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Fungus Diseases and Insect Pests

The Gigantic Task the Producer Faces in his Warfare Against these Destroying Myriads.

New Insecticides constantly being developed and Farmers should keep themselves informed about them.

FUNGUS diseases cause the farmers of Ontario an annual loss of many millions of dollars. Grain smuts destroy the grain; Potato Blight and Rot destroy potatoes; Scab disfigures apples and Black Knot destroys plum and cherry trees. In fact, nearly all farm crops are subject to the ravages of fungus diseases.

By the intelligent use of fungicides such as formalin, Bordeaux mixture and lime-sulphur, much of this loss can be avoided and the available food supplies of the Province increased.

Treating the seed with a formalin solution will prevent Bunt or Stinking Smut of Wheat, Oat Smut and Covered Smut of Barley.

Directions

Mix one pint of formalin with thirty gallons of water. Place the grain to be treated on a clean floor. Sprinkle the formalin solution over the grain, then shovel the grain over into another pile so as to mix thoroughly, then sprinkle and shovel again. Repeat this until every grain is moistened by the solution; then cover the pile with sacking and leave for a couple of hours. At the end of this time spread the grain out thinly to dry. Shovelling over two or three times will hasten the drying.

Late Blight and Rot of Potatoes can be prevented by spraying with Bordeaux mixture. Commence spraying when the plants are from five to eight inches high and keep the foliage covered with Bordeaux throughout the season. Take special care to see that the spraying is very thoroughly done if the weather is at all damp about the 15th of July, as Blight often begins about this time. Add a poison when necessary for potato beetles—arsenate of lead paste 4 pounds to each 40 gallons of the liquid spray, or Paris green 2 pounds to 40 gallons, or a mixture of 2 pounds arsenate of lead paste and one pound of Paris green to 40 gallons. Three to seven applications should be made, depending upon the season—the wetter the weather the larger the number. Do not put off spraying because it looks like rain. If the spray is on the plants half an hour before the rain comes it will be dry and sufficient of it will stick to prevent infection, which takes place during or soon after rain. Such spraying should prevent not only Late Blight and Rot, but also Early Blight and potato beetles.

Apple Scab can almost always be prevented, no matter how wet the season may be, by thorough, timely and intelligent spraying in combination with the proper pruning of the trees. In order to be sure of preventing Scab it is necessary to spray from three to six times during the season, the number of sprayings depending upon whether the weather is wet or dry. For full directions for spraying to prevent Apple Scab, those interested should write to the Department of Agriculture, Toronto.

Peach Leaf Curl, Potato Scab, Black Knot of Plums and Cherries, Brown Rot of Plums and Cherries, Celery Blight and Tomato Blight are other diseases which can be prevented. For information concerning these write to the Ontario Department of Agriculture, Toronto, and full information will be sent by their experts.

INSECT PESTS

Destructive Power of Insects

Insects are very small creatures, it is true, but they have marvellous powers of causing destruction. The San Jose Scale is smaller than the head of a pin, yet it has already destroyed hundreds of thousands of fruit trees in the southern part of the Province where it thrives almost to perfection. The Codling Moth occurs in every apple and pear orchard in the Province, and if these are not sprayed, causes an annual loss of about 40% of the fruit. The Plum Curculio sometimes destroys nearly every plum and cherry in neglected orchards. Some years over 50% of the Montmorency and Morello cherries in some localities are maggoty and unfit to market. Cutworms as well as Army Worms have destroyed field after field of vegetable and farm crops. Hessian Flies destroy the wheat. Grasshoppers have from time to time stripped acre after acre of pasture fields bare of every green blade. Lice and Mite and Gad Flies make cattle, hogs and poultry restless and unthrifty. Buffalo Carpet Beetles and Clothes Moths, by their insidious attacks on furs and woollens, have ruined many a beautiful garment and worked woeful havoc in the home.

It is estimated that the total yield of farm crops almost every year is lessened on an average by at least 10% through insect attacks, and some years by much more than this. Canada's total field crops in 1917 had a field value estimated at $1,060,000,000, therefore a loss of 10% would amount to approximately $100,000,000. The loss to fruit growers is, of course, vastly greater than this average of 10%; in fact, is so great, especially when the diseases also are taken into account, that no fruit grower today can hope to make a success of his business unless he sprays his orchard to ward off these pests.

Can Insects be Combated Successfully and Economically?

Every year the knowledge of how to control insect pests is being rapidly increased. More advance in this line of work has probably been made in the last ten years than in the previous hundred, so that to-day there is scarcely an orchard insect of any importance for which there is not a well-tested and efficient remedy. For many of the other common insect pests there are also simple remedies; for instance, it is neither costly nor difficult as a rule to kill Grasshoppers, Cutworms, Army Worms, Cabbage Worms or Lice on cattle, hogs or poultry. Much also can be done to check the ravages of the Hessian Fly, Wheat Midge, White Grubs and Wireworms. As for ordinary house pests there has recently been discovered a simple remedy against Ants and Cockroaches, and less simple though fairly satisfactory methods are known for combating Bed Bugs, Buffalo Carpet Beetles and Clothes Moths.

New Insecticides

The farmer should try to keep in touch with the various new insecticides that from time to time appear; because it is important that he use the best, especially if it is also the cheapest.

A Few Examples of Remedies for Insects

(1) **Grasshoppers,** no matter how abundant, can readily be controlled as follows: Mix thoroughly 20 lbs. bran and 1 lb. Paris green, in a tub or box. Squeeze the juice of two or three lemons into two gallons of water, run the pulp and rind of the lemons through a meat chopper, then add this and also half a gallon of molasses to the water, stir well, and then pour the liquid upon the poisoned bran, and mix so thoroughly that every part is moist and will fall like sawdust through the fingers. Apply in the morning between 5 and 7 o'clock by scattering so thinly over the infested field, fence corners and roadsides, that the above amount will cover 4 or 5 acres. Sometimes a second application about 3 days later is necessary. It requires 2 or 3 days for the grasshoppers to die.

(2) **Cockroaches**—often a great pest in pantries and kitchens—can be destroyed by dusting sodium fluoride on the floor and shelves, where they are most common, leaving it there a few days, then sweeping it up and giving a second application at once.

(3) **Maggots in Cherries**—a curse to cherry growers—can be absolutely controlled in almost any orchard at a cost of about 5 cents per moderate sized tree by spraying the foliage with 2 lbs. arsenate of lead paste in 40 gallons of water, first when the early varieties are just beginning to turn red, and second two weeks later.

(4) **Wireworms and White Grubs**—can be almost completely kept out of the fields by a short rotation of crops—an ordinary good farm practice.

(5) **San Jose Scale**—the most destructive of all orchard pests can be completely controlled in any orchard by a single thorough annual application about the time the buds are bursting of lime-sulphur of the strength of 1 gallon with seven gallons of water.

(6) **Blister Mite**—a common pest of apple and pear orchards—can be almost entirely annihilated by a single spraying of all the trees with the lime-sulphur wash of the strength of 1 gallon to 8 or 9 gallons of water.

Where to Secure Information on Insects

The Department has now on hand the following up-to-date bulletins dealing with insects and diseases: Nos. 219, 227, 229, 240, 250, 251, 257, 258 and also a spray calendar. Any of these will be gladly sent to any person requesting them. Letters requesting further information on any point will be referred to and promptly answered by our experts on these lines of agriculture. Address Commissioner of Agriculture, Parliament Buildings, Toronto.

Ontario Department of Agriculture

Parliament Buildings, Toronto, Ontario

SIR. WM. H. HEARST,
Minister of Agriculture.

DR. GEO. C. CREELMAN,
Commissioner of Agriculture.

ONTARIO

The Canadian Horticulturist

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Commercial Dusting in a Quebec Orchard*

Rev. Father Leopold, La Trappe, Que.

BEING a firm believer in the spraying of apple orchards, and having successfully sprayed orchards with lime sulphur wash and arsenate of lead, I was sorry to see my Friend power outfit destroyed in the fire that consumed our monastery on the 27th of December, 1916.

This accident led me to gather all the information possible on the new dusting method compared with liquid sprays I wrote to reliable pomologists and entomologists, both in the United States and in Canada, and I went especially to the Ontario Fruit Growers' meeting in Toronto to hear Professors Wetzell, of Cornell, and L. Caesar, of Guelph, discuss the subject of dusting in all its phases. Finally, I decided to purchase an outfit and thus give the method a thorough commercial test during the 1917 season. I was the first to buy a dusting machine in the Province of Quebec. The model I bought was the Niagara D-1 Duster.

*Extract from an address delivered at the recent annual convention of the Province of Quebec Pomological and Fruit Growing Society.

As the orchards at the Oka Agricultural Institute comprise some sixty-five acres in all, I decided to purchase the largest dusting machine on the market, the D-1 Niagara outfit, weighing a trifle over 300 lbs. To this I attached a 3 h.p. Fairbanks-Morse gasoline Z Model, which gave perfect satisfaction. Power is needed to get the best results with a dusting machine. I would not advise any machine less than 3 h.p. with a large dusting outfit. The whole outfit was rigged up and strongly bolted on a specially strong platform.

No comparison was made between the dusting and liquid sprayings, as I believe both are good and serve their purpose. No liquid sprays were therefore used on the 65 acres of the apple orchards during last season. It is therefore a strictly commercial test of the dusting method applied in our orchards and outlined here that I offer in this summary of our work.

Dusting for the control of insects, especially for Codling Moth, was made over the entire acreage, comprising 3,000 trees. This was not the case of the dusting for control of scab, which attacks, here at least, only such varieties of apples as the Fameuse, McIntosh, Russet, and sometimes Wealthy and Ben Davis.

In the test for the control of scab, we dusted only 800 trees out of the 3,000 in the orchards. So we will divide the cost of material and labor in two sections: (a) The **Scab Control** on 800 trees, and (b) the **Codling Moth Control** on 2,200 trees.

The usual recommendation of materials for the control of these two pests is the following:

90% Sulphur (Superfine).
10% Lead arsenate, costing $6.25 for 100 lbs. of mixture.

As I judged this was too costly and not necessary, I used instead my own mixture, for the first application, when the buds were showing pink:

50% Sulphur.
50% Gypsum as a filler, costing $1.66 per 100 lbs.,

applied to 800 trees, at the rate of 1½

The duster used by the Oka Agricultural Institute last year is here shown in full operation. Note how the wind is carrying the dust into the trees which are of medium size. The operator holds the pipe in his right hand and regulates the amount of dust with his left. The total weight is about 300—49—lbs.

lb. (an average) per tree. I therefore used 1,200 lbs. of this mixture, costing $19.92, or 0.0249 per tree. (N.B.—We did not need to mix any arsenate of lead in this application nor in the following, as there were no insects to control.)

The second application was renewed once again before the opening of the flower buds, when the petals of the individual flowers were separated but not open, buds showing pink or rosy, making the cost again 0.0249 per tree.

The third application for scab and first for codling moth, when the petals of the flowers had nearly all fallen. Material used:

40% Sulphur.
10% Lead arsenate.
50% Gypsum, as a diluent, costing $3.88 a 100 lbs.

At 1½ lb. per tree on 800 trees, 1,200 lbs. costing $46.56, it made an outlay of 0.0582 per tree.

The fourth application for scab control and the second for codling moth control was made with the same materials as the preceding one, and at the same cost: 0.0582 per tree. Application made two weeks after preceding one.

Summarising the expenses for the materials for the four applications on the 800 trees of test A:

1st application ..	0.0249	per tree
2nd " ..	0.0249	"
3rd " ..	0.0582	"
4th " ..	0.0582	"
Total	$0.1662	"

A little over 16½ cents.

Material Used for Codling Moth.

For the control of codling moth, the following material was used:

15% Sulphur.
10% Arsenate of lead.
75% Gypsum as diluent, costing $3.12 for 100 lbs.

With 1½ lb. per tree on 2,200 trees, using therefore 3,300 lbs., brought the total cost to $102.96, or 0.0468 per tree.

This first application for the control of the codling moth, made when most of the petals were fallen, was made with little sulphur in the mixture, as the varieties were not subject to scab. But even the 15% sulphur seemed to have an excellent effect on the foliage of the trees.

The last dusting on the 2,200 trees, after two weeks, was made with the same mixture as the preceding application, costing also 0.0468 per tree.

Summarizing the B test:

1st application	0.0468
2nd application	0.0468
Total	$0.0936

Or over 9 cents per tree.

Cost of Labor.

The saving in dusting compared with liquid spraying is mostly in the cost of labor, as dusting can be done readily at least six times quicker than spraying thoroughly. But one must not be induced to think that dusting is an easy job and can be done in haphazard ways. No; the work must be done as carefully as with spraying, but in a much quicker fashion. At the Oka Agricultural Institute, where we have some difficulty in getting water, we always lost a considerable lot of time in going from the orchards to the filling point, though the tank had a capacity of 250 gallons of water.

Taking everything into consideration, one can dust trees of a medium size at the rate of 200 per hour, supposing no time is lost and the horses are kept continually in motion. The cost for one application of 800 trees would therefore be, counting two men at 20c an hour and a team at 25c an hour, $2.60, or $0.0325 per tree. For the four applications, this would make 13 cents per tree. This is an average figure, as trees differ in size in an orchard, some being dusted quicker than others. Our trees are certainly smaller, as a general rule, than most trees in Ontario or in the States.

Adding two cents for contingencies, gasoline, etc., per tree, the total cost per tree averaged 15 cents.

Thus, taking in account the cost of the material on Test A, of 0.1662 and 0.15 cents for labor, this makes an average of 31 cents per tree for the control of apple scab and codling moth on Fameuse and McIntosh trees, on 800 trees.

The cost for the control of codling moth alone on 2,200 trees amounted to $0.0936 per tree for material, and 0.15 cents for labor, making a total cost per tree of 24 cents in Test B.

Results.

In considering results, one must not forget that if ever we had a wet season, in the literal sense of the word, it was the season during which all the spraying was done in the province of Quebec in 1917. I never had to deal with such a bad season as the last one. It would have been absolutely impossible for me to have got out in the orchard and gone over the trees with a heavy gasoline spraying outfit, hauling around the orchard 250 gallons of water, and do the work in time as we have done it with the dusting outfit. On the other hand, in a dryer season, the dust clings more to the foliage than in a wet season, thus more fungicide is apt to be present on the foliage to protect it against fungous attacks.

Taking the weather conditions into consideration, we have had an average of 85% clean fruit, free from scab or codling moth injury, and I am perfectly safe in saying that this is as good, if not better than we could have had, in such a wet season with liquid spraying.

One thing noted by everybody who had a chance of seeing the orchards during the past season was the notably clean foliage all over the trees, even on the 2,200 that received only a mixture of 15% of sulphur. We expect that next season, after having such good foliage, the crop will be more abundant. It has been noted by experts that the longer foliage rests in good condition on a tree, the better is the following crop. Good and thorough spraying is therefore always a good investment for the next season's crop.

Prices obtained during the season of 1917 for boxed apples certainly were a fair compensation for the trouble and expense required to keep the fruit clean.

Best for This Latitude

I like The Canadian Horticulturist very much, and am pleased that we have a paper of this kind in Canada. I am reading with interest the different articles from the growers, which are, I think, more useful in this latitude than articles that we get in the many American papers of the same kind. —A. Lofquist, Marigold Farm, Clarkson's, Ont.

Apply Lime After Plowing

While it is better to use lime on acid soils at any time of the year than not to apply any, soil specialists at the Ohio Experiment Station recommend that this material be used after plowing for some cultivated spring crop. The lime can then perform its full function in promoting the growth of the bacteria that grow on clover roots. These countless bacteria, so helpful to clover crops, work only in the dark and require both water and air for their existence. Also, they can live only in soils either naturally or artificially supplied with lime.

Lime spread on the surface and not stirred into the soil can help the bacteria but little. They would die there for lack of moisture, and the lime would be dissolved and carried into the soil only after a long time. Lime plowed under is also out of reach of the bacteria, which lives chiefly in the upper three or four inches of soil where air is plentiful. Hence, applying lime after plowing in the spring and mixing it by cultivation into the soil during the summer makes conditions most favorable for the clover crops later.

Economical Sprays and Spraying for 1918*

Prof. L. Caesar, Provincial Entomologist, Guelph, Ont.

THE economical use of sprays will be an important matter among fruit growers this year. In discussing it I would like to take up first the question of insecticides and fungicides. As Paris Green has not been used to any appreciable extent for orchard spraying for a number of years we may pass it over with the remark that this year, from the latest quotations received, this poison likely will cost somewhere between 60c and 70c a lb.

Arsenate of Lead will be sold both in the paste and the powder form. One form seems to be practically as good as the other, except that the powder form is easier to ship, is unaffected by evaporation or frost and a little easier to mix before using. The powder form is practically twice as strong as the paste and therefore costs about twice as much, but only half as much per barrel is required. It is believed that there will be a sufficient supply of arsenate of lead available. The price is likely to be for 100-lb. drums about 20c to 25c a lb. for the paste form, and 40c to 48c a lb. for the powder. This is much dearer than last year.

Arsenate of lime—also called arsenate of calcium or calcium arsenate, and in the case of the Canada Paint Co.'s product Kalcikill—is another arsenical that is on the market this year in fairly large quantities. It is sold both in the paste and the powder form, though mostly in the powder. The powder is approximately twice as strong as the paste. Both are white substances very similar in appearance to arsenate of lead. As a rule they contain about one-fifth more arsenic and therefore may be used in about one-fifth less quantity than arsenate of lead. They are also considerably cheaper. As stated before, arsenate of lead this year will cost from about 20c to 25c a lb. for the paste and 40c to 48c for the powder; arsenate of lime will cost from 14c to 18c a lb. for paste and from 28c to 35c for the powder. Roughly speaking, therefore, arsenate of lime costs only about two-thirds as much as arsenate of lead. Therefore, if its use is safe, it would be a boon to fruit growers.

How Far to Substitute.

In the January issue of The Canadian Horticulturist, Mr. G. E. Sanders, of Nova Scotia, speaks very strongly in favor of arsenate of lime as a substitute for arsenate of lead. After discussing the comparative merits of the two substances he says, "It becomes plain that there is only one poison to recommend with lime-sulphur and that is arsenate of lime, from one-half to three-quarters of a pound of the powdered material to forty gallons of solution." This is a very strong recommendation, in my opinion too strong, for Ontario conditions, though it may apply all right to Nova Scotia. I am of course, speaking only of Ontario. Every entomologist would gladly welcome a new and cheaper poison if he were sure that it was safe and effective, but he would be acting unwisely in encouraging fruit growers to adopt new insecticides before he was certain that they were safe and effective. Two years' test in one state or province is not, in my opinion, sufficient to determine this definitely. It is necessary, also, to get the benefit of the experience of others from other parts of the continent where climatic conditions may be different, because a mistake in this matter means too much loss to the fruit growers.

As for arsenate of lime, we know that it is cheaper than arsenate of lead, that it gives apparently as good control of biting insects and that it is more convenient to use with lime-sulphur, because arsenate of lead when added to lime-sulphur causes a black precipitate, while arsenate of lime does not cause any precipitate. We know also that it is safe with Bordeaux on practically any plant except peaches, but so also is arsenate of lime, a substance that many people, including myself once thought safe with lime-sulphur until further experience showed that under some circumstances it would burn severely. Arsenate of lime, however, used with water alone, will burn very severely; arsenate of lead will not. I have ruined almost every leaf on a pear tree with a single application of arsenate of lime. Whether it is safe in Ontario with lime-sulphur, or as safe as arsenate of lead, is in my opinion still undecided. Last week I received a letter from Dr. Quaintance, of the Bureau of Entomology, Washington, D.C., in which he expressed the opinion still undecided. Last week I periments, that it is practically safe on apple and pear trees, but that it is not safe on plum, cherry or peach, because of injury to foliage. Prof. Parrott, of Geneva, said he had tested it and felt so uncertain about its safety that he was going to advise the fruit growers of New York to continue the use of arsenate of lead for the present, at least. Prof. Brock, of Illinois, tested

*An address delivered during February at the annual convention of the Ontario Fruit Growers' Association.

Eastern fruit growers who visit the fruit district along Okanagan Lake, B.C., for the first time, are generally surprised to find it is a semi-arid district, where much irrigation is practiced, and where surprising quantities of fruit are grown. In hot weather the growth is very rapid. One of the largest organizations of growers is The British Columbia Growers, Limited, at Penticton, whose packing house is here shown.
(Photo taken last August by an editor of The Canadian Horticulturist.)

both the home-made and commercial makes on apples in 1916 and 1917. He says "Our two seasons' results would not warrant any satisfactory recommendation as to its use." Mr. Kydd, at Whitby, and I, at Grimsby, tested it last year with lime-sulphur in comparison with arsenate of lead and lime-sulphur, (Mr. Kydd used it only half strength) and in both places it caused more injury than the arsenate of lead. On the other hand Mr. Harris, of Ingersoll, had practically no burning, and in Nova Scotia where large quantities were used, there was very little injury; Mr. Sanders says less injury than from arsenate of lead.

Favors Arsenate of Lead.

Taking all these things into account and remembering that Dr. Quaintance, though favoring its use on apples and pears, expressly warns against using it on plums, cherries and peaches, it seems to me difficult to form any other opinion than that arsenate of lead is still, for fruit trees in general, the safer spray, and that it is the part of wisdom, until the matter is settled definitely, not to adopt arsenate of lime wholesale as a substitute for arsenate of lead. By the way most of the injury from arsenate of lime does not in my experience become noticeable for more than a week after spraying and therefore the fact that the foliage is healthy a couple of days after spraying is no proof it will remain so. I also consider yellowing of leaves just as much a case of injury as the burning of small or large areas in the leaf.

Though I am still far from convinced that arsenate of lime with lime-sulphur is as safe as arsenate of lead with lime-sulphur, I consider that because of the large number of people in Nova Scotia and some other districts who have used it on apples without injury, we should be safe in compromising by using it instead of arsenate of lead on apples just before the blossoms burst, because foliage at this stage is not nearly so liable to spray injury as later. The best strength to use would appear to be three-quarters of a pound of the powder form or one and one-half lbs. of the paste to 40 gals. of dilute lime-sulphur. For all later sprays on apples and also for all sprays against biting insects on pears, plums and cherries, I think we should still rely on arsenate of lead.

As for arsenate of lead itself, I believe that on apples and pears we might lessen the amount for the Codling Moth spray this year and instead of two lbs. paste or one lb. powder use one and one-half lbs. paste or three-quarters pound powder to each 40 gals. liquid; for I do not think the Codling Moth will be very abundant this summer in most orchards, especially orchards where the crop failed almost entirely last year. This change, therefore, and the use of arsenate of lime before the blossoms will lessen the cost of orchard arsenicals considerably.

Liquid Sprays are the Best for Apple Scab.

On potatoes this year, as their foliage is hardy, I should use about one and one-half lbs. arsenate of lime powder or three lbs. paste either to 40 gals. of Bordeaux mixture or to 40 gals. of water, the latter containing about six lbs. of freshly slaked stone lime or eight lbs. of hydrated lime. The lime is used solely to prevent burning.

Fungicide.

Bluestone this year seems likely to cost about 14c to 18c a lb. in fairly large quantities. I might mention here that there are a number of fruit growers who prefer Bordeaux mixture to lime-sulphur. It adheres better to the leaves and fruit in wet weather and were it not for the fact that it is less convenient to use, costs more and russets the fruit badly some years, there would be few good reasons for preferring lime-sulphur to it for any but the first spray. It is the Codling Moth spray, as many have known for years, that causes most of the russeting, and so it would be wiser to use lime-sulphur for it.

Lime-sulphur will likely be available in sufficient quantity this year, but will cost at least $1.00 a bbl. more than last year.

Soluble-sulphur is also available. Wherever there is difficulty in securing a sufficient supply of lime-sulphur, especially in San Jose Scale districts, it could be substituted for the first spray and if thoroughly applied will give good results. I do not recommend it for any later sprayings and consider it unsafe to use with arsenate of lime or any other arsenical.

What Sprays to Omit.

Where fruit growing is a man's business I should advise that all of the regular standard applications as stated in the spray calendar be given. No good fruit grower should try to do with fewer than these standard sprays mentioned there; but when grain and stock raising are combined with fruit growing and all cannot be properly attended to it is clearly, because of the war, one's duty to give the grain and stock the preference. In such cases power outfits and the spray gun or a duster might be purchased to overcome the difficulty, otherwise it would be necessary for such persons either to omit spraying altogether for this year or else to give only one or two applications. In any district except where San Jose Scale exists the most important spray is the one just after the blossoms fall. Some years this one alone will give fruit almost free from scab and worms. The next most important is the spray just before bloom. These two sprays will most years but not every year give almost perfectly clean fruit. The spray before or as the buds are bursting is, of course, all important for San Jose Scale and for Oyster-Shell Scale and also some years for Apple Scab. With these facts in view every person can judge for himself which sprays it will pay him best to omit on his orchard.

The Parsnip Webworm

A. Gibson, Entomological Branch, Dept. Agriculture, Ottawa.

I have grown parsnips for years, but the last three years in succession they have been attacked by a kind of a caterpillar about half-inch or three-quarters of an inch long, rather pretty and with a dark bull head, very active when disturbed. They go for the crown stems and bore into the heart, causing them to rot. I tried various remedies early this year, but they came when the parsnips had grown large. —W. D.

The insect is the parsnip webworm, Depressaria Heracliana. It has been abundant during the past two years and we have received a number of inquiries concerning its ravages. Unfortunately it is a difficult pest to control. During the past year we were able to begin some experimental work on its control, but we have not as yet succeeded in getting perfect control. Mixtures composed of powdered sulphur and powdered arsenate of lead simply dusted over the plants where the caterpillars are present gave the best results. We hope to continue our control experiments whenever possible. It has been found that spraying with lead arsenate and Paris green did not give results hoped for.

War-Time Spraying Problems*

P. J. Parrott, Entomologist, New York Agricultural Experimental Station

THE spraying of orchards during 1918 is conditioned to a certain extent on the ability of fruit growers to secure competent help. The war is also exerting a profound disturbing effect upon the supply and cost of certain insecticidal materials, upon which growers have largely relied for the defence of their crops. Arsenate of lead, lime sulphur and soap have all advanced in price, and no definite statement can be made as to whether they will continue to rise still more or decline in price. Because of the vital importance of affording efficient protection against insects and plant diseases, the United States federal authorities have taken steps to insure an adequate supply of fungicides and insecticides at prices which will not be prohibitory. Present quotations range from 15c to 18c a lb. for paste arsenate of lead; 30c to 34c a lb. for powdered arsenate of lead; $8.50 to $10.00 a bbl. for lime sulphur, and 9½c a lb. for potash fish oil soap.

As with all commodities, the fruit grower should be prepared to adjust himself to the present or higher scale of prices. In an agricultural preparedness programme economy should be considered; but in spite of the increased cost of spraying supplies, it is good policy for growers to continue to use preparations of tested value that are familiar to them. Spraying is relatively not a large item of expense in the cost sheet for a barrel of apples, and generally speaking, no financial outlay brings greater net returns than that expended for spraying. Moreover, the foregoing insecticides are standard articles of the chemical trade. High prices stimulate competition which tends to greater production, followed in turn by reduced value. With the free play of the law of supply and demand, the cost of these commodities is likely to drop, although they may not be as cheap as before the war.

As to choice of the two kinds of arsenate of lead, whether paste or powdered forms, most of our growers have expressed a preference for the paste preparations. As to the actual merits of the two sorts, there is little to add that is not generally well understood. When used with water only, most brands in paste form probably adhere better than the powdered materials, although some of the paste preparations may possess very poor sticking properties. When combined with lime sulphur or bordeaux mixture experiments so far show that the two kinds of arsenates of lead differ very little, if at all, in effectiveness. However, this caution should be observed—in purchasing dry preparations select only those that are light and fluffy, and are to the touch an impalpable powder.

Substitutes for Standard Insecticides.

As a general recommendation it is not advisable for orchardists to purchase mixtures of unknown merit. In planning for retrenchment one should consider very carefully all propositions for purchases of insecticides based on economy or on substitution for preparations of established worth. A few suggestions as to certain materials may not be out of place.

White arsenic—By reason of possessing a supply or a desire to economize, the question is not infrequently asked as to the possibility of using white arsenic as a poison for fruit and leaf-eating insects. There are two serious objections to the employment of white arsenic for this purpose: First, it is soluble in water and may prove very destructive to foliage; and, second, when combined with salsoda or lime to make sodium or lime arsenite, respectively, these compounds cannot be used with lime sulphur without danger of burning the leaves. To those who have supplies of white arsenic, the suggestions is offered that it be made into sodium arsenite and used with bordeaux mixture for the spraying of potatoes. It may also be noted that white arsenic is not available and dealers in druggists' supplies offer no quotations as to price.

High prices for copper sulphate have led to the appearance on the market of a number of proprietary preparations of bordeaux mixture, containing also arsenate of lead. These are in paste form and require only the addition of water to have them ready for spraying operations. Because of convenience of handling they have a certain field of usefulness, especially for those who require bordeaux mixture and have not the facilities for making their own preparations. At strengths commonly recommended on printed circulars it should be noted that these commercial substitutes usually run low in copper sulphate, as shown in the accompanying Table 2, which fact should be considered in planning for effective control of diseases or estimating comparative cost with standard spraying mixtures. As they are chemically similar to bordeaux mixture a caution is given to growers that spraying of apple trees with them may be attended with injuries to foliage and with russeting and deforming of apples.

Calcium arsenate—This is a comparatively recent addition to the list of efficient insecticides, for which much credit is due to the Federal Bureau of Entomology. It is being recommended quite highly for certain purposes because of its toxic properties and cheapness, its cost being about one-half that for arsenate of lead. It bears the

One of 2,000 trees in the orchards of Lieut.-Col. Rance, Clinton, Ont. Ontario is likely to have fewer small orchards and more large ones like this in the future.

* Extract from a paper read at the recent convention of the Western New York Horticultural Society, held at Rochester, New York.

Table 2.—ANALYSIS OF FOUR PROPRIETARY BORDEAUX MIXTURES.
(On basis of 10 lbs. to 50 gallons of water.)

	Bordeaux Mixture 4-4-50	Brand 1	Brand 2	Brand 3	Brand 4
Copper Sulphate ..	4 lbs.	1½ lbs.	1 1-5 lbs.	1 lb.	1 1-5 lbs.
Lime	4 lbs.	1½ lbs.	¾ lb.	1 1-6 lbs.	1¼ lbs.
Lead Arsenate ...	3 lbs.	2 2-3 lbs.	4 lbs.	2 lbs.	1 4-5 lbs.
Water	50 gals.	50 gals.	50 gals.	50 gals.	50 gals.

usual handicap of most new spraying materials in that its merits are not generally appreciated and its full range of usefulness for all sections of the country have not been conclusively demonstrated. There is little question but that it is a promising arsenical which is well worth testing by growers. Its low cost makes a strong appeal when other arsenicals are so expensive. Calcium arsenate is quoted at 11½c per lb. for the paste and 22c per lb. for the powder in 100-lb. lots.

According to Dr. A. L. Quaintance, of the U. S. Bureau of Entomology, arsenate of lime can be profitably used for the control of chewing insects upon plants whose foliage is not tender. The poison, therefore, should not be used on the peach, cherry, plum, or other stone fruits, but may be used on apple, pear, grape and many vegetables. It may be combined with lime sulphur or bordeaux mixture without depreciating the value of the insecticide or the fungicide. For most chewing insects use three-quarters of a lb. of powdered calcium arsenate or two pounds of the paste form to 50 gallons of water, or whatever fungicide is used.

Nova Scotian Results With Arsenate of Lime

G. E. Sanders, Dominion Entomological Laboratory, Annapolis Royal, N.S.

ARSENIC in the form of arsenate of lime costs but little more than half of what it costs in the form of arsenate of lead. At the convention of the Nova Scotia Fruit Growers' Association all of the experimenters who had used it, agreed that the arsenate of lime, lime sulphur combination, gave less burning of the foliage than the arsenate of lead lime sulphur combination. The experiments of the Dominion Entomological Branch have for two years shown that more apples remained on the tree where the arsenate of lime lime sulphur combination was used than where the arsenate of lead lime sulphur was used. Experimenters and fruit growers all agreed that no injury had followed the use of arsenate of lime and lime sulphur for the first three sprays. These are points well worth considering, and when we remember that the material comes in powder form and does not cause any black sludge in the bottom of the spray tank, we must admit that the poison cannot be lightly considered.

In the papers and discussions at the convention, it was found that in some experiments and in several orchards, when used with lime and sulphur as a fourth spray, arsenate of lime had given some slight, and in a few cases, serious yellowing. This was in all probability due to the slow breaking up of arsenate of lime, liberating small traces of soluble arsenic. If arsenic had been freed in any considerable quantities as in the reaction of lead arsenate of lime sulphur, burning instead of yellowing would have resulted.

In many cases yellowing was caused by the grower diluting his lime and sulphur away below the spray calendar and not reducing the arsenate of lime. Knowing that arsenate of lime is unsafe unless protected, we know that it was impossible for this procedure to result in anything but yellowing.

The elimination of small quantities of soluble arsenic, such as causes yellowing, proved an easy matter in 1917. Arsenate of lime (¾ lb. to 40 gals.). which alone yellows badly, was made safe for four sprays by adding 10 lbs of hydrated lime to 40 gallons of spray The soluble sulphur (1 lb. to 40 gals.) arsenate of lime (½ lb. to 40 gals.) combination which normally yellows badly was made safe for four sprays by adding 10 lbs of hydrated lime to 40 gallons of spray. Arsenate of lead, 10 lbs. to 100 gallons, which normally yellows badly, was made safe in the Experimental Farm experiments by adding 5 lbs of hydrated lime to 40 gals. of spray.

For those who wish to retain the good points of arsenate of lime, and the point of cost is an important one, and do away with one defect that showed on the last spray in a few cases, we would recommend the adding of 5 lbs of lime, either slaked or hydrated, to 40 gallons of spray. We do not believe that the addition of lime is necessary for the pre-blossom sprays. We know of no case where it was necessary for the third spray in 1917, but in order to be on the safe side, we recommend for the third spray two gallons of lime sulphur, 1½ lbs of arsenate of lime and 12 lbs. of water slaked or hydrated lime to 100 gallons of water. This will not yellow apple leaves.

For the fourth spray we are recommending Bordeaux and not lime-sulphur. Arsenate of lime is safe with Bordeaux.

While not more than two per cent. of the growers of the Annapolis Valley had any complaint of yellowing (in a meeting of the Annapolis County Farmers' Association, 50 men, most of them sprayers, were asked for complaints about arsenate of lime, and not a man had any), we feel that the complaints made at the Nova Scotia Convention were well grounded and were due to traces of soluble arsenic. A few pounds of hydrated lime will eliminate all danger of yellowing, for we overcame a much more serious trouble of the same nature in the soluble sulphur arsenate of lime combination by the same means in 1917.

The low cost, the reduction in burning, the handy powder form and the freedom from the sludge in the spray tank, make arsenate of lime most desirable. The one defect of the new poison with lime sulphur, which showed in only a few cases in the fourth spray, can be eliminated as already outlined.

Why an Orchard Should Pay

Prof. J. W. Crow, O.A.C., Guelph, Ont.

The planting of commercial apple orchards in the Province of Ontario is highly desirable for several reasons:

Ontario is not producing enough apples for home supply, but imports annually from Nova Scotia, British Columbia, Oregon and California.

Production in Ontario is likely to fall off still more because no commercial planting is being done. Very few commercial apple orchards have been set out in this province since 1911.

Of the thousands of young trees set in the boom years of 1905 to 1911, a large proportion have already passed out of existence. Probably not more than 20 per cent. of the trees planted during those years will figure in the commercial production of the future, and certainly not more than 40 per cent. of them are alive and receiving reasonable attention to-day.

The home orchard will never again be an important factor in commercial apple production in this province, because it is not large enough to be worth while. In seasons when scab control is difficult or when prices are down because of a heavy crop, the return from the small orchard is not large enough to justify the expense and risk

involved. When conditions are unfavorable, the small orchard passes quickly into a state of neglect; this is why apple growing in Ontario is at such a low ebb at present.

Fruit is an essential part of diet. While it is true that in case of necessity people can live without it, it is also true that health suffers and nutritional complaints become more general in the absence from the dietary of fresh fruits and vegetables. The apple is the most important and most useful fruit of the temperate zone, and, from the standpoint of public health, its culture should not be neglected.

Spraying the Apple Orchard

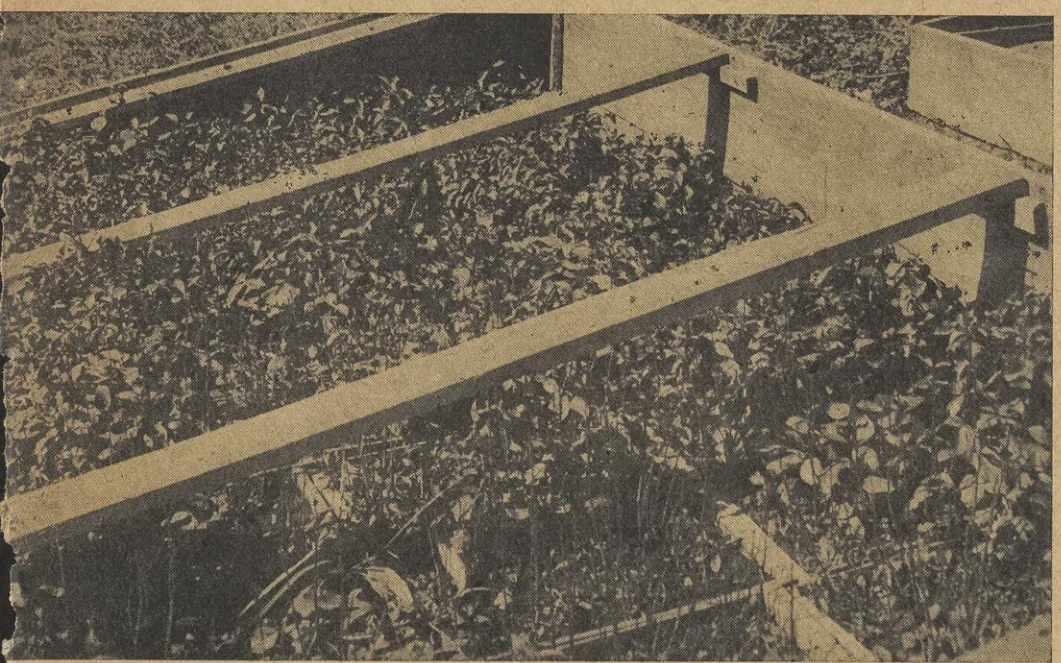
F. Carpenter, Fruitland, Ont.

Spraying Methods.

THE spray calendars give the time of application and materials to use for the spraying of apples. On examining them you will note in the figures, that 90 barrels of dilute spray is used in each of the summer sprays. This means a barrel of spray to approximately five and a half trees. To thoroughly cover every part of the tree at 200 lbs. pressure will require this quantity and the operators will not waste any if the work is properly done. Two men are used, one on the derrick with a line of hose (this man also drives the team) and one on the ground with a 30-foot line of hose. We spray two ways. The man on the ground can cover practically three sides of a tree, thus obviating the necessity of spraying four ways. He uses crooked nozzles and not only covers the outer portion of the tree, but also the inner portion where leaves and fruit are found and that are difficult to reach from the outside. We find it necessary to stop two and three times at each tree. Last year we used non-clog nozzle (containing a sieve) and found them very economical in time and material.

The quantity of arsenate of lead used, one and a half pounds to the barrel, is worthy of comment. The writer does not recommend this quantity for general use. The composers of spray calendars are in a position to advise why more lead is necessary. The use of larger quantities will naturally please the manufacturer and might be advisable in the case of apples where the grower does not use the quantity of spray per tree that we use. The writer maintains that this quantity of spray is necessary to do thorough work and as this quantity of lead has given the results desired (one pound to the barrel has been used with no difference apparent in results) we will use the same quantity or less this year.

It is claimed that arsenate of lead affects materially the fungicidal value of lime-sulphur. This being the case, it stands to reason that the less lead used in the mixture the stronger will be the action of the lime sulphur. This might account for some growers who use two and a half pounds or more of arsenate of lead to a barrel of spray, not obtaining the desired results in the control of apple scab. The writer again wishes to emphasize that he does not recommend the small quantity, but is only giving his experience in results. Different results might be procured with other brands of lead or by other sprayers.



This excellent germination of plum pits was obtained at the Horticultural Experiment Station, Vineland Station, Ont., where considerable experimental work with plums has been conducted.

Be Prepared.

The time of application is undoubtedly important and as it is limited to a few days for each of the summer sprays with a possibility of bad weather intervening, it is essential that the conditions under the grower's control be so arranged that no time is unnecessarily lost. Good hose, good agitation, engine protected from spray, and non-clog nozzles are important.

A quick filling of the spray-tank should be arranged for. Previous to two years ago, we used a tank-filler, drawing water from a creek near the orchard. One-half hour was spent in filling the 180-gallon tank and getting back to the orchard. Three years ago we installed a pumping outfit which pumps the water into the elevated tank, holding twenty-four barrels. A two-inch hose is used to fill the spray tank and five minutes is all the time spent in filling the tank with water and spray material. Thus twenty-five minutes is saved on each tank. It would have been impossible to have sprayed the orchard in time with one sprayer during the past two wet seasons without this filling outfit. As a labor saver the writer expects to use a "spray gun," this season, whereby one man is supposed to do the work of two.

Dust Spraying.

Dust spraying I believe is the method of spraying that will soon be in general use by efficient sprayers. An indifferent sprayer cannot hope to secure results with any spray or type of sprayer. As dusters become more generally used, we can at least hope for a more reasonable price for the outfit and material. We are getting results by using the liquid spray; have an outfit that makes the work comparatively quick and easy, and I believe cheaper than using the dust and duster at present prices. For these reasons, I will use the liquid spray this year, but expect, if dusting holds it present reputation, and the prices become more reasonable, to use a duster next year.

The best time to prune fruit trees is in March or April, after severe freezing weather is over and before growth starts. If it cannot be done then, defer the work until mid-June or early July. Do **not** prune during the period of rapid growth.

No other fruit crop can be grown with less trouble against insects than strawberries when properly handled.

What Fruit to Plant

Prof. J. W. Crow, O.A.C., Guelph.

I have a farm in the township of Willoughby, Lincoln County. Twenty acres I propose to lay out in orchard, gardens with shrubbery and small fruit. It is my desire to know exactly what are the proper things to plant on this ground, as it is clay. I am sending you by post a sample of the soil. I have it all under-drained. Fifteen acres I propose to put out in fruit. What sort of fruit trees would thrive on this soil, apples, peaches, pears, plums or cherries? What sort of small fruit, such as grapes, currants, raspberries, etc.? What in shrubbery, such as roses, lilacs, hydrangea, etc., and ornamental trees and shrubs, and what shade trees, such as oaks, elms, and maples, would do best?—H. L.

The sample of soil you sent looks like fairly stiff clay, and as I have some knowledge of the land in your vicinity, I would say it appears representative. This land is too heavy for peaches or sweet cherries, but should grow any variety of apple, pear, plum or sour cherry, also grapes, currants and gooseberries. It will grow any variety of raspberries, at least fairly well, although it is a little heavy for some of the better sorts, such as Cuthbert. It will grow roses, lilacs, and a long list of ornamental trees and shrubs, including pines, spruce, oaks, elms, spirea, bush honeysuckle, viburnum, and so forth. I do not think it will grow hydrangeas very successfully, but it will grow most of the desirable ornamentals. These statements are based, of course, on your statement that the land is already underdrained, as good drainage is essential for all the fruit trees mentioned, and for much of the other stock. although oaks, elms, and maples grow all through your district naturally on undrained land.

I do not know whether or not you wish me to specify desirable varieties, but I would suggest the following as commercial varieties of fruit trees. If you should wish a further selection of trees, especially for home use, I shall be glad to make recommendations:

Apples: Duchess, Wealthy, Snow, McIntosh, R.I. Greening, Northern Spy, This land is a little too heavy for Baldwin, although they thrive fairly well, but would not be long lived trees. Additional varieties for **home** use would be Red Astrachan, Alexander, Gravenstein and Golden Russet.

Pears: Almost the only commercial pear is Bartlett, although Clapp, Bosc and Kiefer are included in a good many commercial plantations in Ontario. Pears generally require somewhat lighter soil than apples, but will grow on a well-drained clay. Varieties of pears for domestic use are Summer Doyenne, Seckel, Sheldon, Louise, Bonne de Jersey and Winter Nellis.

Plums: Burbank, Bradshaw, Imperial Gage, Reine Claude, Italian Prune, German Prune. These are the best commercial varieties, and include, also, the best varieties for home use.

Sour Cherries: Early Richmond and Montmorency are the only important commercial or domestic varieties.

Grapes: The best commercial varieties for your land are Campbell's Early, Niagara, Concord, Agawam; varieties for home use are Delaware, Worden, Lindley.

Currants: In Red Currants the best commercial varieties are Fay and Cherry. In Black Currants the best commercial sorts are Champion, Naples and Saunders. For home use you might add White Grape and Moore's Ruby (Red). Any variety of Black or Red Currant will grow on your land.

Gooseberry: The American varieties of Gooseberry such as Pearl, Downing and Red Jacket are all hardy, and will succeed with you. The English varieties, of which Whitesmith and Industry are the best, are somewhat difficult to grow successfully, but so far as your soil is concerned they should be satisfactory. They would prefer a position rather shaded by other trees, and not too much exposed to the strong sun in summer.

Raspberries: As before mentioned, your land is somewhat heavy for varieties such as Cuthbert, which is really the commercial variety, although you can, no doubt, grow it with fair success. It is also the most desirable variety for home use. The Marlboro is an early variety adapted to heavy land, and a fair commercial sort, but not good enough in quality for home use. The raspberries mentioned are both red. Blacks are not grown to any extent commercially. For home use you might plant Smith's Giant or Gregg, although these would do better on lighter land.

Roses of all kinds, also Lilacs should thrive with you. Some of the best ornamental shrubs are Barberry, Flowering Currant, Deutzia, Dogwood, Bush Honeysuckle, Japan Quince, Lilac, Philadelphus, Privet, Roses, Spiraea, Caragana. Most of these come in several varieties, and of such as roses and lilacs there are many named sorts from which you may select to suit your preference.

The best road shade and lawn shade trees are **Hard Maple, Soft Maple, Norway Maple, White Elm, Red and White Oak,** although the two latter are rather slow growing. The best evergreen trees are **White Spruce and Austrian Pine.** The best low growing evergreens are Red Cedar (in variety), White Cedar, also Pinus Mugho and Pinus Montana. For descriptions of the varieties you should secure catalogues from Stone & Wellington, of Fonthill; E. D. Smith, of Winona; John Connon Co., of Hamilton, and Ellwanger & Barry, of Rochester, N.Y.

The Buffalo Tree Hopper

I have looked in vain in The Canadian Horticulturist for some reference to the Buffalo Tree Hopper. I have a young orchard (15 acres) apples pretty badly infested with this insect and unless I get some information I am afraid I will lose my trees. Any light either through pages of The Canadian Horticulturist or otherwise will be thankfully received.—G. C.

In Bulletin 250, issued by the Ontario Department of Agriculture, entitled, "Insects Attacking Fruit Trees," reference to the Buffalo Tree Hopper is described. The following is taken from this bulletin:

"This insect is found in all the fruit-growing districts of Ontario, and sometimes does much injury, especially to young apple and pear trees. The injury is almost entirely due to the egg-laying habits of the insect. The eggs are deposited on the upper side of the smaller branches and also in the case of young trees, on the trunks. In each instance before laying her eggs the female, with her sword-like ovipositor, makes a small, more or less crescent-shaped cut through the bark and then places the eggs in this. As soon as this is done, she makes another similar slit close to and just opposite the first, and deposits eggs in it too. The wood beneath these two slits does not heal, but causes an ugly scar which continues to enlarge for several years. As the whole upper surface of the branches and also, in exceptional cases, the trunks of young trees may be almost covered with these slits and scars, it naturally follows that such trees are weakened, dwarfed and more likely to succumb to severe winters or disease than uninjured trees. Some forest trees and shrubs are also infested.

"The winter is passed in the egg stage in the slits of the bark. The eggs hatch about the time the leaf buds burst. The young nymphs, after a very short time go to the ground, where they feed on almost any kind of succulent weeds, sucking the juice out of these. In July they begin to transform into adults which soon fly to trees and shrubs to lay their eggs. Oviposition continues all through August and September up to the first severe frost, which kills the adults.

"A simple means of control is suggested by the fact that the nymphs cannot thrive on the foliage of trees, but go to the ground and feed on plants such as thistles or other weeds; hence, if the orchard is plowed and kept free of weeds during May and early June, the nymphs will be starved. Trees that have already been weakened should be given good cultivation and fertilized to stimulate growth and enable them to recover more rapidly. Of course, care should be taken not to cultivate too long for fear of winter injury."

The War and the Fertilizer Problem*

Geo. W. Cavanagh, N.Y. Agricultural College and Experimental Station, Ithaca, N.Y.

WHEN the great war broke out in Europe, in August, 1914, fruit growers foresaw that their fertilizer supply would be curtailed by the discontinuance of the importation of the German potash salts. During the fall and winter months many inquiries reached the New York Agricultural College and Experiment Station as to what the result would be if a new supply of potash were not found. It seemed to be in the minds of men that the supply of potash was of the utmost importance for the production of our grains, for the growing of potatoes, and the development of our orchard crops. Looking back from three years' experience, I am inclined to believe that this anxiety on the part of the growers was the result of a careful and well-executed plan of fertilizer propaganda on the part of those interested in the sale of potash. Certain investigators and teachers were never in quite full sympathy with some of the popular teachings on the economic necessity for the use of as much potash as was frequently advised.

Since that time, the use of potash has been greatly curtailed. During the past year, there were produced in the United States, from various sources, approximately 30,000 tons of potash, an amount exceedingly small in comparison to that which was used prior to 1914. The diminished use of this material has not been accompanied by a diminished production of our principal food crops. The danger that was apprehended in the fall of 1914, has not materialized.

The war continued, and last April the United States saw fit to enter it, and now we are faced with new and much more critical problems affecting the supply of fertilizer. In order that some of these problems may be a little more clearly understood, I desire to draw attention to certain things fundamental to the production and manufacture of commercial fertilizers. All fertilizers consist of mixtures of three classes of materials, containing respectively, the elements of plant food, nitrogen, phosphoric acid and potash. The usual carriers of these elements are the muriate and sulphate of potash for the potash, acid phosphate for the phosphoric acid, and nitrate of soda, ammonium sulphate, calcium cyanamid, or some vegetable or animal by-product, as cottonseed meal or tankage. When a mixture is made so that it contains some of each of the three essential elements, the mixture is known as a complete fertilizer.

Up to August, 1914, for all intents and purposes, Germany may be said to have controlled the world's supply of potash from her mines at Stassfurt. The nitrate of soda is obtained from Chile, in South America, the ammonium sulphate is a by-product of our coke and gas industry, and the animal and vegetable by-products come from our meat industry and the making of vegetable oils. All the nitrogen-bearing materials used in our fertilizers are obtained in either North or South America. The production of acid phosphate, which furnishes available phosphoric acid in the most economical form, depends on the treatment of a rock phosphate with sulphuric acid. This rock phosphate is obtained in mines in Tennessee, the Carolinas, and in Florida. In its manufacture, the ground phosphate rock and sulphuric acid are used in approximately equal parts by weight For example, 1000 lbs. of the ground rock treated with 1000 lbs. of sulphuric acid, produces about a ton of acid phosphate. Prior to the war, there was produced in the United States, a large quantity of sulphuric acid over 80 per cent. of which was utilized in the manufacture of this fertilizer. Our entrance into the war has had a decided influence on the production of this material for the reason that the Government must use great quantities of sulphuric acid in the production of munitions. All explosives, including gunpowder, smokeless powder, nitro-glycerine, and trinitrotoluole, commonly known at T.N.T., require nitric acid in their production. In this country, all the nitric acid is produced by bringing together sulphuric acid and nitrate of soda, the same material which is commonly used as a source of nitrogen in fertilizers. This of necessity created a rival demand for sulphuric acid, with the result that the fertilizer manufacturer, whether he produced his own sulphuric acid, or purchased it, had to do so at a decidedly increased cost. This same reason also accounts for the increase in the cost of nitrate of soda.

The next question to consider is whether a partial or complete withdrawal of acid phosphate from the market would be attended with no more serious results than followed in the case of withdrawing potash. It is a question of the relative agricultural importance of the two constituents, phosphoric acid and potash. If we consider the prices at which these constituents sold before the war, it might be concluded that they were of about equal importance, since they sold for approximately the same price per unit. Equality of cost does not necessarily carry with it an equality of value. If further, we consider this matter from the point of view of amounts of these materials used by growing crops, we may also be inclined to think that they are of equal importance. For example, good authorities give the following figures as the amounts of phosphoric acid and potash found in certain of our standard crops:

	P. Acid.	Potash.
20 bu. of wheat	20	35
50 bu. of oats	18	45
65 bu. of corn	22	60
150 bu. of potatoes	20	75

While the foregoing figures show

*Extract from an address delivered at the recent annual convention of the Western New York Horticultural Society.

Marking ground in the greenhouse, preparatory to planting lettuce.

A McIntosh Red apple tree, 6 years old, at Rutland, B.C., before pruning.

that there is a greater demand for potash than there is for sulphuric acid, it must not be considered that the withdrawal of potash would be attended with more disastrous results than the lack of phosphoric acid.

The Real Problem.

In the last analysis, it is not a question of the relative importance of these two constituents to the production of crops that confronts us. If it were, the figures given would indicate that the withdrawal of our potash supply would be much more serious than the withdrawal of the phosphoric acid. We must not lose sight of the fact that our problem is a question of the supply of these two constituents and that the quantities furnished through commercial sources, as in fertilizers, is not the main source for the production of crops. The phosphoric acid and potash that went into last season's wheat crop were not all purchased in the form of fertilizers. Our principal source of these constituents is in the soil itself. The using of fertilizers is in reality the making of very small additions to the soil's supply. It seems to me that if we would get a correct view of the problem, we must not fail to take into account the supply of these things in the soil.

In order to have some concrete evidence on this point, I secured samples of soil taken from farms of well-known orchardists. These samples were analyzed for their total potash content. The average weight of soil per acre to the depth of eight inches, approximates 2,000,000 pounds. Using this figure as a basis, I computed from the results of the analyses the quantities of potash present in these soils per acre, and found in the soil from:

	Potash
Hiram McOmber, North Rose, N. Y., ...	32,800
Clark Allisk, Medina, N.Y.	35,600
B. J. Case, Sodus, N.Y.	37,200
Geo. Wignall, Walworth, N.Y.	38,400
F. Mason, Albion, N.Y.	38,400
W. L. Markham, Buffalo, N.Y.	42,000
H. E. Wellman, Kendall, N.Y.	43,200
F. E. Wood, Waterford, N.Y.	45,400

The average quantity of phosphoric acid per acre, ranges from 2,000 to 4,000 lbs., and is seldom above the latter. It will be seen, therefore, that the relative quantities of these two constituents on hand are in about the proportion of eight to ten times as much potash as phosphoric acid. These figures only tend to confirm what has been known to those who have watched fertilizer experiments, namely, that for our soils, an adequate supply of phosphoric acid is of greater importance than a commercial supply of potash. The source of phosphoric acid is within the boundaries of our own country and to make it commercially and agriculturally available, three things are essential. First, the mining of the rock phosphate; second, the production of sulphuric acid; and third, adequate transportation facilities. I have no information concerning the present status of the mining of the rock. In the manufacture of sulphuric acid before the war, this country imported from Spain about 1,250,000 tons of pyrites. Pyrites is a mineral consisting of iron and sulphur which is used as a source of sulphur in the making of sulphuric acid. Owing to well-known difficulties in the ocean-carrying trade, this supply from Spain is to all intents and purposes cut off. There seems to be a greater need for ships for other purposes. In addition to this, it is learned that the Government will require 1,500,000 tons of sulphuric acid during the year 1918, to carry out its program. All this points, it seems to me, to an inevitable increase in the cost of phosphoric acid.

Small Fruit Suggestions

L. J. Farmer, Pulaski, N.Y.

One grower tells me that the St. Regis raspberry is more dependable, even for the spring crop, than the Cuthbert. He says that it seems to become more fruitful from year to year, after several years; while Cuthbert seems to fail and run out after two good crops. Another man tells me St. Regis is a failure so far as its fall crop is concerned, and the berries are too small for market in the regular season. All this comes from New York growers. One man tells me that he sows buckwheat among his raspberries and currants when cultivating in early spring. No more cultivating is done until after fruiting. The pickers trample down the buckwheat and it acts as a mulch and smothers the weeds. He says it is always wet you know under buckwheat straw. Another man tells me that unless he maintains constant cultivation among his raspberries and currants until the fruit begins to ripen, the berries will dry up. The soils must be different. What is poison to one, is food to another. You must find out for yourself.

I find that one of the greatest values of a winter mulch for strawberries is in killing the early crop of spring weeds. If the mulch is left on until the plants have grown a little and look a little sprouty, it kills myriads of weeds. Even if your soil does not heave and cause winterkilling of your plants, it will pay you to experiment with mulching. Try mulching part of your bed and leave the rest unmulched. In picking time, notice how clean of weeds your mulched portion will be compared to the unmulched, even if the straw has been removed from the field.

Mulching with straw to overcome the effects of drouth does much, but cultivation does more. The wide matted row produces one or two good pickings in a very dry season and then sizzles up. Suppose that you dig up all the plants but the narrow row of parent plants; or better still, don't allow the runners to form a wide matted row, cut them off; then cultivate this row close up to the plants, but shallow, from the time that the berries set until picking is over and you will be surprised at the quantity and quality of the fruit produced.

Dust Kills Slugs

Dust like lime, soot, tobacco dust or salt is recommended to kill slugs, or the shell-less snails that often cause damage in greenhouses. These creatures are covered with a slime. Hence, ashes or air-slaked lime spread over their routes of travel will adhere to this slimy coat, and the slug soon dies.

Soot, tobacco dust, salt and hydrated lime exhaust the pests but are not caustic. Sliced vegetables or crackers sprinkled with arsenical powder have also been valuable in reducing the numbers of slugs.

When pruning do not cut out large limbs.

Never prune in frosty weather. Frost-bitten wounds are slow to heal.

The same tree after pruning. Notice the proportion of young wood cut away.

European Foul Brood: Its Prevention and Cure*

J. F. Dunn, Ridgeway, Ont.

IF European foul brood is in the locality, it is sure to pre-empt an apiary of hybrid bees. It always seemed to me that blacks go out of their way to get it; and when they reach their objective the colony is doomed. If they contract the disease in the spring, they may survive the season, to go into winter quarters weak in bees. If there is a dash of good Italian blood, they may get through the spring; and unless treated they will be of no further use, and will be a cause of infection to any bees in the vicinity. There are several strains of Italian bees that are immune, or nearly so, to E. F.B., and the very best locality in which to raise queens that will produce immunity to Bacillus pluton is where this disease has been present for some time. If you are purchasing Italian queens when treating your apiary for E.F.B., do not buy from the man that advertises "no foul brood has ever been seen in this part of the country." Anyone who has had several years' experience in a locality where E.F.B. is often cropping up, knows how much more frequently his home-bred Italian queens will reproduce in her daughters' immunity from E.F.B. than will stock purchased from the queen breeder who has "never seen foul brood." The Goldens or bright yellow bees are, as a rule, said to be better resisters of Bacillus pluton than the leather-colored, and sometimes we think this may be true. But the Goldens have other characteristics not so desirable, at least they have not with us measured up with their more modest appearing sisters, the three-banded, leather-colored Italians. They are beautiful, gentle, and we were about to add idle, although that is putting it rather strong. Occasionally we find a colony of this race that will pile up as many supers as any hive in the apiary, but we have never succeeded in finding a queen in such a hive that would reproduce herself in her daughters, and we look out that there are no drones flying from these colonies during queen rearing.

"All is not gold that glitters," and "a peach in the dance hall may be a lemon in the kitchen." While it may be true that goldens are slightly more resistant to E.F.B., it is equally true that certain strains of leather-colored bees will, if given a fair chance, clean out E.F.B. from a hive and **keep it out,** and such queens are more often found in districts where this disease has been in evidence for several years, than where "foul brood has never been known." Survival of the fittest is more than an axiom; it is a condition. If you have in your own apiary developed a strain of Italians that have proved immune to this disease, don't change the blood. If you are so situated that you get your queens mated with drones from your own hives, you are fortunate. If you cannot do this, because undesirable drones from your neighbors' yards will mate with your choice queens, then buy your queens from the man who sent you that good stock. "Inbreeding," you say. Sure, what of it? If you or the man who bred the queens for you has developed a race of bees that have all of the virtues and none of the faults, why change the strain when judicious inbreeding will intensify all the good points? I say "judicious inbreeding." Who does not know that injudicious inbreeding will work disaster; yes, and in the superlative degree?

If you are buying queens, get them from your best and, if possible, the nearest breeder. A journey of say 1,000 miles in a mail bag is not conducive to longevity, and such queens sometimes turn up missing at the close of the first season, and usually are not of much use; in fact, are very often superseded the second year. If you buy from a southern breeder, and you must do that if you want them early, you can get good queens in the south. If you buy southern queens, purchase from the man who uses northern-bred queens for the queen mother. There are several queen breeders who are getting a good many satisfied customers by following this course.

Complete the Job.

In Italianizing your apiary, you should make a complete or a thorough job of it. On my trips of inspection, my hardest job has been to get the people to do this. In a yard of hybrids, probably but one colony would be diseased, and the owner seemed to think if he Italianized this one colony there would be no more danger. A woman in politics is like a race in a mud puddle; and one colony of Italians in an apiary exposed to E.F.B. is a parallel example. Although no evidence of disease might be found in the other hives, a subsequent visit nearly always revealed the fact that the other colonies were ready for treatment.

In the spring of 1915, we inspected two apiaries in the township of Bertie, situated a quarter of a mile apart. Both apiaries were infected with E.F.B. Mr. A. Italianized only those who had the disease. Mr. B. Italianized every colony. During last summer I again visited those apiaries. Mr. A.'s bees were all badly diseased and about 100 lbs. of honey in the supers of 14 hives would cover the crop. His neighbor had a fine apiary of as nice Italians as I have ever seen; not a hybrid or black in the yard, and a crop of honey any beekeeper might be proud of, some of it stacked up three full-depth L. supers high, solid with honey, and certain-sure signs present convinced us more could have been secured if he had given his bees the chance to store it by adding more supers at the right time. Not a cell of disease was found in his yard. If any of his young queens mismate, he destroys her and puts in a purely-mated one. The man who does that, if he has the right strain of bees, can snap his fingers at old Bacillus Pluton. If you have to buy the queens, it may cost you a little extra, but you are just paying a litle insurance money tempor-

Beekeepers' Field Meet, held at the Home of Mrs. F. N. Wesgate, Portage la Prairie, Man.

* An address given at the annual meeting of the Lincoln and Welland Beekeepers' Association

arily, and your bees are paying not only the premiums, but big dividends also.

You will notice I have said nothing about the cure or treatment for E.F.B. It has been explained and demonstrated over and over again at our field days and demonstrations, and the bulletin covering the same can be secured at any time from the Department.

The "Reversible" Bottomboard

C. A. Vincent, Picton, Ont.

IN discussing the merits of any particular style of bottom-board, one has to consider their adaptability to the needs of the bees at different seasons of the year, and the practical value of them when being manipulated.

For a number of years the large factories have furnished a board with only 3-8 inch cleats on one side, a 3-8 space under the frames being considered quite sufficient. But when the beekeepers became convinced that swarm control, if accomplished, would contribute more than anything else toward success, the bottom-board was provided with deeper cleats on one side, in order to provide better ventilation, or stronger currents of air in under the frames, during the period when such an influence would do its part in controlling the swarming impulse. So now we have what is called the "reversible" bottom-board, 3-8 of an inch on one side, and from 5-8 to 7-8 of an inch depth of space under frames on the other side when reversed. To use this board as designed, the 3-8 space would be used during the cold weather in spring. When the colony becomes strong, and the danger of the swarming impulse approaches, the board is reversed, returning to the shallow depth after the honey flow is over.

Not a Nice Job.

Reversing the board is not a pleasant task for one person to perform. The hive-containing super has to be lifted from its stand and set to one side, the bunch of bees left on the bottom-board has to be dumped in a heap by striking the end of the board on the ground, the board put back on the stand, deep side up, and the hive then returned to its stand on the reversed bottom-board. This operation disturbs and often enrages the bees, besides using up a lot of time.

Many beekeepers overcome this difficulty by using the deep entrance continuously. But this necessitates the use of some kind of protection in the early spring, as well as later in the season, from the cold winds which would drive into an entrance 7-8 of an inch deep by the whole width of the hive. It also would compel one to use some kind of screen when wintering in a cellar to which mice have access.

I know one large beekeeper who uses a 3-4 inch entrance continuously, but he protects the bees in spring and fall by tacking a thin piece to the front of the hive, with a shallow entrance cut into it, which he removes again during warm weather and when putting bees in cellar. The A. J. Root Co. furnish an entrance block with their reversible bottom-board, which reduces the entrance space more than half of the shallow side of the board. These devices are all right, only that they afford no protection against mice, when wintering in a cellar to which these pests have access, because the bees would not get air enough if they were left on the hive.

Another Method.

I have been using reversible boards for part of my bees for several years, the deep side being one inch deep. I believe bees will winter in cellar a little better with a deep space in under the frames, than they will with a 3-8 space and the hive raised at the back by 1-2 inch blocks. But last fall, when I put my bees in the cellar, I tore the deep cleats off all the bottom-boards.

In preparing bees for the cellar that had deep entrances, not only did I have to provide a screen of large enough mesh so that bees could pass through them to deposit their dead upon the alighting board, during the period of their confinement, in order to keep mice from spoiling the combs, but this screen had to be tacked fast to the hive shortly before going into the cellar, which not only disturbs the bees, but chills those to death that attempt to fly, on account of cold.

I have practised raising hives up at the back by pushing little blocks of half-inch stuff in between the body and bottom-board when preparing bees to winter in a cellar, for a number of years, with good success, and will likely depend entirely upon this method in the future, unless I hear of a better way.

By using a piece of steel about 14 inches long, made thin at one end, to push in between hive body and bottom-board, to pry them apart with, the blocks may be inserted easily and rapidly, after the hives have been tiered up the desired height. But there is another reason, as already intimated, why I have abandoned the reversible board. It is because I believe I can put the deep cleats under the hives. When the proper time comes for their use in order to prevent swarming, and when working alone, with less labor and annoyance both to myself and the bees, by having the required depth of cleats loose, tipping the hive over to one side sufficient to push under one cleat at a time. The bees scarcely know you are doing anything to them, and if one is careful, few bees need be crushed.

Of course the hive cannot be clamped fast to the bottom-board when using the loose cleats between the two, but if the stand upon which the hive sits is firmly placed, and properly levelled, the hive will not be easily upset, for the bees soon wax the cleats fast to the bottom-boards.

I would like to hear through the columns of "The Beekeeper" from those who winter their bees above ground, as to the adaptability of the deep entrance to their requirements.

Our Lady of the Sacred Heart Apiary, Huberdeau, Que., Rev. Ad. Lauzon, S.M.M., Manager.

Spring Protection Cases used by H. H. Selwyn. Hives in background just carried from cellar.

Spring Care of the Bees

H. Harley Selwyn, O.A.C., Guelph, Ont.

"Are God and Nature then at strife,
That Nature lends such evil dreams?
So careful of the type she seems,
So careless of the single life."
—Lord Tennyson.

PROBABLY at no time during the annual cycle of the colony do the bees have such adverse conditions to contend with as those existing from early April until the end of May. In short, spring upbuild makes the greatest demand upon the vitality of the community. At this period of the year the bees not only have a continuously fluctuating temperature to contend with day and night. They must also be able to endure cold, driving winds from the north and east, and bring home, in the face of sudden squalls of rain or sleet, the precious pollen so necessary in the development of the oncoming generations.

Time, too, presses hard upon their heels. Their span of life is fast drawing to a close, and before they go, adequate preparation in the form of completed brood must be left to carry on the race. Six weeks from the time of setting out, in northerly latitudes, is about the maximum a bee lives. This may be determined by glancing over the frames of brood about the first of June and noting the almost entire absence of old bees. They have gone, but not before their work has been well and faithfully performed.

The apiarist then should aim to facilitate in every way the endeavours of the bees to build up an efficient working force for the harvest now approaching.

One way in which this may be accomplished is by giving adequate spring protection to each colony, so that the bees devote the minimum of their energy in heat production.

Details of a Spring Casing.

The photo accompanying illustrates to some degree a spring casing for an 8-frame hive. The case is made on the same plan as a honey section, in that it folds up from the flat into a rectangular box, hinging at three corners and hooked at the fourth. An entrance block is put across the front of the hive to hold up the shavings; the case is slipped over the hive and pulled back tight against the entrance block, while shavings are packed in at the rear end of the hive. This wedges it secure, and the balance of the 3-inch space at sides and front may be filled at leisure. A hundred of these cases may be put in place in a morning. They are very light, being made of a substantial roofing paper on a wood frame. A broad, rough-board cover goes over the whole. The entire lot of cases pack away in the flat in a very small space.

Is Spring Protection Efficacious?

Although the writer realizes, in company with beekeepers in general, that double walled hives must be helpful to a colony during the vicissitudes of spring, yet there is a possibility that the idea has been over emphasized. The following observations bear out this possibility.

Colonies, in the yard in question, covering a period of three years, which were not packed, were just as populous as those which had been given this additional protection from the date of setting them on their summer stands.

The springs of the years referred to were not favorable by any means for brood rearing. All hives had good metal telescopic covers and plenty of paper over the quilt.

The matter seems to resolve itself to this: If the yard is situated on a southern slope, with good protection from the north, in the form of higher land, or bush; if the colony is strong in bees (covering 6 frames); if it has a tight, water and draught proof cover, plenty of honey and an energetic queen—that colony, packing or no, ninety-nine times out of a hundred, by the 1st June will be overflowing with young bees ready to gather in the harvest.

In the large apiary there is no place for the weak colony in spring. These are the ones which the protective casing may foster, but far better would it be to carry them along over other strong colonies, to be separated at fruit bloom, when conditions are more favorable for their progress.

No, there are two sides to the question of spring packing cellar wintered bees, and the writer would like to see some further discussion through these columns.

Starting Beekeeping

John Fixter, Ottawa.

A young man who has to earn his own living, is ordered by the doctor to find out-door employment. Could he make a fair living keeping bees? or bees combined with market gardening and poultry? Would bees pay to keep a large apiary within two or three miles of Ottawa? At the utmost the young man in question could invest $200. How would you advise him to start?—Subscriber.

I would advise you to hire with a good beekeeper for at least one year. By that time you will know whether or not you are going to make a beekeeper. If you find you enjoy the work, you will then have no difficulty in making a good living. Bees, gardening and poultry make a good combination, if there is plenty of suitable help available. If you make a success of a few colonies of bees you can increase your apiary and run out apiaries to take all of your time. As to the Ottawa district, I think it is now stocked as much as it can stand. I would advise trying some other district in which to start.

Live Topics Discussed by Beekeepers

THE annual meeting of the Lincoln and Welland Beekeepers' Association was held in Welland, Feb. 21 and 22, with an evening session on Thursday. This meeting, while well attended, was not up to the average of previous years. For reasons but too well known by those who were once enthusiastic beekeepers, it is safe to say there is to-day not a single bee living within a radius of Thorold town or Welland city; and those who, after time and again restocking their apiaries with bees outside the "danger zone," only to have them melt away during the summer, have become discouraged and quit the business. This fact had an influence on the attendance. A. E. Hoshal, of Beamsville, the president, occupied the chair.

A round table talk on the conditions responsible for the heavy losses near Welland and Thorold occupied nearly all the afternoon of the first day. The officers for 1917 were re-elected for 1918. It was decided to give each 1918 member an Italian queen as a premium. The president, who in the absence of Mr. Armstrong took the topic, "Bees in pound packages from the South," gave as his opinion that the two-pound package, all things considered, paid the best. A comb of brood, placed in the hive at the time of introducing the combless bees, was a big boost. If the two-pound package was secured about April 15, and full combs supplied at the right time, they would probably beat a colony wintered over. The point made was that bees secured from the South were all young and full of vigor, while colonies wintered here were at time of year largely composed of bees hatched the fall before, and after withstanding our northern winters were pretty well worn out. Then the queens were young and virile, thus putting the colony in fine shape for the harvest.

Some were of the opinion that April 15 was four weeks too early for the amateur, and that the commencement of fruit bloom, which in this district is usually from May 10 to 24, would be the most desirable time for one not an expert. O. L. Hershiser, of Kenmore, N.Y., who, besides his apiaries in New York State, operates a large yard at Perry Station, Ont., was of the opinion that it would not be easy to secure either bees or queens this year. In response to the request of the Department of Agriculture at Washington, queen breeders were going out of that branch of apiculture and would give their whole time to the production of extracted honey, which was needed not only to feed the armies of the allies, but was also used in making nitro explosives in ammunition. While a certain number of queens might be purchased the supply would be limited and prices higher than in 1917, and Southern breeders were loaded up with orders already.

Mr. Hershiser advocated feeding bees later than is the usual custom. He feeds late in November and early in December, but with such late feeding the bees should be packed before they were fed. Bees having winter stores of late-gathered honey, and on which they might winter poorly, should be given 10 lbs. of 2 to 1 sugar syrup late in the season. This 10 lbs. would just about represent the amount consumed by the bees before spring brood-rearing started. They would be in much better shape to withstand the trying conditions of spring. He advised letting bees severely alone in the spring that showed external conditions of prosperity. At the advent of fruit bloom he places one full depth super over all strong colonies (leaving off the queen excluder), and more as fast as required. There may be at the time of clover bloom brood in nearly every super. He then extracts all honey that is ripe, puts the queen below, a queen excluder is placed over the brood chamber, then a super containing extracting combs, and all brood taken from supers is then placed in a top storey over the empty combs. Extracting combs are then given as fast as the bees can take them. With this management not more than three per cent. of his bees swarm.

Asked if honey from goldenrod was safe for wintering. Mr. Hershiser replied that it was a fine grade of honey and safe for winter. One year his bees gathered 5,000 lbs. from this source alone. A. E. Hoshal demonstrated his method of handling bees and gave an ingenious method of finding the queen. W. B. Angle handled the question drawer to the satisfaction of every enquirer. J. F. Dunn, of Ridgeway, handled the topic, "Uniform v. standard supplies in the apiary." He also gave an address on "E. F. B.," which is published elsewhere in this paper.

Notes by a Traveling Beeman

Morley Pettit, Miami Beach, Fla.

AFTER sending you the notes of travel which appeared in the February number of The Beekeeper, we secured a Ford at Jacksonville and started south. The Dixie Highway, which extends from Michigan to the southern tip of Florida, is at its best in this State, where roads do not have to resist deep freezing, and where good road material is available almost everywhere. From Jacksonville, the northern gateway of the State, to Miami, on the southern tip of mainland, the highway runs along the east coast, much of the way skirting the Indian and Halifax Rivers, great picturesque inland arms of the Atlantic. Below Palm Beach the Atlantic itself is in view from time to time.

The soil being practically all sand, natural roads are usually impassable for motor traffic. Sometimes deep banks of clay are found just under the sandy surface, and the clay is teamed out to make a sand-clay road —the poorest substitute for natural roads, as it is very greasy when wet. The next best road is made of shells, which are found in great deposits, resembling our gravel pits. These are laid with a steam roller, and under pressure and traffic they cement together, making a smooth, hard surface like pavement. The best road of all is the coral rock which underlies the most of peninsular Florida. It is crushed and put down the same as the shell. When properly made and coated at once with asphalt oil, these shell or rock roads are simply wonderful for motoring, and many miles of such roads extend all through the southern part of the State. Farther north brick roads are quite common. There are said to be only two bad stretches on the Dixie Highway between here and Detroit, and we have the promise that these will be put in good shape before another winter season, so this looks like a good place for the man with a car who needs the winter warmth and can be spared from war work next winter.

One's first impression of the Florida landscape in winter is depressing. Only a very small percentage of the land is under cultivation. Much arable land is idle, and very much that is thinly covered with natural growth has rock so near the surface that it is of very little value. Most of the soil is sand, which needs lots of fertilizer to make it grow anything. The saw-palmetto, which grows in the form of individual leaves or fans, one to three feet in height, is the most common weed, and covers the ground everywhere that pine trees grow. It is a good honey plant when it blooms, but it does not always bloom. The jungles of palmetto trees, slim trunks twenty to thirty feet in height with a tuft of long feathery leaves at the top of each, also make good bee pasturage when conditions are right. There are many other honey-bearing plants, including the black mangrove along the keys where the mosquitoes grow, and the blossoms of the citrus groves, which are rather uncertain as to value. On the whole, the impression I get from observation and from beekeepers, is that prospects for keeping bees in Florida are not half as bright as in Ontario. The only real good section seems to be the tupelo districts of the northwest, and these are said to be malarial at some seasons.

Have Their Own Difficulties.

I said that the winter landscape is at first depressing. This, perhaps, is because of the idea one unconsciously gets that summer prevails here in winter time. It does not. The winter is shorter and warmer than at home, but there is a time when three is very little growth. Bees are unable to support themselves except in a few specially-favored places. In fact, the rule is, that on account of their flying every day they require more stores to winter than in Ontario. Supers have to be left on all the time because moths are always active, and in some places ants are so active that the beekeeper must look frequently for queenless colonies to prevent their being overcome and their combs destroyed by ants and moths.

But there is something very attractive about motoring over Florida roads, even in winter. Chief is doubtless the thought that you are escaping the icy blasts and fuel difficulties of the north. Then there are the vistas of tall, straight pines, towering above their carpet of palmetto, the almost impassable jungles of palmetto trees, and the watery wastes of swamp, overgrown with palmetto grass. Frequently broad-branching live oaks, hanging thick with Spanish moss, over-arch the road, then areas of grey-black potato land, and groves of citrus trees, loaded with fruit, lead into some beautiful town. Farther down State hundreds of acres of pineapples are seen, and groves of coacoanut palms with clusters of nuts, and rows of Royal palms skirt the road.

A commendable effort is being made by Government officials and energetic northerners, who have made their homes here, to develop all-year-round farming. I am told that the value of livestock in the State has increased by several million dollars during the last three years. A vigorous campaign is being conducted to have a large acreage

of castor beans grown to produce lubricating oil for aeroplanes. Sugar cane growing is also being promoted.

There is no doubt that winter gardening, citrus fruit growing and general farming for the year around can be, and are in some cases, made profitable, but it remains, and probably will continue to remain, for the tourist from the north to be the most paying proposition in Florida, whether he buys real estate, which may in some future day and generation become worth what he is now asked for it, or whether he pays a good stiff price for the privilege of enjoying the finest climate that can be found almost anywhere in English-speaking America in winter.

There is nothing much in Florida but the climate, the good roads and the water. When you have seen oranges and grape fruit on the trees, and palm trees and Spanish moss, and samples of southern architecture, and some of the strange fish from the sea and around the tourist hotels, you are ready to settle down to fishing and boating and loafing on the beach in a bathing suit. In either case, you burn terribly at first, then your skin all peels off, and finally you tan or freckle, according as you are constituted, and each day you look more like a Seminole Indian, and you talk of how brown you and the other people are, and how warm the water is getting, and how bad the meals are at your special lunch, and how they rob the tourists down here, and how cold it is up home. Oh, you have a most delightful and edifying time, till suddenly you wake up and want to go home and get back to your regular duties, and see the good green fields and rich brown earth of good old Ontario again. Then you dress and pack and start, and getting home is the best of all.

Shall We Specialize?

Sam Ray.

LONG years before we got our laws, our fathers handed down the saws that still you hear where'er you go from guys that say "I told you so." And from this mass there floats to-night, a little prov-b quaint and bright: "Unless you want an omelet, don't put all eggs in one basket."

"If you would spend a life of ease, you've got to specialize in bees." This was the dope that John Doe sprung when 1917 was young. The year before the honey poured, from every flower and moss-grown board, and while men plowed and tedded hay, the bees just worked their lives away. They worked from dawn till late at night; they plugged each dad-blamed section tight, with nectar fit for gods or men, at speed surpassing human ken. The queens laid eggs by tens and fives, the drones en masse forsook the hives, for workers whispered in their ear "Vamoose, this is our busy year." These workers carted home the sweet, through April shower and August heat. They filled their super tier on tier, and every blooming crevice near that bee man's place with honey dripped until the winter frosts had nipped the buds from all the flowers that bloomed. And meantime honey prices boomed.

"Twelve tons of honey! Hully gee! Insects are good enough for me," said Uncle John, as in his socks he tucked three thousand shiny rocks. "No more with pigs and cows I'll mix. My bees could show them forty tricks. I'll sell my honey every fall, then pike it for the date palms tall. I'll save enough on fuel, by George, to fill the old Niagara's gorge."

And so he sold off all his pigs, his reaping hooks and thing-me-jigs. His father's farm went by the board to make a payment on a Ford. "What need have I of land," quoth he, "I'm partner with the busy bee."

So by and by the next year came, but honey didn't flow the same. The winter stayed till late July. The active season floated by, but still the bees sat round and died, for nothing could they do beside. And Uncle John, he fussed around, he tore his hair and beat the ground with angry heels, for where was he without the aid of Brother Bee? As summer swiftly passed along I thought I scented something wrong. John wore an air of dark blue gloom, but still the clover didn't bloom. The bees forgot the taste of hon. and gulped down sugar by the ton, and when they'd cleaned up last year's store, they licked their lips and cried for more.

One weltering August afternoon, I found John crazy as a loon. "What's like the matter? John," I said. "You've cursed enough to raise the dead." Then sobbing like the willow trees, he pointed to his wayward bees. To where they clambered out the door and took the air with sullen roar. They circled like a bi-plane new as up they piked it toward the blue. Old Uncle John let out a groan, "They've taken flight for parts unknown." And as he lay expiring there, he ground his teeth and tore his hair and whispered "I'm a half baked fool to thus forget that old-time rule, 'The mouse with but a single hole is caught as easy as a mole.'"

B.C. Beekeepers Organize

The beekeepers of the Okanagan District met Feb. 14, and formed an organization under the direction of Mr. L. Harris, of Vernon, well-known as an enthusiastic and successful apiarist. Mr. Harris explained that he had been instructed by the Beekeepers' Association of British Columbia to take steps towards organizing the beekeepers of the Okanagan, and had called the meeting for that purpose. The province had been divided into four districts—the Coast Island, Lower Mainland, Okanagan and Kootenay. The Coast and Kootenay had been organized. The Okanagan district extended from Revelstoke to Lytton on the C.P.R. and southward to the Boundary west of the Kootenay district.

Association Formed.

After discussion a motion by G. R. Venables, of the Coldstream and W. Reid, of Lavington, that a Beekeepers' Association for the Okanagan district be formed was carried unanimously, and all present joined at the fee of $1 each.

Officers Elected.

The election of officers resulted as follows: President, Rev. Mr. Vans, Lavington; vice-president, A. Black, Armstrong; secretary-treasurer, G. R. Venables, Vernon, R. R. No. 2. L. Harris, of Vernon, was elected director, and it is intended to appoint additional directors later from more distant points. The next meeting will be held in Vernon on March 20. Mr. Harris stated that there are about 70 beekeepers in the Kootenay. There are about 150 in the Okanagan.

Give the Bees Room

MANY beekeepers make a serious mistake is failing to give their bees enough storage room. The addition of this room at just the right time for the storage of the season's crop of honey requires good judgment and an intimate knowledge of the nectar resources of the particular locality and season. Few people realize that in many localities the entire season's crop of surplus honey is gathered and stored within a period of a few weeks. It is exceedingly important during these few weeks that the progress of the work in the supers be watched closely and additional room be given as rapidly as the bees can use it.

The usual procedure by the inexperienced beekeeper is to put on a super of 25 to 50 lbs. capacity in early spring and give the subject no further thought until late summer or autumn. If the super is found to be full of honey at that time, it is removed and probably an empty one put in its place. In many cases this empty super is given long after there is any possibility of any further storage of honey during the season, and if comb honey is being produced the sections and foundations are ruined for further use by being on the hives during a time when no honey is being stored.

The Apiary of Darwin White, Brighton, Ontario.

Ontario Fruit Growers Make Important Decisions

Favor Standard Sizes for Baskets, Boxes and Barrels—Will Employ National Service Girls—Some Talk of Importing Chinese Labor—Prospects for Fruit

THE problems facing Ontario fruit growers were discussed for two days at the annual convention of the Ontario Fruit Growers' Association, held in Toronto, February 14th and 15th. The two most important matters dealt with were the basis of payment to be allowed the National Service Girls this year. On this an agreement was reached with the representatives of the girls that was declared to be satisfactory to both parties concerned. It was decided also to recommend obtaining legislation setting standard sizes for baskets, boxes and barrels used in the handling of fruit. For baskets the present six-quart size and an eleven-quart basket six inches deep were favored. The western or Oregon apple box, which is also the American apple box, was approved instead of the present Canadian standard. For barrels, the American size, which is smaller than the size which has been in use in Ontario, was endorsed. It holds about three bushels, or a little over 7,000 cubic inches. Its size has been set by the United States Government, and its adoption in Canada has been approved by the Nova Scotia Fruit Growers. If the Dominion Government approves of the proposed standards for boxes and barrels and enacts legislation to that effect, it will give a uniform size of box and barrel for the continent.

President's Address.

President F. A. J. Sheppard, of St. Catharines, pointed out that the year 1917 had proved a difficult one for most fruit growers. Owing to the war, all kinds of supplies and materials had greatly advanced in price, many of them to double and treble the prices for which they were originally sold. Transportation facilities had become demoralized. These conditions, with the scarcity and high cost of labor, had resulted in the fruit grower being hit more heavily, probably, than any other class in the community. In addition, weather conditions had proved unfavorable. The tomato crop in the Niagara district was a failure, the grape crop a light one, and the berry crop not over 50% of an average. Nevertheless, fruit growers recognized the needs of the situation, and while it might not be possible for them to greatly increase production in 1918, he believed they were preparing and ready to do their best to do so.

Financial Statement.

The financial statement presented by the Secretary-Treasurer, P. W. Hodgetts, showed total receipts of $2,583.68, including a government grant of $1,700.00, members' fees of $333.90, and a balance on hand from 1916 of $480.87. The expenditures amounted to $1,233.07, leaving a balance on hand of $1,350.50. The heaviest item of expenditure was one of $519.63 to the special transportation agent of the association.

Officers Elected.

The election of officers resulted as follows: Pres., R. W. Grierson, Oshawa; vice-pres., J. R. Hastings, Winona; sec.-treas., P. W. Hodgetts, Toronto; executive—F. A. J. Sheppard, St. Catharines; W. F. Fisher, Burlington; directors—R. B. Whyte, Ottawa; E. Casselman, Iroquois; Howard Leavens, Bloomfield; J. G. Wait, Colborne; Chas. Howard, Hagersville; Thos. Rowley, Leamington; A. Stephenson, Longwood; J. C. Harris, Ingersoll; W. Mitchell, Clarksburg.

Historical Committee.

The report of the Historical Committee, which had been prepared and was presented by Mr. A. W. Peart, of Burlington, the other member of the committee being Mr. W. T. Macoun, Dominion Horticulturist, Ottawa, dealt with the unfavorable conditions which affected the fruit industry last year, causing the apple crop to be probably the lightest in twenty-five years. Mention was made of the poor crops fruit growers had harvested for three years, and of the trying conditions farmers and fruit growers have been placed in owing to their inability to compete against urban industries. Mr. Wm. Armstrong, of Niagara-on-the-Lake, had furnished the committee with information on the peach industry in the Niagara district, showing it to be well over 100 years old. Mr. Armstrong had in his possession a diary made by the late Jas. Durham, of the Niagara River Road, near Queenston. It is dated March 29, 1850, and showed that he planted peach trees to renew an old peach orchard planted by his father. The father, who died in 1835, told his neighbor, Thos. Vrooman, that he planted the first peach orchard in the Niagara Township about the year 1814. It contained around 500 trees. The Historical Committee invites fruit growers to furnish interesting information of this character for preservation for historical purposes.

Mr. Peart recommended that the names of members, or sons of members, who had enlisted, should be recorded in the report of the association. The suggestion was adopted. Three lists of names will be included in the honor roll: those who enlisted, those who have died, and women who have served as nurses. Members of the association are requested to send names for the roll to Secretary P. W. Hodgetts.

New Fruits.

Mr. W. T. Macoun, Dominion Horticulturist, of the Ottawa Experimental Farm, reported that Red June, a new early apple tested by him, had proved a good shipper. Stayman Wine Sap, a "sport" of the original Winesap, is larger and better than the original apple of the name. Melba and Joyce, seedlings of the McIntosh, come in August and September respectively, and are both good apples. Omaha and Emerald, new plums created by hybridizing Burbank and Wolfe, are both excellent. The first named, a red plum, comes in August, and the latter, a red and yellow, in September. Portia and Oleria are two promising new varieties in strawberries.

The Car Situation.

A frank review of the car situation was given by G. E. McIntosh, transportation agent of the Fruit Division, Ottawa. One statement he made was that if every suitable car was pressed into service the railways could not move the pulp wood alone that is awaiting shipment, some of which has been piled for three years. There are 21,000 cars belonging to Canadian railways in the service of American railways, while only 8,000 foreign cars are on Canadian tracks. The C.P.R. has over 300 potato cars in the New England States, which it could not get back, and there is danger of many car loads of potatoes remaining unmarketed in the Maritime Provinces. A more extended reference to this report will be given.

Spraying Results.

One of the best addresses was given by Prof. L. Caesar, Provincial Entomologist, O.A.C., Guelph. This address is published practically in full on page 51 of this issue.

Work of the Food Controller.

Two addresses bearing on different aspects of the work of the Food Controller were given, one by Mr. D. Johnson, Dominion Fruit Commissioner, an outline of which is published in this issue, and the second by Mr. J. R. Hastings, chairman of the Fruit and Vegetable Committee. Mr. Hastings expressed the belief that the system of licensing all handlers of food products has come to stay. This system will enable the Food Controller to promptly make effective any regulation he may deem it advisable to enact affecting prices and the handlers of food products, and it will be a powerful weapon in dealing with any abuses that may be attempted by the licensees. This system means that the day of the so-called profiteer has passed, as well as of the food speculator. Excessive profits will not be permitted. While maximum profits may be set, nothing will be done to prevent a licensee laying in at any time a sufficient supply of any food product that may be necessary to cover his normal requirements during the usual season of distribution.

Finding an Outlet.

Mr. F. C. Hart, Director of the Markets Branch of the Ontario Department of Agriculture, suggested that in the event of there being a large crop of inferior apples this year, efforts should be made to have as many as possible of them marketed through the canning factories, evaporator plants and similar agencies. Ontario has about 100 canning plants, 150 evaporators and 50 cider mills. A good deal could be done in the making of apple jelly and by handling apples in other semi-manufactured forms. Action of this kind seems necessary, as it is possible that Ontario will have a fairly large crop of comparatively poor fruit this year. This is because most of the apple crop in Ontario is produced in the farm orchards, many of which are likely to be neglected. For the sake of the fruit interests it is necessary that the co-operative associations shall be maintained at the fullest possible strength, as they are composed for the most part of the best fruit growers of the province.

Dr. A. J. Grant, of Thedford, spoke on the effect of the war on the farm apple orchards. Lengthy extracts from this address will be published in The Canadian Horticulturist. An excellent address on strawberry growing was given by Howard Leavens, of Bloomfield. This will appear in our April issue.

National Service Girls.

The longest discussion of the convention

took place in reference to the employment of the National Service Girls. It was led by Dr. W. Riddell, Superintendent of the Trades and Labor Branch of the Provincial Government, and by Miss Harvey, one of his associates, who spoke for the girls and on behalf of the Government. A report of this discussion is published elsewhere in this issue. A pleasing feature of the discussion was the great credit given the girls by a number of the growers for the splendid work they accomplished last year.

Standard Packages.

The discussion on standard size for baskets, boxes and barrels was led by Mr. P. J. Carey, of the Dominion Fruit Division. Reference to this is published on another page.

The Outlook for Fruit.

Short addresses were given by several speakers dealing with the outlook for different varieties of fruit in 1918. Mr. F. G. Stewart, of St. Catharines, warned against the planting of any more commercial vineyards until conditions resulting from the Dominion prohibition legislation have become more settled. It will be necessary to find a market for the large quantities of grapes that have been consumed in the wine industry.

Prospects for small fruits were dealt with by Leonard Harrison, of Waterford, who believed that prices this year are bound to rule high, as every berry grown will be wanted. Both raspberries and strawberries are likely to be wanted for canning purposes. A further reduction in the acreage of raspberries was anticipated, because the crop of late years has not proved a paying one.

The pear outlook was dealt with by Mr. H. T. Foster, of Burlington, who expressed

the belief that there will continue to be a big demand for pears that are well grown and well packed. For this reason, pear growers will be justified in giving their orchards the best possible care.

Mr. W. A. Mitchell, of Port Elgin, considered the outlook none too bright for the cherry growers, in his district at least. Trouble was being experienced with a Shothole fungi. It was possible, also, that the cold weather had caused some damage.

Mr. Hamilton Fleming, of Grimsby, said that the showing of peach buds was good, but the organization of the industry was poor and the transportation outlook bad.

Chinese Labor.

A brief but lively discussion took place in reference to a resolution introduced by A. Onslow and seconded by J. Mussen, requesting the Government to make further investigation of the suggestion of Dr. G. C. Creelman, favoring the importation of Asiatic laborers for the purpose of assisting in the agricultural development of Canada, under the indenture system, for a term of years. The resolutions committee had differed on this resolution and had referred it back to the convention. Mr. Mussen believed that the attitude towards farming of laborers had become so hostile it was necessary for fruit growers to take some action to obtain more labor. He had visited China and did not know of any place where farming was carried on in a more intelligent and methodical way. If the Chinese were all right for Java and Ceylon, where they have proved very useful, he did not see why they should not in this country.

Mr. F. Palmer, of the Vineland Experimental Station, pointed out that the California Fruit Growers' Association is asking the United States Government to provide Asiatic or other labor immediately, and that the British Columbia Fruit Growers' Association has taken a similar stand. He had lived in British Columbia, where Chinese laborers had worked on his place for years and had proved themselves adapted to fruit and vegetable growing. Objection to the resolution was expressed by Mr. Patterson, Dr. Grant and by Mr. R. B. Whyte, on the usual grounds. Mr. Whyte pointed out that the National Service girls would not care to work among Chinamen. The motion was voted down.

Resolutions Passed.

Resolutions were adopted pledging the support of the fruit growers for the prosecution of the war, commending the Dominion Minister of Agriculture upon having appointed a traffic expert in connection with the Dominion Fruit Division, requesting the Dominion Government to enquire into the possibility of assisting in the conservation of fruit, either by assisting or organizing the evaporating industry or in the further development of the jam and canning industry; thanking the National Service girls for their assistance last year; requesting the Government to reduce the duty from all spraying machinery, and thanking the Department of Education for having allowed high school boys and girls to leave school last spring to work on farms, and requesting that this year they be allowed to continue at work until October 1st.

Ontario Vegetable Growers Favor Co-operation

THE two most important subjects discussed at the annual convention of the Ontario Vegetable Growers' Association, held in Toronto on February 15th, were, first: the need of some cooperative organization to assist in the marketing of garden produce, and second: the value of Northern grown potatoes for seed. In the matter of marketing it was shown that the market gardeners of Ontario are badly disorganized. They have no way of knowing the probable supply of vegetables on any particular market with the result that while certain markets may be glutted with one variety of vegetable, other markets may be offering good prices for such vegetables. There is great need for some central bureau of market information. In the matter of Northern grown potato seed the delegates were agreed that immature seed potatoes would increase the potato yield over that from home grown seed out of all proportion to the difference in the cost including freight.

President's Address.

President J. J. Davis, of London, announced the recently formulated policy of the Ontario Department of Agriculture in arranging for the growing of seed potatoes in Northern Ontario. This service on the part of the Department will be of great assistance to the potato growers of Ontario, as the use of immature seed should double the average potato yield per acre. Mr. Davis pointed out that it is important to get seed from fields that have not been diseased. In his judging work last summer he found that potatoes in some parts of New Ontario were affected with blackleg.

Value of Greenhouses.

"There is a feeling," said Mr. Davis, "that greenhouse products are luxuries and that greenhouses should be closed until after the war." "I am unable to define a luxury," he continued, "and have not met anyone who could. If luxuries mean anything and every-

thing that the people could squeeze along without, we would ban, besides greenhouse products, products of biscuit factories, cereal factories, candies, tea, coffee, chocolate, cocoa, musical instruments, jewelry and a host of other things. The result would be a nation of dyspeptics and anaemics, with an army of people thrown out of their usual work who could not be absorbed by other industries."

Mr. Davis pointed out that greenhouses in connection with vegetable growing should be kept going for four reasons. (1) Greenhouse vegetables have a dietetic value far above their cost in adding succulence to our rations. As tonics they are far superior to drugs and much cheaper. (2) Greenhouses enable market gardeners to employ their help at productive work all the year. (3) The demand for greenhouse produce in Canada is even now not being met by Canadian growers. (4) Outdoor vegetable crops are advanced by getting plants started inside. The place of the greenhouse cannot be taken by hotbeds on account of a scarcity of sash.

At the conclusion of the president's address a resolution, moved by F. F. Reeves, of Humber Bay, was passed, asking that the Government refrain from interfering with the greenhouse business as far as vegetables were concerned.

A movement was reported to be on foot within the City Council of Toronto that farmers and vegetable growers be required to pay a license for the privilege of selling their products within the city. Vegetable growers considered this step ill-advised on the part of the city and passed a resolution protesting against restrictions being placed in the way of the free sale of produce and urging that it is in the best interests of the city, as well as of the country at large that the free delivery of foodstuffs, especially during war time, should be facilitated.

Northern Potato Seed.

The president's reference to the value of immature potato seed created considerable discussion. Mr. W. T. Macoun, Dominion Horticulturist, stated that last summer at Ottawa they harvested 400 bushels of potatoes an acre from seed brought from Port Arthur, while a similar plot sown to seed grown at Ottawa for a number of years yielded but 85 bushels an acre. "Potatoes grown for a number of years in our warmer climate," said Mr. Macoun, "become infected with mosaic disease and so become yearly less fit for seed. I am convinced that the use of seed from some of the cooler districts would double the average potato yield of Ontario."

Mr. H. Broughton, one of the Sarnia district potato growers, stated that they have found great advantage in using Northern grown seed. The large growers of early potatoes in Southwestern Ontario have given up the growing of their own seed potatoes. Mr. Broughton pointed out that good fertility of soil and freedom from weeds were as necessary in growing potatoes as good seed.

The Ontario Department of Agriculture will not be able to supply much seed for this year's planting, but they are in touch with New Brunswick growers who will be able to supply seed.

Secretary's Report.

The past year was a fairly successful one for vegetable growers, according to the report of J. Lockie Wilson, secretary-treasurer. Intensive operations under glass had in many instances to be discontinued on account of the high price of coal. The labor problem was also a serious obstacle. The crops entered in the garden competitions were on the whole above the average and the exhibits at the fall fairs never surpassed. A balance of $880.53 was shown in the treasury.

S. C. Johnson, B.S.A., gave a brief report of the experiments carried on during the year by the vegetable specialist. He referred to the rapid spread of onion blight throughout Ontario. So far no good preventive has been found for this disease.

"There are not one per cent. of the vegetable growers of Ontario who can give any definite data as to the cost of producing a given area of crop," said Mr. F. F. Reeves, of Humber Bay, who has during the past year been carrying on a survey of the vegetable industry. The survey has not yet been completed, but from the 760 commercial gardens already visited, Mr. Reeves was able to make certain recommendations. "Growers," said Mr. Reeves, "should keep records of the cost of their operations and also of their returns from each crop, so that they will know which are the profitable crops." There are certain districts throughout Ontario where one or more vegetables are well located climatically and otherwise. In such districts a number of farmers should grow the same crops. In this way the district would become known as a producer of that crop. A saving would also be effected in machinery and in buying supplies. This, however, does not apply to producers living near large cities. Mr. Reeves also advised vegetable growers to make greater use of the scientific information supplied by the Government experts.

Paris green will probably be a scarce article next season, according to Prof. L. Caesar. It will likely cost 60 to 75 cents a pound. Paris green is the quickest killing of common insecticides, but is inclined to burn the foliage unless used with Bordeaux mixture. Arsenate of lead in the paste form, which is one-third as strong as Paris green, will cost 20 to 25 cents a pound, and in the powder form, which is twice as strong as the paste, about 40 to 48 cents. This will stick to foliage better than Paris green and will not burn. A mixture of two pounds of the paste arsenate of lead and one pound Paris green in 40 gallons of water will fix the potato beetle. This will give the quick killing action of the Paris green plus the sticking quality of the lead.

Vegetable Consuming Campaign.

A telegram was received from the Food Controller asking the endorsation of the vegetable growers in a campaign to increase the consumption of onions and carrots, of which vegetable there are considerable surpluses on hand in certain districts. Mr. E. K. Purdy, of Cataraqui, pointed out the need of some central information bureau to show where supplies of vegetables may be obtained. While there are large supplies of onions in some sections of Ontario, other sections cannot fill their orders. Mr. Purdy recommended that local secretaries take a survey of the vegetable crops and send this in to

J. Lockie Wilson, so that buyers will be able to locate supplies.

Mr. J. R. Hastings, of Winona, president of the Fruit and Vegetables' Committee, of the Food Controller's Office, spoke in favor of the recommendation in the telegram. He made the announcement that the British Government cannot take any more dried vegetables, so that we will have to prepare to absorb our crops in Canada. A resolution moved by G. B. Hellerman, of Waterford, was carried, endorsing the greater consumption of onions and carrots so that they may replace foods which may be exported.

Douglas Maynard, of Leamington, recommended the use of 20 tons of manure an acre, applied the year before ground was to be seeded to potatoes. In experiments which he carried on with commercial fertilizers, it required an application of from 600 to 1,000 lbs. an acre, to make it a paying proposition. With the latter application, he found that he was not only paid in the increased yield but in the earlier maturity. One of the secrets of successful potato culture, according to Mr. Maynard, is constant cultivation. His crop is harrowed several times before the potatoes are far enough up to admit of cultivation

Tomatoes Under Glass.

"With tomatoes under glass the most important thing is to get the first two branches to set fruit," said Mr. J. J. Davis, of London. To do this the blossoms must be pollenized by hand. Mr. Davis, after trying out the rabbit's fur method has come to the conclusion that pollenization by the use of a spoon is the quickest and surest method. For brown spot of tomatoes he recommended sulphur. Great care must be used to prevent burning the foliage. A method recommended by Mr. Davis was that the attendant should carry around a shovelful of coal and drop on a little sulphur from time to time.

Cooperation Urged.

W. R. Dewar, of Leamington, dealt with the cooperative shipping of tomatoes. The Erie Company, of which he is manager, has met success through cooperative marketing. They ship tomatoes the year round. The cooperative takes 10 per cent. of sales to cover cost of handling and at the end of the year all surplus over the actual expenses of management is returned pro rata to the growers. This amounted the past season to $10,000, the cost of marketing, including executive's salaries, amounting to but 4 per cent. of sales—considerably better than the 10 per cent. charged by commission men for careless service.

Some of the advantages of cooperative shipping are that it enables the grower to give all his attention to growing, greater uniformity is obtained in the marketable article; it is easier to keep in touch with the markets (the manager can have prices telegraphed him daily), distribution is better controlled; shipping charges come lower when carlots are used; a cooperative company is able to make more f.o.b. shipments, which according to charts shown by Mr. Dewar, are much the more profitable; and a cooperative company is able to market surplus goods in canning factories to advantage.

The growing of cauliflower was the subject of an interesting address by Chas. Syer, of Bartonville, who has had great success in this work. A review of the address of Mr. Syer, as well as that of V. Robinet, on the cultivation of melons will be given in the columns of The Canadian Horticulturist.

Organization Needed.

George Rush, of Humber Bay, pointed out the lack of organization on the part of the

vegetable growers of Ontario, particularly in marketing, as a result of which one market is glutted with vegetables and another starved. He suggested the formation of district organizations similar to the farmers' clubs, and a central market bureau to keep the locals informed as to the state of markets. "Organization," concluded Mr. Rush, "is imperative if we are to stay in the business."

On a motion of J. Lockie Wilson, a committee composed of J. G. Davis, Geo. Rush, F. F. Reeves, F. B. Housser, H. Broughton, T. Delworth, and G. B. Hellerman, was appointed to work up a scheme for the cooperation of vegetable growers, and to submit this at the next annual meeting when action will likely be taken.

A resolution was passed favoring the removal of the duty from commercial fertilizers.

An account of the experiments in vegetable growing which are being carried on at the Vineland Experiment Station, was given by O. J. Robb. This account showed again the value of Northern grown potato seed. It will be given in greater detail elsewhere in The Canadian Horticulturist.

The evening session was addressed by W. T. Macoun, who spoke on the benefits of garden competitions and outlined the procedure followed in Ottawa last year. A well illustrated lecture by L. G. Schermerhorn, of New Brunswick, N. J., showing some of the better gardens of New Jersey, was appreciated. The evening session was brought to a close with the exhibition of motion pictures dealing with vegetable growing.

Election of Officers.

The following officers were elected for 1918: President, J. J. Davis, London; 1st Vice-President, E. K. Purdy, Cataraqui; 2nd Vice-President, M. May, Tecumseh; Secretary-Treasurer, J. Lockie Wilson, Toronto; Executive: J. J. Davis, London; E. K. Purdy, Cataraqui; Maurice May, Tecumseh; J. Lockie Wilson, Toronto; F. F. Reeves, Humber Bay; Thos. Delworth, Weston; Directors: C. Guthrie, Stratford; H. L. Bailie, Billing's Bridge; E. E. Smith, Ealing; J. H. Modeland, Sarnia; W. S. Eborall, Beamsville; E. K. Purdy, Kingston; Maurice May, Tecumseh; T. K. Aymer, Humber Bay; Jas. Dandridge, Humber Bay; Wm. Guthrie, Sarnia; J. W. Smith, Sarnia; A. Nelson, Fonthill. Auditor, D. H. McLennan, Toronto; representative to C. N. E., Jas. Dandridge, Humber Bay, and to the C. C. E., J. J. Davis and I. H. Farquharson, Aylmer, Que.

POULTRY YARD

Back-Yard Poultry

Raising small back-yard flocks of chickens on table and kitchen scraps to produce the family's eggs and part of its meat supply is a solution of one of the problems of the high cost of living. Even as few as six or eight hens should produce eggs enough, where used economically, for a family of four to five persons throughout the year except during the moulting period of the fall and winter. By the preservation in waterglass of surplus eggs produced during the spring and early summer, even this period of scarcity can be provided for. The use of scraps in feeding will keep the cost of maintenance relatively low, since only a small quantity of supplemental feed will be necessary.

There is no necessity for the back-yard poultry flock to become a nuisance to neighbors. If the house and yards are kept reasonably clean there will be no annoying odors. The noise made by male birds can best be eliminated by the elimination of the male bird. The fact that there is no male in the flock will have absolutely no effect on the number of eggs laid by the hens.

General Purpose Breed Best.

One of the general purpose breeds, such as Plymouth Rock, Wyandotte, Rhode Island Red, or Orpington, is preferable to the smaller breeds, such as Leghorns, if the flock is to contribute to the family meat supply as well as to furnish eggs. If the production of eggs is the principal aim of the poultry farmer, however, it will pay to keep one of the egg breeds, since they eat less than the larger fowls.

Piano Box Makes a Good House.

The housing facilities of the back lot need not be elaborate, and may, in fact, be constructed from large packing cases or piano boxes. A floor space of from 3 to 4 square feet per bird is ample in the houses. The yard space should be from 20 to 30 square feet per bird. The back-yard poultryman should take care in feeding table and kitchen scraps not to make use of decomposed waste material or moldy bread or cake, as such food may be seriously harmful to the fowls.

Prepare for Hatching

Look over the breeders; stock which was healthy last fall, if it has been kept in well ventilated houses and fed right since, should be healthy now; but in case any have lost their vitality weed them out and don't, for any reason, let them into the breeding pen.

Where accommodations are such that early chicks can be looked after, hatch some out this month. The cockerels will do for early broilers and the pullets will come in for early eggs in the fall. For the average person this month is too early to hatch chicks, but it is the month to see that everything is ready for mating the breeding pens.

If possible, arrange to have a breeding pen made up of the best year-old-hens. Give them the pleasantest pen and do not include any hens of weak constitution. Aim to use nothing but your very best birds, as it is only from these that the highest results can be obtained.

Selecting the Breeders.

The male to head the flock should be from a high producer. If possible, make sure that his sisters are showing their ability to lay. Not only should his pedigree be right, but he should show vigor in every move. A bird of this description will show a fairly broad head with a rather short stout beak, a bold piercing eye, a skin that is soft and velvety to the touch, shanks with fine scales, and showing a certain amount of red pigment down the outer sides.

His mates should be vigorous females that have shown by egg production what they can do. If trap nests are not used—and they are not in most cases—band those pullets that start to lay first and select the breeding pens from them.

The ideal mating is a well developed cockerel of the foregoing description, mated to young hens, but if enough hens of the desirable type are not available, do not hesitate to use pullets. So long as they are well matured and vigorous, they will give the best of results.

Be sure that all layers, and especially those in the breeding pen, have plenty of green food—roots, vegetables or sprouted grain are very good. Open up the windows on fine days and keep the birds busy by feeding grain in heavy, clean litter.

Incubator Suggestions

The incubator should be thoroughly cleansed and disinfected before operations begin.

See that the machine sits level and solid.

Test the thermometer for accurate readings.

Always adjust the machine for two or three days before the eggs are put in.

Thorough ventilation of the incubator room is essential to the proper development of the embryo.

A small hand flash light is useful for reading temperatures.

The eggs should not be disturbed for the first two or three days.

Always turn and cool the eggs before tending to the lamp.

Operate the machine according to the directions of the manufacturer.

The length of time eggs should be cooled depends upon the temperature of the room and the period of incubation. Cool a few minutes at the beginning and gradually increase the time as the hatch progresses.

Test the eggs on the seventh day and again on the fifteenth day.

Boil the infertile eggs for chick feed.

Do not disturb the eggs after the eighteenth day.

Handle the moisture problem according to the manufacturer's directions.

Never help chicks out of the shell; there is no profit in such a plan.

After the hatch is complete, allow the chicks to remain in the machine for at least twenty-four hours.

Thoroughly clean and adjust the incubator before putting in another setting of eggs.

Advantages of the Leno Basket

Editor, The Canadian Horticulturist: I noticed an article in your February issue, by Wm. Armstrong, of Niagara-on-the-Lake, on leno top baskets being a popular fruit package. I agree with him, although I am in the district he mentions as trying to knock it out. It is an attractive package, and appeals to the consumer. For one thing, he can readily see the whole fruit of top layer, and by tilting the basket to one side can get a pretty good idea of the quality of the fruit throughout the package. It is not so with the flat-top, as he can only see the centre row when packed with peaches, and I am sorry to say that the tendency is, in a good many cases, to put the best looking peaches, smoothest and rosiest, in that centre row. The majority of packers will do this without instructions, as they like to make their work look attractive.

I have customers who tell me that they can sell 25 to 50 per cent. more fruit in the lenos than in the flat top, and also get a much better price. Is not that what the fruit growers need, greater consumption of fruit, and a fair return for their investment, cultivation, fertilizing, spraying, pruning and many other expenses? The basket bill is a heavy one, and the leno top cuts this considerably, as we sell a greater proportion of fruit to the basket. The fruit grower needs a better return for his goods, for we have been hard hit. Of late our expenses have increased, in many cases, over 100 per cent.

I ship my entire crop, via. express and freight, in protected lenos, my customers are very pleased with them, and I find that I have much better returns for the same quantity and quality of fruit. To do away with the leno top will work a disadvantage on the fruit grower.—T. E. McCollum, Winona, Ont.

An Amateur's Success

Editor, The Canadian Horticulturist: Last season I kept a careful record of the work done in connection with the cultivation of a small piece of ground for potatoes, and am led to believe, from what I have been told by others, that results obtained were somewhat unusual. I put in 65 lbs. of seed (Early Ohios) in a piece of ground seventy-four feet long by thirty-four feet wide. From this small patch I harvested 1,274½ lbs., or 21 bushels 14½ lbs. of potatoes. Only about 30 lbs. of these potatoes could be classed as small or unsaleable. Some of the people here told me that they never heard of potatoes producing so freely. One man who has grown potatoes nearly all his life has told me that his most successful year only gave him about 17½ bushels to one bushel of seed.

The potato bug gave me some trouble, but the potato borer proved the worst enemy to the plants. It is a grub something like the cut worm. It enters the vegetable stock at the surface of the soil, and bores to the centre, eating the heart of the stem as it goes. I saved a number of stems by slitting them where I thought the borer was, bringing it out through the slit, and closing it again.

I am highly pleased with The Canadian Horticulturist, as are two of my friends, who I induced to subscribe for it last spring. We look eagerly for its appearance each month.—John. Taylor, Sydney Mines, Cape Breton, N. S.

Niagara Peninsula Growers Convene

THE tender fruit section of the Niagara district, Ontario, has problems of its own. These were discussed at the annual district conventions of the Niagara Peninsula Fruit Growers' Association, held February 27th and 28th. Afternoon and evening sessions were held at Grimsby on one day, and at St. Catharines on the next. This year, as a means of increasing the membership, attendance was confined to members. Although the past few years have not been very favorable for the Niagara Peninsula growers, evident interest in the meetings was manifest. There was a good attendance of growers. President S. H. Rittenhouse presided at all sessions. He stated that methods of cultivating fruit have improved greatly in the Peninsula during the past ten years, but the marketing end of the business has not advanced to the same extent. He advocated the adoption of a more thorough system of grading and packing.

In addition to local speakers, the meetings were addressed by prominent speakers from the United States. A strictly technical address on the structure of fruit trees and their relation to commercial practices was given by Prof. M. F. Barrus, of Cornell University, at the Grimsby meeting. Mr. J. E. Allis, of Medina, N.Y., a practical fruit grower and a large grower of peaches, spoke both at Grimsby and St. Catharines. At both meetings he dealt with the growing of peaches. An outline of his remarks will be given in a later issue of The Canadian Horticulturist.

Professor C. R. Crosby, of Cornell University, was to have spoken at the St. Catharines meeting, but being unable to attend, his place was taken by Prof. M. D. Leonard, of the Department of Entomology, Cornell, who spoke on the "Peach Tree Borer" and on the "Pear Psylla."

The Car Situation.

Mr. Geo. E. McIntosh, transportation expert of the Dominion Fruit Division, Ottawa, spoke at both meetings on the car situation. He dealt with a number of the same points that he had discussed at the Ontario Fruit Growers' Association convention a short time before, mention of which is made elsewhere in this issue, but also gave special attention to some of the special problems of the local growers. Great difficulty is being experienced this year by the Niagara district growers in securing manure. Some 500 cars of manure have been ordered but are still undelivered, owing to the traffic difficulties of the railways. Mr. McIntosh is giving this matter attention. As a result of the order-in-council passed recently on the recommendation of the Food Controller, prohibiting the holding of freight cars by consignees beyond time limit of four days, the number of cars idle in one day has been reduced from 300 to 15.

Professor L. Caesar, Provincial Entomologist, addressed both meetings on spraying subjects. He said that if the practice of spraying were entirely neglected for five years, no fruit trees, with the exception of cherries and some pears, would remain alive in the Niagara Peninsula. Excellent results in controlling brown rot in sweet cherries have been accomplished by thorough spraying. More complete reference to Prof. Caesar's remarks, and also a full report of the address given by Mr. P. J. Carey, of Toronto, on "Some Phases in Marketing," will be published later. Mr. Carey announced that a Dominion fruit conference is to be held in Ottawa shortly, as reported elsewhere in this issue. As the view was expressed that the growers were not agreed

that the proposed new 11-qt. basket, approved by the Ontario Fruit Growers' Association at its recent convention, was best, it was decided to hold a special meeting of the Association on March 8 to investigate this matter further and instruct their delegates in regard thereto.

Mr. E. F. Palmer, Director of the Vineland Experiment Station, spoke at both meetings. At Grimsby he told something of the work being done by the station in the direction of origination and developing new varieties of fruit. Considerable success is being met with in the development of varieties of grapes. Those that are doing best are largely of European extraction. At St. Catharines, Mr. Palmer invited the fruit growers to suggest lines of work they would like to see undertaken at the station. He himself suggested an experiment in pruning peach trees, which he believed might prove an improvement on the system generally followed.

The District Representative.

Mr. David Elliott, B.S.A., the District Representative, at the St. Catharines meeting, gave a brief report of a conference of the district representatives with the Government that had been held the day previous. He described the new tractors the Government is arranging to sell in the province for about $800 each. These, he understood, are good machines and likely to be in great demand. The Government has 100 available. Mr. Elliott pointed out that Lincoln county has only one ditching machine, whereas some other counties have as many as forty. Some 30 miles of underdraining is planned for this one machine this year. He believed more should be employed.

Mr. W. H. Bunting, of St. Catharines, who is a member of the labor section of the Organization of Resources Committee of Ontario, told of a conference of the committee he had attended that week, at which it had been made clear that the world is actually facing famine conditions. It is important that fruit shall be raised to take the place of other food products that must be exported. The Government is using every possible effort to secure labor for the farmer. He urged growers not to be too particular as to the class of help they engaged, and to be willing to make the best of whatever help they can get.

Resolutions Adopted.

A number of resolutions were adopted, including the following: 1. Pledging the support of the fruit growers to the Government in the campaign for greater production; approving the Government's effort to secure farm labor and suggesting that the local representative be given extra assistance to enable him the better to supervise the distribution of this labor. 2. Urging the Dominion and Provincial Governments to co-operate with the local committee on advertising in pushing an advertising campaign for fruit.

3. Objecting to the railways being allowed to charge freight on ice in bunkers of fruit cars. Cars are frequently held up through the fault of the railways and have to be re-iced. Fruit growers pay high rates for icing privileges, and therefore should not be charged extra to cover the freight on the ice. 4. Favoring the Vineland Experiment Station being allowed to conduct tests of implements and tools likely to prove useful to fruit growers, and the making of a special appropriation by the Government for this purpose, if necessary. 5. Urging the Provincial Government to designate the main road running between Hamilton and the Niagara River, and which passes through St. Catharines, as a provincial highway, and in the event of the Government not seeing its way clear to construct a road of more permanent nature until after the war, that it at once take over and maintain the present road, as the increase in international traffic, owing largely to reciprocity in motor licenses, has made the burden of taxation for the maintenance of this road too great for the local municipalities. Should the Government take this action, it is believed that it will be possible for the fruit growers to market considerable quantities of fruit by motor trucks. 6. Objection was expressed to the Day Light Saving proposal to advance all clocks one hour during the summer months, on the ground that the early morning hours are not suitable for the picking and handling of fruit while the dew is on it, the afternoon hours being the best.

Value of Left-over Seed

The critical situation of the seed market, as far as the supply of onion, carrot, beets and sweet corn seed is concerned, makes it desirable that those who have any left-over seed shall use it. Before being used it should be tested.

Prof. T. G. Bunting, of Macdonald College, Que., states that most vegetable seeds are good for three or more years. Parsnip seed is only good for one year; carrot and celery usually one to two years; but tomato, turnip, cucumber and beet seed should be fairly good from five to six years, provided they have not been in an extremely dry or very damp place. The use of old seed, provided it is tested and found good, will result in a saving of money and may mean that someone else will not go short this year.

The Dominion Government, Department of Agriculture, is working on the question of seed supply. Arrangements are being made, in so far as possible, to relieve the seed shortage. In the meantime gardeners ought to do their utmost to eliminate waste in the use of seed.

Standard Packages Approved

AFTER years of discussion, the members of the Ontario Fruit Growers' Association, at their annual convention in Toronto last month, decided to recommend the enactment of legislation by the Dominion Government which will establish standard 6 and 11-qt. baskets, to adopt the American apple box in place of the present Canadian standard box, and to adopt the American apple barrel. The Nova Scotia Fruit Growers' Association had previously approved of the adoption of the American standard barrel as the standard for Canada also. It is understood that the Dominion Minister of Agriculture is favorable to the adoption of these standards, and that legislation to that effect will be enacted at the approaching session of the Dominion House.

The matter was brought up for discussion by Mr. P. J. Carey, of the Dominion Fruit Division, Ottawa, who was careful to explain that he did not desire to be the means of railroading through any legislation to which fruit growers might later take exception. He first dealt with the basket situation. A sample of the proposed new 11-qt. basket was submitted for inspection.

Standard Baskets.

For years there has been a keen discussion as to what baskets are the best. Several different sizes have been in use, and there has been a great lack of uniformity in their shapes, capacity and in the material used in their construction. Mr. Carey pointed this out and stated that it has become generally recognized that the time has come when action should be taken. At a meeting held last year at Grimsby, it was decided almost unanimously to eliminate all baskets except the 6-qt. and the 11-qt. As the fruit growers have endorsed the present 6-qt. basket as all right, there was no need to discuss it further. Mr. Carey made it clear that it will come under the same regulations as other packages as regards the thickness and length of the handle, width of the strip, and every part of its material. It is proposed that the same uniform blocks shall be used by every manufacturer, in order that every basket of both sizes shall be made from the same blocks, so that all the baskets of each size shall be made exactly the same.

The Standard Box.

The standard Canadian apple box is 10" x 11" x 20", inside measure. Its use is obligatory for the export trade. In British Columbia the growers prefer what is known as the Oregon or Washington box, which is 18½" by 11½" by 10½". It is said to be an easier box to pack, to ship and to have other advantages.

A Standard Apple Barrel.

For years there has been a great variety of barrels used in the marketing of the Canadian apple crop. The Inspection and Sales Act stipulates that the minimum size of a standard barrel containing 96 quarts shall be 26½", inside measurement between heads, 17" inside measurement head diameter, and 18½" inside measurement middle diameter. In Nova Scotia the barrel in common use has been made from 28½" to 29½" staves, while the barrel in common use in Ontario has been made from 30-inch staves, its average dimensions being, between heads 27½", head diameter 16", middle diameter 19½".

The American barrel holds about three bushels or a little over 7,000 cubic inches. It is a well shaped barrel. The Ontario barrel holds about three bushels and a peck, or a little more.

Fruit Growers and Girls Agree

AN agreement covering the terms and conditions under which the National Service girls will assist the fruit growers of the Niagara District during the approaching season was reached last month between the growers and representatives of the girls during a discussion of this matter, held at one of the sessions of the annual convention of the Ontario Fruit Growers' Association. Negotiations between representatives of the growers and of the girls had been conducted for some weeks previous thereto. For a time it looked as though there would be a deadlock and that it would be difficult to recruit any considerable number of girls this season. Last year quite a number of the girls failed to meet their expenses, and many barely did so, having little left for themselves at the close of the season after their expenses had been paid. This was more especially the case with those girls whose travelling expenses were high, owing to their living a considerable distance from the fruit district. Over 50% of the girls who worked last season earned an average of $5.00 a week or less, 24% earned $6.00, and 12% $7.00. Thus 87% of the girls earned $7.00 a week or less, out of which they had to meet their expenses. Of those who earned more than this, 4.25% earned $8.00, 2.25% earned $9.00, 2.25% earned $10.00, 1.75% earned $11.00, and 1.75% earned $12.00.

One cause of complaint among the girls last year was that they lost considerable time owing to unfavorable weather, waiting for crops to ripen, and for other similar causes. It was realized, therefore, that if any considerable number of girls were to be engaged this year it was necessary that they should be guaranteed a minimum of $6.00 a week while picking small fruits, and $9.00 a week while picking the larger fruits. The girls at first suggested that the working day be one of nine hours, with Saturday a half holiday, but when the growers pointed out that weather conditions and the hours worked by other employees in the Niagara district made it impossible for them to grant this request, the girls withdrew it.

The New Terms Arranged.

The conditions finally agreed upon are that when working on piece rates each worker shall be guaranteed $1.00 a day, rain or shine, six days a week. When picking pears, plums, apples, peaches and grapes, they are to be paid at the rate of $9.00 a week for a ten-hour day. For overtime they will be paid at the rate of 20c an hour. Especially good pickers are to be given 20c an hour.

For hoeing, weeding, and other vegetable work, the girls will be paid 15c an hour for odd hours, or $9 a week for continuous work.

While the girls will be guaranteed minimum wages as stated, they will work on minimum piece rates. Should they earn more than the minimum, they will be entitled to receive whatever they earn. The minimum piece rates are to be as follows:

Strawberries, 2c a quart.
Raspberries, 3c a quart.
Blackberries, 2c a quart.
Gooseberries, 2c a quart (except for English varieties).
Black currants, 40c for 18 lbs. (11-qt. basket).
Cherries, 20c for 15 lbs. (11-qt. basket).
Red currants, 20c for 11-qt. basket.

If the majority of the girls picking in a patch do not earn at the rate of 15c an hour, they will be put on hour rates at 15c an hour.

To City, Town and Village Dwellers in Ontario

Lloyd George says:

"The line the British Empire is holding must not break anywhere. If it breaks at home it breaks everywhere."

"Canada's sons will have died in vain if **Hunger** compels the Motherland's surrender.

"Our boys and the Allies need **BEEF, BACON, WHEAT** and **SUGAR.**"

BECAUSE

1. They are **exported.**

2. They are **highly nutritious.** They build up the broken down tissue and they supply heat and energy very quickly. Surely, when our boys are recalled again and again to fill up the gaps, we should do **our** part to supply the food that is necessary to refit them.

3. The women over there are accustomed to using these foods. They have no time to experiment with new foods.

HOW CAN WE HELP TO SAVE THE SITUATION? BY USING PERISHABLE FOODS.

A VEGETABLE GARDEN FOR EVERY HOME

1. The farmers must supply the beef, the bacon and the wheat. They have no time or no space left to produce vegetables except those for their own use.

2. The gardeners should be left free to supply the Canning Factories and community; canning centres for Red Cross purposes.

3. A Vegetable Garden in Every Home is a necessity, financially. All canned goods will be exceptionally high for sometime to come.

4. A Vegetable Garden saves the Doctor's bill. In the Spring we find ourselves run-down, we require a tonic. This tonic can be supplied through our fresh vegetables. Lettuce, spinach, Swiss chard, asparagus, etc., are great blood purifiers, supplying the necessary minerals, salts, and acids.

5. Carrots, cabbage, parsnips, can be stored in our cellars for winter use when food will be very much scarcer than it is now.

6. Vegetables which cannot be kept in the cellar during the winter can be dried or canned for home use.

7. Dried Peas, Beans and Lentils are very high in nutritive value, containing more tissue building material than our best cuts of beef. There are endless ways of preparing these vegetables and no one need suffer because she has given up the foods required by the Allies.

A little information on the subject of vegetable growing will assist you wonderfully.

Procure your supply of seed early.

Horticultural Societies, Women's Institutes, School Boards, Town Councils, Church Organizations, Y. M. C. A.'s, etc., should cooperate with one another in organizing the work **NOW.** Lecturers will be furnished to address a meeting of school children in the afternoon, and a public meeting in the evening, wherever possible, but it is hoped that local talent will be used to a great extent.

Applications for speakers and literature—

"A Vegetable Garden for Every Home"—

should be addressed to The Department of Agriculture, Toronto, Ont.

ONTARIO DID WELL IN 1917.
LET US DO BETTER FOR 1918.

Many citizens of urban municipalities will find it impossible to assist directly in the production of food for export. There are few, however, who cannot spare an hour or two each day from their regular work, and this can be of the greatest value if devoted to the production of vegetables.

Those who have land and cannot cultivate it can assist by turning it over to those who have none.

"Whatsoever a man soweth, That shall he also reap."

Plant a garden in 1918, and your harvest will include financial gain, a better diet, better health, assistance to our Empire and through it justice and liberty to the world.

ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO

SIR WM. H. HEARST,
Minister of Agriculture.

DR. G. C. CREELMAN,
Commissioner of Agriculture.

CLASSIFIED ADVERTISEMENTS

Advertisements in this department inserted at the rate of 15 cents a line, each line averaging seven words. Part lines count as whole lines, minimum of two lines accepted. Strictly cash in advance.

BEES

WANTED.—Thirty colonies Italian bees in April. Will Staples, 69 Hogarth Ave., Toronto.

BEES FOR SALE.—Italians, 50 first class colonies in up-to-date hives. If interested, write for prices, etc., J. Raymond Ball & Sons, Knowlton, Que.

BEES WANTED.—Pure bred Italian Bees wanted in 10-frame Langstroth Hives for Spring delivery. Must be free from disease. The Root Canadian House, 73 Jarvis Street, Toronto, Canada.

FOR SALE—Italian bees, strong colonies in Quinby and 8 and 10-frame Langstroth hives, $10.00, $12.00 and $14.00, respectively. Miss M. Gerrie, Ingersoll, Ontario.

750 COLONIES OF BEES FOR SALE—No foul brood. Have been on the job for 30 years. Beuglass Bros., Bright, Oxford Co., Ontario.

APIARY FOR SALE—We will sell twenty-four colonies of Italian and Hybrid bees in McEvoy single walled hives; forty-five supers eight frame drawn out comb; seventeen empty supers, and one two frame 12" x 18" Cowan extractor. All packed for shipment during May, Guaranteed free from disease, f.o.b. Toronto, $400.00. Weir Bros., 34 Chester Ave., Toronto.

FOR SALE—The Best Golden and Three Band Italian Stock—1 lb. bees with unt. queen $2.50, 2 lbs. bees with unt. queen $4.00, 3 lbs. bees with unt. queen $6.00. J. B. Marshall & Son, Rosedale Apiaries, Big Bend, L.A.

Golden and three-banded Italian; also Carniolan Queens—tested, $1.00 each; Untested, 75c each. For larger lots and bees in packages, nuclei, etc., write for prices. C. B. Bankston & Co., Buffalo, Texas, Leon Co.

BEES WANTED—To buy on shares or salary. State particulars. A. R. Vannatter, Ballinafad, Ontario.

FOR SALE—Ginseng roots and seeds, or exchange for bees. P. Wilson, 283 Evelyn Avenue, Toronto, Ont.

BEE SUPPLIES

BEEKEEPERS—Please write for our Catalog. Write to-day for special prices on honey pails. Morgan's Supply House, London.

HONEY

WANTED—First-class white honey, the coming season's production. Will pay ruling prices and supply tins. Foster & Holtermann, Limited, Brantford, Ontario.

REAL ESTATE

ALL KINDS OF FARMS—Fruit farms a specialty. Write for Catalogue. W. B. Calder, Grimsby.

FOR SALE—115 acres, two miles from town of 7,000. Part clay and loam. Nearly new frame house, bank barn, plenty of water; 12 acres fall wheat, 20 acres seeded, 10 acres small fruit, Skinner irrigation. See it at once. Wm. Doan, Box 187, Newmarket, Ont.

FOR SALE—100 acres, Middlesex County. Ideal locality for apiary. Snap for quick sale. Apply Box 60, Canadian Horticulturist and Beekeeper.

SEEDS, PLANTS, SHRUBS

YOU WANT "Reliable Seeds," get our Seed Price List and Save Money. Morgan's Supply House, London.

PRIVET, Barberry, Cedars, Spruce, Pines, Oaks, Chestnut, Walnut, Mulberry, for hedges, windbreaks, timber, mailing size, prepaid; dozen same variety, one dollar; hundred, five dollars. List free. John Downham, Strathroy, Ontario.

FOR SALE.—Seed Artichokes, Horse Radish, Potatoes (Cobbler and Early Harvest). Prize-winner Canadian Exhibition, Dahlias, Gladiolus. O. Sansby, 160 Kingston Road, Toronto, Ont.

SPRAYS

SAVE MONEY—Get our Spraying and Garden Supply Catalog. Morgan's Supply House, London.

Deafness

Perfect hearing is now being restored in every condition of deafness or defective hearing from causes such as Catarrhal Deafness, Relaxed or Sunken Drums, Thickened Drums, Roaring and Hissing Sounds, Perforated, Wholly or Partially Destroyed Drums, Discharge from Ears, etc.

Wilson Common-Sense Ear Drums

"Little Wireless Phones for the Ears" require no medicine but effectively replace what is lacking or defective in the natural ear drums. They are simple devices, which the wearer easily fits into the ears where they are invisible. Soft, safe and comfortable. Write *today* for our 168 page FREE book on DEAFNESS, giving you full particulars and testimonials.

WILSON EAR DRUM CO., Incorporated
464 Inter-Southern Bldg. LOUISVILLE, KY.

The Fruit & Produce Market

The Commission firms undernoted wish consignments of fruit and general produce. They will be pleased to have you write them for information, shipping stamps, etc., if you have fruit or vegetables for sale.

STRONACH & SONS

33 Church St., Toronto, Ont.

Wholesale Fruit, Produce and Commission Merchants.

H. J. ASH

44-46 Church St. - Toronto, Ont.

CONSIGNMENTS OF FRUIT & VEGETABLES SOLICITED

We give personal, consistent and reliable attention to every consignment. Shipping stamps furnished on request.

DAWSON-ELLIOTT Co.

32 West Market St., Toronto, Ont.

Wholesale Fruit and Produce. Consignments Solicited.

HERBERT PETERS

88 Front St. E., Toronto, Ont.

Wholesale Fruit and Produce

See advertisement on page x.

Dominion Fruit Conference

A Dominion fruit conference is being arranged by Mr. D. Johnson, Dominion Fruit Commissioner, Ottawa, to give final consideration to important amendments to the Inspection and Sale Act, which it is hoped it will be possible to have made at the approaching session of the Dominion Parliament. The delegates to the conference will be appointed by the provincial fruit growers' associations, as follows: Ontario, 6; Nova Scotia, 4; British Columbia, 3; Quebec, 2; Prince Edward Island and New Brunswick, 1 each. The consumers in the prairie markets will be invited to send two delegates.

The subjects which it is proposed to discuss will include the following:

1. Adopting a more definite and explicit definition of the No. 2 grade.
2. A definition of the No. 3 grade.
3. Provision for marking opening packages.
4. Making Section 321 (c), in regard to overfacing, more definite.
5. The proper filling of packages to be compulsory.
6. The standardization of packages: (a) uniform apple barrel, (b) uniform apple box for domestic use, with provision for permits for using an export box to comply with the trade requirements of any foreign country; (c) uniform peach, pear and prune box, and four-basket crate; (d) uniform apple crate; (e) standard berry box, preferably the imperial pint and imperial quart; (f) uniform berry crate; (g) standard basket.

Apples in Storage

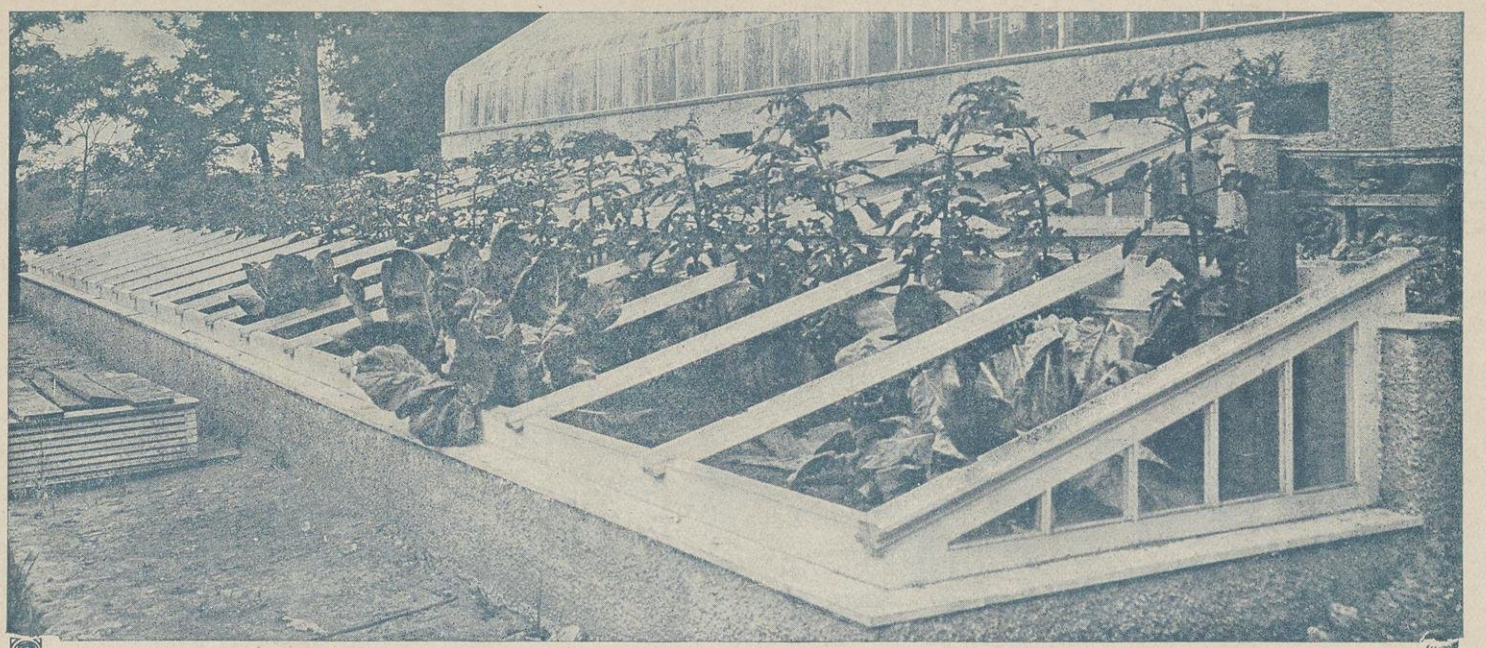
The following is an approximate estimate by the Dominion Fruit Division of the apples in store at the following points on February 28th, 1918, and on the same date in 1917:

Place	1918. bbls.	1918. boxes.	1917. bbls.	1917. boxes.
Nova Scotia	100,000	.....	55,000	.....
St. John, N.B.	7,370	300	(No figures.)	
Quebec, P.Q.	3,500	1,300	3,500	.....
Montreal	22,140	13,674	7,500	5,500
Ottawa	9,500	1,800	2,875	475
Toronto	22,745	11,700	1,500	3,000
Hamilton	2,800	1,400	1,700	.....
Georgian Bay District	1,500	.....	3,150	.....
Lake Ontario District	7,100	.....	8,750	.....
Winnipeg	31,500	5,400	3,400	12,000
Regina	.....	5,400	(No figures.)	
Calgary	.....	11,300	.....	6,000
	208,155	50,674	87,375	26,975

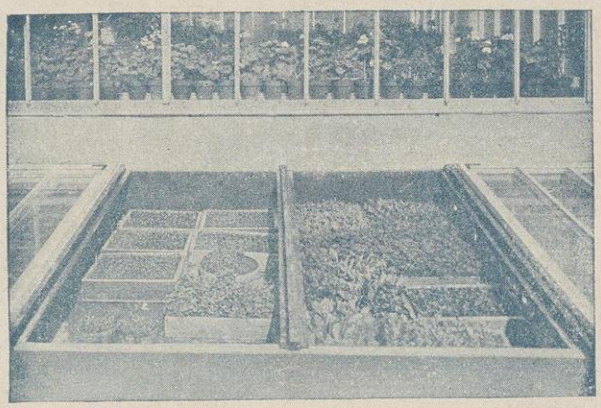
Potatoes Spoiling

Food Controller Herbert Hoover announced recently that owing to the car situation in the United States, large quantities of potatoes were spoiling. There were about 130,000 carloads of potatoes on November 1 which should have been moved from the principal producing centres, and up to the 1st of February there had been moved about 28,000 carloads, while there should have been moved over 50,000. The result is that potatoes are piled up in the producers' hands and the consuming centres have been supplied by virtue of the summer gardens and other stores carried over from last year.

The members of the Clarkson Fruit Growers' Association have passed a resolution protesting against the proposed early closing of fruit and vegetable stores in Toronto during the summer months, as they believe that it would interfere with the handling of perishable fruits.



Photograph was taken last of April. The tomato vines and plants are as large as regular outdoor ones would be along in July.



In a surprisingly small space, you can grow literally thousands of vegetable and flower plants for early setting out. You secure anywhere from 2 to 4 weeks' gain.

Cold Frames for Your Garden are a Matter of Common Sense---They Economize

THEY economize by giving you greater results from the same garden space. Greater results and longer results by giving earlier results.

Take tomatoes for example; you can add an extra month to their fruiting time. Which means three months' yield instead of two.

Then there are egg plant and cauliflower, that vary so in quality and so often are a complete failure. Grow them in cold frames and you overcome such uncertainties.

It is the same with melons. Their success depends largely on an early start. But the early start they need, is too early to start them outside. There, then, is where the cold frame insures success.

So it simmers down to the common sense basic fact that the more your garden yields, the less you have to buy. The less you have to buy, the more money you have in your pocketbook, and the more food there is for those who have no gardens.

If cold frames will do this for you; and in so doing also help the country; it is both an economic advantage and a patriotic act.

You can still further economize by buying only high-grade, enduring frames and sash. You will then have them working economies for you, for years and years to come.

Because we have been building greenhouses for over half a century, we know how to best build frames and sash. Which are, in fact, a Junior brand of greenhouse.

As a guide to frame growing, we have a booklet No. 206, which also contains full descriptions and prices of our Standard Sash and half a dozen or so different kinds of complete frames. Send for it.

Lord & Burnham Co. *Limited of Canada*

Builders of Greenhouses and Conservatories

[Royal Bank Bldg., Toronto
Transportation Bldg., Montreal
Factory, St. Catharines, Ontario