tree—a magnificent apple—in the middle of October, and in marketing condition at that time. The dealers used to pick our Wolf Rivers in September when the apple was not fit to go on the market in condition to attract the consumer. The appearance was attractive, but the quality was anything but attractive and not calculated to bring the consumer back for the apple, but if it were given a little longer time to mature before marketing, it would produce better results.

THE NECESSITY FOR NEW APPLE ORCHARDS IN WESTERN ONTARIO.

Prof. J. W. Crow, Ontario Agricultural College, Guelph.

It has been apparent for some little time that the apple orchard industry in the western part of Ontario, and in fact, in some other parts of Ontario as well, is not prospering as it did some years ago, and I suppose one of the lessons we learn from that is that time, places and conditions change. However, I think perhaps there are very good reasons why the orchard situation in Ontario is as it is to-day, and one of the important reasons which I would like to bring to your attention is what you might call "reaction." I think perhaps most of us have had enough experience and opportunity of observing the changes in the business to realize that there is a tendency in the production of apples, as in other things, to pass through certain cycles of over production and under production.

Going back to the year 1896, we find that year gave us the heaviest crop of apples we had experienced in this country up to that time. You may remember, too, that the crop of 1896 rotted on the ground—a record crop that sold for very, very low prices or were not sold at all. 1896-7 were the two years when the prices of farm products generally over North America were at their lowest point. That was twenty years ago. About the year 1900 a few wide-awake men in the Province of Ontario saw the opportunity of making money in apple orcharding. They went to work mostly by renting other people's orchards which were standing idle and producing little or nothing. Some few men in the Province made money out of that business, and their example stirred up other people to do likewise, and growing out of that, in a very natural way, came a sort of boom or widespread propaganda in apple orcharding. That began about the year 1900, although it did not resume marked proportions until about 1905.

From 1905 to 1910 everybody talked apples, and most people planted them, and there were thousands of apple trees set out in this Province. That was, I think, a boom condition and not a permanent condition of affairs at all, because it is obvious to anyone that the apple orchard industry cannot continue on that basis indefinitely.

We find that in the year 1912 we again reached a point when apples were produced in abundance and rotted on the ground. 1914, if I remember correctly, gave us somewhat of the same condition. The years since 1914 have not blessed us with abundant crops. 1915 and 1916 were two very bad seasons, known as the worst that ever happened from the standpoint of weather conditions and fungus pests and so on.

Now the point I want to make is this: Twenty years ago, 1896, we were at the point of over-production with a limited market, and while since that time the markets have extended a very great deal, we are pretty nearly all the way around the cycle again. We have had the boom condition and the fall, and we have been up to the top in 1910 and pretty nearly at the bottom again. I do not think it is out of the way to say the apple orchard industry has declined and is in a more or less neglected state. I think that is the truth, and I want you to realize that this thing goes in cycles of ups and downs. We are now at the point where if there came a real record crop, it would not go to market. We could not handle it. Do you realize that the years we call the most disastrous years are the years of the heavy crops? Do you ever think of that? We like to have a big crop, and if you have a big crop when nobody else has one, you are all to the good; but usually when you have a big crop everybody else has a big crop, and we have just about reached the stage when a big crop would not go to market. We could not handle it, and we are nearly to the point when people are going to begin again to take a big interest in apple orchards and planting trees.

Another factor which has to do with the present condition of the apple industry in Ontario is the fact that most of the orchards throughout Western Ontario are small in size. If you will look carefully over the orchards in the Province of Ontario from one end to the other, you will find that the orchards to-day which are receiving care and attention are good sized orchards—orchards big enough to make it worth the owner's while to look after it. And the orchards which have passed into a state of neglect are the small orchards. I believe that is the correct diagnosis, and if it is correct, it means there is something about the small orchard which is not economical and not conducive to keeping that orchard in a state of productivity. I believe, therefore, that our orchards are too small. There are numbers of men who have temporarily dropped apple growing. The trees are standing there, but they are not sprayed or pruned.

Q.—Where would you draw the line?

Prof. Crow: With the man who runs the show. There are plenty of men who at the present time have dropped the orchard temporarily, but who if they had more trees would be better off. They may think they have too many when they have three or four or five acres, but if they had ten or twenty, they would have enough to make it worth while caring for.

One point in which perhaps we have erred and gone wrong is the way we went at it to stir up this boom in apple growing. There was as you know a great deal of talk about apple orcharding, and emphasis was given to the profits certain men had made in fruit growing. That is all right if you take it right, but it may be very misleading, and that is where we made a serious error.

During the years from 1905 to 1910, there was too much of a tendency to look at the orchard on a farm as the unit. We have gone after the man with the small orchard and preached into him that he ought to take care of his orchard as if it were the principal end of farming, whereas the farmer is thinking

of his whole farm as the unit of production and not the apple orchard that occupies one corner of it.

I want to base this statement on the remarks I have made up to the present: I believe that the present is exactly the right time if a man is properly situated, to plant an orchard, and if there ever was a necessity for a campaign in production we have an instance of it right here, because from a national standpoint, if we do not look after our apple orchards and encourage the planting of more orchards, our apple orchard industry is going to fade—I won't say out of sight, but it is going to fade. We want to persuade men to plant apple trees, but we must pick the men who are rightly situated to do it, and who are in a position to plant a large enough orchard to make it worth their while. Five years from now under normal conditions and even under war conditions, should they continue that long, the public generally will be waking up to this opportunity in the apple business. That is self-evident and is no prophecy.

For some years in Ontario, there has been a sort of campaign in marketing. We have thought, and it has been freely stated, that the problem in fruit growing was not the growing of the fruit but the marketing of it. I would bring to your attention the fact that great progress has been made in the marketing of all kinds of fruit in this Province in the last ten or fifteen years. We have progressed so far in marketing that we have come to the point where the problem is once more the growing of the fruit, and my impression is that the general fruit grower and apple grower in this Province has much more to learn about the growing of the fruit and the selection of the varieties and the management of his orchard. We have made tremendous strides in marketing. We are doing things now that ten or fifteen years ago would not have been attempted, and which under those conditions would have been out of the question.

Just as an instance of that. The Niagara District peach crop of 1913 was a bumper one, and if it had come ten years previous, it would have spoiled on the ground, but the peach crop of 1913 went to market, and although the prices were not as high as they might have been, it was moved and sold—the biggest peach crop the country ever had.

We are marketing apples in the West by co-operative methods through the various Associations and the Central organization, in a manner that we would not have thought possible ten years ago. And the problem to-day is the growing of the fruit. That point is emphasized somewhat by the character of the season of 1915 and 1916. It was very difficult to get spraying done, and yet there were clean apples grown in the Province in fair quantity in both of these seasons.

I would like to direct your attention to some of the causes which have played a part in bringing about the present condition of affairs in the apple industry. The first is the small orchard. I believe the day of the small orchard is over, and perhaps it would not be too much to say that the small orchard is the curse of the business. When conditions get down to a certain point, the men with small orchards stop caring for them for ten or fifteen years, and then when they want to, they can bring them into cultivation again. There can be no more disturbing element in fruit growing.

Another point is the matter of varieties, and I have listened with much interest to what I have heard of the discussion of varieties. I do not need to add anything to that at the present time. For my own part, I want to say that I do not believe the Northern Spy apple is half as profitable as some have stated. I believe it is the most difficult to grow and one of the most expensive.

There is another point I would like to mention which has been a source of very great difficulty. You know the extent to which trees have been winter killed in various fashions. One of the principal means by which trees go out in this way is root killing. An interesting point in this connection is root killing is worse in the southern counties than in the northern where they have more snow. There is more root killing in the county of Kent than in Huron or Bruce or Muskoka, because in the latter there is a heavy blanket of snow. I believe this can be avoided by growing trees on hardy roots, either on their own roots or grafting then on to some other variety. The Spy is a very hardy tree. It will grow in a country where the Baldwin or the Greening will not. The Baldwin is not satisfactory on its own roots, but I will guarantee it will live longer and thrive better top grafted, because we have thousands of Baldwin trees going out with root killing. This is a problem for our nurserymen, however. If you want a tree on strictly hardy roots, and if you want to pay the price, there is no reason why you should not have it.

There is an important way by which all this root killing can be avoided, and connected with that is the matter of top grafting such varieties as the Baldwin. When the Baldwin tree goes out at twenty-five years of age, there is something radically wrong. There are a great many places in Ontario where the Baldwins are going out at twenty-five years where they ought to live longer, and where they would if they were top grafted. You want not only hardy roots, but hardy trunks.

Q.—How old should a tree be for top-grafting?

Prof. Crow: You can top graft a tree at almost any age from three years planted up to as far as you like, but my impression is that the best time to top graft a tree would be seven or eight years planted.

The Chairman: I am sure you will agree with me we have listened to a very excellent address from Prof. Crow. I am ready to agree with Prof. Crow that the fruit industry has reached that stage when we have gotten over this panicky attitude, and we are ready now to go ahead and profit by the lessons we have learned.

Prof. Crow: Mr. Carpenter, who is a nurseryman, has asked me what I mean by a tree on its own roots, and wants to know whether I am talking of the growing of trees from seed. The point is if a nurseryman would use short pieces of root and a long scion and plant it deep, the scion will develop its own roots eventually.

Mr. W. F. W. Fisher: There is one point I would be interested in hearing developed. Is there any way of treating an orchard that will lead to its early productivity? My observation in the West is that one of the reasons why they get early productivity of trees is because they do not prune them. They plant a tree and go away from it, and leave it for eight or ten years, and then they have a tree in full bearing for its size, and then they prune them very heavily. I have never seen their orchards pruned very heavily in the West. We have been pruning somewhat heavily on all the varieties of fruit we grow—apples, pears, plums and cherries—for the last few years. We have started off on that principle, that we are going to leave the tree without any branches that come in the way of working the land. We have known that the lower buds are the ones that are the best to bear fruit, and by the system of pruning we remove those buds and it keeps delaying the trees, according to this theory, from coming into bearing. Now, we hope that will establish the bearing habit earlier in life, and after that is once established fruit bearing spurs will come on more regularly.

PROF. CROW: I would say that it does on general principles. I have been interested in the varieties that have been discussed, and to my mind the only thing new has been the recommendation to plant Chenangoes. They are not grown in our district, but I think it would be well to include them in our varieties.

PROF. MACOUN: Prof. Crow does not think there is a place for the small orchard, but I am a great believer in the small orchard near the city or town. I believe the time is coming when the market gardeners are going to grow more apples than they are now. Quite a number of market gardeners have a number of early bearing varieties, and these are the best kind that market gardeners should handle, and I believe there is a great opportunity for market gardeners all over Canada in this respect. I agree with Prof. Crow that the average farmer with the small orchard does not look after it, but the market gardener and the truck gardener will look after it.

MR. PATTERSON: I believe Mr. Fisher is absolutely right about not pruning. Certain experiments have been conducted at the Vineland Farm for the last five or six years, and comparison was made between the trees that were pruned severely, pruned very moderately and not pruned at all. The trees not pruned at all were away ahead of all the others; there was no comparison both in girth of trunk, in size of branch and size of tree. Experiments along this line are almost conclusive in regard to the early bearing, and I think it is right not to prune trees at all until they have had six or seven years of growth.

MR. PALMER, Vineland: I would like to qualify the remarks of Mr. Pattison. The biggest difference is between the winter pruned trees and the summer pruned, but between the well pruned and unpruned trees there is not the same big difference. Taking everything into consideration—the shape of the tree and the general health of the tree—I think that the semi-pruned is perhaps the better state, the trees are a better shape and not leaning away from the prevailing winds, and are not as straggly as the unpruned trees, but as far as the experiment is concerned, unpruned trees are out-bearing the summer pruned and winter pruned, and outgrowing them in length of branches and girth of trunk. Against that must be set the fact that the unpruned trees are straggly and the branches are very thick. In two or three years there won't be any buds in the centre of these trees; there is too much shade.

THE CHAIRMAN: The tendency will be that we will go too far the other way.

REPORT OF THE HISTORICAL COMMITTEE.

A. W. PEART, BURLINGTON, AND W. T. MACOUN, OTTAWA.

In 1914 and 1915 the report of this Committee set forth the more important events connected with the growth of the Ontario Fruit Growers' Association. As the main features of that field have been, for the most part, well covered, we propose to confine ourselves this year very briefly to the remarkable season of 1916 as it affected the fruit grower. It has been well said that everything has been abnormal and out of gear. The war was and is still raging and assuming even larger proportions. The spring and summer were phenomenal in their destructive effects on the fruit grower and farmer. Incessant rains until the last of June waterlogged the soil and largely prevented the usual work on our farms. Orchards if ploughed at all were ploughed wet—if cultivated, were cultivated wet—and in

any event the soil was lifeless, chilled to death and with it trees, bushes and vines.

Then came a drouth of three months, with intense heat. The soil baked quickly, and probably within the memory of man land was never so stubborn and hard to handle. The rains interfered with the setting of the blossoms of the larger tree fruits, and as a result there were short crops of apples, pears, and plums. This was aggravated by the impossibility of effective cultivation, so that the apples were small, defective and of low quality. Strawberries on light and well drained soils were a fair crop. Raspberries, poor; cherries in too many orchards were destroyed by the cherry fly; pear trees were attacked by the Psylla, and the San José Scale spread rapidly. Very seldom, if ever, was the apple scab so bad as this year.

But amid the general desolation there was one bright spot—prices were good, as well they might be, for the grower had little or nothing to sell. Cherries climbed to old time prices 75c. to $1.50 per 11 qt. basket; plums 75c. to $1.00; pears brought good prices in our home markets, and if you could get them across to Great Britain, sold at record prices; apples $1.25 to $1.75 per box f.o.b. for No. 1 and 2, and $2.50 per barrel for No. 3. Winter Nelis pears sold in Glasgow last October as high as 13 shillings per one-half standard box, and King apples at 16 shillings per box.

During 1916 commercial dusting was tried in a few orchards instead of the usual spraying to destroy insects and fungi. The results were such as to inspire the hope that this method might become generally effective. The relative lightness of the outfit and the rapidity of the work are strong factors in its favor.

In the winter of 1915 and 1916 thousands of young fruit trees were girdled by mice, involving a heavy loss to many growers. Those who promptly protected the wounds with burlap, then bridged them with scions when vegetation started and used grafting wax freely, were able to save many good trees.

This is the third annual meeting since the beginning of the war. During the past year many of our sons have seen active service at the front. Some have been wounded, others again have paid the supreme price. We all fervently hope that this dreadful nightmare, this foul blot on civilization, this brazen challenge to Christianity itself may soon be ended, and that the British Empire with her allies may emerge successfully on a basis of permanent peace rooted in honor and justice.

During 1916 two strong men officially connected with the fruit industry have passed away. The Hon. James S. Duff, Minister of Agriculture of Ontario, died near Cookstown on June 20th. He represented West Simcoe in the Provincial House for eighteen years, and was one of the most able Ministers the Province has had. Mr. Duff was a successful farmer and a practical man, bringing to the responsible duties of his position as Minister, useful progressive ideas and shrewd common sense. He introduced the system of County Agricultural Representatives, School Fairs in rural districts, the merging of Farmers' Institutes into Clubs, Agricultural Travelling Demonstration Trains, various acts for the betterment of the live stock and dairy industry and was a good friend of the fruit interests of the Province. Both his public and private life were marked by simplicity, rugged honesty, and devotion to duty. He was genial and sympathetic, and his demise which was universally regretted was doubtless hastened by the shock of the news of his son having been killed in France while fighting for Canada and the Empire.

Dr. C. C. James, Canadian Commissioner of Agriculture, died suddenly on June 24th. From 1891 to 1912 Dr. James was Deputy Minister of Agriculture

of Ontario. During the latter year he was transferred to the wider Dominion field. At the instance of the Hon. Martin Burrell, Dominion Minister of Agriculture, he directed the Patriotism and Production Campaign in 1915 throughout Canada, and the Production and Thrift Campaign in 1916. Dr. James was a close student, and a man of wide sympathies, which, directed by a certain resistless energy and enthusiasm, gave his life a broad usefulness. He was pleasant and approachable, and the fruit as well as other agricultural industries were materially advanced through his work and influence. Dr. James was a member of the Senate of Toronto University, Past President of the Ontario Historical Society, a Fellow of the Royal Society of Canada, and a companion of the Order of St. Michael and St. George. The news of his death was received generally with deep regret.

CARE OF THE ORCHARD DURING THE LABOR SCARCITY.

A. W. Peart, Burlington.

This subject, "The Care of the Orchard During the Labor Scarcity," I consider is a very difficult matter to handle. The care of an orchard under normal conditions is hard enough, but when we strike conditions such as we are likely to confront and have been confronted with during the last year, it makes it very much more difficult to try to say anything about it. Last year we had a hard season from the standpoint of the weather. There was a vast amount of rain during the early part of the year, succeeded by intense heat and drought from July on. That made it so that the fruit grower could with no satisfaction whatever work or handle his fruit plantations and orchards; and, besides that, there was a labor scarcity. I dare say that in our part of the country the farmers are short from 25 to 50 per cent. of the usual quantity of labor they keep. As time goes on men are getting scarcer and scarcer. Recruiting is taking more and more of our men, as also are the munition factories. Then there are public works going on which absorb numbers of men and which offer higher wages. The farmer cannot profess to compete with the munition manufacturer in the payment of wages, nor can he compete with the wages offered by commissions of various sorts and by private contractors.

In Burlington district to-day, hired men ask from $2.50 to $3.00 a day, and they would point to sewer works and other public undertakings where they pay laborers 30c. an hour.

That is the situation that confronts us, and it is up to us as fruit growers to meet that situation as best we can. I do not know that I have any special suggestion to offer to you so far as that situation is concerned. We had a very hard year last year due to the season and the scarcity of labor, and if we have normal conditions this season even though wages are higher, we cannot have a worse year than what we have recently passed through.

It seems to me there are at least three things which are indispensable, and which we should make a big effort to try to do on our farms. The first is keeping up the fertility of the soil in order to produce a good crop of any sort. The next indispensable operation is cultivation. We must look after the cultivation of our orchards; at least that is the experience in our district. I understand in some districts the orchards are situated on such exceptional soil that they require no cultivation; but if I were to handle my orchard that way I would produce a very

inferior quality of fruit. I have not only to keep up the fertility of the orchard, but I have to cultivate it as well. The third point is in regard to spraying. These three operations must be looked after—the fertilization of the soil, cultivation of the soil and spraying of the trees.

In regard to the fertilization of the land, my practise is, so far as I can carry it out, to plough all the orchard I can in the fall. What I do not get ploughed in the fall, I plough in the spring. I would rather plough all the orchard in the fall for the general reason that I find with all sorts of crops, grain, corn, mangels, the ground ploughed the fall before retains the moisture better throughout the succeeding year than if it is ploughed in the spring, and I find the same reasoning will hold true in regard to orchards. Last fall I left three orchards unploughed, and at the present time I am drawing stable manure out to those orchards. I got two car loads of manure in December and I am spreading it out under the trees as far as the branches reach.

Q.—Do you plough towards the tree or away from them in the fall?

A.—I prefer to plough towards the trees unless the ground is very uneven.

Q.—You would not be afraid of tearing the roots?

A.—As I say I prefer to plough to the trees; the orchards I ploughed last fall I ploughed away from the trees and left three or four rows to the old trees. I would not care to tear the roots.

Q.—What depth do you plough?

A.—Five or six inches.

Q.—Depending on cover crops in adding humus to the soil, what would you do?

A.—If I find time to plough it in the fall, even with a cover crop on, I would do so for the sake of keeping moisture in the soil. If I plough in the spring I do not seem to be able to keep the moisture in the soil.

Q.—You would have to turn your cover crop in pretty early?

A.—In the middle of July.

Q.—That would not do for a young orchard?

A.—In a young orchard we expect to grow something else besides trees, of course.

Q.—Take an orchard 18 or 20 years old, would you advise ploughing right up to the trees or would you leave three feet or a greater amount next to the tree?

A.—I always plough right up to the tree.

Q.—Some people find it an advantage to leave 10 or 12 feet?

A.—I daresay there are some grounds and some lands where a person can do that without sacrificing the size of the apples, and it might tend to make the apples a better color to leave a strip of 10 or 12 feet in width. Some people say it tends to make a better color in the apples, but whether that is true or not, I do not know.

Q.—I did not mean that exactly. The small feeding roots in the trees are not very close to the trunk, and according to the size and age of the tree, would you plough close to the tree or leave a strip? That is, with a young tree would you plough close and as it grew older leave a little more ground?

A.—Some say that is an advantage; but I plough right up to the tree, though not deep, and the farther I get away from the trunk, the deeper I plough. But your point is leaving a strip of sod that you do not plough at all. That would not suit my orchards. I require to cultivate all I can to get any sized apples. In regard to cultivation, I like to put the roller around as soon after I plough as possible, and then put the harrow over the ground.

Q.—What kind of soil have you?

A.—Clay loam and gravel loam. As soon as the ground is fit to work in the spring I like to get on it with a disk and then the harrow. I give it the same treatment as a field I was going to sow with oats, as far as the harrowing is concerned. If we leave it as the disk leaves it, there is greater evaporation in the surface than when left after the harrow.

In regard to spraying, I believe last year was a great revelation in some parts of the country in regard to the quantity of injurious insects and fungi we have to combat. In my own orchards for the first time to any great extent, the aphis did as much damage as it possibly could. The fruit was small and the leaves were blackened, and in cultivating that orchard crosswise with a team during the months of July and September, a certain amount of water or honey dew would be swept off the trees on to the horses.

Then again, the Cherry Fly developed very largely in the cherry. The San José Scale developed very rapidly, and we were also troubled with apple spot or scab. So in addition to these other two operations, spraying is absolutely essential.

I have not had any experience with the new dusters, but the fruit growers are hopeful that the dust method of treating trees for fungi will be satisfactory. Last spring and summer it was practically impossible to spray our trees properly on account of the soft ground and the rain, and I have no doubt that is one reason why the fungi and the scab in the apples was so prevalent.

Orchards have also to be pruned in order to get fruit worth picking. Raspberries and blackberries should be pruned, and I think young orchards generally should be gone over and a little taken out of them, but at the same time, I agree with the opinion expressed here that we should not do too much pruning on young trees.

Q.—If you do not prune a young Spy tree what kind of a tree are you going to have? It will grow 20 feet higher in the year?

A.—Every rule has exceptions, and I dare say the Spy tree is the exception. I agree with you that young Spy trees make a vigorous growth in a single season, and it has been my practice to cut those growths back always.

There were thousands of trees in the Burlington district ruined with mice. Some of us went to work and tied up the wounds with burlap so that the sun and the wind would not dry out the tree. We tied the top and the bottom of the scion with twine, and then we packed the wound up with grafting wax and in that way we saved a number of good trees which would have been ruined.

Q.—Is there a particular time for doing that work?

A.—I do that about the middle of June.

Mr. Falen: If you have clean cultivation and your fences clean, you would not have any mice.

Mr. Peart: Unfortunately our fences are not always clean, and we cannot always have clean cultivation, but I agree with Mr. Falen.

A Member: Even with clean cultivation the mice worked through on my orchard?

A.—They were certainly very bad. I know orchards where hundreds of trees were destroyed. I think it would be well for us to go over our trees and put on tar paper.

Prof. Crow: I do not see where you are saving a great deal of labor on that orchard.

Mr. Peart: The point I want to make is this: We are up against a situation.

There are certain indispensable things to do, but we could cut out thinning, although the thinning of certain varieties might be profitable in normal times. I do not think I would consider that this year at all. So far as possible, the fruit growers and farmers should confine their energies and work to things absolutely indispensable. Leave out the non-essentials, and just get along the best we can under the conditions we are up against.

Our boys are fighting at the front, and they are making a good fight and bringing honor to Canada. It is up to us who are here and not at the front to also make a good fight in our work whether it be in our orchards or on our farms, and be a credit to our boys who are at the front.

THE CHAIRMAN: The question has just come up in regard to mice damage. Has anybody had any experience in the application of a strong lime-sulphur solution applied to the trees as a preventative?

FATHER LEOPOLD: I tried that out in the fall, and where we have put that on the mice have not touched, but this is the first year of using it.

PROF. MACOUN: There is a method of cultivation called the Johnston System which saves half the expense of the operation of cultivation, but whether it is practicable to this part of Ontario or not, I cannot say. In this method every other row is cultivated. Supposing you have a cover crop of clover in your orchard, next spring instead of ploughing up the whole orchard, you plough up between every other row, and in that way you save half the seed, half the expense of ploughing, and half the expense of cultivation, and they claim in Nova Scotia they get a better quality of apple and sufficient moisture to produce apples of good size.

THE CHAIRMAN: Mr. Gibson, would you mind explaining to us the system you have of leaving the trees with a strip of sod?

MR. GIBSON: Our object in doing it is saving labor. We keep the orchard in clean cultivation until the tree is nicely in bearing, and then we sow a strip of clover perhaps 10 or 12 feet wide. If the rows are 35 feet apart, that leaves 25 feet for cultivation out from the branches, allowing the branches to drop down over this sod strip. A lot of the apples are low down and within reach of the pickers, and so far I have had sod strips that have been in continuous sod for 15 or 16 years and the trees are making plenty of wood. By the cultivation of the centre, we get plenty of moisture, and I am sure I am getting a better quality of apple, and the trees go into winter with wood better ripened by having this portion of sod around them, and there is apparently no winter injury.

MR. TERRY: How would you cut the grass if the trees are so low?

MR. GIBSON: With the mower. We cut back the limbs pointing sideways so as to allow the horse to go past.

Q.—Have you any injury from the mulch?

A.—No, but it has a tendency to harbor mice, but so far we have had very little injury from mice.

FALL PLOUGHING.

W. F. KYDD, TORONTO.

At many meetings like this the question has been often asked about fall ploughing, and not so very long ago there seemed to be a great difference of opinion about it. I am glad Mr. Peart spoke the way he did, because it makes me stronger in my ideas on the subject.

For a number of years the Fruit Branch has had orchards in different parts of Ontario. In three of these orchards from the very beginning some fall ploughing was done every year. We find in the spring cultivation the labor does not cost half as much if the orchard has been fall ploughed, and it is easier to keep the ground clean. We also found we had greater wood growth with fall ploughing than with spring ploughing. I suppose the reason for that is that we were able to keep the ground moist during the summer. I would advise fall ploughing to be done as late as possible so that there will not be any chance of any growth starting in the tree.

Of course fall ploughing does away with the cover crop for winter protection, but if you have your ground ploughed in the fall and harrowed, you have five or six inches of mulch, and I believe that is a good preventive from winter injury to those roots.

Another thing I would advise is ploughing towards the trees. I do not believe in leaving anything resembling a dead forest around those trees.

Mr. Peart has covered the ground so thoroughly that I can hardly add anything to what he has said, but I would be pleased to answer any questions.

Mr. Falen: Do you ever plough away from the tree?

Mr. Kydd: No; never away from them.

Q.—What kind of plough do you use?

A.—Any kind, as long as it is easy to handle.

Q.—How many furrows?

A.—Generally one.

Q.—That would be pretty slow if you had a great many trees?

A.—I would use two, then, or more than one plough.

Q.—Would you advocate ploughing every fall?

A.—If I am going to do spring cultivating every spring I would advocate fall ploughing every fall.

Q.—How deep do you plough?

A.—Pretty shallow, because as a rule these orchard trees have not been cultivated, and if you plough five or six inches you are apt to give them an awful shock. There are a few orchards that are never cultivated at all, and they have splendid results. I know of an orchard near St. Thomas where there are splendid crops of Snows and McIntoshes every year, and it has not had a horse work on it for the last twenty years.

Prof. Crow: Would you fall plough sand?

Mr. Kydd: Sandy land would not need fall ploughing nor spring ploughing. A disk would do all that was necessary.

Mr. Allen: As far as I am concerned I am never satisfied unless I have all my ploughing done in the fall. I find with the land ploughed you are no more susceptible to frost than the man who has his mulch. As Mr. Kydd has stated it certainly lessens by 50 per cent. or more the labor in the spring. When you plough up your land you have a loose mulch, as Mr. Kydd has stated, and the road adjoining your orchard may be frozen hard, but your orchard will not have nearly the depth of frost in it.

The reason for late fall ploughing is to get rid of the mouse trouble. If you plough early or not at all the mice will have their homes in there by the scores, but if you go in as late as possible in the fall to plough you are going to be pretty hard on the mice, as Bobby Burns said, and clean them out to a very great extent. And we find also when we plough to our trees we eliminate this difficulty with mice.

MR. W. H. BUNTING: In the last few years I have practised all kinds of methods. I have given mulch a trial, clover as a cover crop, and also fall ploughing, and I have found that they have all been good, but when I come to my work in the spring, if I have done a good deal of fall ploughing I am very much ahead.

MR. ROBERTSON, St. Catharines: I have a little farm, and it is in an exposed position. Practically all my loss has come from allowing the land to become bare during the winter by the snow blowing off, and I would never advocate fall ploughing on my farm. I lost 90 per cent. of one orchard with fall ploughing, whereas in another orchard with a cover crop I lost practically nothing.

MR. KYDD: Is it necessary to cultivate absolutely close to the trunk of a full-grown bearing apple tree? Is there any need of going within three feet? Is not that the most expensive part of the cultivation?

MR. ROBERTSON: It is the most dangerous.

MR. KYDD: You can almost have anyone do the cultivating if you do not have to go within three feet of the trunk of the tree. I know of several orchards in Ontario where they are not going within three feet. There is one near Oshawa, and the owner has as fine foliage as you could desire, and he is one of the best fruit growers I know of. What is the use of our bothering with that expensive labor? We have tried this thing out in the orchard in Paris. We have some trees standing in 14 feet square of sod, others in ten and others in 3½ and 5 feet square, and last year there was no difference in the color whether they were in the large squares of sod or had only three or four feet each side of the tree.

Q.—Could you see any difference in the blossoms?

A.—We could not see anything of the kind.

MR. FISHER: Would it depend on the size of the tree?

MR. KYDD: It does not make any difference at all.

MR. FISHER: I never made a very great success of growing apples, but the practice we follow and propose following is to plough our orchards both fall and spring with a shallow two or three gang plough, and we find it is the cheapest form of cultivation.

PROF. MACOUN: We adopt the spring ploughing at Ottawa for the reason that our soil is sandy loam, and we had one very bad experience many years ago which we do not want repeated. A very large proportion of our trees were killed in the winter by fall ploughing, and since then we have grown cover crops continually. Of course we adopt the method of growing most of our trees on hardy roots, but for our section of the country—Eastern Ontario—I would certainly not advise fall ploughing.

DOES THE INSPECTION AND SALES ACT PROTECT THE CONSUMER?

A. S. CHAPIN, TORONTO.

In any successful business the chief aim of the management is to give satisfaction to the person using the products of that business, because if the person using the products is satisfied with the products he will use more of them, will increase his orders for them, and the business will benefit thereby.

How can we apply this principle to the apple business?

Simply by giving the consumer satisfaction so that he will use more apples and pay higher prices.

Does the Inspection and Sales Act, as it is to-day, accomplish this? Let us see.

CONSUMERS.—There are two classes of consumers. The first class is composed of those who buy their apples in barrels, such as the farmers in the North-West; and the second class is composed of people in cities, towns and villages who buy their apples by the basket or small measure, or even by the dozen.

In order to ascertain if the Inspection and Sales Act protects the first class of consumers, I must take up the grading of apples under the Inspection and Sales Act as it is to-day.

GRADING.—In regard to No. 1 grade, I will say very little, as it is nearly what it should be, but in regard to No. 2 grade I have much to say.

If there is any man in this meeting, including inspectors, who can tell me what a barrel of apples marked No. 2, contains, I wish he would stand up, and I will willingly go to the expense of having his photograph taken.

I admit that I do not know, and I do not believe it is possible for any person to know, simply because it is a barrel of mixed grades.

If we who pick and inspect apples do not know what a No. 2 barrel of apples contains, how is the consumer to know?

Therefore, I claim that the Inspection and Sales Act, as it is to-day, affords absolutely no protection whatever to the consumer, especially in regard to No. 2 grade. I also claim that it is grossly unfair to the inspectors to ask them to inspect the No. 2 grade, under the wording of the Act as it is at the present time.

If you will permit me, I will offer for your approval a method of grading apples which I have proven to give protection and satisfaction to the consumer, and at the same time to give the highest prices to the producer.

Under the Inspection and Sales Act we pay absolutely no attention to the grading of apples as to uniformity of size and color, and these are two of the most important things in connection with the grading of apples, because we all know that high prices depend, to a very great extent, upon the appearance of the fruit and package.

Therefore, instead of mixing small and large No. 1 apples together, and thus injuring the appearance of the small apples, I would make two grades of No. 1, and mark them Large No. 1 and Small No. 1, but both barrels must contain No. 1 apples in quality.

Next I would take the apples off color, and apples with a few spots, and I would put them in a package by themselves, and mark them just what they are, namely, "Seconds."

We then have nothing left except apples with worm holes, apples covered with fungus or scale, and ill-shaped apples, which are nothing more nor less than dead culls.

It is a great pity our Government cannot prohibit the marketing of culls, as no man can estimate the amount of injury to our first and second grades that is done by the marketing of this rubbish, which should go to the evaporator.

The Government can prohibit the sale of fruit, if it is unfit for consumption, and I honestly believe that if our worthy Commissioner would take a wormy apple to the Government analyst and have it properly analyzed, the analyst would at once pronounce the apple unfit for consumption, owing to the poison injected into the apple by the insect.

However, if the Government cannot prohibit the marketing of culls, it can compel the package to be branded just what it contains, namely, "Culls," in large letters, so that the word could be distinguished in the dark.

As to the cost of grading under the system I have suggested, as compared with the cost under the Inspection and Sales Act as it is at present, I claim that under the system of grading I have just suggested, a man will grade apples in three-quarters of the time he takes under the present system.

Under the present system a great deal of time is lost in the men deciding where the apples should go. For instance, a sorter picks up a good apple with a few spots, and is undecided what to do with it. He holds a discussion around the table, and finally decides to slip it into the No. 1 barrel and take a chance.

Under the system I have suggested, a man knows what every apple is as soon as he sees it. If it is a perfect apple, it is a No. 1; if it is off color, or has a few small spots, it is a second; and if it is a wormy apple, or covered with large spots, or ill-shaped, it is a cull, and he knows just where to put every apple, and can go along with the grading without any discussion and any fear that he may be sent to prison.

By grading the apples as I have just suggested, we are giving sufficient protection to the consumer who buys by the barrel, because when he buys large No. 1's, he gets large No. 1's; if he buys small No. 1's, he gets small No. 1's; and if he buys seconds, he gets seconds; and, therefore, he will be satisfied with what he buys, and will use more apples, and will pay higher prices, because he will have more confidence in the grading of our apples.

But what about the consumer in the cities, towns and villages who buys by the small basket or small measure, or even by the dozen?

Are the apples we have so carefully graded going to reach him in the same grades as we graded them? No. And why?

Because the retailer goes down to the wholesale market, buys your apples branded "Seconds" or "Thirds," takes them to his store, takes the head out of the barrel and sells them to the consumer in small lots as first class Ontario apples, because the Inspection and Sales Act does not cover apples in open packages.

The result is that when the housewife telephones her grocer to send her a small measure of good Ontario apples, he delivers your seconds and thirds, and charges her a good price.

The consumer is displeased, blames the dealer and grower, and uses far less apples than she would if she had been delivered the quality of apples that she had purchased.

Therefore, I claim that the retailer should also be governed by the Inspection and Sales Act, and be compelled to brand with a rubber stamp, every package, open or closed, in the same way the packages are branded in the orchard and in the packing houses. I believe in British fair play, and if the growers and dealers are to be governed by law in regard to the grading of their fruit, and taken to court and fined if they transgress the law, then I say that every person handling apples should be governed by the same law, taken before the same courts of justice and subjected to the same fines as the dealer and grower. This is only fair.

If we bring the retailer under the Inspection and Sales Act, the consumer will then receive the apples under the same grading as they leave the orchard, and the grower will then receive the credit and prices he is justly entitled to for his hard work.

But, you may say, how is the consumer to know anything about the grading of apples?

To this I would reply, let the Government advertise in the papers what firsts, seconds and culls are, and if graded as I have suggested, the language would be

so simple that any man, woman or child could easily understand that firsts are perfect apples, seconds are apples off color and spotted, and that culls were culls, which every person already knows.

The consumers are here and are willing to pay the price; they are in the Canadian West, and are willing to pay the price; they are in England and Scotland, and are willing to pay the price, if we will only give them what they want.

The old idea of compelling the consumer to accept any old thing we see fit to send him is bad business, because he does not have to buy our apples, and he will not pay us the price unless we give him what he wants.

You can easily see the proof of this by looking in the shop windows in Toronto, and see the large quantities of Western apples as compared with the small quantity of Ontario apples, and the quantity of Western apples is increasing every year.

This fact alone proves that our methods of handling this apple business are wrong, and we must adopt new and up-to-date methods which will give the consumer what he wants and is willing to pay for, and what he is justly entitled to.

I beg to thank you and the members of the Ontario Fruit Growers' Association very much indeed for giving me this opportunity of addressing you, as I consider it a great honor. In conclusion, I want to impress upon those present that we are losing our apple trade, and that we must discard the old ideas and adopt new ones, if we are to retain it. And above all things, let us do away for ever with the great uncertainty in the grading of our fruit.

I did not know you were going to have this splendid array of apples here this afternoon, but it is right along my line. You have a box of large apples and one of smaller apples, and I claim those two boxes of apples packed in that way will bring you more money than if you mixed the two sizes together. I have brought with me some apples that I took out of a barrel of No. 1 Spies that a man in the city paid $7 for. There we have the large No. 1; here we have the small apple, perfectly clean, and in my opinion just as good an apple as the other, and it also should be marked No. 1. If you pack those apples together, then the large apple will destroy to a certain extent the value of that small one, because it makes the small apple appear smaller. So I would pack those separately, and then you would have a very nice package of apples.

What have we next? We have this large apple which is off color. If our first apple was No. 1 grade, what should this be? I think we must call that a Second. We have another apple here with color but with some spots, and I would put this one along with the one off color and make a barrel of Seconds.

Now we have another grade here. Here is one which is very small and has two worm holes, and these all came out of a No. 1 barrel. Apples like this are Culls, and they should be marked what they are. I think any man ought to be ashamed of himself to ship such apples to people in a city like this and expect them to consume them, and you men are the ones who are suffering for this. It is coming back on you. Some might object to making two grades of No. 1, but it will make more money for you. If you put No. 1 apples in a No. 1 barrel, and if you put apples off color and those with a few spots in a No. 2 barrel, you will have a good barrel of No. 2's.

Q.—How many spots would you allow?

A.—I would draw the line pretty close.

Q.—How would you define it?

A.—Spotted apple as a second.

Q.—Covered with spots?

A.—That is a third.

Somebody will say, "Oh, labor is too high for us to grade our apples in that way; there is too much expense, we cannot do it?" I honestly believe that by this system of putting the apples where they belong, the packers will pack the apples in three-quarters of the time that they do under the present system, and with three-quarters of the expense. Why? The packer has a law hanging over his head, and it is worded so that it would take a Philadelphia lawyer to understand it. He starts sorting apples, and he does not know what to do with an apple like this. He starts a little discussion around the table which will take up ten or fifteen minutes, and then the inspector comes along and the discussion continues, and another ten or fifteen minutes is lost finding out where to put one apple. Under this other system, you know the minute you see an apple where it belongs.

In packing apples in this way, I think we would be giving satisfaction to the consumer who buys by the barrel, because he knows just what is in the barrel.

D. Johnson, Dominion Fruit Commissioner, Ottawa: I am very glad to know the charges are no worse than they are. I was under the impression that possibly Mr. Chapin was going to charge the Fruit Commissioner and the Fruit Inspectors with all kinds of graft, and that we were going to be held up as most awful fellows, but I am pleased that the charges are directed more particularly at the Act rather than at the administration of the Act.

I am free to admit to you that much of what Mr. Chapin has said to you is perfectly correct. What he has stated in regard to No. 2 grade is very largely correct. The Act as it now reads gives very little direction to the packers or consumers as far as No. 2 apples are concerned, and I think I have voiced that sentiment time after time. I have brought that to the attention of the fruit growers and various committees, and asked them to define in some way No. 2 grade, which will give the inspectors some real line of work.

To say the Fruit Marks Act is of no value whatever to the consumer is something I cannot agree with. I am going to give you a case in point. In the State of Maine, they have no Fruit Marks Act, and this year we received in Canada many thousands of barrels of apples packed in the State of Maine, marked No. 1, and all kinds of marks, and when we investigated these apples, we found on the face, they were beauties, but the contents were trash, and we had many of the wholesale men get to work and repack the apples in order that the consumers might be protected.

It is only necessary to go to the State of New York to look over this matter. There are splendid fruit growers and packers over there, and yet a large percentage of the apples packed in the State of New York are very much overfaced. While in Ontario we do have people who will not pack their apples properly, yet some apples will get out like this barrel of apples Mr. Chapin got hold of here. I would not wonder but that he searched the whole city for this barrel of apples.

You must remember that Canada is a big country, and we have only 65 inspectors, owing to the fact that we are under war conditions and we cannot increase our staff as we would like to. The apple districts of Canada are fairly well defined. We know where the apples are produced, and in order to carry out the wishes of this Association, that apple inspection should be almost entirely at the point of shipment, we have instructed our inspector in charge of each section to go up and down the country in order to get to the people, and show them how to pack their apples. As they have found, as in hundreds of thousands of cases, apples not pro-

perly packed, they have gently pointed out to the people that their fruit was not being properly packed, and they stayed with them and showed them how to pack, so that the consumer would be protected. The result has been having thousands and thousands of barrels marked at the shipping point before they have gone out into the market, and in that way we get the best protection we can get.

But the question of open packages is altogether a different thing. We have no control of open packages, and, therefore, all this sort of stuff is put up on you. If there was no inspection or no Fruit Marks Act, your No. 1 and No. 2 would also be trash.

To-day the Western dealers can buy with a reasonable amount of assurance that they are going to get their apples properly packed. In fact the great majority are put through on the condition that they should be packed according to Government standard, and if they are not, then as a rule the shipper or dealer has an opportunity of getting back at the packer. Our opinion has been that if we correct the evil at the shipping point—whether it be peaches, tomatoes, apples, pears or anything else—the consumer is better protected than by any other means. If we were to go into every town and village and city, and all the country districts of this country and tried to make the store keepers honest in the selling of their fruit, it would take a tremendous army of inspectors. We have inspectors who are doing excellent work in protecting the consumers by prosecuting some people. I believe if we can correct the evil at the shipping point, we are doing the greatest service we possibly can.

I would be very glad to have any suggestions. We are willing and anxious to have suggestions at all times, and as soon as the opportunity is offered us, these suggestions will be put into force.

At the commencement of my address, I admitted we have many holes in the Fruit Marks Act. No one knows that better than the inspectors, but until we have legislation in the Parliament of Canada, we cannot go further in protecting the consumers. The law says that the face of the open package shall represent the contents of the package.

MR. W. F. W. FISHER: Is that not enough? Is not that sufficient for everybody?

MR. JOHNSON: Mr. Chapin claims a retailer buys a barrel of No. 3's and he takes the head out and sells them for No. 1's. We cannot stop it.

MR. CHAPIN: The consumer is the man who is suffering.

MR. JOHNSON: And if you can give us any suggestion as to how we can protect you, we will be glad to do so. The dealers know we have no control over open packages just as well as we do.

MR. BUNTING: Cannot the consumer examine the apples?

MR. JOHNSON: With open packages there is an opportunity offered for everyone to examine the fruit before taking it. The Inspection and Sales Act is for the purpose of protecting dealers and men who deal in large quantities.

MR. BUNTING: You made the statement that on the other side it is the practice to over-mark the apples. That cannot take place in this country.

MR. JOHNSON: No. I must say for the packers of Canada that as far as over-facing is concerned, they are very honest. It is very seldom we find an overfaced package.

MR. BUNTING: When Mr. Chapin held up these cull apples, there was not a pair of eyes in this audience but recognized them as cull apples, and they could not be put over on us by any dealer or retailer as anything else. I think the average

consumer would have nearly as much intelligence as we have here, and the consumer buying that package would know it was not according to specifications. Of course if it was ordered over the telephone and the maid received it that is another question, and that is the point Mr. Chapin wants to make—that these inferior fruits are delivered at the house without the purchaser knowing exactly what he is getting or having an opportunity of making a protest. If the package is sold in the open market under the personal inspection of the consumer, he can see what he is getting. We know we have some inferior fruit in this country, and there is a trade that will take that class of fruit, and they should not be debarred from taking that fruit if they wish it.

MR. CHAPIN: I think your argument is right along in line with mine. I did not bar any class of fruit. I said it is a shame to have these culls put on the market, but the Government cannot stop any one from selling them. They should be put in a package so that the consumer knows what they are. I do not think a cull has any business in a No. 2 or No. 1 barrel.

I did not mean to infer that the Fruit Marks Act had not done any good, because it has done a great deal of good. The very reason this Act was passed in the first place was because our Canadian apple business had got so bad that we had lost our trade in England, and the Fruit Marks Act was introduced to save the apple industry. It has been of much benefit, but I think we can make it better, and if we take the culls out of the Seconds and out of the Firsts there won't be any trouble.

MR. BRAGG: It was only a few years ago that we saw the first apples from Western Canada in the stores in Toronto. Now you see them in every small town and village in the country, and they are very common in Toronto. If we had attained the high standard which we are trying to reach, these apples would not be in the stores to-day, and while they are coming here, they are displacing our Ontario apples. The people who buy these Western apples are not particular what price they pay, and that should be an incentive to fruit growers to try to improve their orchards and the quality of their apples.

If I have anything to say in regard to No. 1's, 2's, and 3's, I say eliminate the No. 3 entirely, and the people will pay good prices for the No. 1's, and fair prices for the No. 2's.

MR. FISHER: I wish to ask a question of Mr. Johnson. If I understand him right, he said his Department has no control whatever over open packages. That is not my conception of the Act. Here is Inspector Smith who has us all "scared stiff" around Burlington. If he sees an open package that is not full right up to the top or an open package that he considers is not up to specifications, he makes us come to time, and I am wondering if we have been enjoying all the privileges we ought to enjoy.

MR. JOHNSON: I think I ought to qualify that statement. We have no control as far as packing is concerned, but we have as far as facing is concerned. The Act says the face shall be a fair representation of the contents of the package, and unfortunately there seems to be a great tendency for many people to put the big peaches on the top, and we put our inspectors in the Niagara District and similar fruit districts, and the fruit growers work in harmony with the inspectors, and we have fruit going out which reflects great credit upon the fruit growers of Burlington, Niagara, and other districts.

THE CHAIRMAN: I was thinking that we have been saying about ourselves and listening to a great many things that are certainly very caustic. The truth is

what we want to get at. I think I made it this morning in my address, as Mr. Chapin has suggested to you, that there certainly is something absolutely and radically wrong with us, or the system, or something, when such a state of affairs exists as the increasing volume of imported apples. Some will say that this year it is on account of our poor crop. But in 1914 thousands of barrels of our apples hit the ground and stayed there, and the country was full of imported apples. The thing that is radically wrong is that we as growers are persistently blinding ourselves to the fact that there is a market for a lot of better fruit that we can grow. We are too easily satisfied. We grow too much ordinary stuff. If we grew more good fruit, I am perfectly satisfied we could get a very large volume of the trade that is now being supplied by the Western boxed apple. The people who patronize this trade are ready to pay fabulous prices so long as they can get an apple that suits them. Why cannot we get that trade? Here is a sample of apples on the table that have been grown under Mr. Kydd's supervision. I will defy anybody to beat those apples for color or texture or anything else. They will go up against any Western boxed apple for appearance and quality. They were grown in Ontario under ordinary conditions, and why cannot we grow more of them.

I might say that was partly the object in having Mr. Chapin address you on this subject to-day. It was not to poke holes in the Fruit Marks Act. The idea was to bring Mr. Chapin as a representative of the apple trade to speak to us, so that we could get together on common ground to find out where we are losing the trade, and where we are standing in our own light. I am satisfied he succeeded very well in doing that. What he said with reference to the Fruit Marks Act as to the No. 2 apple not being well defined is quite true. I think you will find that just as soon as legislation regarding that can be taken up the No. 2 will be more definitely defined, and No. 3 grade of apple more clearly defined and subject to inspection. This is the last item on our programme this afternoon. It is a very important item for discussion, and if anyone else has anything to say in the matter, let us hear from him now.

A Member: I might just say with regard to the small and large apple being packed together, and my friend Mr. Neil can tell you, that in the West they do not object to the small and large apple being in the same barrel, and they would rather have the two sizes together. Perhaps that would not do if you are catering to a high class city market, but for the Western market, I do not think it is necessary to go to the expense and trouble of separating them, and I do not think they would command any higher price.

With regard to bringing in Western apples. In the city of Brantford I warned the dealers ahead that they were going to be short of apples, and they have been forced, not by any choice of their own, to import apples from British Columbia or elsewhere. At the same time, some of our Ontario growers were getting nearly twice as much in the Old Country in competition with the Western apples.

Mr. Allan, Grimsby: Regarding the retailer, as Mr. Chaplin stated, what does it matter whether we put up No. 1, 2 or 3 grade if when they get to the retailer, he sells them all as No. 1. I call that man a crook, and the law should get after him and punish him. The Fruit Marks Act has no hold on that man. I hope there are very few of those men in Toronto, and I believe there are not. I think the Fruit Marks Act is doing its work well. The inspectors are busier every year. Mr. Johnson says when normal conditions are restored again he will be able to put on a whole forest of inspectors, and the difficulties will be cut down to a minimum.

MR. PRITCHARD: I think the difficulty is that there is no one looking after our local trade. It is a well known fact—at least that is the way I see it—that the apples of this country largely go into the hands of the speculator, and he puts them into store houses and repacks them. He is looking after the foreign trade, or where he can get the most money. It has not occurred to him that he can get the most money in our local markets. The speculator gets the best apples, and we have nothing but culls to give our own people.

MR. CAREY: I wish to say a few words about the No. 3. I attended a meeting in Nova Scotia a few weeks ago, and a committee was appointed to endeavour to define the No. 3 apple. You all know the difficulty of defining the No. 3. We spent two days trying to define the No. 2. We took up the Act, and I found something in it that helped us out. The definition of a cull reads something like this: "A cull is an apple either very small for the variety or with the skin broken so that the tissue beneath shows, or so affected with fungus, worm holes and other defects which render it unmarketable." At the beginning of each grade, in the first paragraph it says, "It shall include no culls," and then it defines the No. 1 and the No. 2. After discussing the matter of the No. 3 for a few hours, we came to the conclusion that to put at the beginning "Shall include no culls" was the only feasible thing to do; and I want to submit it to this meeting, as Mr. Johnson said I might, and ask you what you think of that definition. It certainly would keep out bruised apples, broken apples, scabby apples or very small apples, and that is as good a definition as we could arrive at for No. 3.

All inspectors will back me up in saying we are all very careful how we deal with the No. 2 grade when it comes to valuation. Last year at this Convention, we decided on a grade called "Domestic," and included such apples as Mr. Chapin showed here with a little off color or having a few spots. But that has not gone through Parliament yet.

PROF. CROW: Was anybody ever prosecuted under that phrase "Shall include no culls" for the No. 1 or No. 2?

MR. CAREY: I do not think that question ever came up in a Court. The other defects were so apparent that it overshadowed anything of that kind.

PROF. CROW: It might as well not be in the book?

MR. CAREY: In the No. 3 apples the point would be raised at once, because three-quarters of the apples now put up under No. 3 are culls, and I think the question would be raised in that case.

MR. PRITCHARD: In regard to the No. 3 apple I believe in having free trade in regard to that matter. A person is not obliged to buy an apple unless he wants it.

As to the No. 1 and No. 2, I think the suggestions made by Mr. Johnson last year to make No. 2 a better grade, and possibly Mr. Chapin's idea in dividing the No. 1 into two sizes, are very worthy of consideration, especially for the local market. But the lower grades of apples ought to be left in the hands of the people who buy them, and allow them to stand on their own merit. If you sell a man a lot of culls for No. 3 apples, you cannot do it the second time. You may keep on selling to other people, but you will lose your name. Let the man who grows inferior apples sell them to the best advantage he can, and let the buyer buy them to the best advantage he can. Everybody knows a good apple from a bad apple, and they are not compelled to buy what they do not want. I think the less you try to govern people in a matter of this kind, the better off we will be.

A MEMBER: There is a matter in connection with this discussion that has not yet been touched on. In a season like the past, a large number of dealers who had voluntarily eliminated themselves from the market because they could not pack No. 1 and No. 2 grade have come back, and have bought a large number of apples and graded them as "Orchard Pack No. 3." The buyer has a right to expect something better even though it is marked No. 3, and No. 3 ought to carry something better than orchard apples.

There is another fact that I have noticed. Some man with a small orchard, unsprayed and more or less neglected, through a friend, gets an order for a few barrels of apples. He does not know anything about packing, and he puts everything in it, and he ships it out immediately, and it goes straight to the man who buys it. It is not subject to inspection on account of the circumstances under which it is shipped, although the law compels a barrel of apples to be marked with the name of the producer. I know of several cases where small orders have gone to men engaged in a small retail trade, and the Fruit Marks Act has been overlooked by them in every case of that kind.

MR. CHAPIN: Just to explain how I got these apples. That was only one barrel out of twelve which were just the same as that. They were in a wholesale house on West Market Street, and the wholesaler sold five barrels at $7 apiece and they were all brought back to him, and the packer had been in the business for twenty-five years. The reason I was called in was because I happen to handle that brand of apples for export. There were twelve barrels. Furthermore, I went down into the tail end of this barrel to get two clean apples, and I had to go to a barrel of Nova Scotia Spies to get those two No. 1 apples that I showed you. The inspectors were called in, and they got the men who packed the apples, and they were marked down to No. 2.

MR. CARPENTER: I have listened with a great deal of interest to this discussion, and I think it is time you took some action on the Fruit Marks Act. It would be a good idea for a committee to be appointed to act in conjunction with Mr. Johnson in going into this matter, and have the law changed so that it would govern all cases.

THE CHAIRMAN: At the last Convention, I believe there was a committee appointed to confer with the Fruit Commissioner relative to the proposed changes in grading apples. The matter of green fruit was discussed, and did not reach a climax. Of course what we have been discussing this afternoon was discussed last year, and I believe what the Convention carried last year in the form of a resolution about covers what we have been discussing this afternoon.

MR. CARPENTER: Has that committee reported at all?

THE CHAIRMAN: The committee has not been called into action, because on account of the war no action could be taken.

MR. HODGETTS: Ontario has been getting hit pretty hard this afternoon, and I do not think it is altogether square. Of course we know the conditions in the Province are the worst we have ever seen. I do not think anybody can remember when the scab has been so bad, and the orchards have had to be neglected on account of weather conditions. Consequently we have a lot of poor apples. Yet there have been a great many good apples go out of the Province this year. There are men like Mr. Fisher, Dr. Grant, Mr. Gibson, and many others, who are growing thousands and thousands of barrels of splendid apples, that have gone out to satisfied customers. The poor apples are here, and they will always be with us, like the poor man. We shipped 23,000 boxes overseas this year that were bought

from various men in the Province, and these also were very satisfactory. I know that a great deal of fruit was sent West that was quite satisfactory to the grain growers out there. While there may be cars here and there that were defective, on the whole, considering the difficulties that the Ontario fruit growers were up against this year, Ontario fruit was all right.

Toronto gets the worst quality of apples of any market on the continent. I do not know exactly why that should be. One reason undoubtedly is that the Fruit Growers' Associations believe that they can make more money supplying the export markets than they can by shipping to Toronto. I suppose they must have proved that by the prices they have got in the past. Undoubtedly our best fruit has been going to the West and to England and Scotland, but at the same time Toronto has been getting some good apples. Anyone who has seen the orchards belonging to the Watsons at Port Credit, who bring large quantities of apples into the city, will back me up in this statement; but a lot of poor apples come into Toronto, I am told, because the dealers have been willing to pay the low prices, and bring that class of fruit in, knowing there is a big demand for it.

MR. FLEMING: In 1913 there was some $800,000 worth of fruit, that is including duty, imported from the States; in 1914, some $1,200,000 worth of apples imported from the States. Those are the most recent figures I have got. The competition used to be all from the States, but now it is coming from British Columbia, and I think that is a good sign. They are very wide awake in British Columbia.

DUSTING AS A SUBSTITUTE FOR SPRAYING: HISTORY AND PROGRESS.

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Dusting is probably the oldest method of applying fungicides and insecticides. Long before Bordeaux was discovered, dry sulphur was dusted on grapes, roses and other plants to control the mildew, while various poisons and deterrents were likewise applied against insect pests. The apparatus for applying these was very primitive: the hand, a thin cheesecloth bag, or a tin can with holes in the lid. Primitive dusters, modified forms of hand bellows, were also in use.

With the discovery of Bordeaux mixture, and the resulting general adoption of the copper sprays, sulphur as a fungicide all but disappeared from the materia medica of the orchardist. The application of fungicides or insecticides in a dry form received but little attention from 1880 until the beginning of the present century about 1902.

The history of dusting as a substitute for spraying in the control of apple diseases and insect pests is not an ancient or extensive one. There have been two dusting periods during the history of apple disease control in North America. The first extended roughly from about 1900 to 1908; and the second, the present one, began in 1911.

THE DRY BORDEAUX AND PARIS GREEN PERIOD.

The first movement to substitute dust for liquids in the apple orchard was initiated in the hilly apple regions of Missouri, where the topography of the land and the scarcity of water made spraying difficult if not impossible. This move-

ment arose and declined during the last decade in which copper in the form of Bordeaux retained its dominating position as the fungicide, and Paris Green, a similar place as the insecticide for the apple orchard. Naturally the dust mixtures proposed and tested were of the same nature. Apple growers in the Ozarks appear to have been the first to attempt the use of dry Bordeaux and Paris green. Experimental work was undertaken largely by the entomologists and horticulturists of several state experiment stations about 1902. The first report on such work of any importance appears to have been that of Craig from the Cornell Station in 1904, to be found in Cornell Bulletin 216, pp. 111-117. Similar experiments were reported during the years 1905 to 1908 inclusive, from Delaware, Michigan, Illinois, Washington, Arkansas, Missouri and Oregon. The most extensive of these tests appear to have been those made in Illinois, as the result of which it was concluded "that dust-spray is absolutely ineffective as a preventive of injury from prevailing orchard fungi, and that it is considerably less efficient as an insect remedy than is the liquid method of applying arsenates." In spite of the fact that the experiments in some of the other states, notably in Delaware, Michigan and New York gave promising results, especially in the control of the insects, the results in Illinois were apparently so decisive that with the close of 1908, dusting, as a means of controlling apple pests and diseases, was entirely abandoned by experiment stations. Some growers in the different apple growing sections, however, continued to employ dust, but they were few and attracted little attention. In closing our discussion of this first unsuccessful attempt to develop dusting several important facts should be emphasized: (1) that it was made with a fungicide and insecticide poorly adapted for application in dry form; (2) that the machinery used was relatively primitive and not well adapted for orchard work; and (3) that since that time much has been added to our knowledge and experience in the control of apple fungi and insects.

The Dry Sulphur and Arsenate of Lead Period.

The year 1907 saw the discovery by Cordley, in Oregon, of the possibilities of lime-sulphur solution as a substitute for Bordeaux in the control of apple scab. So successful were his experiments again in 1908 as to attract the attention of apple growers throughout the United States and Canada. Stimulated by the success of Cordley, the Cornell Station began in 1909 an extensive investigation of the merits of lime-sulphur as a summer spray. The success of these experiments was so convincing to New York State growers that within three years an almost complete change was made from Bordeaux to lime-sulphur. In the State of New York, our experiments during 1909-1911 with lime-sulphur were so successful that not only in New York, but throughout the United States, Canada, and, in fact, the apple growing sections of the world, lime-sulphur and arsenate of lead have largely replaced Bordeaux and Paris green for the spraying of apples. And who will deny the progress in disease and insect control which this change represents? Prior to 1900, copper sulphate and Paris green ruled; to-day it is sulphur and arsenate of lead. To-day these substances are applied wet; spraying is the almost universal method of applying these to the apple orchard.

The substitution of dry sulphur and dry arsenate of lead for these substances in solution for apple orchard treatment was undertaken by Blodgett of the Cornell Station in 1911. Another step in the progress of disease control in our apple orchards was thus initiated.

The decision to again raise the question of dusting as a substitute for spray-

ing in the apple orchard was determined by: (1) a demand for a more rapid method in order that applications may be more timely; (2) the fact that it is the sulphur finally left from the lime-sulphur on fruit and foliage that is the effective fungicidal agent; and (3) the success attained in the control of hop mildew in the hop sections of New York by dusting during the seasons of 1910 and 1911.

The necessity for timeliness in making applications of fungicides has become more evident with each passing season. We pathologists have preached it with increasing confidence and vehemence; you growers have more and more recognized and admitted it. With seldom more than one to four days in which a given application may profitably be made, a method more rapid than spraying is required. With soft ground in the orchards at the time when the early applications are called for, an outfit that eliminates heavy machinery and tons of water is imperative. Dusting would make timeliness of application possible.

Investigation had clearly shown that it is the finely divided sulphur particles left on the leaves and fruit from the dried lime-sulphur that destroys the scab fungus spores. The sulphur itself is the fungicidal agent. Since this is true, there can be no particular virtue in putting it on in water if it can be applied dry.

The success with which dusting with sulphur for the control of powdery mildew in grapes in Europe and on the Pacific Coast; for asparagus rust in California and finally for hop mildew, both in England and in the State of New York, seemed to warrant the conclusion that it could be successfully dusted on apple trees.

The path of progress lay clear before us. Every fundamental requisite for success was at hand. Here was an effective dry fungicide; a tested dry insecticide to mix with it; a fairly efficient apparatus for applying the mixture; an investigator trained and experienced in the methods to be employed; and most hopeful of all, the confident interest and co-operation of the apple growers of the State.

Under such propitious circumstances, the first results of importance were obtained during the season of 1912. The work was continued and greatly extended during the seasons of 1913, 1914, 1915, and 1916. Let us consider for a moment the following summarized figures for the experiments conducted during these years:

TABLE 1. SUMMARY OF RESULTS OF DUSTING IN NEW YORK FOR THE SEASONS 1912 TO 1916, INCLUSIVE

Yr.	Name	Variety	Place	Untreated			Sprayed			Dusted			Perfect Apples favor of		Scab Control favor of		Worm Control favor of	
				Perfect	Scab	Codling Moth	Perfect	Scab	Codling Moth	Perfect	Scab	Codling Moth	Spray	Dust	Spray	Dust	Spray	Dust
1912	Kinne.....	.....	Hartwick Seminary..	3.8	9.3	50.9	73.6	0.7	11.4	86.2	0.5	6.0	.....	12.6	.....	0.2	.....	5.4
1913	Catchpole.	.....	North Rose.....	7.5	79.8	12.3	61.0	21.0	1.4	63.7	33.5	0.4	.....	2.7	12.5	.....	.....	1.0
"	Lawson...	King.....	Owego.....	10.9	21.9	20.3	42.8	24.9	6.7	45.7	34.9	4.2	.....	2.9	10.0	.....	.....	2.5
"	"	Spy.....	"	9.2	50.2	46.0	22.1	39.8	41.9	38.1	25.8	27.3	.....	16.0	.....	14.0	.....	14.6
1914	Glidden...	Baldwin..	Holley.....	6.4	83.0	1.1	63.2	15.7	0.1	70.6	14.1	0.2	.....	7.4	.....	1.6	0.1	.....
"	Catchpole.	Ben Davis.	North Rose.....	9.6	81.4	0.1	63.7	20.1	0.0	30.3	48.3	0.1	.....	.....	.....	.....	.....	.....
"	Friedah ..	Ben Davis.	Owego.....	0.1	96.4	2.2	51.4	34.2	0.0	26.5	67.3	0.1	.....	.....	.....	.....	.....	.....
1915	Rogers ...	M. Blush..	Williamson.....	60.8	21.7	0.8	82.6	0.9	0.1	85.3	1.3	0.0	.....	2.7	0.4	.....	.....	0.1
"	Jungbluth.	T. Ounce..	Spencerport.....	48.8	2.8	16.1	53.0	0.1	7.8	57.5	0.5	7.1	.....	4.5	0.4	.....	.....	0.7
"	Glidden...	Greening .	Holley.....	7.6	77.7	7.6	75.9	0.2	1.6	67.9	6.7	0.9	8.0	.....	6.5	.....	.....	0.7
"	"	Baldwin..	"	49.7	28.3	4.2	87.4	1.5	0.6	82.4	4.7	1.6	5.0	.....	3.2	.....	1.0	.....
"	McClew ..	Greening .	Newfane.....	36.8	13.4	15.8	77.0	0.4	2.6	84.3	1.5	1.5	.....	7.3	1.1	.....	.....	1.1
"	"	Baldwin..	"	29.0	16.6	15.6	73.8	1.5	3.2	66.9	2.5	8.3	6.9	.....	1.0	.....	5.1	.....
														3.3	1.7	.....	.....	1.9
1916	Anderson.	Baldwin..	Hilton.....	8.1	91.0	6.1	33.1	65.7	2.2	29.7	69.5	1.4	3.4	.....	3.8	.....	.....	.8
"	Smith	Baldwin..	"	6.3	89.8	17.9	33.1	60.4	9.8	18.6	75.8	11.9	14.5	.....	15.4	.....	2.1	.....
"	Curtis	Baldwin..	"	25.7	66.6	19.4	40.6	44.0	18.4	14.9	79.7	27.0	25.7	.....	35.7	.....	8.6	.....
"	Tenney...	Baldwin..	"	4.1	95.2	9.1	53.1	44.3	4.9	32.3	65.0	5.6	20.8	.....	20.7	.....	0.7	.....
"	Collamer .	Baldwin..	Collamers	10.1	88.9	3.0	68.6	31.7	1.8	33.0	65.0	2.8	35.6	.....	33.3	.....	1.	.....
"	Smith	T. Ounce .	Hilton.....	5.7	91.0	24.6	31.0	61.1	17.7	17.0	76.9	19.4	14.0	.....	15.8	.....	1.7	.....
"	Lee	T. Ounce .	"	3.0	96.6	55.3	25.0	55.8	24.4	32.5	59.8	25.8	.....	7.5	.....	6.0	1.4	.....
"	Curtis	Greening..	"	2.5	97.3	6.2	45.3	53.1	4.0	11.1	87.7	8.5	34.2	.....	34.6	.....	4.5	.....
"	Case	Baldwin..	Sodus.....	.....	(90)	.....	37.6	61.9	1.6	46.4	53.2	.5	.....	8.8	.....	8.7	.....	1.1
"	Lumb	Greening..	Barker.....	2.2	96.5	24.0	66.9	25.2	10.0	36.2	60.7	3.1	30.7	.....	35.5	.....	.....	6.9
"	"	Baldwin..	"	.....	(90)	.....	78.9	19.4	1.9	64.9	33.5	1.7	14.0	.....	14.1	.....	.....	.2
"	Cothran...	Baldwin..	Youngstown	11.7	87.8	3.2	65.4	34.0	.8	56.1	42.4	1.9	9.3	.....	8.4	.....	1.1	.....
													15.6		16.9		1.0	

It is to be observed that these thirteen separate experiments, covering the four years, were carefully planned to make a severe test of the efficiency of applying sulphur and arsenate of lead dry as compared with applying them wet. They were planned and carried out under the immediate control of experienced investigators—Blodgett during 1912 and 1913, Reddick and Crosby during 1914 and 1915. There were naturally various obstacles which interfered with ideal work in some cases. For example, the results obtained in the Catchpole and Friedah orchards in 1914 vary so strikingly from the results in all the other experiments during the four years as to indicate some reasonable explanations therefor. An examination of the detailed records of these experiments in Cornell Bulletin 354 affords such explanations. We state them briefly. Scab was practically the only pest to be controlled in either orchard, codling moth being almost wanting. The failure to get scab control with dust in the Catchpole orchard is attributed: (1) to very high winds at the time of the second application, which prevented as thorough application of the dust as was possible with the spraying; (2) the heavy drenching rain on the afternoon of June 19, during the forenoon of which the third application had been made; the spray mixtures stuck better than the dust which had not had a light rain or dew to help fix it on the fruit and foliage. Had another application of the dust been made directly following the downpour of June 19, the infections which took place during the very favorable infection period of June 21-24 inclusive would doubtless have been largely prevented. In short, very exceptional weather conditions were here largely responsible for the failures. The failure to get control of the scab with the dust in the Friedah orchard is to be attributed to the following facts. In making the third application June 20, directly after the infection period of the night of June 19, the spray was applied early in the morning. The dust was not put on until after five o'clock in the evening. This was eighteen hours after the rain set in, giving the scab fungus time to infect the fruit before the dust was applied.

Leaving out of consideration, then, the Catchpole and Friedah experiments of 1914, since the results there obtained may not justly be compared with the other experiments, let us consider the averages of the results obtained in the remaining eleven experiments. First as regards perfect apples: there was an average of 3.3 per cent. more perfect apples on the dusted than on the sprayed trees. Second as regards scab control; there was but 1.7 per cent. more scabby apples on the dusted than the sprayed trees. Third as to worm control: there was nearly 2 per cent. less wormy apples on the dusted than on sprayed trees.

What do these exceedingly small average differences in favor of one method or the other show? They show that under average conditions with little experience and relatively unperfected equipment just as good results were obtained with dusting as with spraying. In fact, these results are decidedly favorable to dusting for they indicate, that with increased experience and improved machinery, better results may be expected on the average from dusting than from spraying.

Dusting in New York Apple Orchards in 1916.

With four seasons of such uniformly favorable results behind us, it was not deemed necessary to continue further carefully planned and controlled experiments in dusting for the control of scab and worms in the apple orchard. It was felt that further progress in perfecting dusting for this purpose might safely

be left to the growers and the commercial manufacturers of dust and dusting machinery. It was felt that any further efforts on our part lay along the lines of extension work in the form of co-operative demonstrations with growers. To this end there were conducted during the past season (1916) a number of comparative dusting and spraying demonstrations in apple orchards in different apple growing sections of the State. Due to the energetic co-operation of County Agents Toan and Peet, these experiments were most numerous in Monroe and Niagara Counties.

If the statement for 1916 represented the results of twelve experiments carried out by a trained experimenter and covering a period of several successive years, one might be justified in concluding that dusting is a failure. We must consider, however, that they represent the results of co-operative demonstrations for a single season and that, the most unfavorable for scab control in twenty years.

Before discussing the dusting situation, it will be well to consider the prevailing opinion that spraying during the season of 1916 was generally ineffective and unsatisfactory. The more evident reasons for this conclusion may be stated concisely: (1) weather conditions during the spring were exceptionally favorable to the scab fungus; probably not in twenty years have growers experienced a spring so favorable to scab as the past one; (2) the cold rainy season made spraying exceptionally difficult; the ground was often too soft for heavy tanks and machinery and the rains were often so frequent and extended as to preclude applications at the proper time; (3) the continued cold, wet weather in May delayed the normally rapid development of the leaves and blossom buds; they were thus not only longer exposed to inoculation but were held in an especially susceptible condition.

Under such conditions, it was often impossible to make timely applications of spray mixtures. When they were made, the work was rushed in order to cover as many trees as possible with the result that the spraying was much less thoroughly done. It was a test season; a season in which only the most experienced, best equipped and most fortunate grower could be expected to succeed entirely. The results bear out this expectation when such well known and successful apple growers as those whose names appear in tabulated results succeed in getting an average of scarcely 40 per cent. more perfect apples on their sprayed trees than were to be found on their unsprayed trees.

Turning now to the results with dusting during the season just past, let us examine the data at hand.

Co-operative Demonstrations. An examination of the results tabulated for 1916 shows an average of 15.6 per cent. more perfect apples on sprayed than on dusted trees; an average of 16.9 per cent. less scabby fruit on sprayed than on dusted trees and 1 per cent. less wormy apples on trees sprayed than on those dusted. This minute difference of 1 per cent. in the control of codling moth may be dismissed with the evident conclusion that one method was quite as effective as the other. The difference of 15 and 16 per cent. in favor of spraying for perfect fruit and scab control represent in the writer's opinion the price of inexperience, coarse sulphur, and imperfect machinery in a season exceptionally favorable to scab. This opinion is fully warranted in view of the fact that in the four previous seasons of average weather conditions working under similar handicaps as to experience and machinery, equally as good results were obtained by dusting as by spraying. We venture to predict that in coming seasons, with increasing experience, improved dusters and finer sulphur, better results with dusting will be secured than with spraying.

Opinions of Growers Who Dusted.

The opinion of a single grower or experimenter for that matter is seldom or never to be trusted; never to be put over against proved facts and fair figures. On the other hand, the concensus of opinion of a large number of growers who have tested a new method is always worth consideration, and not to be rejected without most careful consideration. We collected the written expressions of many growers who in 1916 dusted more or less extensively. The statement of a grower that he expects to dust again next year is sufficient evidence that he at least believes in the possibilities of the method, for no fruit grower would gamble his time and money on a proposition which he believed to be a failure. On this basis, then, we have divided the growers, whose opinions on this matter we have obtained, into three groups: those who say they will dust next year; those who are doubtful; and those who say they do not expect to dust. Seventy-five per cent. of those whose opinion we have will dust next year. They believe to a greater or less extent in dusting, and that in a year when most of them fell down with it. They are wise enough to seek the explanation of their failure elsewhere than in the method which the four preceding years has shown to be equally effective with spraying.

Relative Cost.

The question of relative cost of the two methods is a most important factor for the apple grower. In demonstrations conducted in Monroe County, New York, in 1916, the cost of dusting averaged 77 cents per tree for the season as compared with 43 cents per tree for spraying. This appears to challenge the statement made in a previous bulletin* that "it now appears that an orchard may be protected by dusting at the same cost per tree as spraying, or at less cost." It must be remembered that about 95 per cent. of the cost of dusting is cost of materials, so that any increase in price or amount of materials is at once reflected in the cost of dusting.

Two factors appear to have been the cause of the higher cost of dusting in Monroe County in 1916. One of these, the coarseness of the sulphur has been previously referred to. This tends not only to lessen the effectiveness of dusting but also to raise the amount used. The operators, who were accustomed to using finer sulphur, found it very difficult to reduce the amount applied and still be certain that the trees were well covered. This was because the coarser sulphur does not produce so dense a cloud of dust when the same amount is used as does the finer sulphur. There was always, then, in these tests a tendency to raise the amounts of sulphur and thus raise the cost.

The materials cost more per pound than reported in previous experimental work, and also more than reported by large commercial growers in Orleans County who mixed their own materials.

If suitable allowances were made for these two factors, it appears quite certain, that the difference in cost would have been slight. This experience rather emphasizes the necessity for using care in the purchasing and using of dusting materials. A comparison of the price of sulphur and lead arsenate should be made with the cost of the prepared mixture. It has been shown by the experience in Orleans County that the cost of mixing is very slight, especially

*New York Cornell Bulletin 354, page 92.

where a number of men buy a machine together. Equal or greater emphasis should be placed on the importance of securing finely ground sulphur.

Improvements in the dusting machinery, which will enable the operator to more effectively control the amount delivered and the direction of delivery, will tend to a marked reduction in the cost of material. It is now generally considered that much of the material is wasted.

Conclusions.

We believe it may be said that in general those who sprayed apple orchards in 1916 were less successful than in previous seasons. There were some striking exceptions which only indicate where responsibility for failure is in general to be placed.

Available data and opinion show that in general less satisfactory results were obtained by dusting than by spraying, but that the difference was actually small (on the average 15 to 16 per cent. in favor of spraying). That this failure to get as good results with dusting as with spraying is not to be attributed to the method seems certain in the face of the experimental data of the four previous seasons. To take any other position on this point is to question the personal integrity or scientific ability of the investigators. Certainly no intelligent grower or experimenter is prepared to take such an attitude on the basis of the results of a single season and under such conditions as we have experienced in 1916.

Wherein then lies the explanation of the general failure to get as good results with dusting as with spraying. Were we thoroughly familiar with all the details in each case, no doubt specific and convincing reasons could be presented. That they would not be the same in all cases is evident. As the speaker sees it, the explanation lies primarily along the following lines: (1) relative inexperience in dusting as compared with spraying; spraying was even under the trying conditions more thoroughly done than dusting; (2) coarseness of the sulphur generally used. The efficiency of sulphur as a fungicide depends to a very large degree upon the fineness of the particles. The sulphur generally used in these experiments was not as finely ground as it should have been, at least in the earlier applications. This is shown by tests made in our laboratories. It was certainly not as fine as that used in the experiments of 1912 to 1915. (3) General failure to appreciate the greatest advantage which dusting has over spraying, namely, that of the possibility of making timely applications. More frequent applications of the dust could and should have been made at critical times than were possible with spraying. (4) The dusting machinery is much less perfected than is spraying machinery. This is especially true of the delivery and distributing parts of the apparatus. Compare the large rigid delivery tube of the duster and its unmodified mouth with the flexible hose, light rod and highly perfected modern nozzle of the sprayer.

Not one of these factors offers an insurmountable or even serious obstacle to the substitution of dusting for spraying. It is only necessary: (1) that growers continue to dust and thereby gain the requisite experience; (2) that sulphur be ground finer and that growers insist on getting the finest to be had; (3) that timeliness of application be studied, emphasized and practised; and (4) that the manufacturers of dusters improve their machines, especially the feed control and distributing tube.

Every grower who sprayed last season, whether profitably or not, will go forth with confidence to spray his trees next season (if he does not dust). Every

grower who dusted last season may likewise go forth with his duster in equal confidence that with increased experience and improved machinery, he may expect to get on the average as profitable results with dusting as with spraying. The results of the experimental work of the four seasons previous to 1916; the opinions of the growers of New York State who dusted in 1916; and the generally favorable results from other states and countries where dusting was tried out the past season, fully justify this optimism. Here are the facts and opinions. It is for you, the intelligent grower, to decide on the evidence at hand what you individually will do. It is not for me to advise or recommend.

Q.—Do you use that dust for scale?

A.—Our entomologists are experimenting with that at the present time, but I cannot give you any definite information. I know in a general way they are hopeful that it will be successful.

Q.—Have you used the sulphur dusting for brown rot on peaches?

A.—We have not, but others have had very good results from dusting.

PROF. CAESAR: Do you know anything about the effect of the dust on potatoes?

A.—I do not happen to know of any experiments that have been conducted, but I see no reason why satisfactory results could not be obtained. There are some small dusters on the market now that can be used for that purpose.

Q.—What is the price of this machine you use for dusting in an orchard?

A.—I do not sell the machine, but if you ask some of the men who are selling them they will give you the figures.

MR. HART: I cannot give you any figures except from the United States. The price there for the larger orchard machine is $125—that is, for the machine without the engine. We sell them without the engines because the old sprayer machine engine is strong enough for the dusting machine.

Q.—What power engine does it require?

A.—It takes two and a half horse power to operate the machine at the maximum capacity, but we use a three horse power engine to take care of the overload.

Q.—Must you have an air-cooled engine?

A.—We simply use that because we happen to be handling that engine in our territory.

Q.—Have you a duster that can be used in ordinary town gardens?

A.—Yes, we have a hand-pump that is sold for $3.

PROF. WHETZEL: I use one of them in my garden, but he cannot sell me another one. I have seen most of the hand dusters that are on the market. I have an opinion that they ought to make us a good deal better duster than they have at the present time. It is a very tiresome job to use them.

Q.—Has anybody done anything in the way of dusting with tobacco dust?

A.—Yes, our entomologists are working now on tobacco dust for San José Scale and also for the Aphis and other things. It does not make any difference whether they have results or not, if you insist on them continuing they will get you results.

Q.—Do you recommend 10 per cent. arsenate of lead instead of 15 per cent.?

A.—No, I do not recommend anything at all. We have used 15 per cent. and 85 per cent., but we do not know that that is the best combination. In our nursery work we use 10 per cent. and 80 per cent. If I were going to dust with what little knowledge I have about the insect end of it, I would use only ten

pounds of the arsenate of lead, particularly if it was expensive. I would take a chance for one year, and then if I did not kill all the worms, I would say I had not a sufficient quantity of lead. It is up to you to use enough to kill them.

Q.—Have any injuries ever resulted from the experiments you have conducted?

A.—Not in our experiments, but peach-foliage has been injured where the sulphur has been converted into sulphuric acid, and I think there has been some burning of the leaves. The chances are that this foliage was badly scabbed, and that would be burned by almost anything you put on it. There are dusting materials on the market that might cause injury. There is a lime sulphur dust that some concerns are putting on the market that might burn, but I do not know positively as to that. Then there is soluble sulphur; I am speaking of sulphur and arsenate of lead.

Q.—What about it being washed off by the rain?

A.—Dr. Blodgett carried on rather extensive tests as to the sticking value of dust. If the dust sets before the rain it will stick just as well as the spray. If the dust has lain on the trees overnight, the moist atmosphere of the night will fix it, and it will stick, but if you dust and the next hour it rains, it will be washed off. If you will remember how hard it is to wash off road dust from the leaves on your trees after it has once set on them, you will understand that dust will stick. When the dust sets on foliage, it is very hard to wash it off.

Q.—Is it necessary to spray both sides of the tree with the dust?

A.—You will have to dust both sides of the tree if you want a good job. If you can do a good job of spraying from one side all right, but I prefer to dust from both sides.

Q.—Is it better to dust in the morning when there is less wind?

A.—It is better to spray when there is less wind. On the other hand, I would not put off dusting because there was a nice breeze going. If you put on the dust early in the morning or late in the evening when the air is cool or when there is a slight breeze, I think it is better. If a heavy wind is blowing, it will affect the dust the same as it will the spraying.

Q.—Do you think we could have produced clean fruit in a season like last year by dusting?

A.—Here is the answer to the question: It is the sulphur that does the business, and the arsenate of lead whether you put it on with water or air. You can put it on a good deal more quickly dry than wet. It is my opinion that when you know the dust game you will be able, in a season like last season, to get much better results with dust than by spraying, because you can do it more nearly at the right time. The fact that you did not succeed last year is not conclusive evidence. You did not take into consideration the fact that you can put the dust on several times in quick succession. You dusted once and let it go.

Q.—The two years with the experiments were exactly the same; you did not give the percentage of apple scab in the orchard?

A.—You will find that in this bulletin that I spoke of.

Q.—How many sprays did you put on before the buds show pink?

A.—That all depends on the season. You might put on three and you might put on one, and if you were a good gambler, you might not put on any and get away with it. If there are frequent rains you would have to put on more. Ordinarily in the State of New York, we put on one spraying before the blossoms are over. Some growers put on two. It all depends on the weather.

The day you are going to dust depends first upon the development of the buds, and second, the weather, and you cannot ignore either one or the other. The number of applications in any season will depend upon the season just the same as in spraying.

Q.—It seems very evident that you yourself are absolutely convinced that dusting will control the apple scab?

A.—You can control it with dusting just as efficiently as you can with spraying.

Q.—There are many here who have had 90 per cent. control, and we may assume from your evidence that any man who does efficient work with the dust would have the same results?

A.—I should assume so. My opinion is based on the evidence; that is the only way in which we can judge, and the evidence shows plainly that for four years in which experimental dusting was done that was as effective as the spray It is my opinion that a man who is a successful sprayer with a liquid spray, with a couple of years' experience would be just as effective with the dusting.

DUSTING FOR TENDER FRUITS AND APPLES.

L. Caesar, Provincial Entomologist, O.A.C., Guelph.

The experiments with dusting were carried out on apples, plums, sweet cherries, peaches and grapes.

Dusting Apples.

The orchard chosen for the experiment was situated at the base of the so-called mountain near Grimsby. It consisted of 162 large trees. Of these, 92 in a solid block were selected for dusting, 51 for spraying with the liquid lime-sulphur and arsenate of lead, and the remainder for spraying with soluble sulphur and calcium arsenate. As the buds were ready to burst or in some cases bursting, the whole orchard was sprayed heavily with lime-sulphur to control the San José Scale, which was somewhat abundant on most of the trees. The dusted part received only two treatments with the dust over and above this first dormant spray with the liquid lime-sulphur. The first dusting was just as the blossoms were ready to burst. Every tree was in nearly ideal condition for treatment. The second was very soon after the blossoms had fallen. The mixture used was 85 per cent. finely ground sulphur and 15 per cent. arsenate of lead. Precautions were taken to see that each tree was thoroughly done. It was found after some trials that three pounds were sufficient to treat each tree if properly applied.

The portion sprayed with the liquid received just as careful treatment and at the same stage of the foliage and blossom as the dusted area, so that there might be a fair comparison.

Results.

1. The *foliage* on the dusted area was decidedly superior to that on the area sprayed with the liquid spray, the leaves being almost perfect, whereas those on the part sprayed with the lime-sulphur were more or less crumpled, and while very little injured, they did not look nearly so beautiful and uniform.

The soluble sulphur and calcium arsenate burned the foliage severely and showed itself not by any means a safe spray mixture.

2. The Codling Moth and Lesser Apple Worm, the two chief insect pests, which are in fact so closely allied that they are easily mistaken for each other, were well controlled on all plots treated whether dusted or sprayed with liquid. There was a very little difference in the degree of control on these plots. Possibly the lime-sulphur and arsenate of lead gave slightly better results than the dust. In no part of the orchard was there more than an average of 7 per cent. or 8 per cent. of wormy apples. This for the Niagara district, where the Codling Moth is normally very abundant, I consider very satisfactory. The check trees and unsprayed orchards in the neighborhood showed from 50 per cent. to 60 per cent. of wormy fruit.

3. On Apple Scab the results were that the liquid sprayed part had 99 per cent. and upwards of fruit free from scab, while the dusted area had 97 per cent as near as we could judge. All the fruit was not counted, but a careful estimate was made of every tree and a considerable number of fruits from each tree were counted.

The varieties in the dusted area were Baldwin, Greening, Spy, 20-ounce Pippin, Yellow Harvest, Red Astrachan and Gravenstein. Yellow Harvest is well known to be very subject to scab, but showed only 3.4 per cent. from actual count of 1,500 apples at picking time. The check trees showed an average of from 30 per cent. to 70 per cent. scabby fruit, the average being around 50 per cent.

Plums.

Fifty-five Lombard plums in the orchard of J. W. Smith, Winona, were treated with the dust, and 40 of the same variety in the same row in a similar situation were left untreated. The plums received three applications with the dust in addition to having had the early dormant spray with lime-sulphur. The first of these was on June 12th, the second on June 26th and the third on July 27th.

Results.—There were very few insects attacking the plums even on the check plot, so that insects need not be considered. The Brown Rot on the check trees was not specially prevalent, and yet it injured a considerable number of the fruit. The trees were small, each of them being capable of bearing only about five or six baskets of fruit. An average of four to five clusters of rotted plums per tree were found on the checks the last time I was able to examine them which was shortly before picking. On the dusted area only two clusters in all of rotten fruits were found on the fifty trees, and Mr. Smith, Jr., who supervised the picking, said that there was decided benefit noticeable from the dusting compared with the checks. He was much pleased with the results.

Sweet Cherries.

Three blocks of sweet cherries were sprayed on the farm of Mr. J. W. Smith. The trees were all fairly large. One block of forty-five trees was treated with the dust, another of the same size with the liquid lime-sulphur, and a third of about seventy trees with Bordeaux mixture. All the different plots had received the dormant spray with lime-sulphur for San José Scale.

Results.—Very little difference, in fact, no difference that one could determine, was evident between the three plots, the rot being well controlled on all

three. Check trees in rather less favorable conditions for developing Brown Rot showed that all three methods of treating had been of much benefit, because there were very many more rotten fruits on the checks.

I should have mentioned that the first dusting was done on May 31st when the fruit was about half grown, and the second on June 12th. The liquid sprays were applied the same day, the weather being ideal for doing a thorough job and enabling us to treat both sides the same day.

A noticeable feature in connection with this experiment was that the liquid spray at the time of picking was still very evident, a little too evident, on the fruit. I was afraid that the owner might have difficulty in selling it, but such did not turn out to be the case. On the dusted area there was no evidence that I could see with a hand lens of any of the dust on the fruit at picking time. This shows that the dust could be applied even two or three days before picking, and might in critical weather be of very great value in saving the crop. Of course in such a case the poison would have to be omitted and just the sulphur dust alone used. The liquid spray certainly could not have been applied any later than we applied it without making the fruit unsaleable.

Peaches.

Sixty-five peach trees, thirty-five of them Triumphs and thirty Leamingtons, both varieties quite subject to rot, received each two dustings, but no further mention need be made of this experiment, because even on the checks there was scarcely any rot this year, and therefore no definite conclusions could be made as to the value of the dust for this disease on peach trees. Of course there seems to be no reason why it should not be excellent, especially as the fruit of the peach is very pubescent and will readily hold the dust in among the fine hairs, and as the effect on the cherries and plums against the same disease was good. It was possible to find the dust on the peaches here several weeks after it was applied.

Grapes.

One acre of Roger grapes belonging to Mr. Smith, which had been so infested most years with the Powdery Mildew that he was thinking of removing them and substituting Concords or some other variety not specially subject to this disease, was dusted. Four applications were given, the first May 31st, when the fourth leaf had just appeared, the second June 26th as the blossoms were almost bursting, the third July 27th and the fourth August 26th. On June 24th by a mistake, Mr. Smith's men gave this plot along with his other plots a light spray of Bordeaux mixture.

Results.—The season was not specially bad for Powdery Mildew and there was practically no Black Rot, but on the dusted area only two berries in all were found with any evidence of Mildew and the foliage was equally as clean. There was no burning of the foliage, though the weather at times was exceedingly hot. On the checks there was in some cases as high as 10 per cent. of the fruit affected with the Mildew, the clusters nearest the ground always being worst. The foliage also showed a considerable amount of Mildew. Concord vines alongside of the dusted area had the leaves affected with this disease, but the fruit was free from it. It is therefore evident that the dusting has considerable value in the control of Powdery Mildew, but this season was not a specially good one for testing how effective it would be in a year when the disease was rampant, such as was the case in 1915.

Comparative Cost of Dust Spraying.

On large apple trees I found that the dusting was slightly cheaper, but not more than 1c. per tree for each application. On the sweet cherry trees of moderate size the liquid spray was nearly 50 per cent. cheaper, and on smaller trees the cost was even more in favor of the liquid. This is due to the fact that with a good spray outfit for lime-sulphur or any other liquid spray, small trees can be treated quite rapidly, whereas the treatment of large trees is very slow. Gasoline outfits were used for the liquid spraying.

Comparative Speed of Treatment.

For large apple trees I found that dusting did not require more than about one-eighth the length of time that the liquid spraying did. On the sweet cherries it required from one-half to one-quarter of the time, and on smaller trees it required about half the time. It is much more pleasant to use the dust than to use the liquid, because one's face and clothes do not get wet, and any trouble to the eyes from the dust can be avoided with a little care and the use of goggles.

Caution in Regard to Conclusions.

If I were to judge from my own experience this year with the dust compared with the liquid spray, I should feel very much like being a strong advocate of the dust method; but when one considers the fact that of the other men who used this method in Ontario no one had anything like so satisfactory results as I, and in fact nearly all of them had only half and sometimes not even half as clean fruit as that obtained from the liquid spray, one has to be careful in forming his conclusions.

It is also necessary to remember that in the Niagara district this year Apple Scab was not nearly so prevalent as in the other parts of the Province. Unsprayed orchards as mentioned above, had not more than 60 per cent. of scabby fruit. Of course there was an occasional variety such as St. Lawrence, which had a higher percentage than this. On the other hand, Greening had much lower. Therefore, Niagara conditions were not the extreme test that the conditions in other parts of the Province were. In New York State also, the great majority of those who used the dust did not obtain much more than half as good results as from the liquid spray.

There is in my opinion no doubt at all that the liquid spray held on the leaves very much better than the dust. This was well illustrated, as mentioned above, in connection with sweet cherries, but it is true also to a very large extent of apples. Hence if one is to obtain as good results in a wet season from the dusting as from liquid spraying, it is clear that extra applications will have to be given. In some cases this year I have no doubt that had there been an application with the sulphur dust alone, leaving out the poison, between the time when the blossoms began to open and when they fell, the fruit would have been clean or at any rate a very much higher percentage of it; but points like this show that while the dust method will probably in the long run prove satisfactory, there is need of caution in advising people to purchase dusting machines at the present time.

There is also the fact that in the districts where San José Scale and Oyster Shell Scale are prevalent, we are not sure at all that any satisfactory dust has been discovered that will control this. I tested one type of dust against San José

Scale and found it promising, but not satisfactory, so that in San José Scale districts for some time yet it would be necessary to have an outfit for liquid spraying even if a duster were purchased. My advice, therefore, to the average fruit grower would be not to be in a hurry yet to purchase a duster, but to wait another year or two until we know more definitely its value, and until improvements have been made in the material, possibly in the fineness, and in the manufacture of substances which will control the scale and also Aphids and Pear Psylla. We believe that steps are being taken to devise or discover substances which will be satisfactory against these pests.

Q.—What varieties were they?

A.—Spies and Greenings; the greatest number were Baldwins, Yellow Harvest. Among the worst scabbers we have are the Red Astrachan and the Golden Russet, 20-ounce Pippin and the Fall Pippin. On the Yellow Harvest I counted 1,500 apples and out of the 1,500 we had 3.4 per cent. of scab.

Q.—What mixture did you use?

A.—The Niagara brand 85 per cent. of evenly ground sulphur and 15 per cent. of arsenate of lead.

THE RAILWAY SITUATION.

G. E. McIntosh, Transportation Agent, Ontario Fruit Growers' Association, Forest.

There are about as many opinions as to what transportation is as there are opinions as to what a railroad company can do legally under the Canadian Railway Act. And so to-day transportation, as applied to railroad organization, coupled with the industrial and commercial welfare of the country, is a very complex scheme at best, and is a broad subject.

The evolution of transportation is one of the most remarkable of the age in which we live. The pioneer blazes the trail, others follow, towns and villages spring up, the country becomes productive beyond its immediate consuming capacity, and there arises a need for transportation that will afford broader and better markets for the excess products. Ever changing conditions have of necessity compelled the organization of a system of transportation that will meet the conditions and enable the movement of the products of one distant producing section to the consuming markets of another part of the country. The sparsely settled Provinces in the West, for example, compel transportation, and at such a cost as will permit of the excess products of other provinces being marketed there. In this condition, probably one of the most efficient steps is the kind of transportation, and the rates adopted that enables the marketing of the fruits of Ontario at points thousands of miles from the source of production.

We do not all agree that the railways have by any means attained a point of perfection as regards public service, even under the modern rules of railroad organization, but the point is clear that in "one man's lifetime," there has been a wonderful development along the line of transportation, and especially as applied to the marketing of perishable products. The transportation mechanism that has made possible the shipment over great distances, and the storage mechanism or refrigeration service, making possible the retention of perishable food products for long periods, may be said to really date back beyond 1868. It was at this time, however, the first refrigeration car was devised, but it was not until 1887

that fruits or vegetables were successfully transported for considerable distances in the same car, being re-iced en route as often as necessary.

In all this development, however, the people of Canada have stood behind the railway companies, and for the 35,582 miles of railroad now constructed in Canada they have made to the railway companies a present of something like $1,000,000,000 in cash subsidies, land grants, guarantees, etc., so that it is with no timidity that we persist in our claims for the best possible service and lowest possible rates for our fruit shipments.

These gifts to the railways are made up as follows: Cash subsidies, approximately, $302,196,840; land grants, 55,740,249 acres, at an estimated value of $5 per acre, and the balance consists of guarantees, which during recent years, have to a large extent taken the place of cash subsidies. It is interesting to note that the area of land granted to the railways exceeds the total area sown to field crops, including the orchards and vineyards by 18,336,660 acres.

In their relation to the public, the railway companies are common carriers, subject as such to all the provisions of the civil, and commercial code. They are bound to maintain their equipment and service adequate to the public demand, but because of the urgent conditions of the war placing our Canadian railways in a serious position, and compelling them to meet tremendous difficulties not generally known to the public, let us under present-day conditions find as little fault as possible. For that reason, I will offer no criticism on the service accorded the fruit industry the past season. Our aim to-day, as in the past, is to be constructive rather than obstructive.

That the railways of Canada have been operating for some time past under great difficulties has been known to the public, but the real conditions are known only to the operating officials and the Railway Commission. In 1914, under serious financial and traffic conditions, orders for equipment were curtailed, and in many instances where orders were placed, they were cancelled. The war broke out; unexpected demands were made upon the railways, and in a few months it was found that additional equipment would be required. Orders were then rushed in but could not be filled. Skilled labor gradually became scarcer; steel and other material went soaring in price, until to-day conditions are such that it may be said to be a crime to press the railway companies to purchase equipment at the excessive cost over that which it would be under normal conditions. Refrigerator cars for instance, in which we are most interested, cannot be bought to-day under $3,500 each, yet $1,500 was considered a big price less than three years ago. The railway shops were depleted of men, many of them skilled in their particular line of work. Locomotives, under continuous use, have been kept in repair under great difficulties. Motive power for a time gradually became less instead of greater, and only a few weeks ago several passenger trains were cancelled in order that the freight congestion might be relieved by the use of the extra locomotives. In face of all these conditions, the railways are endeavoring to keep their rolling stock up, as well as devoting part of their shops to the making of munitions. The C. P. R., for instance, received within the past three months 507 box cars, 200 refrigerators and placed an order for 432 more refrigerator cars; the C. N. R. recently added 400 box cars, and the G. T. R. has material ordered for 480 refrigerator cars. No railway in North America, however, is attempting to buy rolling stock this year to compare with last. But everything considered, we must admit the carriers are doing what seems to be all that is possible towards meeting the conditions, in so far as supplying equipment and service is concerned. All shippers, therefore,

should make every effort within their power to lighten the burden of the railroads, under present moment conditions.

It was my privilege to attend conferences of traffic men representing different interests at various times the past year. The matter of traffic congestion was proven to us to be of a serious nature all over the Dominion. Coal and coke shipments in some instances were delayed to an alarming extent, and at one time the American railroads were about ready to place an embargo on all coal cars coming into Canada because the G. T. R. could not move them as fast as they were being delivered at the bridge. I might go on and point out that raw material for munition factories was delayed, and grain movements interfered with to an alarming extent. Yet, the causes, as Sir Henry Drayton said, "are not altogether a railway failure," but include an irregular loading movement overseas, resulting in an uncertainty in the railway movement and consequent congestion of traffic, of itself in excess of the traffic ordinarily offered on Canadian lines."

Whether present conditions will prevail during the movement of the fruit crop the coming season no one knows. It may not extend over the opening of navigation, but it may be longer. The Railway Commission has ruled that the freight movement must be increased, but with the cutting off of 49 or more express trains the troubles of the railways are by no means over.

Though the fruitmen are prepared to bear as much of the burden as is necessary in the prosecution of the war, regret is expressed at the impairment of the express service in the fresh fruit producing sections, and it is just possible some changes will have to be asked for to move the crop and avoid serious loss.

The express companies are not satisfied, and claim the cancelling of passenger trains is an effort of the railways to get back some of the business from the express companies for their freight department. On the other hand, however, freight movements are almost sure to be more prompt, and the supply of refrigerator cars should be greatly improved because of the new demurrage charges, under which cars will be more promptly released.

With a reduced passenger service, the freight equipment will be better maintained, and made more efficient. There will be more room at terminals, and thus a more expeditious movement of freight trains. Except for export shipments, I do not anticipate any serious trouble in regard to the movement of food products or perishable shipments while the war lasts. These will have the preference, and no doubt special efforts will be made to see that all crops are safely marketed. However, we may expect that many of the passenger trains cancelled will never again be scheduled.

What does the year 1917 hold in store for the railroads? How will earnings compare with 1916? What advancement will be made on the part of the railroads, as far as physical and financial betterment are concerned? These are but a few of the important subjects to be considered by the people of Canada. Permission to increase rates, and other favorable decisions of the Railway Commission cannot help but bring ample credit and sufficient credit will prompt the carriers to provide greater facilities, and a broader field means increased revenue. One could follow this trend of thought right down the line. Greater revenue means larger and more frequent dividends, good returns on investments augurs a prosperous public, a prosperous public means more spending to the advantage of the merchant. Thus it can easily be seen that the railroads are truly the arteries of our national life. Therefore everyone is interested in the welfare of the railroads. What effect the cessation of hosilities in Europe will have is another interesting

topic. It is the consensus of opinion that while the railroads must necessarily feel the change in economic conditions, it is also agreed that the change will not be felt until some time after the war ends. Any readjustment of general business must necessarily be felt by the carriers, and for this reason peace will have some effect. War freights of all kinds have undoubtedly contributed heavily to the freight volume and earnings of the carriers, and their withdrawal must lead to a consequent shrinkage. On the other hand, however, reconstruction problems among belligerents will probably lead to large foreign purchasing, so that it may safely be said the railways will not suffer in respect of earnings for some time at least, after hostilities cease.

That Canada should nationalize its railways, telegraphs and telephones, when the war is ended, has been advocated by some of our prominent men and supported by leading newspapers. I do not propose to commit myself upon this point. All I wish to say is, "If we are going to decide wisely on the question of private versus government ownership, particularly in regard to railways, we must get clearly and keep constantly in mind our peculiar conditions, and then try to determine which policy will produce better results under those particular conditions." Germany has adopted government ownership of railways, but Britain adheres to private ownership. Most of the railways of Austria-Hungary are state operated, but most of those of France are still in private hands. Most of the railways of Italy and Russia are state owned, but in the principal country of South America, Argentina, with a mileage greater than that of Italy, and in Canada, with a large and rapidly increasing mileage, private ownership is still greatly preponderant. Japan is committed to government ownership, but in the United States, which alone has a mileage exceeding that of the combined state-owned railways of the world, and 50,000 miles more than the total railway mileage of Europe, private management is the sole policy. The railways of Prussia are the best state managed railways in the world, and yet the private railways of France handle more traffic in proportion to their operating expenses. The private railways of Canada also handle more traffic in proportion to their operating expenses than does the Intercolonial. It possibly is true, however, that the higher expenses of government owned railways are due to the fact that they give better and more adequate service. It is a well known fact that the Intercolonial rates are low, and that for the last year or two at least it has greatly increased its earnings and reduced its yearly expenses. It may also be said, that while traffic is heavy on the Intercolonial, there is no blockade, and it will not be necessary to reduce passenger train service in order to provide motive power for freight. A comparison, however, of freight rates on the state-controlled railways of Europe with those in force in the United States, proves that the latter have reached a much lower level of rates. Therefore Government versus private ownership is a problem with good points in favor of both.

I believe this question will some future day be one of the big problems before the Governments of Canada and the United States. North America with its 305,000 miles of railway—exclusive of sidings—enough to reach from the earth to the moon, and a surplus sufficient to girdle the globe five times—is now the great stronghold of private ownership, but outside of this continent there is a greater mileage of railways in the hands of governments than in those of private companies. People are becoming more and more educated along the lines of public ownership, and the lessons learned from the successes of the Hydro Power Commission of Ontario, in its great undertakings are burying themselves deep in

the minds of the people of this country, who after all are the dictators of the governments. It is possible, and I may say even probable, that government ownership will, after the war, be adopted where private ownership previously existed. Britain long ago adopted the system of public ownership of telegraphs, telephones, street railways, etc., and immediately on the outbreak of the war took under control the steam railways and even the agricultural interests. Other countries at war followed her example. A successful operation of these industries, under war conditions, though it may not be so financially, may demand a continuance under government control after the war, so that when the Allies have tightened the rope now being fixed round the neck of the bully and tyrant of Europe; when they have completed this great task which they have undertaken for the sake of humanity, and have forever crushed the whole system of military barbarism enforced by Germany, nationalization of railways may be one of the great problems to be dealt with, even in Canada. Control of railways under Commissions is a good thing. We have experienced that in Canada, and some of us think the powers of the Commission could be extended without placing the railways under too stringent a control. We realize there is a danger in going too far in this respect, for while stringent control of railways has many advantages, it tends to prevent the reduction of rates. Without the ability to raise rates, experiments in lowering rates in order to build up traffic are not freely attempted by the railways.

In normal times, Britishers or Canadians do not like to see or feel the hand of state interfering in their private business. But we are not living in normal times and we have already learned the lesson that resources of the nation should be mobilized and used to the best advantage.

In the early part of 1916, and I say it with all sincerity, the fruit industry of the province of Ontario was in danger of almost complete annihilation, in so far as profitable marketing was concerned. This was possibly through representations made to the Railway Commission by the different railways in supporting requests for increased icing and heating charges and cancellation of commodity rates. In opposing one of these, the proposed tariff regulating heated refrigerator cars, I contended, "That if the tariff was to be inaugurated because of a temporary falling off of earnings, that condition did not and would not exist throughout 1916. The lack of tonnage in 1914, due to temporary commercial conditions, and increased operating costs began to right themselves early in 1915, and it is safe to say the net earnings of $1,464.84 per mile of line for the year ending June 30, 1915, will for the year ending June 30, 1916, closely approximate those of 1913, the banner railway year, when the net earnings were $2,549.12 per mile of line, or may even carry them beyond. Such is the financial condition of the Canadian railroads to-day, for the C. N. R., C. P. R. and G. T R., each show large increased earnings as late as November and December, 1916, and this at a rate of a trifle over ¾ of a cent per ton per mile. The C. P. R., for instance, reports its net earnings up to June 30, 1916, $49,225,920, a new record for that company by 3 million dollars. Working expenses in 1915-16 were nearly $13,000,000 below those of 1912-13, the banner railway year.

American railroads are also sharing in the good times, and will close the year 1916 with a net income of over one billion dollars, made from an average rate of a little less than three-quarters of a cent per ton per mile.

And while such success is being attained by these railways, I might point out that the railways of France closed the year, ending December 31st, with a deficit of $87,718,500.

Just what the conditions will be after the cessation of the war is a matter of discussion. Prominent railway men have stated that the railroads of the United States will face a critical situation; business conditions generally in that country will be crippled when hostilities cease, and that Canadian railways would share likewise, but in a less degree, because of a dearth of capital, reduction in immigration and keen competition.

You may ask: "What has all this to do with fruit growing or the agricultural industry. Just this. The national debt for war is being piled up in hundreds of millions, and it is upon the agricultural industry we depend to enable us to carry the war burden. The relation between this industry and cheap, rapid and safe transportation is most intimate. Injury to one is injury to both. Therefore, the conditions of both must be studied to profit in that which your interests lie.

In regard to the work entrusted to me by the Association, I will just briefly refer to some of the more important matters dealt with the past year.

At the request of a great many shippers, circulars bearing on the movement of the crop by freight and express were issued from time to time. The intention was to give the shippers, as briefly as possible, such information as would develop by the issuing of new tariffs, supplements, or change of service, the same to afford a ready reference during the busy shipping season. Of each issue 600 copies were sent out, the first being dated June 1st, and the last Nov. 2nd.

During the year replies were sent to 376 enquiries about such matters as claims, rates and service, including several from Nova Scotia and British Columbia, and a few from Washington and Oregon.

Ten sittings of the Board of Railway Commissioners of Canada were attended, in support of applications filed by myself or to defend the rights of the fruit growers on applications filed by the railways.

Twenty-seven interviews on appointment with representatives of the railways, express companies, navigation companies and electric railways were attended.

Several conferences with the transportation managers of the Toronto Board of Trade, Canadian manufacturers, and others were held, at which different matters to be submitted to the commission were considered, and plans of argument decided upon.

Tariffs making certain charges for heated refrigerator cars, in addition to freight charges, were issued Dec. 1st, 1915. On Jan. 25th, 1916, I applied to the Commission for the suspension of the tariffs, contending that the charges were too high. Two or three hearings were held by the Board, and finally on October 26th, 1916, an order was issued, under which the charges were greatly reduced, the estimated saving to the fruit industry on cars of apples that actually moved between the date of our appeal and the effective date of the new tariff was approximately $7,500. These charges amounted to 3 cents per box and 8 cents per barrel to Winnipeg; 3½ cents and 9½ cents respectively to other Manitoba points; 4 cents and 11 cents to Saskatchewan, and 4½ cents and 13 cents to Alberta points. The charges are still too high, and should not exceed the actual cost of the fuel. Fruit growers will feel this extra cost, as probably 60 per cent. of Western shipments move after Oct. 15th, or during the period for which heated car service is required.

During the season of 1914 and 1915, the shipper who loaded vegetables in a car with fruit for points east of Port Arthur, had to either pay the less car load rate on vegetables and the carload rate on the fruit, or pay 3rd class rate, mini-

mum 20,000 pounds on the fruit and vegetables. Instances were reported, however, where the privilege was allowed, but not by authorized tariff, thus making the shipper liable to prosecution. Complaint was made to the Railway Commission and referred to the Canadian Freight Association. The complaint was favorably considered, and the mixing of fruit and vegetables between stations in Ontario and Quebec and to points in the Maritime Provinces to or from which through class rates are published, is now authorized by a tariff becoming effective March 24th, the following rates applying:—

Lots of less than 10,000 lbs., 1st class rates.

Lots of 10,000 lbs. or over, 2nd class rates.

Carloads, minimum 20,000 lbs., 4th class rates.

Under this privilege, the actual saving in dollars and cents, apart from the convenience, can best be estimated by the shippers affected.

The unfairness of charging shippers freight rates on the material supplied for false floors placed in refrigerator cars, not slatted, was presented to the board, and an order obtained, allowing 500 lbs. from the carload minimum, in addition to the $3 allowance for material.

Improvements in the express service at Vineland and Jordan were obtained on presentation of evidence to the Commission on an appeal of the Vineland Growers. The terms of the order being as follows:—

Order 24976, dated the 15th of May, 1916, provides:

(a) That Ottawa shipments be accepted daily, except Sunday, on train 97 from Jordan and Vineland, and when necessary, train 97 be held at Vineland for three minutes, the shippers to help place shipments in car.

(b) That a car be placed at Jordan daily, except Saturday and Sunday; that shipments for the following points be accepted in such car: Port Hope, Cobourg, Trenton, Belleville, Napanee, Kingston, Gananoque, Brockville, Prescott, Morrisburg, Cornwall, Lancaster and Montreal, said car to be picked up by train 97 and transferred to train 20 at Hamilton and train 18 at Toronto.

(c) That, when necessary, train 18 to be held five minutes at Toronto, or until 8.35 p.m. in the event of No. 20 being late, to enable the transfer of said car.

(d) The service mentioned was to be furnished from July 1st to August 31st.

Icing Charges.—The railways issued a new tariff on April 11th, to become effective May 15th, increasing the charge for ice from $2.50 to $3 per ton, and making a charge for hauling the ice, based on the distance the car travels, ranging from $2.60 per car for 350 miles or less, to $10.90 per car for 1,450 miles. An appeal was made in behalf of the fruit shippers, and on May 3rd the effective dates of the new tariffs were suspended until further notice. As soon as the tariff was suspended, other interests began to realize the costly nature of same, and I was asked to permit them to appear in support of our appeal. This was gladly done, and some astonishing evidence has been gathered and presented at the two hearings for Eastern territory. No decision has yet been given by the Board, and I therefore do not care to go into details. Suffice it to say that the mere fact of preventing this tariff becoming effective for the past season, saved either the producer or the consumer the magnificent sum of approximately $30,000. This is what it meant to the fruit industry of Ontario, figured on the actual movement of iced cars during the season of 1916.

Improved express service was obtained at Beamsville through the favorable consideration by Mr. Waller, Superintendent of the H. G. and B., of a suggestion to relieve congestion at the shipping shed terminal by making stops at the ware-

house of Messrs. Prudhomme, Jemmett and Culp, in securing which privilege the council of the village had also to be interviewed and consent obtained.

A splendid eleven-car fruit siding was obtained for Burlington shippers, and still better facilities in the way of shelters are being sought for the section from Hamilton to Toronto, a request now being in for suitable buildings at Burlington Junction, Bronte, Oakville and Clarkson. Several interviews have been held within the past six weeks regarding this accommodation, and while no definite assurance has yet been obtained, I do not think the matter will be permitted to go to the Railway Commission.

The difficulties and loss encountered by the Express Companies in accepting small or L.C.L. shipments of leno covered baskets of fruit was taken up by the Express Traffic Association, and application made to the Railway Commission for permission to refuse such. On the date of the hearing, I met Mr. Burr, chairman of the Association, and was able to satisfy him that the leno package when equipped with a protector, would carry as safely as the patent covered basket. The application was therefore withdrawn, and the Tariffs issued in accordance therewith. As the leno covered basket is rapidly growing in favor, the possibility of having it refused by the express companies was a serious matter to the growers, although it was hardly reasonable to expect them to carry such baskets in L.C.L. lots without some kind of protection. The above method, however, will assure equal delivery with the patent covered baskets, and the cost is not very great.

Express Classification.—The Express Traffic Association of Canada, submitted on June 8th, for approval of the Board of Railway Commissioners, Supplement No. 10 to Express Classification No. 3, covering certain changes, cancellations and additions. A synopsis of the changes affecting fruit shipments was prepared and mailed to several of the large shippers on June 12th, and on July 7th our objections were filed with the Board. Rule 26, as proposed, would annul the wagon delivery service for fruit shipments under the present special carload tariff.

Mr. Burr was interviewed on this matter, and other minor objections filed. The question of delivery service for fruit shipments was, however, the most important, and it was finally decided that our objections to the supplement would be withdrawn on condition that the fruit tariffs would be amended to permit of a delivery service for this commodity being continued. This was consented to by Mr. Burr, and the Railway Commission notified on what conditions the objections were withdrawn.

Express Service from Prince Edward County.—Points along the Canadian Northern from which fresh fruit shipments are made have reason for complaint in regard to the express rate to points east. This matter has been under discussion with officials of the Canadian Northern Express Co., but up to the present we have been unable to obtain satisfactory concessions.

On August 11th, lake and rail service via Northern Navigation Co., from Sarnia to Sault Ste. Marie, Ont., or traffic to other points which necessitated a transfer from steamers at Sault Ste. Marie, was cancelled. Owing to the fact that the Soo is a distributing centre for a large amount of fruit, the matter was taken up with officials of the above company. We found the embargo was necessitated, because of conditions then appearing beyond the company's control. Mr. Gildersleeve, manager, and Mr. Robinson, general freight agent, were interviewed, and assurance was obtained that schedules would be so arranged for the 1917 season that the service to the Soo would be maintained throughout the season.

Judgment was given by the Railway Commission in the Eastern Freight Rates Case, which was before the Board for two years. The all round increase asked for by the railways was not granted, but each rate was considered on its merits, the increase varying according to the locality and commodities affected. In so far as the class rates are concerned, the fruit industry bears a proportional increase of two cents in the first and one cent in the fifth classes on eastern shipments.

Tariffs have been issued under this order, and in checking them over, I find the increase in nearly all instances is under two cents a barrel. No order has yet been issued regarding the Fruit Commodity rates, under which the greater part of the crop moves, and in which we are more particularly interested.

It is a well known fact that the fruit growers of Ontario are to-day struggling under many difficulties in the way of profitable marketing. The cost of production is increasing with fruitmen just the same as the alleged increased cost of railway operation. You must protect yourselves against additional costs just the same as other interests, and for that reason I have endeavored to prevent the cancellation of commodity tariffs. These tariffs cover shipments into Western Canada, and, I think it is a fair estimate to say 70 per cent. of the commercial apple crop for shipment is marketed there. The present rates are reasonable, and our contention is that neither the carrier, nor the Railway Commission should disturb a long-standing system of rates without a careful consideration of the effect on property interests; that sale prices in the Western markets have been regulated to some extent by the non-profitable dump prices obtained by American growers, and that Ontario growers cannot afford to pay higher transportation charges under such conditions. Railway records also prove that a much larger profit is obtained by hauling large quantities of goods at low rates than small quantities at high rates. Therefore Commodity Tariffs are beneficial to the carriers. The saving of $7,500 on heated car service and $30,000 on increased icing charges for one season, is an example of the extreme limits to which the railways will go in their efforts to increase earnings, without apparent consideration of the effect upon the interests which are forced to bear these charges. It cannot, therefore, be too often asserted that each interest and particularly the agriculturists, should be ever alert to proposed changes affecting marketing advantages and privileges. To be neutral in this respect might be destructive.

The increased demurrage rates received our support, because the fact that consignees use cars for storage purposes, is one of the reasons why we experience a shortage of refrigerators each year. But in supporting the proposed changes, the Board was asked to deal with the question of average or reciprocal demurrage which has been before them for sometime.

A new Canadian Freight Classification has been submitted to the Board of Railway Commissioners for approval. It is a complete revision of Classification No. 16, and in providing Rules and Conditions of Carriage, description of articles, packing requirements and carload minimum weights, the carriers have largely adopted such changes as are compiled and incorporated in the Official and Western Classifications. It is claimed that the movement of traffic between a large portion of Canada and the United States is governed by two classifications—the Canadian and either the Official or Western—and owing to the constant increase in the interchange of freight traffic between Canada and the United States, uniformity in rules, packing requirements, etc., where such would harmonize with conditions prevailing in Canada, was desirable.

It would be impossible to attempt a review of the many changes proposed.

A few, however, that are of particular interest and importance are brought to your attention.

Rule 10, Sec. 3, reads.—"Owners are required to load into or on cars and to unload from cars all freight carried at carload ratings. If, in the instance of shipments tendered in less than carload lots, but upon which the carload rate and minimum is applied as provided in Section 1 of this Rule, such service is performed by carriers' agents, a charge of one and one-half (1½) cents per 100 lbs. will be made for loading and a like charge for unloading.

Under the present classification all carload shipments under 2,000 lbs. per piece, and all freight in 1, 2, 3, 4 and 5th class is loaded and unloaded by the carrier.

Rule 17 reads.—"Freight loaded by shipper when not checked by carrier, will be receipted for as 'Shippers Load and Count.'"

Under the reading of this rule, the agent may so delay sending a checker that it would be impossible for the shipper to wait. The rule should protect the shipper if he but notifies the carrier, and will of course do so, except at private warehouses or sidings.

The only changes affecting rates on fruit, is the cancelling of the rates on grapes in barrels for wine purposes.

Objections to the changes mentioned and a few others of less importance have been filed with the Board.

There are many things the growers need in making the fruit business a success, but one thing you must have is proper transportation in order to develop wider distribution. In this regard, I may briefly say an extension of the special commodity tariff on rates to additional points in Western Canada; an improvement of express service to Northern Ontario points; and better transfer service at divisional points, whereby such unreasonable delays as 24 hours at Toronto will be alleviated; are a few of the necessities.

In the United States, railways are not permitted to own steamships. I believe that is a good thing. It is wrong that railways should own, operate and control shipping. There are other grievances—many of them—but time will not permit a reference to all.

Delay in transit is one of the most costly problems with which the growers have to contend. You who are in the fruit business know where the markets are, and can sell in those markets providing the carriers get them there without the terrible delays experienced. Proper and reasonable delivery is what we must have. Rates are but a secondary consideration, and in that regard the Allies "Pinchers" are nothing compared to the dilemma the shippers are in. If they ship too much the rates go up, so the railroads can buy more equipment. If they don't ship, the rates go up because the railroads are not earning enough revenue. We are now entering upon a year that is perhaps of greater importance to the shippers than any of the past ten. The greatest effort is necessary to hold your present privileges and prevent additional charges which in reality are covered by the present rate. I refer to heating, icing, cartage, etc. It is this unfair method of overstepping authorized rates and developing a total prohibitive rate that hurts. We want nothing that we are not entitled to, but we do want justice.

In conclusion, it may fairly be said that we are demanding on the part of the railways better and safer roadbeds, double tracking, more adequate terminals, and improved equipment throughout, in order to secure more satisfactory service. The railways feel it incumbent upon them, as far as possible, to meet these de-

mands, and they must do it, either by providing funds out of net profits, or by additions to capital stock. In some cases, it is understood that our railways have spent many millions during the past few years out of their net returns, for betterments such as above indicated. This policy has probably prevented them from paying dividends upon their capital stock, and, therefore on this very account, it is harder for them to raise additional capital in the money markets of the world. In such cases it might well be asked if this is a condition calling for higher freight rates. It is like a manufacturer putting all his profits into increased construction, equipment and betterments, thus preventing dividends being paid to shareholders, and then seeking to right the situation by advancing prices to customers.

OUR METHOD OF GROWING AND HANDLING STRAWBERRIES IN THE CLARKSON DISTRICT.

C. R. Terry, Clarkson.

Seven years ago this spring we landed in Clarkson with a large family of young children and located on a farm, just west of the Grand Trunk station, which was very conveniently situated, especially for the shipping of fruit to the Toronto market.

Unfortunately, the farm we chose as our home had had a great lack of man power, hence weeds were everywhere in evidence. To my way of thinking we had no land in suitable condition for setting out a patch of berries that year; but as I had made up my mind to grow strawberries, we planted a little more than an acre on land which had grown corn the previous year. Being strangers to the business we were compelled to work on advice which was freely given by kind neighbors, and which was thankfully accepted by us and followed as closely as possible.

First. We will take the question of the soil. I have planted on various kinds of soil from the very dry to the very moist, on land with a dark surface and a subsoil of dry sand, on land with just a little clay in the subsoil and on land with a subsoil of quicksand, and have found after giving the same attention to the surface that in every case we pick more berries off the land with the quicksand subsoil. The plants on the quicksand subsoil will stand up in dry weather and keep on bearing fruit quite as well or better than if we had frequent showers.

Second. The preparation of the soil. I have found that it suits our conditions best to manure at the rate of about twenty-five tons to the acre. Plow in the fall and in the spring as early as possible, cultivate and keep on stirring the surface, not too deeply, as often as needs be, which depends on weather conditions until time of planting.

Third. About May 15th to 24th we find the best time for planting. We have planted as late as the first week in June with good results. After thoroughly cultivating the land we roll it, as it plants very much nicer, preventing the soil from slipping in at the back of the spade when pressing it forward to admit the plant. We plant in rows forty-two inches apart, and set plants from eighteen to twenty-four inches in the row according to the nature of the soil. We always plant by line as we are anxious to have the rows as straight as possible, because they can be cultivated to a better advantage and present a better appearance.

Fourth. As soon as possible after the planting is finished, the patch is cultivated and followed with the hoe to move the surface about the plants and retain the moisture, as well as to disturb those little weeds which have the habit of making their appearance very early. We have no hard and fast rule for cultivating, as a great deal depends on weather conditions. If it rains every week we cultivate every week if we can, as we believe it best to keep the surface loose. Strawberries like other things take kindly to the hoe and always respond to a gentle application, and there is no danger of giving them too much of it. We always try to have them absolutely clean before they start to send out runners. When the runners appear we set them by hand, unless they happen to take root in the proper place. We grow only the matted row, and train the runners as nearly as we can to have the plants from two to three inches apart each way because we find they fruit better if not too close. It is well to keep the cultivator going as late in the season as possible and when it is impossible to use the hoe it is well to pull any stray weeds by hand. During the summer, when hoeing we aim to hoe the soil up to the plants to make a crown to the row, as this is a good method to prevent loss from ice during the winter in time of a thaw followed by a sudden freeze before the water has had time to get away.

Fifth. Now let us consider the covering of the berry plants, for the winter. The time best suited is as soon as the ground is frozen solid; but unfortunately, we are not always able to follow out our belief. We do our covering oftener in the early part of March than any other time because our time is so much taken up draining and repairing until very late in the fall. I do not approve of covering a lot of snow, choosing rather to cover just when the snow has nearly gone, than to seeing the manure leaking out and the black liquid running away to the ditch to be carried to the lake. We generally use about sixteen tons of long strawy manure to the acre for covering.

Sixth. Now we have our plants through the winter and the first thing to do is to uncover them, the time of which varies considerably according to weather conditions. If we have a very early spring and the plants start to grow up through the covering and we are afraid of frost, which by the way never does much harm, we go over the patch with forks and loosen the covering to prevent smothering in some cases and the breaking of foliage in others. In a few days we remove the covering into the paths between the rows, which prevents the weeds getting through, retains moisture and serves as a cushion to kneel on while picking.

Seventh. As far as possible we prevent the weeds from showing. If grass or weeds do appear, the best time to destroy them is in their youth as the larger they get the more they rob the soil of the food the plant should have in order to produce the best crop. If perchance the weeds do get ahead of us, we find it very bad practice to pull them at picking time as it usually loosens the soil around the roots of the plants allowing the air to enter causing a heavy loss in the crop.

Eighth. We find the matter of picking the most disagreeable part of the business. It is very difficult to obtain pickers who will take as much interest in picking a good box of berries as we do in growing them. We generally engage girls and women to pick for us paying one cent per box and board.

We always hire one reliable person to help with the packing of the berries and endeavor to grade the fruit so that each crate will be as nearly uniform in quality as possible. We use the twenty-seven box crate only.

We sell about forty per cent. to the Montreal buyers, the balance we ship to the commission merchants in Toronto, except a few crates to the surrounding towns and villages.

You will notice, if you have followed me closely, that we have covered a period of upwards of eighteen months since we commenced operations, to secure the crop we have just marketed at considerable cost to us in time and money. While we take great pleasure in our work, we do not work for pleasure only but naturally look for a fair remuneration for our efforts and very seldom fail to get it. We harvest from five to ten thousand quarts per acre, which we consider a good yield, and with prices as they have been for the past few years we look on the strawberry as the mortgage lifter. We have a considerable amount of soil in the Clarkson district well adapted for strawberry culture, and some very fine yields have been obtained. I have realized upwards of one thousand dollars per acre; no doubt others have done better. In conversation with the President of our Clarkson Fruit Growers' Association a few days ago, he informed me that he had taken one thousand dollars per week for three weeks off a two acre patch, and I am satisfied that there are others who have done equally as well. To give you some idea of the extent of the industry in our locality it might be well to quote the number of berry boxes purchased by our Association. Last year we purchased one million and a quarter, this year eight hundred thousand. I find in looking over past years we average about a million boxes a year, about eighty per cent. of which are used for strawberries.

Mr. Kydd: I think you mentioned in your varieties that you were growing the Williams.

Mr. Terry: No, I did not mention any variety. The principal variety grown in our district is the Glen Mary.

Q.—Are not there a great many Williams strawberries grown there?

A.—I planted a few rows of the Williams, but I never planted any after. I do not believe there is an acre of Williams berries in the Clarkson district.

Mr. Kydd: I am glad to hear that there are so few of them, because we people in Toronto do not want to eat them, and if you producers would try and grow the berries we want to eat, you would sell more of them. I have gone through the stores of Toronto during the strawberry season, and I could not get a strawberry that was not a Williams. I know their good points, but I hate to eat them.

Mr. Terry: I think I am safe in saying every farmer has the Glen Mary berry in our district, and a great many have nothing else. One grower packed last year 600 crates of Glen Mary in one day.

Q.—What are the prospects for this year?

A.—Our plants have not made the rows they did other years, and although the rows are not as wide, it is possible we may harvest as good a crop as other years.

Mr. Clark: Does any one know if the Glen Mary is equally good for canning purposes as the Williams?

Mr. Terry: We have no canning factories in our district.

Mr. Culverhouse: I have had a slight experience with the canning of Glen Mary and have heard the opinion of other canners, and they say it is a little too soft for canning purposes. It tends to go down in shipment, and worse still in the process, whether of jam making or straight canning. I agree with the last speaker that for home use, we prefer the Williams every time. It does not melt

away; it stays as the housewife wishes to have it stay which a softer berry will not do. I know as well as Mr. Kydd knows that the Williams is subject to a green tip.

MR. KYDD: I object to the core as well as the green tip.

MR. FOSTER: I do not think the Williams strawberry always has that disastrous core. In a very much overgrown berry it is more subject to the core or even a hollow place, but after the first picking or so the green tip will disappear. We hardly think the green tip is a serious matter. I believe the Williams strawberry will arrive on the market in better condition than any other berry that I know of at the present time.

MR. KYDD: I will admit it will arrive on the market in better condition and come back to you from the market, but you cannot make me believe it is a good strawberry for domestic use. It has a tip that will never ripen until the back end is beginning to rot, and it has a core that you chew and chew and then cannot get through.

MR. LOVEKIN: Do you grow any really early berry for the Toronto market?

MR. TERRY: There are very few of the early varieties grown. A few years ago a number of the growers on the higher land grew Bederwood. They realized a very good price for them, but they had a very small crop. In fact, I never heard of them or saw them any more, but the Glen Mary is about the only berry we use at Clarkson.

A MEMBER: Do you find the most rapid method of setting your plants is by the spade?

MR. TERRY: That is the only method we use. We have never used any other method, and I have never seen any of our neighbors plant them in any other way.

MR. CLARK: I would like to ask a question as to the blight that affected the strawberries last year. It was quite a serious problem down in Prince Edward County.

MR. CAESAR: I visited a few places where the blight was troublesome. Do you mean the leaves got curly and thickened, or do you refer to the trouble with the roots?

MR. CLARK: It was the root in Prince Edward County.

MR. CAESAR: There has been a great deal of trouble in various places with the root. I visited a large acreage in Norfolk, and just about the middle of the picking season they went right off; they got one or two pickings, and then they went right off, and I think the same thing happened in several other places. It is a very puzzling thing, and personally I do not know what to make of it. I was inclined to think in some way it was due to either winter killing, which was not severe enough to prevent the first picking, but when the weather got drier as it does in the strawberry season, the roots could not supply the plants with the necessary food, or it may be that in some cases it is due to a strain of berries that is not suited for that particular kind of soil. I should like to hear Mr. McCubbin's opinion on that.

MR. MCCUBBIN: I started to work on this trouble last spring, and I was compelled to give it up for pressure of other work, but I believe what Mr. Caesar has said is quite right, except that I found a fungus associated with the disease. I was unable to go on with the work, and determine the cause and find a remedy, but there is a fungus connected with the disease as well as weedy conditions of the soil, and possibly winter killing or unadapted plants.

THE CHAIRMAN: How does Mr. Terry handle the two and three year old patches?

MR. TERRY: As soon as we are through picking we go in with a mower and cut off the tops and rake them up with a horse rake and plow our row to about eight inches and then roll, and then we weed carefully and get in with the cultivator, as soon as possible. The plants send out runners and we never find any difficulty in getting plenty of rows, and we treat the three year old the same as the two year old, and we find we get almost as good a yield on the three year old as on the two year old. In fact, last year our best patch was our three year old, and I hated to turn them under last fall.

Q.—Why would you plow it down?

A.—I believe the strawberry plant takes out of the soil something that is peculiar to the strawberry, and I think it is well not to drive the land too hard. If you have a good horse do not work him to death because he is a good one.

LIGHT CROPS AND THEIR CAUSES.

W. T. MACOUN, DOMINION HORTICULTURIST, OTTAWA.

The short crops which are experienced more or less frequently in all parts of Canada are very disappointing and discouraging to the fruit grower. No matter how good the price for fruit may be, if a man has not got much of it he benefits but little by the price. Furthermore, a good crop one year and little or no crop the next brings down the average returns very much and makes the fruit business, especially when one depends on apples or peaches alone, a rather precarious one. If I could, at the outset, assure you of good crops every year by following certain methods, I should be glad to describe such, but there are conditions, such as the weather, which are beyond our control, and while we may, by the use of fire pots, ward off frost at a critical time, practically no means has yet been devised of preventing rain or making very cool weather warm or of causing rain in time of drought, these being important factors in fruit production. The season previous to the light crop may have an important bearing on that crop. It is not yet fully understood as to what are the climatic conditions most favorable to the development of fruit buds, but it is known that most of the fruit buds are formed in June or July of the year before the crop. If the trees, therefore, are defoliated by caterpillars or apple scab or foliage injured by other insects or diseases, it should not require any great effort to believe that there could not be the same development of fruit buds as if the leaves of the tree were all healthy and remained on the tree all summer, nor is it hard to believe that even if buds developed sufficiently to form flowers that the buds might not be in a vigorous enough condition to ensure the setting of the fruit. Much more experimental work is still needed in this direction, however. We do not, as much as we should, know how much the development of fruit buds depends on the temperature or the general character of the weather in the season previous to the light crop. How, also, for instance, does a summer which is very dry and warm, followed by a warm wet autumn in which new growth starts and some flowers appear, affect the crop for the following year? How does a severe winter affect the flower buds, or very late autumn growth followed by severe frosts?

Before going any deeper into our subject it may be well to give a list of at least some of the things which affect the setting of fruit. They are: (1) The condition of the trees and the weather of the previous year. (2) Winter injury to fruit buds. (3) Temperature and humidity at the blooming season. (4) Pollination. (5) Soil moisture immediately after the blooming season. (6) Fertilizers. (7) Diseases. (8) Insects. (9) Thinning. (10) Summer pruning. (11) Spray injury.

Something has already been said in regard to the season previous to the light crop and the condition of the trees, but the following data in regard to set of fruit from spurs of various kinds will show the importance of having vigorous spurs, and vigorous spurs cannot be obtained without good foliage. These figures are taken from a paper on "The Abscission (or falling off) of Flowers and Partially Developed Fruits of Pyrus Malus (the apple)," by A. J. Heiniche, Ithaca, N.Y., read before the Society for Horticultural Science at New York on December 29, 1916.

Baldwin branch with 251 flower-bearing spurs.
Average weight of 139 spurs which did not set fruit, 1.45 gramme.
Average weight of 112 spurs which did set fruit, 2.76 gramme.

Baldwin branch with 88 spurs.
Average weight of 30 spurs which held fruit less than two weeks, 2.94 gramme.
Average weight of 28 spurs which held fruit until the June drop, 3.29 gramme.
Average weight of 30 spurs which held fruit after the June drop, 4.27 gramme.

Baldwin branch with 677 spurs.
Number of spurs making more than 1 centimetre of growth during 1915, 320, of which 67.2 per cent. produced fruit.
Number of spurs making less than 1 centimetre of growth during 1915, 357, of which 25.5 per cent. produced fruit in 1916.

Baldwin branch with 443 spurs.
Number of spurs with 4 flowers, 50; percentage bearing fruit, 20.00.
Number of spurs with 5 flowers, 137; percentage bearing fruit, 40.9.
Number of spurs with 6 flowers, 266; percentage bearing fruit, 54.9.

Fallawater branch with 59 spurs.
Average weight of all spurs which produced 4 flowers, 1.76 gramme.
Average weight of all spurs which produced 5 flowers, 2.73 gramme.
Average weight of all spurs which produced 6 flowers, 3.36 gramme.

Baldwin branch with 225 spurs.
Average weight of 74 spurs with small conducting tissues (1 to 1.4 mm. in diameter) 1.50 gr.
Average weight of 112 spurs with medium conducting tissues (1.5 to 1.9 mm.), 2.47 gr.
Average weight of 39 spurs with large conducting tissues (2.0 to 2.5 mm.), 3.27 gr.

The above figures and others which might be quoted show that the largest fruit spurs set the largest proportion of fruit; that the largest number of flowers in a cluster was on the largest spurs. They also show that the largest conducting tissues or channels through which the sap flows were in the largest spurs, making it evident that the spurs through which there could be the best flow of sap, set the largest number of fruits. Not only is it important to have large spurs with good sap conducting tissues but it is important to have an abundance of moisture available in the soil when the trees are in bloom and the fruit is setting.

Winter Injury to Fruit Buds. Comparatively little is known in regard to winter injury of fruit buds though light crops of peaches are often rightly attributed to winter conditions, and there is evidence to show that the fruit buds

of such hardy fruits as apples and pears may be badly injured even though the tree is not killed back. The winter of 1910-11 was a very severe one in Montana, and the Agricultural Experiment Station there made a special study of the fruit buds of apples and pears and found a large percentage killed. There was much very cold weather, and when the buds did thaw out there were very high winds which apparently prevented the sap, which had been withdrawn from the cells into the intercellular spaces during freezing, from returning, as the high winds evaporated it. There were 98 per cent. of the buds of Whitney Crab killed and 94 per cent. of Transcendent Crab. "A Flemish Beauty pear tree loaded with fruit buds did not produce a single flower." In the spring leaves pushed out from the fruit spurs but no blossoms developed. Microscopical examination showed the withered fruit buds. There is no doubt but that such conditions frequently occur in Canada. The cause of light peach crops can often be traced to sudden changes of weather in winter when the temperature goes considerably above freezing and then suddenly there is a hard freeze. The examination of cherry buds at Ottawa during the past two winters has shown that the injury which is so frequent at Ottawa is not due—at least, not as a rule—to cold weather but to changeable weather, although there are, no doubt, minimum temperatures lower than which fruit buds of different kinds and varieties will be killed. Although the temperature has been 20 below zero this winter, there has been little injury so far, as there has been no thawing since early in the winter. The fruit buds of European and Japanese plums are killed nearly every winter at Ottawa, and, while these have not been examined at intervals during the winter as have been the cherries, it would, doubtless, be found that in an average winter most of the injury occurred after sudden changes of temperature.

Unfavorable Weather in Spring. Perhaps one of the commonest causes of short crops in some places is unfavorable weather at the blooming season; low temperatures and rain making very unfavorable conditions for the setting of fruit.

In Bulletin 299 of the New York Agricultural Experiment Station, by Prof. U. P. Hedrick on "The Relation of Weather to the Setting of Fruit with Blooming Dates for 866 Varieties," in which the weather records and crops for the years 1881-1905 have been compared, these being based on the County reports of the Horticultural Society of Western New York, Prof. Hedrick states:—

"In New York, unfavorable weather is probably the predominating one of the several factors which cause the loss of fruit crops during blooming time."

"Late frosts ruined the fruit crop in Western New York in 1889, 1890, 1895, and 1902. The fruit crops of 1884, 1888, 1891, 1893, and 1903 were seriously damaged by killing frosts. Besides the above years, pears, peaches and plums were more or less injured by frosts in 1892, 1896, and 1900. Fruits were injured at blossoming time by frosts in thirteen years out of twenty-five under consideration."

"Wet weather almost wholly prevented the setting of fruit in New York in the years 1881, 1882, 1883, 1886, 1890, 1892, and 1901. Rain is mentioned as one of the causes of the poor setting of fruit in the years 1888, 1889, 1891, 1893, 1894, 1898, 1905. Of the seasons given above, moisture came at blossoming time in the form of snow in 1899 and in 1891. Gales of wind accompanied the rain in 1881, 1882, 1883 and 1905. The rainfalls came in periods of prolonged cold weather in the years 1881, 1882, 1883, 1886, 1888, 1889, 1891, 1892, 1894, 1898 and 1905. In 1890 the rainy weather was hot and sultry Frosts and cold weather accompanied the rains in 1888, 1889, 1890, 1891 and 1892."

"Rain and the cold and wind that usually accompany it at blossoming time cause the loss of more fruit than any other climatal agencies. The damage is done in several ways. The most obvious injury is the washing of the pollen from the anthers. The secretion of the stigmas also is often washed away or becomes so diluted that the

pollen does not germinate. It is probable that the chill of rainy weather decreases the vitality of the pollen and an excess of moisture often causes pollen grains to swell and burst. Rain also prevents bees and insects from carrying pollen."

Most fruit growers now know how pollination and fertilization of the flowers take place. Just as the flowers are opening, if conditions are favorable, the anthers containing the dust-like pollen burst open and the pollen is shed either onto the stigma of its own flower or is carried by insects to another flower or flowers where it adheres to their stigmas. The individual grains of pollen are very small and a number of them, under favorable conditions, reach the stigma which, when it is in the best condition, is moist, and holds the pollen grains better than if dry. If conditions remain favorable these tiny pollen grains germinate, or at least some of them do, and the strongest and most active throw out a tube which pushes down through the soft stigma and style until it reaches the ovule and finally the embryo sac, and when its cytoplasm meets that of the female organ fertilization takes place.

Now, if certain conditions are unfavorable, the stigmas of self-sterile varieties may not receive any pollen from other varieties to fertilize them and little or no fruit will set. Again, if certain other conditions are unfavorable, pollen, if it germinates at all, may not have sufficient vigor to develop a pollen tube which will reach the embryo sac, and again, as has been stated above, pollen grains may swell and burst without germinating.

Mr. F. Adams, of the Botanical Division at Ottawa, found by experiment that there was only slight germination of apple pollen and the pollen tube only partially developed at a temperature of 40 to 44.3 deg. F., and the most favorable temperature for the germination and development was from 69.8 deg. F. to 73.6 deg. F. Prof. Sandsten of the Wisconsin Experiment Station found the best temperature for the germination of apple pollen to be 75.2 deg. F., his experiments having ranged from 59 deg. F. to 96.7 deg. F. Prof. Kraus of the Agricultural Experiment Station, Corvallis, Oregon, states that 65½ deg. F. to 83 deg. F. may be considered as suitable for the majority of tree fruit pollen. It will thus be seen that should the temperature run pretty regularly below 70 deg. F. during the blooming season fertilization is not likely to be good. Prof. Hedrick, in New York State Bulletin 407, published in May, 1915, on "The Blooming Season of Hardy Fruits," states that during the season of 1915 "Mr. W. F. Friedman, a student assistant at this Station, has found that pollen grains of practically all fruits burst and will not germinate in water," showing what effect excessive moisture might have in preventing germination of pollen. It is further stated in the same bulletin, "From this work, extending through the whole blooming season of 1915, there could be little doubt that the action of rain on pollen is quite a potent factor in preventing a set of fruit due to its injurious effect on the stigmatic juices." Sandsten found that pollen burst when in masses during warm rains. Adams found pollen germinated in the anthers before being shed. This might occur during a fairly moist warm period. It will be seen from the foregoing that not only is moderately warm weather necessary during the blooming period, but that bright sunny weather is desirable also, and a long spell of cool wet weather beginning when the flowers are opening is very unfavorable to pollination. In addition to the cool wet weather unfavorable to the germination of pollen and unfavorable to fertilization, there may be frost. Fruit blossoms in bud will stand more frost than when they are fully open. When the petals fall less frost will cause injury that when the trees are in full bloom. From five

to seven degrees Fahrenheit of frost are likely to cause severe injury to apples when in full bloom, and after the bloom has fallen, from four to five degrees may do much harm. Much depends on the length of time the flowers are frozen and on the weather following the freeze. There is often frost at Ottawa when the native plums are in bloom, as they bloom early and sometimes the crop is practically a total failure from this cause. If the flowers have been injured by frost, an examination after the petals are open, if the frost occurs when they are in bud, will reveal the centre of the flower or pistil discolored or brownish. The fruit will not set when the flowers are injured in this way. The frost may, however, come after fertilization has taken place when the fruit may set.

Experiments have been made with orchard heaters at Ottawa for several seasons and while, as yet, no results have been obtained which show an increased crop from the use of the heaters, as the weather has not been cold enough at the blooming season when the heaters have been in use to demonstrate their value, yet it has been shown that the temperature can be raised considerably. On the night of May 20, 1915, sixty-three "Competition" heaters were used in an apple orchard over an area of 32,564 square feet, or at the rate of eighty per acre. At 1 a.m. an alarm came in that the temperature had reached 34 deg. F. and by 1.30, when the heaters were lighted, it had fallen to 32 deg. F. The ground temperature that night fell as low as 31 deg. outside the orchard, when the ground temperature inside the orchard was never below 34 deg. after the heaters were lighted. At three feet from the ground the temperature outside was 32 deg., while inside it never fell below 36 deg. after lighting the heaters. On May 27 the heaters were lighted at midnight when the ground temperature was 32 deg., and 34 deg. was registered three feet above the ground. By 2 o'clock the temperature outside stood at 28 deg. on the ground and 32 deg. three feet from the ground, while inside the orchard the ground temperature was 33 deg., and the temperature three feet above the ground was 37 deg. On this night the heaters were used at the rate of only 60 per acre. This demonstrated that in an orchard of one acre, sixty heaters of the Competition type are capable, under certain conditions, of raising the temperature of the air surrounding the trees, 9 degrees. From our experience with six different types of heaters the following kind of a heater is recommended.

1. One with a large capacity, or not less than four gallons.

2. One with a good draft control. Proper control of draft is very important, for it allows the operator to increase or decrease the fuel consumption, as he desires, thus increasing or decreasing the amount of heat given off per hour.

3. Round heaters are preferable to square or longitudinal ones, as they do not warp so readily.

Cross-pollination. It might be thought that enough had been said about pollination but there is still another important phase of it to consider. Experiments have shown at Ottawa that a large proportion of varieties of apples are self-sterile or practically so, and need pollen of another variety to ensure a setting of fruit. In 1915, for instance, of twenty-nine varieties tested only five varieties set any fruit at all and only one was decidedly self-fertile, whereas when thirteen of the same varieties were cross-pollinated, only two failed to set fruit. Most of the pollination of apple blossoms is done by insects, hence it will be readily seen that if the weather is unfavorable for insects to work, fertilization is not likely to be good. Some varieties of apples, though self-sterile in one place, do not appear to be so in another, and this is being studied in order to learn the cause.

In the case of some kinds and varieties of nuts, the pollen and the pistil are not mature at the same time, and one may be too far gone to effect fertilization before the other is ready. It is probable that further studies in pollination will show that this happens with varieties of apples, and that certain climatic conditions will cause either the pollen or pistil to mature first while, under other conditions, they may mature at the same time or one may remain in good condition long enough for the other to catch up. In studies of the pollination of pecans in Georgia, Prof. Stuckey informed me recently that one cause of self-sterility in pecan varieties was that the pistil was mature before the pollen bearing or staminate. With other fruits, and with other varieties it might be reserved. From observations at Ottawa we believe that the stamens which bear the pollen mature quicker in high temperatures than the pistil, hence pollen of a variety might be shed before the stigma was ready. The pollen and pistils of some varieties may mature at different temperatures to others. These are things that have yet to be worked out. The fact, however, that cross-pollination among varieties is desirable has been well demonstrated, hence the importance of having favorable conditions for this to take place. Apple blossoms do not all come out the same day and sometimes, if the weather is cool, the blooming season of one variety will continue for between two and three weeks or perhaps longer, but in a warm dry season it may only last five or six days. To be sure of the best conditions for cross-pollination it is desirable to have varieties beginning to bloom at the same time in the same orchard, and preferable to have the rows alternating or, say, two rows of one variety to four of another, so that in case there is only a limited time when conditions are favorable for insects to work they will lose the least amount of time in pollinating. In some seasons when the weather is unfavorable for pollination there will, no doubt, be an advantage in having a variety that begins to bloom a little later than another as the pollen from it might catch the later blooms of the early variety at a time favorable to pollination when the main blooming season of two varieties blooming at the same time might be unfavorable. All these things are well worth considering in planting orchards.

Comparatively little is known yet as to the cause of the June drop of apples, which in some years is very heavy. This may be due to only partial fertilization, the pollen tube having germinated, but failed to fertilize the ovary. It may be due to unfavorable weather, or soil conditions which check the growth of the tree, causing a certain proportion of the fruit to drop. This checking of the growth might be due to water soaked cold soil, or it might be due to very dry soil, or it might be due to very cool weather. It has been stated that aphids cause enough irritation about the pistil to cause the apple to swell a little but not being properly fertilized it drops off later. But there is much to be learned about this June drop yet.

Soil Moisture at Blooming Time. The importance of a good supply of moisture in soil when the fruit is setting was noticed at Ottawa in 1911, when there was a very hot dry time from the blooming season until well on into the summer and a relatively small crop set. It is important to plow a cover crop under early and start cultivation early in order to conserve moisture at that critical season of the year, in case there should be a dry time, as the loss of moisture from ground not cultivated and especially when there is a growing cover crop may be very rapid.

Fertilizers. Little will be said in regard to the value of fertilizers in obtaining good crops as the results from the use of fertilizers might be quite

marked in one orchard while in another where the soil was somewhat different it might be difficult to find any marked advantage in their use, but when it is known what kind of plant food the soil really needs the results may be quite striking. Such results were recently presented by Prof. Lewis of the Oregon Experiment Station at a meeting of the Society for Horticultural Science in New York on December 28, when he showed that by the application of 6.7 lbs. of nitrate of soda per apple tree a month before the trees bloomed, in soil lacking in humus and nitrogen, there was 166 per cent. more fruit set than on trees which received none. Just how the nitrate of soda caused the fruit to set is not clear. It dissolves rapidly and the trees would, no doubt, be taking up the nitrogen by the time the fruit was setting, when, perhaps, the extra vigor of growth caused by the nitrogen would cause a quicker flow of sap which would better ensure the young fruit getting an adequate supply.

Injurious Insects and Disease. I shall refrain from saying much about the loss of crop by fruit not setting due to Apple Scab and other diseases and insects. The loss is, doubtless, very heavy, particularly in some seasons.

Thinning and Pruning. So far as I have been able to find, no marked difference in the crop has been obtained by thinning or methods of pruning in previous years, although these, no doubt, have some influence.

Spray Injury. Drenching the trees with very strong or improperly made spray mixtures may cause such injury that the fruit will not set well. It is desirable to use the materials and formulas which have been well tested and found satisfactory.

Results at Ottawa: At the Experimental Farm at Ottawa records have been kept of the yields in gallons of each individual tree in the orchards since 1898, or for 19 consecutive seasons. The time when each tree began to bloom, was in full bloom, and when the bloom fell, has been recorded every year since 1899. The amount of bloom, whether small, medium or large has been recorded every year since 1899. The temperature records have been kept since that time and also the daily sunshine records and rainfall so that we have an abundance of data on which to base the cause of the large proportion of good crops which have been obtained. The trees have been thoroughly sprayed every year since that time and they have never suffered to any great extent from either injurious insects or disease until 1916, when in the early part of the season the scab on the foliage was very bad, and what is quite unusual with us, there was some scab on the fruit of some varieties as well. In the 18 seasons from 1899 to 1916, inclusive, there has been a relatively light crop of some varieties every alternate year, there being one exception in the year 1905; thus certain varieties bore light crops in the years 1899, 1901, 1903, 1907, 1909, 1911, 1913, and 1915 while medium to good crops were produced in the other years. This would seem to prove that most varieties are alternate bearers, but on consulting our weather records, there appears to be good reason for the light crops in most of the years. Thus in 1899 the maximum temperatures ranged between 58 degrees and 61 degrees when the flowers were opening and it rained on four consecutive days. In 1901 the maximum temperatures were below 60, and it remained at that on four consecutive days during the blooming period. In 1903 the weather was excessively hot during the blooming time, the temperatures ranging from 82 to 91 on six consecutive days and the ground was very dry. The exception to the regularly alternate off year came in 1905 when there was a good crop generally, but we found that the maximum temperatures ranged between 70

degrees and 80 degrees most of the time, being quite favorable for pollination. The year 1907, the bloom was very late and the maximum temperatures ranged from 57 degrees to 67 degrees in the first and second weeks of June when the trees were in bloom and beginning in May and ending June 10 there were sixteen consecutive days when it either rained or was cloudy. In 1909 while the maximum temperatures were above seventy most of the blooming season, and the weather clear, the blooming season was late and weather was unfavorable for growth in June which may have prevented the fruit from developing. In 1911 it was very hot and dry in the blooming season, maximum records on successive days beginning May 18 being 86, 82, 92, 94, 94, and 87 degrees. This exceedingly hot dry weather is not, we believe, favorable to good pollination. It was an early blooming season in 1913 but when the flowers began to open the temperature fell and between May 8 and May 22, when most of the bloom was, there were nine days when it was below sixty and frost was recorded on four nights.

In 1915 the maximum temperatures ranged from 49 to 67 degrees on four days it was below 60; once it went up to 77 during the blooming period. Frost was recorded on one night. This was an unfavorable season for the setting of fruit in many places in Ontario.

The years 1900, 1902, 1904, 1905, 1906, 1908, 1910, 1912, 1914 and 1916 were all favorable for the setting of fruit, the temperature being sufficiently high but not exceptionally high and the weather being clear most of the time.

It will be seen that the alternate bearing which at first glance might be thought was due entirely to heredity or constitution is really a coincidence and that it is caused mainly by the approximate alternate favorable and unfavorable weather conditions at blooming time or possibly during the previous winter. It is true that the bloom has not been so heavy in these off years, but there is usually some blooms and in a season favorable for pollination fair crops have been obtained when the bloom was relatively light.

As bearing out our records in regard to the influence of the season on the size of the crop, let me quote the summary of observations made at the Woburn Fruit Experiment Station in England:

"The view that fruit trees tend to bear heavily and lightly in alternate seasons is often made the basis of a recommendation to thin a heavy crop borne one year, in order to obtain a better crop the succeeding year. It appears, however, that the tendency towards alternate cropping, as it may be called, is very feeble, and that there is, at the same time, an equally potent tendency towards consecutive cropping, that is, that a tree bearing particularly well or badly during one season will probably do the same in the succeeding season, whilst the chief factor in determining good or poor bearing is undoubtedly the atmospheric conditions and not any innate tendency of the individual tree to either alternate or consecutive fruiting.

"In another case of apple trees where observations apply to over 5,700 instances extending from 1904 to 1915 the tendency has been, with only one slight exception, towards consecutive bearing. But this tendency affects the results to only a slight extent, about 12 per cent., the remaining 88 per cent. being attributed to peculiarities of the season, and not to the individual behavior of the trees." Further—"The alternation of good and bad years has been uniformly exhibited to a most marked extent in some plantations available for observation over a period of 20 years. As the injury to these crops has nearly always been due to spring frosts, it is evident that the alternation of good and bad years is due to the tendency of such frosts to occur alternatively in consecutive seasons."

The Baldwin apple has the reputation of being an alternate bearer, yet Geo. T. Powell, a veteran fruit grower and experimenter in New York, states that he gets annual crops if the soil is good and there is abundance of moisture. He also thins the heavy crop in order to get a good development of fruit buds for the next year's crop. In a recent letter he states: "I have Baldwin and Sutton trees that are heavily pruned and thinned that give regular annual crops." Thus showing that if weather conditions are favorable and cultural conditions good, the tendency is for even Baldwins to bear annually.

Cause of Good Crops at Ottawa. Someone may now wonder, if there has been an unfavorable spring every other year at Ottawa, why good crops have been obtained fairly regularly from some varieties. We believe it to be due to the fact that a large proportion of the varieties now growing at Ottawa are very hardy, and the flowers are able to withstand adverse climatic conditions better than the more tender sorts. Take the following yields in gallons for instance of individual trees, which if divided by 24, will give about the number of barrels each year.

Duchess of Oldenburg, planted in 1888: Following are the yields from a certain tree for the years 1902-16, consecutively, in gallons—63½, 47, 89, 70, 111½, 68, 100, 52½, 111½, 93, 149, 49, 132, 69, 132½, an average of 89 gallons or 3¾ barrels per year for 15 consecutive years.

McMahon White, planted in 1888, beginning in 1902: 69½, 43, 72, 96, 75. 52, 81, 78, 97, 94, 50, 74, 143, 109, 136, an average of 85 gallons or 3½ barrels per year for 15 consecutive years.

Charlamoff, planted in 1888, beginning in 1902: 66, 6, 106½, 33, 81, 33, 103, 38, 97½, 15, 108½, 25, 133, 22½, 123½, an average of 66 gallons or 2¾ barrels per year for 15 consecutive years, the lighter crops being in the unfavorable seasons.

Antonovka, one of the hardiest Russian apples and one that is most extensively grown in the colder parts of Russia, has made a good record. Planted in 1888, the yields from 1902 are: 57, 7, 88, 68, 105, 84½, 84, 77, 112, 65 113 (it had a large crop the next year, 1913, but the yield was not recorded), 152, 116½, 93, an average for the 14 years of 87 gallons or 3⅝ barrels per year.

McIntosh, planted in 1890: The yields from 1902 are, 71½, 94, 12, 109, 3, 109, 41½, 184, 50, 166, 55, 145, 112, 44, 149½, an average of 90 gallons or 3¾ barrels per year.

Wealthy, planted in 1888. The yields from 1902 are: 21½, 35½, 60, 60, 65½, 33, 69½, 12½, 62½, 15½, 93½, 12, 114, 24, 124, an average of 54 gallons or 2¼ barrels per year.

All of the trees of the above mentioned varieties did not yield as good crops as regularly as those given above, but these and others are the varieties which assured us good crops in bad seasons.

There are undoubtedly some varieties of apples which bear in alternate years, and which have no flowers in the off year. Tetofsky is one of these, there being an off year regularly, alternately from 1899 to 1916, except in one off year when there was a slight amount of bloom. The Tetofsky goes very much to spurs and bears very heavily in alternate years.

From the foregoing data and other information, we make the following recommendation for obtaining the maximum number of good crops:

For the man who intends planting an orchard, we advise planting on a slope where there will be a good circulation of air, avoiding pockets and flat land where

frost will settle. In blooming time the temperature on the slope may be 9 to 10 degrees higher than that on the level, and even if there is no frost the temperature on the level may not be high enough to ensure a good germination of pollen and fertilization.

Plant at least some of the hardiest varieties of apples so that these may be depended upon in unfavorable seasons to give a medium to good crop.

Plant varieties which have the same blooming season alternately, say two rows of one and four of another.

Keep bees to aid in pollination so that the greatest advantage may be obtained from a short favorable period in a generally unfavorable blooming season.

When trees are old enough to begin to crowd, prune severely to admit sunlight and air or take out some trees altogether.

Spray thoroughly every year to reduce to a minimum the loss from injurious insects and fungus diseases and ensure good foliage and a good development of fruit buds.

Begin to cultivate as early in the spring as possible to conserve moisture where there is any danger of too little moisture in a dry time.

Keep up the fertility of the soil. Trees with insufficient available plant food will not set as much fruit as those with a regular and good supply.

REPORT OF THE RESOLUTIONS COMMITTEE.

The following resolutions were presented at the Convention and received its approval:

1. Resolved, that we desire to place on record our deep sense of the loss sustained during the past year in the sudden and unexpected death of the late Dr. C. C. James, Commissioner of Agriculture for the Dominion of Canada. Dr. James was perhaps the most outstanding figure in Canadian agriculture, a cultured gentleman and one deeply interested in all progressive movements in the Dominion for the furtherance of the well-being of the people at large. He has been removed by Divine Providence in the prime of life, and on the threshold of what promised to be a career of unexampled usefulness to the Canadian public.

As fruit growers we will cherish in our hearts the wise counsels and active interest he took for many years in the fruit industry of Canada.

We extend to his family our sincere sympathy.

2. Resolved, that it is with sorrow that we have also to record the sudden and unexpected removal by death during the recent weeks of the Hon. James Duff, Minister of Agriculture for this Province. Hon. Mr. Duff was a worthy successor to the Hon. Mr. Monteith, and during the years in which he occupied the honorable position of Minister of Agriculture, he closely identified himself with all movements for real progress in his Department. A good friend and a noble man has passed away, and a vacancy has been left that will be very difficult to fill. Our sympathies go out to his bereaved family.

3. Resolved, that this Association once more place on record its appreciation and recognition of the very valuable services that have been rendered the fruit growing interests of the Province by the transportation agent of the Association, Mr. Geo. McIntosh, a work which has resulted in the saving of many thousands of dollars to the fruit growers of Ontario, and we express the hope that this work shall be continued.

4. Resolved, that, whereas the Ontario Fruit Growers' Association exists for the one purpose of promoting the best interests of the fruit growers of the Province, and whereas the power and influence of the Association is in a very real degree determined by the extent of the membership of this Association, we would urge our brother fruit growers who have not already done so, to identify themselves with this organization, and to lead others to do so and especially to use their influence with ours to show the members of the local fruit growers' associations how important it is in the interests of the fruit industry that they shall affiliate themselves with the Ontario Fruit Growers' Association.

5. Resolved, that, whereas the best interests of the fruit growing industry and of the people of Canada is being endangered by the embargo which has been placed by the railways upon the transportation of spraying material, spraying equipment, fertilizers and seeds, and whereas the Dominion and Provincial Governments are urging in the interests of the Empire the importance of increased national production, be it resolved that we believe that it is necessary that this embargo shall be removed speedily, and we would request that a copy of this resolution shall be forwarded to the Minister of Agriculture for the Dominion and the Chairman of the Dominion Board of Railway Commissioners and the railroad companies, with the request that action be taken in reference to it immediately.

6. Resolved, that in view of the excellent success of the efforts of our transportation expert in a Provincial sphere, the Minister of Agriculture at Ottawa be petitioned to appoint an official in connection with the Department of the Dominion Fruit Commissioner to work in the interests of fruit growers throughout the entire Dominion, the work so far accomplished by this Association having demonstrated that such an official would be able to render valuable assistance to the efforts of our Provincial Association.

7. Resolved, that in view of the immense damage which now threatens this Province from the recently introduced disease known as the White Pine Blister Rust, this Association earnestly urges both the Federal and Provincial Governments to take immediate and adequate steps to eradicate or control this dangerous pest, and that a copy of this resolution be forwarded to the proper authorities.

SWEET CHERRIES.

G. A. Robertson, St. Catharines.

The cherry seems to be pretty well distributed over the different parts of the Continents, but the sweet cherry (*Prunus avium*) from which we derive our better known varieties, is supposed to have come from the Mediterranean to England, from whence we get the name "English Cherry."

From England it was taken to the United States, and in no small degree was the means of bringing into prominence one of the many sterling qualities of one of their former Presidents, George Washington.

This species, *Prunus avium*, is divided into the following: —

The Hearts: These are heart-shaped cherries with soft flesh, and juicy; and include such varieties as the Black Tartarian, and Governor Wood.

The Bigarreaus: Which are also heart-shaped, but with firm, crisp and crackling flesh, and includes such varieties as Napoleon, Windsor and Elkhorn.

The Dukes: These are supposed to be crossed with the sour cherry (*Prunus cerasus*) by some, while others say they are from the *Prunus avium* alone, they are upright growers usually reddish in color and acid in flavor, and include such varieties as May Duke and Late Duke. The last class includes the Mazzard, on which many cultivated varieties are budded, and which is used principally for root stock.

From the time of planting the trees, the one object to be kept in view is the annual production of the maximum crop of the highest quality of marketable fruit.

This can be done only by overcoming the chief causes which work against the attainment of this object, which are:—

1. The improper location of the orchard.
2. The choice of unproductive varieties.
3. The use of improper nursery stock.
4. Improper methods of pruning.
5. Lack of necessary spraying to overcome insect and fungous diseases, which attack the trees and fruit.
6. Lack of care in harvesting; which includes the marketing of immature fruit, the breaking of the fruit spurs from the trees by careless picking, the picking of the fruit without the stems.
7. The lack of the necessary amount of plant food in the soil.

For it is only by the overcoming of all these, that one is able to get the best results.

Sweet cherries are yearly increasing in popular favor; and this popular favor will increase or diminish, only as the product put on the market is good, thereby increasing the demand; or poor, thereby decreasing the consumption. Not many years ago the sweet and so-called sour varieties were marketed at practically the same price per basket; the sweets are much more difficult to produce, and to market than the common or sour varieties, and an impetus was given to planting the sour cherry at the expense of the sweet. Since then the sour cherries have decreased steadily in price, and the sweets have increased, until now a sweet cherry orchard in full bearing is a decided asset to any farm.

Location. Sweet cherries should be planted on a deep, dry, well drained soil. No other tree fruit will respond any better to good treatment but planting on an unsuitable soil is disastrous, and a wet subsoil will prove fatal. Therefore, when chosing a location, a high dry sandy or gravelly knoll is best, and a proper system of underdrainage will prove beneficial. Close proximity to a town where a requisite number of good pickers may be had, and frequent and rapid shipping facilities is desirable.

Sweet cherries bloom very early, varying in the last few years from say as early as the 23rd of April, and sometimes as late as the 10th of May, most of our popular varieties bloom heavily and set freely; when in full bloom, a few hours of hot sunshine assisted by the presence of myriads of bees will set a fair crop, this may be followed by a week or ten days of cold wet weather, with perhaps a few degrees of frost; but if properly set the calyx of the blossom forms a little blanket to protect the tender fruit, and this drops only as the cherry swells, or as the stem of the improperly fertilized fruit shrivels and drops; hence planting an orchard near a body of water which will modify the temperature, will often insure a crop when a few miles inland, the few degrees difference in temperature, may shorten it materially, if not destroy it entirely for the season.

Varieties. In choosing the varieties from a commercial standpoint, annual

bearing is the most desirable, and coupled with that, a fruit that is good size, color and flavor, and also good in shipping quality. The tree should be a rapid grower, strong and hardy. The varieties that so far I have tried that conform to this standard named in the order of ripening are: Black Tartarian, Napoleon, Elkhorn, and Windsor. I have also fruited Lambert which ripens after Windsor, and is promising, being of good size and flavor. I may also add Bing. Both of these are grown in the west, the latter ripening about the same time as Elkhorn, and is an excellently flavored cherry.

Nursery Stock. Our future orchard should consist of trees procured from some honest, reliable nurseryman or grower. The first precaution is to be sure that they are true to name, and then it is necessary to see that they are grown on the Mazzard or sweet root stock. Unfortunately too many of our Canadian nurserymen use the Mahaleb stock, this is easier to grow in the nursery, but when planted in the orchard it makes a short-lived tree, as the butt of the sweet stock outgrows in diameter the Mahaleb root, the first noticeable effect is that some of the limbs on one side of the tree, lack vigor, and finally die; this is followed by a rapid decline of the tree, and often a fungus breaks out at the surface of the ground where the root joins with the butt.

I may also add that in cherries as well as other fruits, the attention of careful bud selection is an item which has not been given due consideration. In California the failure of some of the lemon groves to produce remunerative crops has been investigated, and the shortage in the crop is attributed to no other cause than the indiscriminate gathering of the buds used by the nurseryman; the prolific tree being as a rule not a tree where there is a superabundance of buds suitable for propagation, the nurseryman taking the buds from those of the same variety, but one which has a disposition to form a shade tree rather than one with heavy fruiting qualities.

Planting. In starting an orchard, a serious mistake is often made by not giving the trees sufficient room. Sour cherries do well when planted twenty by twenty feet apart. Sweet cherries should have at least a distance of twenty-five by twenty-five, and the more spreading thirty by thirty feet. In my newer plantations, I stake the orchard at twenty by twenty feet, and then start planting alternately each way, a cherry and a peach. This makes the cherries about twenty-eight and a half feet apart diagonally, the peach coming into bearing more rapidly, and being shorter lived is used as a filler, and must be pulled out so as not to interfere with the cherries, which should not usually occur until after the trees have reached the age of ten or more years.

The nursery stock as procured from the nursery should be one or two years old from the time of budding. The former is usually a straight upright growth, usually called a "whip," while the two-year-old is branched.

From past experience, fall planting of sweet cherries is most desirable for the Niagara District. One can get a better headed tree, as the buds are dormant, and the roots become firmly settled in the ground; and an early start in the spring is essential. If spring planting is followed, they should be planted as early as the ground is suitable, as the buds usually swell very early, and many get rubbed off even with the most careful handling. After planting do not prune back too much; the terminal bud is the one where the growth starts most readily, and then the several buds surrounding the terminal bud. I prefer to have the trees headed not lower than three feet from the ground and three feet six inches is better for the more spreading varieties.

If you have a two-year-old tree, it will likely have a head formed, and if it is the proper height you may cut out the vertical growth of the terminal bud in the centre formed the preceding year, but do not shorten in the laterals if the tree has been fall planted, for top and root growth develop simultaneously, and if you cut off the one you retard the other, and from actual test at the Vineland Experimental Farm, the losses from the shortened in trees were fifty per cent. greater than those left unshortened.

My preference is to have a tree forked with three branches spaced evenly, and if you have such do not under any consideration cut it back. There is a common belief that a heavily pruned tree grows faster than an unpruned tree, and many prune heavily to "force wood growth." If you wish a tree to increase in size just let it grow. If you wish a strongly forked tree leave the branches which form first from the main shoot. The fast growing branch is erroneously called a strong growth, whereas in reality the heavy growing upright branches are not the strongest growing, and the more rapid and upright growth stimulated by excessive pruning while forming the head of the tree is a source of weakness and trouble later on.

General Care. After planting in the fall it is a good practice to plow up to the young trees, or throw the earth around them with a spade so that there will be no hollow for the water to lie around the tree. This is removed in the spring and if the tree be a yearling the lower buds on the newly planted tree may be rubbed off to the desired height as they begin to swell. The young trees should be sprayed with concentrated lime and sulphur at the winter strength just as the buds are ready to burst, and they are benefited by a spraying or two with the summer strength of lime and sulphur with arsenate of lead added about the first of June, and again the middle of the same month. Hoed crops may be grown between the trees for the first five years, and the necessary cultivation and manures necessary for these crops will benefit the cherries. After this time the trees will require most of the space. Then they should be given clean cultivation until July. The earth may then be thrown up to the trees, and the land seeded down until the following spring, when the same process is repeated. The future pruning of the tree is not a very serious problem. It consists of the pruning out of some of the unnecessary branches that form in the centre of the tree, and trying to allow the tree to take on a natural rather than a forced wood growth, and not allowing the one side of the tree to grow at the expense of the other. If it is necessary to remove rather much wood from the centre of the tree, a modified system of summer pruning may be adopted. This is best done about the middle of July. It has a tendency to check wood growth and cause the formation of fruit spurs. As the trees start to bear the fruiting will retard the excessive wood growth, and the manure may be applied more liberally. When the trees are in full bearing, liberal application of barnyard manure may be applied in the winter, with the addition of about four hundred pounds of bone meal in the spring, and about two hundred pounds of nitrate of potash per acre, clean cultivation until picking time; then seeding down in July.

Fungous Diseases and Insect Pests. In former years before spraying became general, perhaps one of the most serious pests of the Sweet Cherry was the so-called Leaf Blight or Shot-Hole fungus (*Cylindrosporium spadi*). Early in the summer the leaves became more or less affected with little brown spots, these spots in time broke away leaving the little perforations in the leaf, hence the name "Shot-Hole Fungus." This frequently became so serious that whole

trees became defoliated during midsummer; since spraying has become general this is not a serious disease, although we not infrequently see a branch or even a whole tree more or less affected.

The most serious of all the pests to cope with is the Brown-Rot (*Sclerotinia cinerea*). It is on account of this one fungus that there are so few sweet cherries grown in this section of the country, and if one does not make every effort to overcome this disease he might better go out of business. If the weather is hot and dry from the time of blossoming to the time of ripening, we have little or no trouble with the "rot." Then again a season comes when the weather is hot and sultry, and the fruit may be apparently sound and all right at night, while the following morning it may be rotten and not worth picking, so serious does this pest become. Spraying, which seems to control it one season, apparently has little or no effect another season; hence the only way to combat this disease is to surround the tree with those conditions which do not favor the development of the disease. I touched before on the advisability of setting out the trees at a good distance apart, heading them well up from the ground, also allowing the branches to grow in as nearly a horizontal position as possible, of not allowing more than three main branches, and adopting a modified system of summer pruning to keep the centre of the tree open and avoid the excessive upward wood growth and consequent shade, and to these we add the removal of all wind-breaks which would retard a free circulation of air.

The best fungicide is free access of air and sunlight. The next best fungicide is a liberal use of arsenate of lead to prevent the insects from puncturing the fruits, for if these are kept unblemished and the moisture dried up from them, the battle is half won, as the fungi develop most readily from insect stings, or where the fruits hang in clusters surrounded by dampness. When spraying we find it best to spray both sides of the tree thoroughly before the blossoms burst, trying to do the second side of the tree just after the buds burst and before the blossoms open, just as they are commencing to show their white color, both sprayings with the full strength winter spray, lime and sulphur, of the specific gravity 1.03. (This also helps keep the cherry aphis in check.) Then after the fruit develops, and the little coverings commence to fall, we give the second spray one gallon of the concentrated to 40 gallons of water, to which is added three pounds of arsenate of lead. Then we repeat in ten days, with the same mixture. The second of these sprays will prevent the stinging of the young fruits by the "Plum Curculio" (*Conotrachelus nenuphar*), which deposits its egg by stinging the fruit while very small and cutting a little semi-circular mark around the puncture to prevent the growth of the young fruit from destroying the young larva. The third spray also helps to prevent the rot by preventing the development of the Cherry Flies, *Rhagoletis cingulata* and *R. fausta*, two little flies similar to the common house-fly but smaller. These emerge about the time of the first reddening of the Early Richmond sour Cherries, and fly about for several days feeding on sweet substances before they sting the late varieties of fruit. Perhaps to this, emphasis should be put on the necessity of watching the cherries during catchy weather, and marketing them as soon as they are fit, but not before. To do this they must have an even ripeness and good color. Color comes by the action of sunlight, and cherries bring the top price only when they are the best quality.

I will not touch on the San José Scale (*Aspidiotus perniciosus*), which has no footing in a properly conducted orchard, as the winter spray of lime sulphur controls this.

Harvesting. The harvesting of the cherry crop is given altogether too little attention by the average grower. We may take every care to have the trees grow right, to thin out the branches, and keep the fruit sound and clean; and then allow the pickers in the orchard. The first thing to watch is that, while harvesting the fruit, they do not break the fruit spurs on which the fruit hangs and grows each year. It is an easy matter by a careful examination of the spurs to read the history of the tree and count the former crops. Yet, if you allow a lot of careless or thoughtless pickers to have their way, the surface of the ground will seem to have more leaves on than the tree; and in a few years the limbs will become denuded of fruit spurs, bearing almost all of their fruit on the terminal branches, the intervening parts being almost bare. To overcome this, many of the growers in the west clip the cherries with the aid of scissors. It is not a difficult thing for a picker to harvest the cherries properly provided they are reasonably mature.

Then again we find the other extreme, that of picking without stems. This may be done if the fruit is delivered immediately to a nearby canning factory for present use, but even then it is questionable if in the case of large white cherries this should be allowed, for if they are put up in glass every little bruise shows. When cherries are shipped this practice should never be followed. A few years ago I went over to the Toronto fruit market and saw some No. 1 common red cherries selling for $1.25 per 11 quart basket. I also saw a lot of equally good fruit they were asking 50 cents for an 11 quart basket, and the salesman said they would likely have to take much less. The only difference was that one was picked carefully and with the stems on, and possibly contained about 15 lbs. net weight of cherries, sound and dry; the other contained possibly 17 or 18 lbs. net of cherries, picked with the stems off, at present apparently sound, but wet and sticky. The juice was running so that the veneer of the basket was quite wet; if these were not sold until the following day, the former would be all right while the latter would likely contain very few sound cherries, and would likely sell for about ten cents per basket. We shall figure the net cost and the balance left in each case from the time the cherries hung on the tree until they were sold by the wholesaler in Toronto. Taking 10 per cent. for selling, 1 cent for cartage, 4 cents for freight, 20 cents for picking, 5 cents for sorting, 5 cents for the basket, 5 cents for overhead expenses in the orchard, and 1 cent for delivery at the point of shipment, leaves in the first case for the properly picked cherries 71.5 cents per basket. In the case of the second lot we shall not deduct the 5 cents for sorting and still we have 13.5 cents left; or in the one case 4.7 cents per pound, and in the other case about .8 cents per pound, or about six times as much for the one as the other, and when we consider that from this net price we still deduct the cost of the care of the orchard, including pruning, manuring, three sprayings, the cost of the ladders used in picking and their upkeep, the rent of the land, taxes, and depreciation in the orchard, to say nothing of the cultivation, we are reminded that the old adage, "Whatever is worth doing is worth doing well, surely applies to Sweet Cherry growing.

I will not mention packages, as certain markets demand certain styles of packages; but will say that good fruit sells on appearance, and should never be put up in a rough slipshod or untidy manner, and that cherries carry better if the package is not too bulky.

Prof. Crow: I was interested in Mr. Robertson's remarks on pruning, and I would like to compliment him on the accuracy of his observations, but I am afraid

it is going to go abroad from this Convention that we are over-doing the pruning business, and I would consider it a mistake to have an impression of that kind created. I am afraid a wrong impression has been created. I would like to say that the idea of leaving young trees to grow for three or four years without pruning is all right with a great many varieties, but it is principally a question of variety. There are varieties of apples and pears that do not require very much pruning. They grow about the right shape if you leave them alone; but there are others that certainly require pruning and correction. There are varieties of the Northern Spy and the upright growing varieties of pears which are very late in coming into bearing, and I think it would be a mistake for anybody to come to the conclusion that a Spy tree should be left unpruned until it is ready to bear. If you leave it alone you will certainly have to wait a long time. I certainly think that the Spy or any other upright growing variety of apple or pear should be pruned from the start. Do not head back, but take out all the surplus branches, and I guarantee you will bring that tree into bearing sooner. It stands to reason it can be done, and I would like to correct any false impression that has been created here in that regard.

THE CHAIRMAN: It has been said that we have been pruning our young trees too much. Now do not let us swing the other way and not prune them at all. That is what Prof. Crow wants to impress upon us, and I think he is perfectly right.

THE WHITE PINE BLISTER RUST IN CANADA.

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Owing to the ease with which articles of all kinds are now transported by land and sea, there has grown up in recent years a wide interchange in all sorts of commodities between different countries and between far distant continents. Among these innumerable articles of exchange are to be found a goodly number of plants or parts of plants, so that there is hardly an ocean-going vessel which does not carry in its hold seeds, bulbs, cuttings or seedlings destined for the use or pleasure of other lands and other peoples.

INTRODUCTION OF FOREIGN DISEASES.

That these importations are valuable additions to the field, garden and orchard inhabitants of their new homes cannot be doubted: but they are not in all cases an unmixed blessing. It is a matter of common knowledge that these imported plants sometimes bring in with them very undesirable foreign diseases which thus get free transportation to a new field of activity where they may spread and become very destructive. As instances of this disease introduction there may be mentioned the American Gooseberry Mildew, which we bestowed upon Europe through the medium of young gooseberry plants which were taken over from our side of the world. The Grape Mildew was carried over to France in a similar way on grape seedling stock; while the Chestnut Blight which now promises to wipe out the valuable chestnut forests of the United States is reputed to have been brought in from China on imported chestnuts.

In the last few years, we in Canada, narrowly escaped the curse of a serious potato disease, the potato canker, and it was only by the energetic action on the part of the Federal authorities that the danger was averted.

It is to be noted that this problem of disease introduction is rendered much more complicated by the difficulty of foreseeing how virulent any given plant disease will become when introduced into a new environment, where it is allowed to attack a number of new species which not inured have not by ages of continued exposure developed resistant qualities, as have the ordinary hosts in its home land. In several cases it has happened that a disease which was considered comparatively harmless in its native place becomes exceedingly destructive when it is established elsewhere. The Grape Mildew, already mentioned, is a striking example of this erratic behavior. This mildew was of little importance on the native American grapes, but in the few years following its introduction into Europe, about 1875, it became so destructive that the grape industry of France was almost wiped out before spraying methods were devised to control it.

The necessity of guarding against these "Greek gifts" from abroad has long been apparent and nearly all progressive countries now have in operation stringent quarantine regulations which either prohibit foreign plants from being imported or allow their importation only after the most rigid inspection. The inadequacy of the existing regulations in America has been apparent in a large number of cases in recent years and the tendency in future will doubtless be to build the barriers against foreign plants much higher than they have been heretofore. It has been found out by dearly-bought experience that the loss caused by one single disease will pay many times over for the cost of enforcing an efficient quarantine.

Description of Blister Rust.

Europe has recently added another unwelcome contribution to the plant disease of North America, viz., The White Pine Blister Rust. (*Perid. str. kl.*)

Life History of the Disease on the Pine.—As the common name indicates, it is chiefly noted as a fungus parasite of the white pine (*Pinus Strobus L.*), but it can also attack several other species of pines, viz.: *P. Cembra, P. monticola, P. excelsa,* and *P. Lambertiana,* and perhaps any or all of the thirteen species of five-leaved pines. It may be noted in passing that the five-leaved pines alone are susceptible and that the two or three-leaved species, including the Austrian Pine, the Scotch Pine, and the Jack Pine of our northern forests, are not subject to the disease.

The most serious phase of injury on the white pine occurs in the seedling stage on young trees or on comparatively young shoots and limbs. Extended observations in the Niagara district in 1916 have established that although the fungus may enter the limbs through wounds in the bark the great majority of infections occur by way of the leaf shoots. From the point of entry the fungus grows up, down and around the branch in the soft bark. If the shoot is weakly the invaded tissue is killed and a dead area appears in the bark. If the shoot is vigorous and healthy, however, a growth stimulation is set up and the limb becomes swollen and puffed and this swelling often takes on a sickly yellowish appearance.

From such swellings there arise in spring from April to the middle of June the characteristic "blisters" which have given the disease its name. These blisters are about the size of a match head or larger and are of a pale orange or whitish color. In age they fade to white. Each blister has a delicate covering which encloses countless orange-colored spores within. In a short time the covering breaks and the dust-like spores are carried away by the wind leaving only ragged remnants of the blister coat behind. Even these white delicate remnants soon disappear and for the rest of the summer the infection shows only the slit-like

cavities where the blisters were formed, or swelling and discoloration further down the limb where the fungus has advanced into adjacent parts.

The time which elapses between the infection of a pine and the formation of spores varies somewhat from three to six years or more, but according to evidence collected from 1,700 cases the usual period appears to be about three and one-half years; that is, an infection started in September, 1912, would normally produce blisters in May, 1916. No more blisters are produced afterward at this same point, but a fresh series of blisters arises next season from the parts next the old blister area. The year after others appear beyond this part again, and this annual succession of blisters continues as the fungus creeps down the limb until the tree dies.

It is seen from the above that the course of the disease on pines is very slow. It takes a long time to kill a large tree and this can only be accomplished by a number of infections working in different limbs. Small trees, however, are girdled and killed very readily, and as they seem to be especially susceptible to attack it is evident that in or near an affected grove the seedlings on which future forests depend would have little chance of surviving.

The Disease on Currants.

Like many other rusts this fungus passes part of its life on another host—the currant, or to speak more correctly, on all species of the genus Ribes. Of these species, which include all the wild and cultivated currants and gooseberries, the common garden black currant is by far the most susceptible. On the red and white varieties, on gooseberries, and on wild currants comparatively little damage is done, but black currants suffer so severely at times that the disease promises to become quite a serious pest in black currant plantations. Not only is the food producing power of the leaves greatly reduced by the presence of the rust but in the more severe cases the leaves fall long before their time. In such cases the buds which ought to remain dormant over winter may start into growth in fall, thus producing a secondary set of leaves. As these are always killed by winter and the shoots lose the stored food which was used up in their formation, the damage to such plants is very considerable.

The spores shed by the blisters on the pine in the spring are not known to be capable of infecting other pines again, but they readily infect near by currants. The leaves *only* of the current plant are attacked, and ten to fifteen days after infection they appear on the under sides of these leaves small pustules of a brilliant orange color, and filled with orange spores. These spores in their turn are carried by the wind to other currant leaves, and thus the currant infection is spread throughout the summer. So rapid is the spread of the disease by means of these spores that where currant plantations are numerous in a district all the black currants for several miles around the infected pine may be rusted before the end of summer. Although the spores produced in the early part of summer on currant leaves are incapable of reinfecting pines, yet towards the close of the season the pustules put out small orange finger-like growths on which spores are formed that are able to infect pines again; and since, as noted above, the rust may spread on currants for several miles, there is every danger that a new lot of pines may be infected a long distance away from the original pine from which the currants received their infection in the spring.

Until lately it has been considered that the rust died out every winter in the currants, and had to be renewed each spring by infection starting from some

diseased pine. During 1916, however, a great deal of evidence has been collected in the Niagara Peninsula, which indicates very strongly that the fungus may be able to pass the winter in the currants themselves, and that once started in a district it may go on from year to year even if the pines are destroyed. This point is of extreme importance in the question of control.

Summary of the Life History.

We may sum up the main features in the life-history of the disease as follows:

A. On the Pine.

1. Lives on five-leaved pines only.
2. Produces swollen discolored areas on the limbs.
3. Spore filled blisters arise from these swellings in early spring.
4. The spores infect nearby currants, but not pines again.
5. Seedling trees are girdled and killed rapidly, adult trees damaged more slowly.

B. On Currants.

1. On all wild and cultivated currants and gooseberries; black currants particularly susceptible.
2. Leaves only affected; few or many small orange rust pustules are formed on the under sides of the leaves.
3. Spores from these pustules spread the disease during the summer to other currants (but not to pines).
4. In fall spores capable of infecting pines appear on the leaves.
5. Rust mostly dies out each winter on currants but may live over to start the disease in spring again under exceptional conditions.

Origin of the Disease.

This fungus has been known in Europe for many years, but appeared to have done little damage to native European pines. As soon, however, as our North American white pine was introduced into European forest nurseries, this rust found it a very susceptible host, and attacked it so severely that a great deal of damage resulted. It was on nursery seedlings of white pine that the disease found its way to our continent. Owing to cheap labor in Europe these pines could be grown there, shipped here, and sold to us at a price lower than the cost of raising them here. A considerable trade of this nature sprang up, and several millions of these seedling white pine were imported into the United States and Canada from France, Holland, Belgium and Germany. The greater part of these importations took place in 1906-7-8, and in these years if not earlier the rust disease came in unnoticed on these young pines and established itself on our continent. As soon as the disease was discovered further importations were discontinued and the authorities set themselves to the task of eradicating the pest.

The Situation in the United States.

The disease was first discovered in New York State in 1909, and later on in 1910 other centres were located in several other States.

It was then seen that the disease was more widely spread than had been suspected, and during the last three years special efforts have been made to locate all the centres of infection and destroy the infected pines. The present situation there is not very promising, the disease having now become so generally established in the north-eastern states that its total eradication can hardly be hoped for.

The Situation in Canada.

The disease was first discovered in Canada in the fall of 1914, at the Ontario Agricultural College, Guelph, and a hurried and very limited survey during the remainder of the season showed that it was general in the Niagara Peninsula on currants. More extended surveys in 1915 and 1916 show that in addition to the large area of infection in the peninsula, there are a number of small isolated cases at Guelph, Brantford, Port Burwell, Dutton, Oakville, Cookstown, Lindsay, Bowmanville and Ottawa. While only two places in Quebec are at present known to be infected, Oka and St. Anne de Bellevue, it is probable that surveys in that Province will show a much more extensive occurrence of the disease.

The Problem of Control.

What can we do with this disease? Is it still possible to entirely eradicate it from the continent or will it continue to spread despite all our efforts? Failing complete eradication, will it be possible to keep the disease from the large areas specially adapted to pine growing in the north of the province? Even if this could be done, can a control method be worked out whereby the pine areas which will inevitably be planted out in future days may be kept free from the disease at a cost which will still leave the matured forest commercially profitable?

The problem is a difficult one to solve. Fortunately there is now no danger of fresh importations of the disease from Europe since both Canada and the United States have already in force regulations absolutely prohibiting the entrance of European five-leaved pines; we are, therefore, concerned only with the already established areas of infection. Until recently it was thought that the problem of eradication could be solved very simply by destroying one of the host plants in a district. This method was based on the generally accepted belief that the currant stage dies out each winter, and must be started again each spring from some affected pine nearby, so that if the affected pines, or to make sure, all pines in the neighborhood, were destroyed the disease would be obliterated. Unfortunately the evidence already mentioned indicates very strongly that the disease may pass the winter on the currant and that the removal of affected pines will not prevent the continuance of the disease on currants from year to year. On the other hand the removal of currants from the neighborhood of diseased pines would also appear to be effective in stopping the spread of the disease. This is undoubtedly true, but in the areas where this method has been tried it is found to be both costly and uncertain. There is difficulty in carrying out the work so thoroughly that a perfect dead area is created about the pines. If a single currant plant or even roots or a small part of them are left, there is great danger that the rust will pass by way of this plant to the region beyond the dead area in much the same way as a man uses a stepping stone in a stream too broad to be crossed at a bound. One or two plants left in this way may render the whole work useless. It is obvious that the chief difficulty in this case would arise in connection with wild currants. The orderly rows of cultivated currants would be easily and surely disposed of, but wild currants and gooseberries grow in all sorts of sheltered and out of the way

places in the woods and their complete destruction is a very difficult and, therefore, costly operation.

Moreover, while this procedure may be advisable in the small isolated areas mentioned, it is scarcely practicable in the Niagara Peninsula where there are thousands of large commercial currant plantations. Yet if these cultivated currants which are now almost all affected by the rust are allowed to remain the rust will probably continue to live on them from year to year, and will doubtless spread gradually, so that any hope of finally eradicating the disease within the Province would have to be given up.

It may be possible to adopt a suggestion made by the Dominion Botanist, and by denuding a broad belt of both pines and currants separate this affected area from the pine producing territory farther north. Such a measure would afford a temporary barrier to the spread of the disease and might arrest its progress until we are in a position to deal with the question in the light of greater knowledge. It is my opinion that this barrier belt would not be permanently useful—that in a few years the rust would pass over it as it might well do in a number of ways, and its chief value would be to give time for working out a settled policy.

If we are unable to prevent the spread of the rust in the Province, we are then confronted with the problem: Can pines be grown in spite of its presence. I think an affirmative answer will finally be given to this question, though we are unable to give such at present. The answer involves a number of factors concerning which we have as yet but very limited data, such as the distance spores are carried from pine to currant and from currant to pine, the susceptibility of pines at various ages, the number of wild currants and gooseberries which may be permitted in and about a pine plantation without rendering it commercially profitless, and the cost of destroying wild currants in a given plantation. It may happen that after investigation has been carried out along these lines, methods can be worked out by which white pine forests may still be grown *with profit*. It should be kept in mind that this disease can scarcely be regarded as threatening to existing stands of mature or nearly mature pines. It is a danger which mainly concerns the younger trees which ought to grow up into a future timber supply, and since reforestration will in the natural course of things become a vital necessity for Canada, the problem is one that pre-eminently pertains to a reforestration policy.

The situation may be shortly summarized by a series of alternatives, thus:

Eradication, if possible; failing that

Segregation, if possible; failing that

Regulation, if possible; failing that

Resignation—the giving up of white pine altogether as a commercial forest tree.

It is not yet possible to say at what stage in the above series we shall be able to stop. So little is known about the disease in America that we cannot foretell the future with confidence. The experiences with the same disease on our white pine in Europe are helpful to some extent, but it is quite possible that under different climatic conditions the course of the disease and the amount of the damage done in the American continent may not be at all comparable to the European situation.

The recent activities of the various states and the aroused interest of the provinces of Canada lead us to hope that within the next year or two at most, sufficient data will be available for determining with a fair degree of accuracy just what policy it will be wise to pursue in future.

THE MARKETING SITUATION IN THE NIAGARA DISTRICT.

F. A. J. SHEPPARD, ST. CATHARINES.

The theme that your committee has chosen for me to speak to you about for a few minutes this afternoon, "The Marketing Situation in the Niagara District," has been the subject of a lot of discussion and the source of a lot of anxiety and worry both by the growers themselves and by the buyers and dealers and shippers throughout the district for the past three years. A number of meetings have been held and a lot of time spent by growers and dealers, assisted by officials of the Department of Agriculture, discussing the various phases of the situation in the hope that some scheme could be devised which would materially assist in the marketing and distribution of the tender fruits of the district, whereby an adequate return would be assured to the grower for his labor and expenditure in producing good fruit.

One of the great drawbacks in the marketing of our fruit is the lack of uniformity in our packing, almost every grower has a different idea about what constitutes a No. 1 package of fruit. I have on several occasions attempted to load cars of peaches that would be uniform in size throughout, but it is seldom that you can get 1,200 11-qt baskets from one man in a day, and if you have three or four different growers' fruit in the car, you are sure to have a great variation in pack and size of fruit, and adjustments often have to be made because our customer in 99 cases out of 100 will fix the standard of No. 1 stock by the largest in the car, and will often maintain that there are a certain number of baskets of No. 2 fruit, simply because it did not come up to the standard of a few baskets of fancy stock put in by some grower at the same price.

In order to satisfy our customers and get repeat orders, it is of the utmost importance that we have some standard of pack whereby the dealer may know what he is to receive when he orders a certain grade of fruit. At the present time outside of apples, we have nothing to go by for grade in the tender fruits except what we find in the baskets which as most of you know in some cases run from No. 3 up to fancy. The result of this kind of packing is that a large amount of our fruit has to be shipped on commission and thrown on the open market to bring what it will because the pack is so indifferent that the dealer cannot buy it to send out to his customer at a fixed price.

My own idea of a remedy for the existing conditions lies in the central packing-house system. A system whereby packing houses would be established at all the large shipping stations where the growers could bring their fruit fresh from the trees and have it packed and graded by expert packers whose only interest in the business would be to make a uniform pack and give a square deal to everyone. The fruit could then be precooled and shipped out on order with a definite guarantee of grade and quality. In connection with these packing houses, I would establish a central selling agency, managed by a man of high ability, who would gather around him a staff of salesmen sufficient to cover the territory in which it would be profitable and possible to ship tender fruits. With such an organization as this, I believe every basket of our fruit could be profitably marketed, and at a cost very much less then we are paying at present.

Our chief competitors in the business at present are our friends in British Columbia and the Western States, and were it not for co-operative packing and selling, they could not stay in the business a year. I might also mention that in one of the large grape belts of New York State, a selling association such as I

have mentioned handled 90 per cent. of the grapes at a cost to the growers of 1 cent per 12-qt. basket, and ½ cent per smaller package, and netted the growers an average of $40 a ton and better. It would appear from efforts put forward last year, that our fruit growers are not yet ready to adopt the above system, and while nothing up to the present has been obtained in a co-operative marketing scheme, I am glad to report that through the efforts of the Niagara District Sellers' Association organized last season, and which was composed of about 90 per cent. of the co-operative company's buyers and dealers in fruit of the district, we were able to realize for the growers an advance of at least 20 per cent. over prices obtained in 1915.

Some of you will remember that at our meeting last year, one of the speakers mentioned the fact that the fruit grower of late years had not been receiving his just share of the prosperity which our people in other lines were enjoying, and went so far as to say that some of the fruit growers had ceased to wear "the smile that won't come off." This condition reached the climax in 1913, when thousands of baskets of peaches and plums were left to rot on the trees because the price realized on the commission was not sufficient to pay the cost of package and transportation. It was realized that with a tremendous number of young trees coming into bearing in the next two or three years, something must be done to further the distribution and sale of our fruit if we were to avoid disastrous results. With this in view, The Niagara Peninsula Fruit Growers' Association of St. Catharines in the spring of 1915 organized the Niagara Peninsula Publicity campaign, and spent between $3,000 and $4,000 in advertising the tender fruits of the district, and in trying to stimulate the consumption of Niagara Peninsula fruit in the smaller towns thus giving a wider distribution. While the prices realized in 1915 were not large, it was felt that the advertising did a lot of good, as we were able to dispose of all of the crops. This work was carried on again in 1916, and we hope will be further extended in 1917.

The growing of tender fruits in the Niagara District has assumed large proportions in the last decade, it being estimated that in 1915 approximately 100,000 tons of fruit were shipped, valued at about five and one-half millions of dollars. To market and distribute so large an amount of fruit as this in the short season allowed us requires the earnest co-operation of growers, shippers, transportation companies and retail dealers to make it a success. Good work has been done in the last few years by the transportation companies in arranging their schedules so as to give special despatch to fresh fruit shipments, and by making special fruit rates on car loads and half car loads to the smaller towns. We ask that these rates be further extended. The company that I have the honor to represent—The St. Catharines Cold Storage and Forwarding Co., Ltd., ship each year a large number of cars of tender fruit to Winnipeg and the Canadian West. In June last I made a trip to Winnipeg to study conditions and try to find out why Niagara District fruit sells for such varying prices on the Winnipeg market. I spent considerable time discussing the business with the wholesale dealers, and also spent a couple of days interviewing the retail dealers for the purpose of finding out what condition our fruit arrived in, and also how the quality compared with the Western fruit.

In every case I found that when Niagara district fruit arrived in good condition, it was considered superior in texture and flavor to the Western fruit, and that the people of the middle West would be glad to handle our fruit; but on account of the large percentage of loss caused by indifferent packing and so many inferior specimens being placed in the baskets, the Winnipeg dealers found it

more profitable to buy the product of the Western States and only want to handle our fruit on commission.

In conclusion, let me urge our Ontario fruit growers not to be satisfied with the present conditions, but to rise nobly to the occasion and use every effort to overcome it, and not be satisfied until they have grown their fruit so good and packed so uniformly that all the dealers in Toronto, Montreal, Winnipeg and all our other cities and town will be asking for Ontario fruit, and will become boosters for the sale of it to the great advantage of both grower and consumer.

F. C. HART: The question of mobilizing the growers and co-operative associations and dealers in the Niagara district and the marketing of fruit there is a large proposition. We have been working at it for some time. Difficulties in the way seem to be cropping up at all times, and the work seems rather slow for many reasons. Everybody seems to be of the opinion that with a proper business organization, the solving of this question of the advertising of the grading and standardization of packages will be effected. The main difficulty is to create a business organization that can handle a business of that size. Possibly this is not the place to go into the details of such difficulties, but the old question is not shelved at the present time. We are still working on it and hope to be able to soon take in the growers, co-operative associations and dealers on an equitable basis so as to handle the fruit of the Niagara district. We may have to start with a little less ambitious scheme in the near future, but ultimately the fruit of the Niagara district will go out under one organization. That is what we are working for, and it will come sooner or later. How soon it will come depends largely upon the growers and dealers in the district.

MR. FLEMING: I would like to ask Mr. Sheppard if he thinks the labelling system was a success? In the Niagara district they issued a label, and there was no direct supervision over packages upon which the label was placed. The question is whether the label is a good thing unless there is supervision.

MR. SHEPPARD: In answer to Mr. Fleming's question, I might say I was not very favorable to the label, just for the very reason that he has given. The idea in having the label was that people who secured fruit under that label would be looking for it again. The question Mr. Fleming has brought up was one which came into my mind very strongly that people would use a label on poor fruit. If we do not put the right kind of stuff under the label, it has an adverse result; because if the people do not get a first-class article with the label they would not ask for it any more. I am pleased to say that in St. Catharines the people who use the label put it on their best fruit only, but it was not used sufficiently to get it properly before the public. A number of the growers bought the label to help on the advertising scheme simply to give us money to carry on the work, and after they got them, they put them on the shelf and did not use them at all. I cannot say whether the committee will adopt the label system next year or not, but if we do it is up to us to see that the goods that go under that label are sufficiently good to warrant the people coming back and asking for more.

MR. SMITH: I examined a great many packages of fruit with the label on, but I did not find that they were any better than a great many other packages that came from the Niagara district without the label. I did not find any packages with the label that were in violation of the Act, but there were a great many packages in violation of the Act from Niagara district this year. I could not say that the packages with the labels stood out very strongly.

MR. CAREY: I noticed in a half dozen cases the label on very inferior fruit.

It was not in violation of the Act, but the quality was very poor, and it struck me that that was cutting the ice the wrong way.

THE CHAIRMAN: If these labels get into the hands of thoroughly conscientious growers, then it would be all right, but if they get into the hands of unscrupulous people then the reverse will be the case. If the label is put on a very ordinary basket of fruit, then it does more harm than good.

MR. CRAISE: I used about 10,000 of these labels last year, and as it was a new thing, and as I was in touch with Mr. Sheppard in regard to it, I tried it out as an experiment, using them on part of our shipment each day for two or three weeks at a time, shipping some with and some without the label of the same quality of fruit. We ship entirely to one commission man and he knows our goods. We asked him to keep a separate account of the baskets that went with the label and without the label, and his returns gave us about 5 cents a basket more during the season for fruit with the label, and it was all the same class of fruit.

MR. FLEMING: I used these labels entirely for the late packages of fruit, and I found it created quite a demand for the fruit, and I think it was a boon for the district. I was very careful as to the kind of fruit that went into these baskets. I was told at the end of the season by the manager of one of the large co-operative companies that he had seen fruit shipped with this label on the baskets that he would not handle. It seems to me that is advertising the wrong way, but if we can have some supervision and only a certain standard of fruit with the label on, I think it would have a very beneficial effect. I would like to find out if there was any way in which the Government could help us to see that fruit with the label on was up to standard.

MR. JOHNSON, Fruit Commissioner: I would not like to commit myself on that just now, but I can assure you that my sympathies are with you in your work, and I would be very glad to consult with you and talk the matter over with you, and if it does not interfere with our work, we would be very glad to help you out. I can assure you that you could have my co-operation and sympathy in every way.

MR. ROBERTSON: I think the opinion in our district was that the label, like a revolver, was not to be placed in every one's hands, because it might go off the wrong way and do some damage.

MR. SHEPPARD: My idea and the idea of the committee two years ago was that the growers themselves should help to do this advertising. We had a systematic canvass of our section for subscribers. We asked the large growers to give $10 and the smaller ones $5, and others to give a lesser sum. We felt that everybody should do something to help. We raised considerable money but we found we could not go back and get it again. A great many people claim that they did not receive any direct advantage. They were looking for something in which they could put $5 and get back $10, and we thought the scheme of selling the labels to be put on their baskets of fruit would be a good one. Mr. Craise says he realized 5 cents more a basket for his fruit with the label on, and the label cost him less than half a cent. I do not think there is anybody here who would not pay out half a cent if they were going to get 5 cents for it. We feel that if the right kind of fruit is used that this label will be a great advantage, and the people will come back and ask for more.

A MEMBER: I think the time has come when every man should stamp his name on the package. Every man who sends fruit to the market should put his name on the package, and then the people would know where it came from. I believe that would be better than the labels.

MR. TERRY: I had the pleasure of being on the fruit market one morning when berries were being sold. While I was standing there, three or four gentlemen came up inquiring for my berries. I always stamp the crate with my own name. I said to these gentlemen, "Why do you ask for that man's berries?" and they said, "Because he always puts them up nice; he fills up his crate." I am not trying to blow my own horn, but I am telling you that is why these men were coming back for my berries. If I had put them up in a poor way, they would not have been there asking for my berries, and I think if we put up our fruit properly it will be sure to find a good market.

The Convention then adjourned.