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Final Appeal Judge Gives Ruling on Exemption of Farmers

Mr. Justice Duff (the Final Court of Appeal) Declares it is Essential that there shall be No Diminution in Agricultural Production

(Published by authority of Director of Public Information, Ottawa.)

Hon. Mr. Justice Duff gave judgment on December 6th, in the first test case brought before him, as Central Appeal Judge (the final court of appeal), for the exemption of a farmer. The appeal was made by W. H. Rowntree in respect of his son, W. J. Rowntree, from the decision of Local Tribunal, Ontario, No. 421, which refused a claim for exemption. The son was stated to be an experienced farm hand, who had been working on the farm continuously for the past seven years, and ever since leaving school. He lives and works with his father, who owns a farm of 150 acres near Weston, Ontario. With the exception of a younger brother, he is the only male help of the father on the farm. The father is a man of advanced years.

In granting the man exemption "until he ceases to be employed in agricultural labor," Mr. Justice Duff said:

"The Military Service Act does not deal with the subject of the exemption of persons engaged in the agricultural industry; and the question which it is my duty to decide is whether the applicant being and having been, as above mentioned, habitually and effectively engaged in agriculture and in labor essential to the carrying on of agricultural production, ought to be exempted under the provisions of the Military Service Act.

"These two propositions are indisputable:

"(1) In order that the military power of the allies may be adequately sustained, it is essential that in this country and under the present conditions, there should be no diminution in agricultural production.

"(2) The supply of competent labor available for the purpose of agricultural production is not abundant, but actually is deficient.

"The proper conclusion appears to be that the applicant, a competent person, who had been habitually and effectively engaged in labor essential to such production, ought not to be withdrawn from it.

"It is perhaps unnecessary to say that such exemptions are not granted as concessions on account of personal hardship, still less as a favor to a class. The sole ground of them is that the national interest is the better served by keeping these men at home. The supreme necessity (upon the existence of which, as its preamble shows, this policy of the Military Service Act is founded) that leads the State to take men by compulsion and put them in the fighting line requires that men shall be kept at home who are engaged in work essential to enable the State to maintain the full efficiency of the combatant forces, and whose places cannot be taken by others not within the class called out."

Ottawa, Dec. 8, 1917.

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Apple Spraying*

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

IN coming before you to discuss the subject of apple spraying, I realize that my paper must deal with principles that hold true everywhere, and must in the absence of full and detailed knowledge of local conditions in the Province of Quebec, avoid as far as possible, such questions as the dates or periods at which to apply spray, whether one or two sprays are necessary before the blossoms, whether one or two sprays are necessary after the blossoms, etc. These are questions which the local climate, the prevailing varieties of apples and the insects and fungus diseases dictate the answer to, and the Rev. Father Leopold, Mr. C. E. Petch, Prof. T. G. Bunting and others of your excellent local men are best qualified to answer. In Nova Scotia we lost at least twenty per cent. of the total crop one year through a portion of the growers following the advice of a man not familiar with local conditions and omitting the first spray. It just happened that we had that year a serious infection of apple scab started about a week before the blossoms opened and as the blossoms opened it spread to the set, removing ninety per cent. of the crop from the orchards that were not sprayed twice before the blossoms. I would therefore ask you to consult your local men as to the date of spraying and local pests, rather than have you hinge the failure or success of your apple crop on advice from an outsider like myself.

Effect of Spraying.

We have few men left in Nova Scotia to convert on the value of spraying in growing clean apples. In our heaviest apple county, namely Kings, over 87 per cent. of the orchard is sprayed according to Prof. Brittain's latest census. What the people there want to know is what spray to use and when to use it. I have no doubt that you here have been told and showed so often how much cleaner and better sprayed apples are than unsprayed that it would bore you to recite figures showing the improvement in quality for the current year due to spraying.

The effect of spraying on the quantity of fruit of the current year is something upon which experiments show the widest variation. If an insect such as the tent caterpillar, canker worm, tussock moth, codlin moth or the apple maggot are to be controlled spraying may show enormous increases in yield for the cerrent year. Again, if some of the fungus diseases are very bad, such as apple scab developing early enough to infect the young stems of the blossoms and young sets, spraying may mean the difference between a full crop and no crop.

On the other hand when very few insects are present and the season happens to be dry and unfavorable to the development of fungus diseases, it may, and often does, happen that the trees sprayed with lime and sulphur will not give so many apples as the unsprayed. Spraying with lime sulphur as practised to date in the majority of cases must be considered as an insurance against loss of the crop by fungus and insect pests and against the growing of all No. 3 apples, but cannot be regarded as beneficial in the rare cases where neither fungus diseases nor insect pests are present in injurious numbers. Spraying with lime sulphur as usually practised may be regarded as the lesser of two evils, the greater evils being the fungus and insect pests, which are offset by the spray.

It has long been noted that thorough spraying equalizes the crops of apples so that after a man has sprayed thoroughly for several years he has practically no failures and no bumper crops. Many of our orchardists in Nova Scotia have varied less than twenty per cent. from the average during the last seven years. One orchard very thoroughly sprayed varied less than one and a half per cent. during the years 1914-15-16.

In our browntail moth work in the orchards we have long noted that the orchards that were sprayed usually held their leaves later in the fall than those that were not sprayed. It was thought that there might be some relation between the holding of the leaves in the fall and the annual bearing and some studies were made in order to determine this point.

The first experiment was in an orchard of 148 trees that had never before been sprayed and which in 1912 and 1913 gave less than 25 barrels of apples. In 1914 it gave 16 barrels. In 1915 we sprayed the orchard thoroughly and got 85 barrels of shipping apples. In 1916 the orchard was not sprayed but it gave 160 barrels. In 1917 it was not sprayed and it gave 23 barrels. This tended to corroborate our contention that spraying as a rule influenced the quantity of fruit produced the folowing year more than it did the quantity produced the current year.

In 1915 we sprayed so as to damage the leaves on four Wagner trees in a row across a block of Wagners. The next spring the trees stood out the only four in the orchard with a small amount of bloom on them. In another orchard, Prof. W. H. Brittain sprayed one half in 1915 and 1916, leaving the other half unsprayed. In 1915 the sprayed half gave 2.46 barrels of apples a tree while the unsprayed half gave only .69 barrels per tree. On October 25th, 1915, we photographed

* Extract from an address delivered before the recent annual convention of the Quebec Pomological Society.

the trees. Where we sprayed, the trees were in full leaf and where we had not sprayed they were practically defoliated. The next spring we photographed the same trees. The plot that had given a full crop the year before and had held its leaves late, had a full bloom and the plot that had a small crop the year before and where the leaves had dropped early, on account of the blackspot getting on them, had almost no bloom. This rule, of course, only holds true in years where apple scab is prevalent enough to infect the leaves and cause them to drop early in the fall. In years where no apple scab is present and the leaves stay on the unsprayed trees as late as they do on the sprayed, there will be little, if any, difference in the amount of bloom the following spring.

When we had worked with the principle for two years, Prof. Brittain and I became convinved as to the accuracy of it and in December, 1916, we found by enquiry that on account of the prevalence of apple scab the leaves had dropped very early in Ontario; we therefore predicted a short apple crop in Ontario in 1917 and warned the Nova Scotia apple growers who had a chance of a crop that it would be up to them in 1917 to supply the markets usually supplied by Ontario and to care for their orchards accordingly. This has proved out more true even than we anticipated, for this year Nova Scotia is selling her crop in Ontario, and is even supplying the orchard towns of Ontario with their fruit.

I am convinced that the effect of the spray in keeping the apple scab off the leaves and so causing them to stay on late in the fall, thus going a long way towards insuring a crop for the coming year, is one of the greatest, if not the greatest, benefit that we get from spraying and it is a benefit that is not generally recognized. The McIntosh Red in New Brunswick in 1917 was a failure on account of lack of bloom, that in turn being caused by premature dropping of the leaves in 1916, due to the apple scab infection.

Combinations of Materials.

It would appear that in the past too little attention has been paid to the combining of poisons and fungicides for spraying purposes. Because a fungicide by itself is harmless to foliage and a poison by itself is equally harmless, it has often been assumed that a mixture resulting from a combination of the two would be harmless, when in fact the materials resulting from the mixture of the two were possibly extremey dangerous or useless. On the other hand poisons which are harmful to foilage when used alone may in many cases be rendered safe when combined with the proper fungicides.

As bases for our combinations we have tried three main fungicides, Bordeaux mixture and its modifications, lime sulphur and the various sodium sulphide combinations, such as Sulfocide, soluble sulphur and Spra sulphur.

Bordeaux.

All poisons can be combined with

A Garden That Gave Results.
In a garden 100 feet square, Dr. Metherall, of Burlington, Ont., produced enough vegetables and strawberries for a family of four. The Allies require many more such gardens this year.

Bordeaux with a greater degree of safety than with any other fungicide, even soluble arsenicals such as sodium arsenate being added in finely powdered form to ordinary stone lime Bordeaux and used with perfect safety on the potato. On the apple when using sodium arsenate it seems advisable to slake the lime with a water solution of the sodium arsenate, thus forming arsenate of lime which is then used the ordinary way in making the Bordeaux. Paris green, the old standby, can be used with greater safety with Bordeaux than in any other way.

Arsenate of lead makes an excellent poison with Bordeaux on the apple where there is not a serious outbreak of biting insects. Arsenate of lime can be used with Bordeaux both on the apple and potato. Arsenate of zinc is primarily a potato poison and one of the best, but it can be used with a high degree of safety with Bordeaux on the apple. This season we combined finely ground white arsenic with Bordeaux and used it on the potato with very slight burning, and fair killing results.

We are not yet in a position to say what poison is the best to use with Bordeaux. For the present it would seem that the cheapest poison, such as arsenate of lime, would be the best, but on the apple arsenate of lead might prove better on account of its adhesive qualities. Until we know more about poisons with Bordeaux I would hesitate to recommend any one of them definitely, especially as all are to a great degree safe when used with Bordeaux.

Lime Sulphur.

Up until last year lime and sulphur was almost universally used with arsenate of lead. We had tested arsenate of lime with it in a small way in 1915 and to the extent of four tons in the Annapolis Valley in 1915, and on the strength of our experiments and the universal satisfaction that the four tons gave to the people who used it, we recommended arsenate of lime with lime and sulphur in a large way in 1917 with the result that twenty-two tons of arsenate of lime were used in Nova Scotia during the past season.

In all of our experimental plots for three years we have, without exception, gotten more fruit and less foliage injury from the lime sulphur, arsenate of lime combination than from the lime sulphur, arsenate of lead combination. In the orchards the results have been substantially the same, the variation in weighing out and mixing and in application more than accounting for the variations in results over the country.

In theory, too, the arsenate of lime sulphur combination is the safer. When straight tricalcium arsenate, with less than one half of one per cent. of soluble arsenic, is added to lime and sulphur no chemical change takes place, the lime sulphur remaining in full strength while the arsenate of lime remains as insoluble as ever.

When standard arsenate of lead is added to lime and sulphur, double decomposition occurs with the formation of lead sulphide, the black insoluble precipitate of sludge that is found at the bottom of so many spray tanks and a crude arsenate of lime, five per cent. of which is soluble. As a rule this chemical change decreases the amount of sulphur in solution by about thirty per cent.

One can easily see from the chemical standpoint alone that arsenate of lime is preferable to arsenate of lead as a poison to use with lime sulphur solutions. When this is borne out by practical tests in the field, the argument becomes more convincing and when we find that arsenic in the form of arsenate of lime costs about one-half of what arsenic in the form of arsenate of lead costs it becomes plain that there is only one poison to recommend with lime sulphur and that is arsenate of lime, from half to three-quarters of the powdered material to forty gallons of solution.

Sodium Sulphides.

Sulfocide, Spra Sulphur, soluble sulphur materials have been on the market for several years and have given from fair to good results in the control of fungus diseases. When used straight they are safe on apple foliage. All have been tried in combination with the arsenicals of copper, lead and zinc, but owing to double decomposition taking place with the resultant formation of soluble arsenical salts of sodium, they have in the past proved unsafe as apple sprays. In 1915 we found that arsenate of lime did not decompose when added to sodium sulphide, consequently the two could be used in combination with a fair degree of safety. Unfortunately arsenate of lime cannot be used alone on apple foliage and sodium sulphide does not protect arsenate of lime from the action of the air in the same way as lime sulphur and bordeaux mixtures do. We, therefore, found that the second and third application of the sodium sulphide arsenate of lime combination resulted in considerable yellowing and dropping of the leaves even though no burning was apparent. It was at the same time found that one and a quarter pounds of arsenate of lime to one hundred gallons, used with sodium sulphide, was as efficient an insecticide as two pounds of the same poison with lime and sulphur.

In our work of 1917 we have been practically able to eliminate the yellowing which resulted from the use of arsenate of lime with sodium sulphide by reducing the quantity of arsenate of lime and adding an excessive quantity of either water slaked lime or hydrated lime. To one hundred gallons we therefore recommend two and a half to three and a half pounds of soluble sulphur (a sodium sulphide), one and a quarter pounds of arsenate of lime and fifteen to twenty pounds of either hydrated or water slaked lime, in cases where the sodium sulphide sprays are recommended. This combination we used four times on apples during the past season with no trace of yellowing or burning, so for the one or two applications which this combination is recommended for, we feel absolutely safe in stating that it is harmless to apple foliage.

B. T. S. or Barium Tetrasulphide.

This material comes in dry or powdered form and when brought into solution is very similar to lime sulphur in its action, but with one difference, it acts much more rapidly and completely on arsenate of lead when brought in contact with it and oxidizes more rapidly on exposure to the air. As with lime sulphur, arsenate of lime is the proper poison to use with B. T. S.

Potassium Sulphide.

Potassium sulphide or liver of sulphide is one of the old fashioned fungicides which acts in the same manner as the sodium sulphides, safe alone but dangerous when used with any of the metallic arsenates. We have found that it can be used with arsenate of lime in the same manner as sodium sulphide is used and in cases where it is available it can be used with arsenate of lime and an excess of lime with perfect safety.

Nicotine Sulphate.

This material can be used with any of the fungicides or poisons with perfect safety. From Prof. Brittain's experience it would seem that Nicotine sulphate is more efficient with sodium sulphide solutions than with lime sulphur or Bordeaux.

Orchard Trees Which Do Not Bear

By W. A. McCubbin

OUR attention is often called to trees or orchards which do not bear fruit, and so many cases of these have been noted that it seems worth while to say a few words in connection with the subject. In a number of cases the lack of bearing is merely temporary, and is due to the winter killing of buds, to unhealthiness in trees, presence of disease, or over-bearing in the previous summer. With these causes almost everyone is familiar, and it is not intended to discuss them here. The lack of bearing that usually gives most trouble is a more or less permanent condition in the tree. Year after year the tree produces either no crop at all or a mere scattering of fruit. This sterility is due to various causes, and it would be impossible to say which cause was active in any particular case, without a very careful study. A number of causes of permanent sterility are mentioned in the hope that growers will be able to recognize the peculiar cause in their own orchards, and either get over the difficulty or remove the tree.

This five-year-old apple tree in the orchard of W. A. Fraser, Trenton, Ont., produced half a barrel of apples.

1—Blossom Sterility.

It very often happens that the lack of crop is due to imperfect fertilization of the blossoms. Every fruit grower knows that before the young fruit will start to develop the yellow, dust-like pollen which is found in the flowers, must come into contact with the embryo fruit, or at least with the small, stalk-like growth which rises from this embryo in the centre of the flower. When the pollen grain falls on the top of this stalk it grows much as seed does, sending a long delicate thread down through the stalk into the embryo, which it fertilizes. After this takes place the fruit

will develop. If it does not take place the blossom will fall without "setting." Now it is a well known fact that the pollen on the blossoms in some trees is incapable of fertilizing into blossoms on that same tree. Pollen must be brought from a nearby tree of the same kind in order to fertilize the blossoms, and if no such trees are near at hand so that bees can readily carry their pollen, the tree will be sterile. This need of cross fertilization from one to another explains a good deal of the sterility in our apple orchards.

2—Sterility of Varieties.

Certain varieties of trees are well known to be weak in setting fruit. It is only occasionally that some of them will be induced to bear a full crop. This conditions of affairs is by no means common, since such partially sterile varieties are weeded out by the nurseries and experimental farms who are engaged in the production of new fruits. They do not often come into commercial use unless they are of exceptionally good quality in other respects. In setting a new orchard great care should be taken to inquire into the record of varieties in this respect.

3—Individual Sterility.

Many young fruit growers do not realize a fact which is very apparent to old experienced men who have brought up several orchards, that trees possess a certain amount of individuality; they differ among themselves just as human beings and animals do, and since we often meet with animals and human beings who are sterile, we may expect to find the same condition in certain trees as well. No reason can be given for this except that it is a peculiarity of the individual plant.

4—Strong Vegetable Growth.

In a limited number of cases lack of productiveness may be due to too strong vegetable growth. This is well known to gardeners and growers of hothouse plants. When a gardener wishes to send a rose bush or a geranium into bearing he cuts down the supply of water and food, especially the nitrogen food supply. When a plant is growing very luxuriantly it tends to put off the bearing stage as long as possible. There is one principle to be noted here which concerns plants and animals alike. Every organism makes an effort to reproduce itself before it dies, and in either plants or animals adverse conditions of climate, accident, or food, which threaten its existence will tend to quicken the reproductive functions. The hint given in this point is valuable for the orchardist; if a tree is growing vigorously but is making no attempt to produce fruit it may often be induced to do so by starving or wounding it, which means either reducing the food material or pruning. It is important to note here that excessive nitrogen tends to encourage vegetative growth, while the addition of a greater proportion of potash tends to increase the reproductive function. Also the check that is given by pruning often stimulates the tree to form blossom buds, consequently to produce more fruit.

In conclusion it may be said that when trees are not productive they should be studied by the orchardist himself. He should make sure that they are being properly fertilized, then if attention to the matter of food supplies and pruning do not cure them they are not among the varieties listed as shy bearers, it is probable that they are weak in production individuality, in which case the best plan would be to get rid of them and plant fresh.

VEGETABLE PROBLEMS ANSWERED

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

Varieties of Rhubarb.

Will you kindly send information about the best varieties of rhubarb for clay soil, method of cultivation, etc.?—E. J.

The two common varieties in use at the present time are Victoria and Linnaeus, although these are being replaced to some extent by Sutton's Seedless. However, it is almost impossible to get plants of this variety, as very few of the seedsmen list it. Rhubarb is best transplanted in the spring. The old roots are dug up, split into sections, in most cases one bud to a section. These are planted in trenches, putting the bud one inch under the soil, and are then allowed to grow for two years before any of the crop is pulled.

Growing Asparagus.

Would like information regarding growing Asparagus. The kind of soil used; when it should be planted; what kind of roots are best to plant; the proper depth to plant and the space between each root; some idea as to the value of the roots and when to secure them. —E. F.

The best type of soil is sandy loam, well drained, but containing sufficient soil moisture, with a south or south-east slope. The young plants are set as early in the spring as it is possible to get the ground ready, in rows five feet apart and plants eighteen inches in the rows, the young plants being set with the crowns at least four inches under the surface. One year old plants are much the best, and where one has a choice it is well to take those that have a smaller number of buds but larger in size, as these will give larger stalks later on. Our plan is to sow the seed in the field in the spring, mixing it half and half with radish seed, in rows about two feet apart. The radish seed will come up and mark the row so we can cultivate, and is out of the way before the asparagus comes through, as it doesn't appear until about three or four weeks after seeding. When the asparagus plants are about four inches high they are thinned out to about one or two inches apart, and are allowed to grow, and kept clear of bugs until fall, when the tops are cut off and burnt. The young plants are taken up, tied in bundles and placed in moist sand in a cold cellar over the winter or buried in the ground out of doors. You can buy roots from seedsmen, and would suggest you write them for prices. If you cared to you could grow your own plants from seed, but it would take an extra year.

Starting Sage.

Kindly send us information in connection with sage growing, transplanting, etc.—H. L.

We ordinarily sow the seed in the garden early in spring in rows 18 ins. apart. If you want it singly, plants should be thinned out to 10 or 12 ins. Or you could plant seeds in a hot-bed and transplant into the field. The plants when transplanted are handled the same as any other planting crop.

Disposing of Onions.

With regard to late sown onions—Yellow Globe Danvers and Red Weathersfield, would the small ones be suitable for sets next spring, and would the medium size ones, that are too small for sale, be of any use as hen feed, boiling tops and all?—S. J.

Regarding the small onions, these may be used for sets. Red Weathersfield does not make a good bunching onion on account of its color. However, if you are in a section where you can sell red onions, you might be able to dispose of them. We have used up to one and a quarter inches in diameter for sets, but these are always pulled the very first. I am doubtful about the use of onions for hen feed, as I am afraid they would taint the eggs.

Non-Productive Cucumbers.

I have quite a large patch of cucumbers and they are good, healthy vines, but produce mostly sterile blossoms. What is the cause of it? They have been the same each year at first, but they get all right later on. I could have cucumbers from two to three weeks earlier every year if the blossoms were good.—F. L.

The cause of the lack of fruit in the early season is probably due to moist weather, which causes failure of the fruit to set. Cucumber plants, as a rule, carry about forty male blossoms to one female, and wet weather hampers very much the fertilization of the one from the other as they are on separate parts of the plant. For this reason, in the early season, the cucumbers will not all fertilize and will turn yellow and drop off. This only happens with the American varieties, as the English have been bred to set without being pollenized.

Low Temperature Effect on Set of Fruit*

J. G. Chapais

AFTER the heavy crop of fruit we had in Eastern Quebec in 1916, we did not expect to get a great abundance of fruit last year. Nevertheless, from the appearance of our trees before and, above all, during the blooming period, we thought we could hope to have a good crop, though rather a little below the average. But, how greatly we were disappointed.

The blossoms were below the average for cherries, very good for plums and a little below the average for apples. But, cherry and plum trees, instead of beginning to bloom by the 28th of May, as usual, began only by the 10th of June, and apple trees, instead of beginning to open their buds by June 10th, opened them only from June 20th to June 30th. The cause of such a delay was the cold, gloomy and rainy weather that prevailed during May, with the blowing, for the most of that period, of north eastern winds. During May we had twenty days when the temperature fell below 50 degrees F., five sharp frosts, seven rainy days and three slight falls of snow.

Though our fruit trees bloomed fairly well, but in a rather belated way, very little fruit set. It was below the average for cherries, about the average for plums and almost nothing for apples. Our trees had wintered well, as it was shown by their fair blooming. We must, therefore, come to the conclusion that it is the temperature that was at fault. The May temperature was unbearable. The June weather when blooming occurred, was not more favorable. Here is a summary of what it was: Sixteen days very cool, between 50 and 60 degrees F., except two days with 42 and 43 degrees F.; of these cool days, ten gave us rain and six were cloudy. The wind blew from north-east for twenty days. Now, we remember having read that, before a convention of the Ontario Fruit Growers' Association, Mr. W. T. Macoun, Dominion Horticulturist, said that should the temperature run fairly regularly below 70 degrees F. during the blossoming season, pollenation is not likely to be good. Experience has proven that if we have not a temperature at least moderately warm with a few sunny days, during blossoming time; if, above all, the weather is cool and rainy, during that period, everything then contributes to hinder good pollenation. This is the weather that we had in the district below Quebec. During the period when it occurred fruit did not set, from the 10th to the 30th of June. In our orchard, last year, we gathered three hundred bushels of apples; this year, we hardly got sixteen bushels.

A fact which shows that rain and north-east winds had a great influence in preventing pollenization is that two apple trees in our orchard proved an exception to the general rule and gave us a fine crop of fruit. They were one crab apple tree of the Whitney variety and one Peach of Montreal apple tree. Those two trees were exceptionally well sheltered by large spruce trees standing as a wind-break for our orchard. For those two trees, that shelter prevented wind and rain from reaching them as badly as the other trees, and, consequently, helped the setting of their fruit.

In British Columbia even the boys are taught how to pack friut. These boys attended a special class held at Vernon, B.C. Largely because of its uniform pack British Columbia fruit, after being shipped over 2,000 miles, realizes top prices on the markets of the East. Note article on Packing Schools, page 6.

* Extract from an address delivered before the annual convention of the Pomological and Fruit Growing Society of the Province of Quebec, held at Macdonald College on December 4th and 5th, 1917.

What Fertilizers to Buy

One dollar spent for acid phosphate will bring larger returns in increased crop yields than for any other kind of fertilizer at general market prices. This conclusion made by the Ohio Experiment Station is given after more than 20 years' investigational work.

Complete fertilizers—that is, those containing all three elements, nitrogen, phosphorus and potassium—are doubtful purchases to-day because of high prices for them. "Increases in crops produced by adding nitrogen or potassium to phosphate are likely to be worth less than the added cost of the fertilizer," the state experts say.

The same amount of money spent for raw rock phosphate, or floats, did not return as much as when expended for acid phosphate in one test at Wooster. Acid phosphate was used at the rate of 480 pounds in connection with eight tons of manure applied to corn in a four-year rotation of corn, oats, wheat and clover. The same money bought 768 pounds of raw phosphate rock.

The average yields per acre from acid phosphate were seven bushels more of corn, three and a fourth bushels more oats and four bushels more wheat than from raw phosphate rock.

Winter Control of Insects

Certain insects are more readily controlled during the winter months. In the provinces of Nova Scotia and New Brunswick fruit growers should collect the winter webs of the brown-tail moth. The law requires owners of properties infested with this insect to adopt control measures.

Throughout eastern Canada there is a widespread outbreak of the white-marked tussock moth, which may be serious next year. Fruit-growers and owners of shade trees should destroy as many as possible of the conspicuous white egg clusters in which the insect passes the winter. They can be scraped off the trees, fences, etc., or swabbed with creosote. Much injury next year will be prevented by taking such steps this winter and in the early spring before the buds burst.

Apple Packing Schools

The Department of Agriculture of British Columbia has shown great interest in the question of apple packing in the province and in the past few years has held apple packing schools in all the fruit sections. The local administration of these schools is placed in the hands of a responsible body such as The Farmers' Institute, Fruit Growers' Associations, or Board of Trade. These associations must guarantee twelve pupils at two dollars each. The schools run for six days with five hours' work each day. In districts where it is impossible to secure the above mentioned number of pupils, a three-day course is held for a minimum of eight pupils at a fee of one dollar per pupil, to take six lessons of two and a half hours each. The Department of Agriculture provides a competent instructor, pays his expenses, supplies fruit, wrapping paper and packing tables. The applicants for packing school have to bear the expense of renting, heating and lighting of the hall. These packing schools have proved a great success. From among those who have taken the work, we have been able to get many skilled packers. This has enabled us to handle the increased tonnage without any loss. Many of the packers developed from these schools have been women and girls. Their work has been very satisfactory and will be a large factor in packing the crop of 1917. During the past winter courses in packing were held for school children fourteen years of age and older. The results accomplished by most of those who took the work were amazing, as the accompanying photographs will show.

Apple Cedar Rust Controlled

Complete success in controlling cedar rust of apples by the eradication of the red cedars has been shown possible by representatives of the United States Department of Agriculture working in large commercial apple districts. Whenever it is desired to control apple cedar rust in an apple-growing community it can be effectively and permanently accomplished, the specialists say in a recent report, by destroying the red cedars in the winter.

Cedar rust still remains a serious disease in many localities, particularly where the orchards do not form a dominant part of the plant industry. While there are certain phases of this subject that require further investigation, the main problem may be regarded as being definitely solved.

Do not store apples in a potato cellar as they take up odors.

LIGHT ON FRUIT PROBLEMS

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

Top Grafting.

I have a block of 66 peach trees in my orchard, five years old, that have turned out to be natural fruits. Would you advise me to graft new tops on these or cut them down?—A. L.

I doubt whether it would pay to undertake budding these trees. It could be done, but I should not care to advise it. You would probably be further ahead in the long run to plant new trees.

Black Heart.

Will you please tell me all you know about black heart in apple trees? Do you think that Baldwin trees with this disease will recover?—C. B.

Black heart is a form of winter killing, and is very common in the Baldwin variety, even in the mildest parts of Ontario. Under these circumstances one is almost forced to the conclusion that Baldwin is scarcely hardy enough for the Ontario climate. This injury is very often induced and rendered much more serious, by the forcing of trees for strong growth. In reality, a Baldwin tree should on no account be forced, even if recourse has to be made to laying the orchard down in sod for a year or two occasionally. If the trunk and main branches are perfectly sound without wounds of any kind through which decay might have gained an entrance, I should favor leaving them, providing they are growing satisfactorily. Black heart will not kill a tree outright. So long as decay can be kept out the damaged wood simply dries up without any harm being done, but if at any point this injured wood becomes exposed to the air, decay is certain to set in. This means, of course, that it is much safer not to prune a Baldwin tree in its early years. If pruning is necessary, the wound should be covered immediately and thoroughly. It seems to me your only course is to leave the trees which appear sound and healthy and replace the others as fast as they begin to show signs of failing health.

Grafted Apple Tree.

I put two grafts in the stump of a dead apple tree, which both lived. I cut one out. The other is a fine tree but does not bear yet. It is 9 years old now. Does it need grafting again?—F. E.

Concerning your grafted apple tree would say whether or not it should be grafted again depends on where you got your scion. If you took this scion off a tree of good variety, the fruit produced by this graft will be the same as the original tree. If, however, the graft was taken from a wild tree or from a shoot coming from the root of another tree, the probability is the present tree would require to be grafted again in order to bear good fruit. In that case you would use a graft (or scion) from whatever kind you wish to grow.

Pruning Cherry Trees.

I would be glad to receive information regarding pruning cherry trees. I have two cherry trees about ten or twelve years old, which were practically barren of fruit last season except on the tip where the birds alone could reach it. I removed the interfering and interlacing boughs, clearing the centre of the trees and opening the top by reducing the height, working on the assumption that access of air and light was necessary before the tree could be expected to bear fruit. Would you kindly inform me whether the trees would benefit or suffer as a result of my action, and should it happen I had been too reckless what symptoms should I be prepared to find. The wounds of course have been painted over.—J. E.

You do not state whether the cherry trees are sweet or sour. Sweet cherry trees seldom need much pruning, as they grow naturally quite open to sunlight, although with age they tend to get tall, sometimes necessitating the removal of the central leader. Sour cherries seldom require heading back of branches, but do often require thinning out of small branches. I do not consider the removal of these small ones which crowd each other is in any way detrimental, although it should not be carried too far. Your trees should not suffer permanently from the treatment they have received, and if they have thrown out numerous crowded shoots, which result usually follows too much pruning, all that can be done is to thin out somewhat and allow the balance to remain without treatment.

Orchard Cultivation.

Would you kindly send directions for apple orchard cultivation?—C. R.

Begin cultivation as early in the spring as the land is ready to work, and continue until about June 15th. The spring cultivation can be started by ploughing or disking if land is light. If the land is in sod, it would be wise not to plough deep—four inches would be as deep as one would dare go. Ploughing should be followed by disking, or harrowing, so as to put the land in good condition, and this cultivating should be repeated at intervals of not less than ten days until about June 15th. Our practice is to sow a cover crop such as rye, rape, buckwheat or a mixture, at the last cultivation, which is plowed down in fall or early spring.

A Neglected Orchard.

My orchard has been neglected for several years and I may not be able to prune it in the spring. Would it injure the orchard seriously if I pruned it in June?—H. S.

Light pruning of these trees in June would not be objectionable, but if the trees are in a condition which necessitates heavy pruning, I should advise against doing the work in June. If a moderate pruning out could be given this season, and the job finished next spring it would prove more satisfactory than heavy June pruning.

Air Conditions in the Bee Cellar

F. W. L. Sladen, Apiarist, Dominion Experimental Farms

WITH the outside temperature ranging from many degrees below zero to 40 degrees above and more, and the increasing accumulation of dead bees, conditions in the best of bee cellars are bound to vary considerably.

If there is ventilation from outside (every cellar in which the hives are at all crowded should have provision for this) there is bound to be a strong inward current of cold fresh air during the cold spells, with a corresponding drying of the air, sometimes to a degree that is beyond that most favorable for bee life. The dry air outside becomes still drier when warmed up in the bee cellar, although, if all is well, this is largely counteracted by the moisture given off by the bees from the honey they consume. This condition can be ameliorated by greatly reducing the intake, or by closing it altogether, allowing the air to filter through the thicknesses of bran sacking or burlap. When the outside temperature rises above freezing, this covering should be removed, and, as the time approaches for the bees to be brought out in spring, every orifice that does not also let in light should be opened wide for ventilation and drying.

Pure Air Required.

The air of a crowded bee cellar gradually becomes foul through the accumulation of dead bees on the floor. The odour of these is very harmful to the bees, and they should be swept up at intervals.

It is not advisable to close these remarks without reference to other conditions in the bee cellar which are often of vital importance—the exclusion of mice, and the provision of food to colonies that may run short and starve before they can be brought out. Colonies that are wintering well on wholesome stores in a steady temperature of about 42 to 45 degrees, with sufficient fresh air, generally consume not more than about ten pounds of stores through the winter, but if the stores are unwholesome, or if the cellar is subject to great and frequent changes in temperature, they may consume twenty or twenty-five pounds, with perhaps ten pounds more before they were brought in.

Several excellent recipes for making candy in cakes, to be placed over the combs in the winter, are given in text-books and bulletins. Under Canadian conditions, however, a warning is here necessary. In cold weather the air of the cellar may be so dry that candy given to weak, starving colonies, especially if their stores are granulated, may become so hard on the surface that the bees are unable to reach its moist interior and will then die of starvation. The remedy is to make the candy as soft as possible, but not so soft that it will run and fall between the combs on to the bees. The excessively dry conditions are most often met with in the basements of well-built dwelling-houses, where only a few colonies are wintered.

Out-Apiaries*

E. T. Bairnard, Lambeth

OUT-APIARIES are established for several purposes. In queen rearing several strains of bees may be reared by having each yard a few miles apart. Mr. D. H. Jones, who was one of the first beekeepers in Canada to try it, had bee yards established on the islands of Georgian Bay for testing the new races of bees he had imported from Europe.

A business or professional man living in a city, where it might not be convenient to keep bees, could place them just beyond the city limits and look after them during his spare time and holidays. Most out-apiaries are established by beekeepers for the purpose of keeping more bees than the home pasturage would support.

The number of colonies of bees that can be profitably kept in one location is limited by the amount of pasturage in the spring to build upon and in the summer season for surplus. Some locations will support far more than others, depending on the nature of the soil and the kind of farming carried on in the district. Most beekeepers in Ontario find it inadvisable to keep more than seventy-five to one hundred colonies in an out-apiary, but if enough help is available to make it possible to look after them in our day's work, more may be kept.

It is better to have the home apiary just a little crowded before going to the expense of an out-apiary. Some beekeepers might succeed with a home apiary where they are every day, but with an out-yard, several miles from home, they might be neglectful. A good test before starting an out-apiary would be to divide the home yard for a season and work part of it by examining the colonies, say once a week. You would then see how successful you would be in controlling swarming.

The Location.

The location for an out-apiary must be far enough distant from the home yard not to interfere with it. This means that it should be three or four miles from home and the same distance from other apiaries. Always locate where the pasturage is good. It pays to vary a location a mile or more

* A paper read last month at the annual convention of the Ontario Beekeepers' Association.

A good location for an apiary, where excellent shade is provided.

for the sake of having it where pleasant people live, in a sheltered location, or near good roads.

We prefer placing our apiaries in the woods, and if possible on the north side of a good road. We then have them sheltered on at last three sides: the west, north and east. All we expect of the farmer is to provide us with a quarter acre of ground. We do the fencing, levelling, and arrange the roadway in to the hives, and put up a small portable building about eight by twelve feet, bolted together at the corners.

We want out-apiaries so arranged that we can load them at short notice and move at practically little expense. This is one reason why we prefer closed end frames and wired combs. The easiest way to move an apiary is on sleighs in the spring, and if possible while the bees are in the winter cases.

Some beekeepers pay a fixed rent of $10 to $15. Others pay a percentage of the crop. Still others pay so much for every swarm hived. At least fifty pounds of honey should be given, depending on the amount of trouble the farmer is put to by having you and your bees on his farm.

For visiting out-apiaries nothing is equal to an automobile and trailer or auto truck. You will find this especially true when you have to move bees in the summer from an out-apiary, and it is necessary for you to be in the yard maybe eight or ten miles from home at daybreak, in order to close the bees in their hives.

The tools used in the home apiary will do in an out-apiary. During the busy season we carry all the time one set of tools in the automobile, consisting principally of bee-smoker, veil, hive-opening tool, tin box with an extra supply of matches, small sharp saw, wrapped up in a piece of cotton, and a small hammer. We never leave a smoker or veil at an out-yard, as it might tempt visitors to use them, but we keep a hive cart in each yard.

Advantages of Out-Apiaries.

Some of the advantages of out-apiaries are:

You can select the very best locations for honey production.

You can select locations where you will be free from foul brood and other diseases.

You can move a colony, or a part of a colony, from one apiary to another, where you can feel sure that the bees will stay where they are placed.

Some of the disadvantages of out-apiaries are:

The problem of swarm control, especially when the weather is too cool and windy to open hives with pleasure.

The outside wintering of bees in such a way that the entrances to the hives will not become clogged up with dead bees during the winter months.

The damage occasionally done by thieves opening hives in quest of honey. The Heddon hive is almost proof against being robbed. The only remedy we have used is to leave honey in the building for them and say little about it.

The spring visit, when we are anxious to know how the bees have wintered, is sometimes a difficult task, on account of bad roads. If you are careless with foul brood, out-apiaries will help you to spread it.

The Farmer Beekeeper

W. W. Webster, Little Britain, Ont

FOR a numb r of years I have been managing a farm consisting of 200 acres and a 200-acre ranch farm adjoining and 90 to 100 colonies of bees. Why I chose to combine the two I cannot say, but perhaps for the same reason that the Israelites longed for a land flowing with milk and honey, for in combining farming and beekeeping you sometimes have these ideal conditions. The dairy part of the business is a great business and gives direct results. You can give a cow a pail of water, then immediately milk a full pail of milk. Did you ever get the pail almost full when the cow kicked and the land flowed with milk for many feet around you? If you haven't, I have. Did you ever turn a tap on a honey tank when honey runs slowly, and then be suddenly called away, thinking you will be back before the vessel is full? You forget all about the honey and are called away again, and when you come back the honey house and even the land beyond flows with honey. So the farmer beekeeper at times enjoys the ideal condition of a land flowing with milk and honey.

Why should we not combine farming with beekeeping? Let us imagine agriculture to represent a tree and beekeeping a little branch, yet very essential to the welfare of the tree. The bees pollenize the clovers, buckwheat and fruit blossoms, and as a result we have an increased yield of clover seed, grain and fruit. Then to make the business a success the farmers must produce clovers and buckwheat, which with us are the principal sources of nectar, as the willows, golden rod, asters and apple blossoms would not be sufficient to make it a profitable business.

Farmers in general are not always as thoughtful for the welfare of the apiarist as they might be in planting seeds and grain which produce nectar for the bees, so in running a farm in connection with bees, you can plant alsike, red and sweet clover, also buckwheat, and in this way, especially on a good-sized farm, be able to influence the honey crop to a great extent. Our chief flow is from alsike clover. Red clover yields some during the buckwheat flow, but somehow when it gets together it is all buckwheat honey.

Sweet clover yields a little, but being a very bad weed is not grown very extensively as yet in our locality. Sweet clover used to be a weed, but is not considered so now, but I believe it always was and always will be a weed. The bees, however, work on it well. A neighbor of mine who had a nice field of sweet clover was very enthusiastic over it, as it proved a good paying crop, and in addition to this built up the land for the following year. He also observed when the clover was in bloom the bees were very thick and busy on the blossoms. He concluded they were my bees, and decided I was securing honey very fast, and told me he had no doubt I would be over shortly with a quantity of honey to his home. I assured him I would consider the matter, and asked him if it would be convenient for him to bring me over a few bushels of sweet clover seed in return for the accommodation the bees had given him in pollenizing the blossoms and securing for him a good yield of clover. He hasn't brought the seed yet. Perhaps he will when I bring the honey. Anyway, he tells me his spare time is taken up hand-picking sweet clover to get rid of it. So I contend sweet clover is a weed, for, according to Noah Webster, "a weed is any plant growing in cultivated ground to the injury of the crop or disfigurement of the place."

The years of 1914 and 1915 were not good honey seasons, and beekeeping was at a low ebb. In fact, beekeeping in itself is considered a precarious occupation in that it sometimes fails in one season to give a man a straight salary, while another year it gives him more than he deserves. The season of 1914 gave me no honey worth mentioning, and when feeding time came, three fat steers obligingly paid the bill. The following year was a light crop of honey, but a good crop of wheat at a fair price helped me out. So with me it seems almost a necessity to combine the two occupations. The year 1916 was an extremely successful honey

* Extract from an address delivered at the recent annual convention of the Ontario Beekeepers' Association.

An attractive beehouse and workshop, built on a concrete foundation and owned by C. Klaubuhn & Sons.

year, while 1917 was a light crop, but an excellent price, and the bees made ends meet and some surplus besides.

Of course combining the two occupations makes one very busy, but there are various ways labor may be lessened. In the first place, our land lies together with no off-place, which always makes extra work. Then the bees are all together, with no outapiaries, which saves time and gasolene for a car. I find no time for the grafting method of queen rearing, but simply raise brood to the super above and replace with empty combs. This gives me in ten or eleven days all the queen cells I require to form into nuclei and to re-queen with later. Then my time is not taken up with swarming, as this method usually stops that also. I have a lawn mower, but do not use it in the apiary. A flock of sheep make a fine job of mowing the grass. Then while I tried to give them a weekly examination I found in war time they could do with three in a season: One in fruit bloom, when I clipped the queen's wings; then at the commencement of the clover flow, when I put on excluders and raised the brood to the supers; and then again at the latter end of the buckwheat flow, when I ascertained how much feed they required and noted their condition for wintering. Between examinations, I observed their conduct at the entrances and attended to any I suspected were weak or queenless. I leave the bees packed along the sides in their winter cases all summer. To remove the case takes time, and they are cooler and better in outside cases. Then in the matter of feeding much time can be saved. My old method was to bring the water to a boil, put in sugar, and boil again. Waiting for it to boil the second time is what tries the patience. Now I fill an ordinary wash boiler with water, bring it to a boil, then put the water in a small honey tank placed high enough to allow the syrup to run from the tap into an ordinary pail. Then I add two sacks of sugar and stir with an ordinary turnip hoe, and as soon as dissolved the syrup is just the right temperature for feeding. The feeders are large sap pails used for making maple syrup in my farming capacity. These are some of the various ways you can lessen the labor when your hired man goes to the trenches.

The Price of Honey.

Honey prices have been excellent this season, but strange to say, all things considered, I often long for the good old times when wages were $1.00 per day, barley 50c a bushel, clover honey 6½c a lb., and peace reigned supreme. This year I sold to storekeepers in small quantities at 15c. They were astonished at the big price, and wanted to know why honey was so high in price. Was not God's sunshine as free as ever it was? But I hung out for my price, and went singing, "If you want honey you must have money, for it's money, money, money everywhere." But on reaching home, like the woman at the counter where the goods went up 60c while she was considering what to buy, I found a letter awaiting me offering me 15c f.o.b. my station for the entire crop, which would be much better than selling in small quantities.

A good deal of our apiary work comes in between our busy seasons on the farm, but there are times when apiculture seems to be antagonistic to farming. For instance, you often have to extract when you are badly needed to make the necessary number of men to draw in grain, but in many other ways they glide along together.

I am glad to see that our honey committee are commanding the respect of the honey dealers, who are paying the prices set by the committee, and even more. I think as farmers and beekeepers the seller has a better right to set the price than the buyer.

The specialist in beekeeping, of course, has more bees, and in a good year makes a lot of money; but when lean years follow in succession he needs to be very optimistic and wait for the good years to come, for everything comes to those who wait.

Good stores is the great essential in wintering. Lots of young bees come next, and in a hive not too large, that they may retain the heat. In nuclei or small colonies, contract the hive by taking out two combs in an eight-frame hive and insert a division board, and they will be as snug as "a bug in a rug."

I prefer the sealed cover to the absorbent cover. Years ago, I tried the absorbent plan with poor success. Then I tried using paper at first, only partially covering the top of the hive. Then, as my confidence strengthened in the sealed cover, I covered the whole surface. The next and following years I added an extra thickness, and still more, as if their very life depended upon it. One year, as sometimes happens, I forgot to pack one at all, and to my surprise in the spring it was strong and in good condition. This shook my faith, however, that so very much depended on the packing, but the sealed newspaper cover was on all right, which proved that the sealed cover was doing its work. But I think good stores the great essential, and packing and other things in connection with wintering of minor importance. Mr. J. L. Beyer struck the keynote when he said: "Cellar or out of doors, it makes very little difference, provided there is an abundance of good stores." It seems to me there are great possibilities in apiculture at the present time.

Hives may be brought into the cellar at various times in the fall, but when bees are put out in the spring every hive should go out on the same day. Moving bees to and from the cellar is hard labor and entails continuous lifting and carrying. They must be set out in the spring as soon as the weather permits, and this cannot be delayed. On account of these reasons some beekeepers prefer the outdoor method.—H. W. Jones, Bedford, Que.

Ontario Beekeepers Hold Fine Convention

A New Disease Has Caused Trouble. Out-Apiaries Discussed. An Improved Extractor. Officers Elected.

A LARGE attendance and a splendid programme were the chief features of the 38th annual convention of the Ontario Beekeepers Association, held at the Hotel Carls-Rite, Toronto, on December 11, 12, and 13. Veterans and novices alike gathered from all over Ontario, Western Quebec, and across the line, to discuss the problems of the beekeeper, including the disappointments and discouragements of the past, and prospects for the future. The spirit of good will and optimism, which always marks these conventions, was again noticeable, and many jokes passed back and forth among the older beekeepers, who are fast friends through their long connection with the Association.

The business of the Association was transacted on Wednesday afternoon, when the reports of the secretary, treasurer, the crop committee, and the apiary inspectors, were read and adopted, and the new board of directors elected. The membership now stands at 1,113. Two new county associations, Bruce and Parry Sound, have been formed, while Essex, Norfolk, Simcoe and Stormont have been dropped owing to lack of sufficient members. During the year 1,078 queens were purchased by 148 members at an average price of 66 cents. In concluding his report the retiring secretary, Mr. Pettit, extended his thanks to the officers and members for their co-operation in promoting the interests of the organization.

The treasurer's report showed a balance on hand from the past year of $364.36.

Association's Officers.

The officers for the ensuing year are as follows:

President, James Armstrong, Selkirk; 1st Vice-President, W. W. Webster, Little Britain; 2nd Vice-President, A. McTavish, Carleton Place; Secretary-Treasurer, P. W. Hodgetts, Toronto.

Board of Directors—R. E. L. Harkness, Iroquois; R. McTavish, Carleton Place; M. B. Holmes, Athens; J. Chisholm, Belleville; W. W. Webster, Little Britain; H. G. Sibbald, Claude; F. W. Krouse, Guelph; Jas. Armstrong, Selkirk; J. Newton, Thamesford; J. Haberer, Zurich; C. E. Chrysler, Chatham; R. G. Houghten, Bradford.

Revising Committee—J. L. Byer and Jas. Armstrong.

Crop Report Committee—W. Couse, W. J. Craig, H. G. Sibbald, Jas. Armstrong and P. W. Hodgetts.

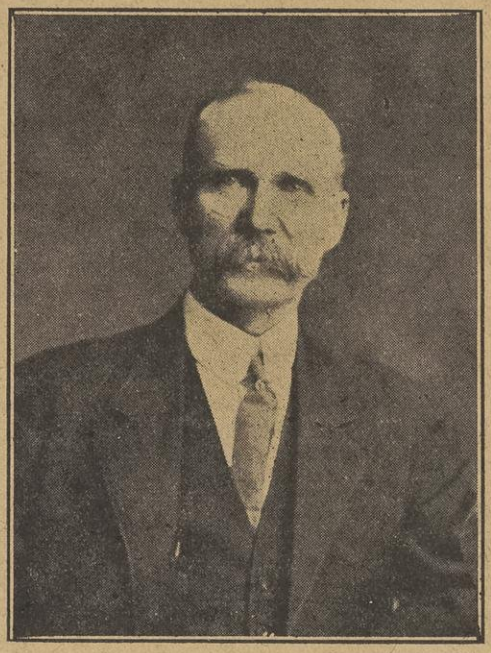
Transportation Committee—J. Evans, Jas. Armstrong and P. W. Hodgetts.

Exhibition Committee—J. Evans, representative to Toronto; E. T. Bainard, representative to London; Messrs. Holmes and Armstrong, representatives to Ottawa.

President's Address.

In his opening address President Krouse's first reference was to the resignation of Mr. Pettit, who has been a faithful member and has done much to build up and forward the interests of the Association. The past season had not been normal. The cold, wet weather in the early part of the season delayed the clover flow two weeks, but on the other hand gave the bees time to build up. The crop was average, but mostly a second-grade article. The prices, the highest in years, helped to offset the small crop, otherwise many men would have been at a loss owing to the increased cost of production. European foul brood was gradually spreading, and help hard to obtain. Beekeepers should produce as much as possible, as honey is now becoming a staple product and a substitute for butter and sugar. Mr. Krouse concluded by alluding to the good prospects for the coming year.

Mr. James Armstrong, in replying, also dwelt on Mr. Pettit's resignation. Under



Jas. Armstrong, Selkirk, Pres. Ontario Beekeeper's Association.

his guidance apiary inspection has been put on a systematic basis. The province has been mapped, records kept of the condition of every apiary, and the spread of disease. The matter of large losses to beekeepers in the silver smelting districts has been laid before the Department of Agriculture. Mr. Armstrong suggested an amendment to the Foul Brood Act, by omitting the word "knowingly" from clause 5, making it read: "Any owner or possessor of diseased colonies of bees, or of any infected appliances of beekeeping, who . . . sells or barters or gives away such diseased colonies," etc. the word "knowingly" has been made a loophole by offenders in the past.

Mr. W. W. Webster, 2nd vice-president, advised clipping queens without catching them. Allow the queen to walk over the comb until she pokes her head into the bottom of a cell, then at the opportune moment as she backs out, nip off the two wings on one side. He also spoke of artificial pollen for stimulating brood rearing, suggesting barley and oatmeal instead of flour, owing to the high price and scarcity of the latter.

Apiary Appliances.

Mr. W. J. Craig, of the Ham and Nott Co., gave an address on apiary appliances. The all-wire queen excluder has given good satisfaction the past season, as it aids ventilation and affords easier passage for the bees than the perforated zinc. The new bee escape with a double wire cloth centre has two bee exits in opposite corners, and has the advantage of allowing free circulation of air, while the double wire cloth prevents the bees feeding each other. The Armstrong capping-melter was next shown The cappings are melted in a large boiler from which they run into a separating can with a double wall containing hot water. The separating can is divided by a partition. The wax rises in one, and the honey in the other, and is run out into suitable vessels. The honey obtained from the cappings is saleable, and is preferred by some to honey taken from the extractor.

An Improved Extractor.

Mr. George Markle, of Brantford, was called on to explain the new improvements which he has added to the honey extractor. The machine is a six-frame, friction drive. The inventor tried to evolve a type of machine which would run with the least expenditure of power, and with least noise. The baskets and all gearing are attached at the bottom, and the brake works with only a slight pressure on the lever. The baskets reverse at full speed which means a saving of time. It is proposed to publish a special article with cuts which will fully illustrate the operation of this machine.

Mr. E. R. Root who was to speak at the evening session was delayed, and Mr. J. L. Byer stepped into the gap and gave some of his experiences with foul brood. His first experience with the disease was on June 2nd, when 30 diseased colonies were found, 12 being very bad. Later the disease was found in 60 colonies. Mr. Byer found that when Italian queens were introduced the disease was soon cleaned up. The point was emphasized that it is practically impossible to rear queens in a disease infested apiary.

Wax Rendering.

Mr. John Newton, of Thamesford, opened the Wednesday morning session with an instructive address on rendering wax. Great quantities of wax are annually wasted, and if beekeepers realized that it requires an average of sixteen pounds of honey to make one pound of beeswax, they would be careful to save the odds and ends of wax, and scrapings from combs which are usually thrown away. The most and best wax comes from cappings. These are easily rendered in a capping melter, or in the case of a small apiary, a solar extractor will do the work. The machine should be shaded when not in actual use, otherwise the sun will bleach the wax in the pans.

Next to cappings, old combs yield the most wax. If the combs are broken up, and soaked in cold or tepid water for two hours before pressing, better results are obtained. Plenty of hot water or live steam are needed during the operation of pressing, and all parts of the press must be kept well soaked to prevent the wax sticking to them.

It pays to render a certain proportion of old combs every year, as better results can be obtained when some fresh foundation is used each year.

Mr. W. W. Webster gave a humorous account of his experiences as a farmer-beekeeper. A separate report of his address appears on page 8.

Paper Containers.

At the opening of the Wednesday afternoon session Mr. Sladen, of the C.E.F., explained the paper honey container. The increasing price of tinware had led him to experiment along this line. The container consists of a cylinder of waxed paper folded four times at one end. It is opened on a wooden block, and inserted into the card-

P. W. HODGETTS, Secretary Ontario Beekeepers' Assoc.

board carton. The block is then withdrawn. The folded end lessens the danger of bursting the bag while it is being inserted. The honey is poured in when commencing to granulate. In a few weeks the honey will be hard, and will stand a temperature of 100 degrees. The ends are then folded, and the honey is packed in cases, made of light wood, and lined with corrugated paper. The cartons were originally made in the two pound size, but are now made in five pound size. They cost only 1-4 to 1-3 as much as tin ware, and are much less bulky for shipping.

Mr. E. R. Root, of Medina, O., spoke on "The Present and Future of Beekeeping." In opening Mr. Root spoke of the united attitude of the United States toward Canada and the Allies, and their firm determination to see the war through to a successful issue. He then reviewed the honey market conditions of the past few years. In 1915 honey was going steadily down, Michigan honey bringing only 5½c and Southern honey lower. An advertising campaign was started, with the result that an increase was soon noticeable. Then came the sugar shortage which created a great demand both at home and by the Allies. Prices began to soar, but during the early autumn when there was talk of an early end of the war prices sagged again, but stiffened when it was seen that there was no prospect of the war ending by January. In order to show the vast quantities of honey leaving the country, the speaker told of seeing 2,000 tons of honey on the New York docks for shipment to Italy. This was only one of many such shipments. The huge demand for honey by the soldiers is shown by the fact that it sells in the canteens at 55c for eight ounces. To illustrate the great desire for sweets by the soldiers, Mr. Root gave a personal experience. Some years ago he made a bicycle tour of several of the states, and on his return was threatened with a breakdown, due to the great strain. A beef diet was prescribed, and all starch and sweets denied him. In a few months the craving for sweets became intense. It is the same with the soldiers. They need concentrated food that can be rapidly changed into the heat energy necessary to sustain them on long marches, and under severe physical strain.

The future of beekeeping was never brighter. In some cities sugar cannot be bought and the demand has forced it into thousands of homes where it has hitherto been considered a luxury, or not used at all. A level spoonful of honey will go as far as a heaping spoonful of sugar, and it is far superior to sugar for canning purposes. There is no prospect of the price going down and beekeepers should prepare for an immense demand next year. The sugar beet lands of Germany and France have been utilized for growing other foods, and even in the event of an early peace, the world hunger for sweets will not be satisfied for a considerable time to come.

The Annual Banquet.

On Wednesday evening the members had a banquet in the dining hall of the hotel. A splendid dinner was served, after which, with Mr. M. B. Holmes as toast master, toasts to the King and Our American Allies were proposed, and brief speeches made by Messrs. Couse, Sibbald, Byer, and Dunn, on the association and its relation to the Dept. of Agriculture. Mr. Root and Mr. Hersheiser replied to the toast to America, and Mr. H. B. Cowan of The Beekeeper spoke on behalf of the press. Mr. Craig, Mr. Newton, and Mr. Chrysler, spoke for the supply men. Mr. Holmes and Mr. Armstrong ably championed the cause of the ladies. Brief addresses were also given by Messrs. Finter, Jones, Sladen, and Kingsmill. Motion pictures were then shown illustrating several phases of beekeeping, and proved both entertaining and instructive.

Apiary Location.

On Thursday morning Mr. M. B. Holmes opened the session by answering a few questions relating to beekeeping, after which Mr. E. T. Bainard, of Lambeth, took up the subject of "Out Apiaries." A report of his address appears on Page 7. Mr. H. G. Sibbald followed with an address on apiary locations. A beekeeper before locating an apiary in any section of the country should make careful investigations. A district where clover is grown commercially is one of the best as alsike is first among the sources of honey. It would be well to visit seedsmen and find in what sections large shipments of seed were in demand. A variety of bloom lasting from spring to autumn to keep the bees up to full strength is desirable. It should be noted if there are any other bees in that locality, as it is an unwritten law among beemen that no yard shall be established close to that of a man already in the field. Yards should be located in sheltered places where the bees will have easy access to water.

Mr. Root mentioned what he called a 30-mile apiary. Test hives were placed one-half mile apart along a road bordered 50 to 60 feet deep with sweet clover. The hives were placed in the midst of the clover and yielded three or four supers each of sweet clover honey.

The Thursday afternoon session was in some respects the most important of the convention, being devoted to the discussion of a mysterious disease which is making serious inroads. Mr. Armstrong had sent out letters to beekeepers asking particulars in regard to location, kind of bees kept, time of appearance of disease, etc. From the replies received, and the discussion which followed, it was brought out that the disease may appear at any time from spring to autumn, but usually disappears after a few days of hot, dry weather, with a honey flow. No evidence of the disease is found in the combs, but in the adult bees themselves. They may or may not become distended, but become partially paralyzed, leave the hive, and crawl around on the ground. Damp, cold, rainy weather, and a wet location seem to favor its development. Several of the members attributed the condition to the fumes from the silver smelter, which is located in the district where the disease has been most prevalent, while one thought it was due to an imperfection of the adult from a diseased state of the larva. Mr. Sladen said the disease is practically identical with Isle of Wight disease which has caused such havoc in Great Britain. But the real cause and remedy are yet to be found.

The subject of wintering was dealt with by Mr. J. L. Byer, who spoke briefly owing to the fact that the afternoon was well advanced, and many wished to catch the early trains. There have been many changes of opinion in the past few years, but there are a few essentials, the first being good stores, given at the right time. The hive itself is not an important factor. The next essential is a young queen put in during the clover or buckwheat flow. The third essential is good protection. It is better to take chances with good protection and little packing, than with plenty of packing and no protection. Evergreens and scrub timber make a good shelter. Abundance of packing is also needed. The best packing is what ever is handiest. Some prefer a sealed cover, others a porous quilt over the frames to give upward ventilation. If a sealed cover is used larger entrance space is needed. It is very important to have an air space between the packing, and the cover of the packing case.

A committee composed of Messrs. Armstrong, Couse, Evans, and Sibbald, was appointed to interview Dr. Creelman to signify the wishes of the association in regard to the appointment of a successor to Mr. Pettit as provincial apiarist.

Convention Topics Reviewed

Morley Pettit, Georgetown, Ont.

I FEEL like sending greetings now to the readers of The Beekeeper, and especially to members of the Ontario Beekeepers' Association, as "Morley Pettit, apiarist and honey producer." While my letters now will have to be picked out on the typewriter by my own hand, letters and enquiries from beekeepers will be just as welcome as ever, and will receive as prompt attention as business will allow.

Judging by newspaper reports of the Toronto convention, which an accident prevented my attending, there were the usual lively discussions. A few comments on points reported may be of interest.

Mysterious Losses of Adult Bees.—In assigning this subject to the men who, no doubt, ably discussed it, the executive committee intended that a resolution should be passed and sent to the Department of Agriculture urging the importance of employing a scientific man to investigate the matter and determine, if possible, the cause and the cure. Apparently, however, "wiser counsel" prevailed, and beekeepers were urged to experiment for themselves.

I can imagine any of the other agricultural societies reaching that decision with reference to a similar loss in their stock of plant or naimal life. That is, I cannot imagine their doing anything but ask for help from the source of all such help in this country. It has long been the wise policy of the Department of Agriculture to do for the farmer what, for lack of the necessary organization, he cannot very well do for himself. The Commissioner of Agriculture has publicly stated this policy on several occasions recently.

There are many things which beekeepers are quite capable of doing, such as inspecting and treating their bees for diseases which are well understood. But when it comes to symptoms similar to those which in some places have caused enormous losses, without any known method of preventing them, it seems time to ask for a bac-

teriologist with special training in bee diseases.

Paper Honey Containers.

Another point over which one of the farm papers seemed very entnusiastic was the paper container which is being tested at Ottawa, and which was reported on at the convention. Those of us who have been testing paper containers off and on for ten or more years are not likely to get very much excited over it, as we know that, everything considered, it will never give as good satisfaction as tin.

For the sake of the newer members suppose we place the paper container in the box and examine his case. One of the first to recommend them, as my memory goes, was R. C. Aikin, of Colorado. He made manilla paper bags, soaked in paraffine, filled them with alfalfa honey, and let them stand open until it granulated, then folded the tops over. The bags were nicely printed in colors with the beekeeper's name, etc., and made an attractive package. The writer secured a number of them of various sizes, filled some with the best of clover honey, and sold to local high-class grocers. There was not one repeat order. Customers did not want granulated honey when they could get it well liquefied. Furthermore, the bags could not be kept long in a warm room, or in war mweather, without becoming soft and sticky. In other words, the honey, of whose keeping qualities we boast so much, became more perishable and more liable to be a loss to the dealer who did not happen to sell it promptly.

Next came the cone-shaped paper milk bottle, recommended by W. A. Pouder, of Indianapolis. I have a stock of these also in my museum, or had until the last time I moved, when they were left for the next fellow.

Then the Root Co. wrote up very extensively the "Honey Brick" or "Honey Spread." By this plan honey was first allowed to granulate in 60-pound tins. The tin was then cut off and the block of honey cut into bricks by means of a butter cutter. Each brick was wrapped in waxed paper, then placed in a carton which was covered with a lithographed label and fastened with tasty seals on the ends. We tested these most carefully, invested in all the paraphernalia execept the butter cutter, a machine costing something over fifty dollars. Fortunately we were able to borrow this. The bricks sold well at first, but repeat orders came slowly, and the second season we did not consider it worth following up. It is true there were some customers who enthused over the granulated honey, but when the grocers got caught with it on their hands in warm weather they became pretty shy of honev done up in paper. Even the firm who advertised the "Honey Spread" most widely does not seem to have any more to say about it.

So the pendulum of the paper package has swung with the years, and the reasons for its failure to "stay" may be summed up as follows:

When the two are marketed side by side over a period of years, honey which has been carefully liquefied sells more freely than granulated honey.

Even the best honey we are able to secure does not always granulate with a smooth, dry grain, suitable for a paper package. If left exposed to the air, especially if the weather should turn damp, honey loses aroma, flavor and specific gravity. Yet I understand the package advocated calls for standing open until the honey hardens.

All granulated honey becomes soft in time, so that the paper package would not be safe for honey stored beyond the winter months. Yet this is likely to occur at any time, and thus one of the chief arguments for honey be lost.

The chief arguments in favor of the paper package are its cheapness and lightness, and the fact that the consumer will receive net weight.

If the time should come that we cannot get tin at any reasonable price it will be necessary to look for a substitute, and paper seems the best one in sight. Barring the objections previously cited, objections which would by no means be insurmountable if no honey were being placed on the market in tin or glass, paper packages are certainly lighter, and cost less money; but for shipping they would require stronger and more expensive crates than tin. For those who like granulated honey they open up very nicely for serving, provided the honey has granulated well and has not been stored in a warm place.

Unless all beekeepers, for patriotic reasons, should be asked to refrain from using tin, and so long as tin is available, it would seem best to experiment with paper only in a small way. I cannot see that tin is any more expensive in proportion to the price of honey, or of paper, than it has ever been. Prices of all three have advanced. Incomes of producers have increased, and so has the cost of living, so we stand about where we did in that respect. Only the man on a fixed salary comes out at the small end of the horn.

Beekeeping in the North

Editor The Beekeeper:—I live in a bush country in New Ontario. It is a very cold place. I notice all the bee talk in The Beekeeper is by people living south of here. I have never heard a word of the north, although we have a lot of beekeepers in and around here. The Government reports are the same, as they have not a word about the north, although this could be made a bee country if it had a little encouragement. All we hear is how to winter bees in the south. I wonder what our Experimental Farm is doing in this line? If the Government would issue a bulletin on "Bees of the North," it would be fine.

We have heard of hives giving 240 lbs. of honey in this district, but nothing is heard of it from the Monteith Experimental Farm. We never get a word from that place. It might as well be off the map for all we learn from it. I hope you will not think me a kicker, but I saw your invitation to readers wishing to see a special subject discussed to write you, and I am doing so.—Alfred Hulcoop, Krugersdorf, New Ontario.

Mating Experiment

In the report of the Dominion Experimental Farms for the year ending March 31, 1915, page 1000, reference is made to a colony of three-banded Italians in the apiary at the Centarl Experimental Farm, Ottawa, that made no preparation for swarming either in 1913 or in 1914, when about 80 per cent. of the colonies in the apiary swarmed or prepared to swarm and to attempts that were made to mate daughters of the queen to drones of the same parentage. Unfortunately the experiment was stopped by the death of the queen in the winter of 1914-15, and during the last three years no strong colony of well-marked Italians in the apiary has refrained from building queen-cells at swarming time. It is intended, however, to continue this experiment next year at a mating station on the Transcontinental Railway, where the necessary isolation can be secured, porvided such a queen or queens can be obtained and will stand the test. If any of our readers have such a queen, Mr. F. W. L. Sladen would be pleased to receive full particulars from you. Letters addressed to the Apiarist, Central Experimental Farm, Ottawa, do not need to be stamped.

World Sugar Shortage

The world shortage of sugar is likely to help maintain high prices for honey for some time. How great this shortage is is shown by the following statement issued recently by the Canadian Food Controller:

The production of beet sugar in France this year has been estimated at only 207,000 tons, as compared with an average annual production during the five years before the war (1909-13) of 752,542 tons. Normal consumption in France is 704,830 tons. The beet sugar production of Italy has also been reduced from a pre-war average of 211,050 tons to 75,000 tons. The pre-war annual consumption of sugar in the United Kingdom was 2,056,000 tons, all of which had to be imported. About 70 per cent. of the supply of the United Kingodm came from countries from which it is now cut off by the war, Great Britain, France and Italy would require to import about 2,700,000 tons before the next crop—and most of it from new sources—if they were to maintain their normal consumption.

But the necessity of conserving supplies of sugar, which was emphasized by the shortage of shipping, has resulted in stern economies among the allies. Before the war, England had the largest per capita consumption of sugar of any nation—93 1-3 pounds per person per year. This has now been reduced to 26 pounds per person per year, or above one ounce per day per person. In Great Britain prices have now been fixed for jams and jellies. There is no sugar for the home-made product. In France the people are on rations of 1.1 pounds per person per month, which the Government distributes at about 25 cents per pound. In Italy, because of the shortage of sugar supplies, the Government has set a retail price of $1.25 for a box containing 2.2 pounds. In Germany the present sugar ration is only .77 pounds per person per month. In the United States and Canada the per capita monthly consumption of sugar is about 7.4 pounds.

The Food Controller has asked Canadians to reduce their consumption of sugar by at least seven ounces per week per person and, in order to provide larger supplies to meet the necessary requirements of the allies, a further reduction to three pounds per person per month may be urged. Steps have already been taken to curtail the use of cane sugar in candy-making, and the use of sugar or molasses in distillation of potable liquors has been prohibited.

About 50 per cent. of the sugar consumed in North America is imported from Cuba, so that the Cuban product is the dominating market factor. The International Sugar Commission, representing the allied countries, as well as the United States Food Administration and the Food Controller for Canada, is endeavoring to secure the Cuban production at a reasonable price. By curtailing consumption in this country so that the necessity of securing the Cuban crop is not so urgent, the people of Canada will be assisting the Sugar Commission, the allied countries and themselves in obtaining supplies for spring and summe rat lower prices than would otherwise be possible.

Niagara District Notes

F. G. H. Pattison, Winona, Ont.

WHEN we consider that the last five years have been far from satisfactory on the fruit farms as regards financial returns, the response by our fruit growers to the request of the Minister of Finance to buy Victory Bonds was wonderfully good. The counties of both Wentworth and Lincoln made an excellent showing, as did also the City of St. Catharines. The objective of the township of Saltfleet was $100,000. It raised over $216,000.

The latter part of November, was very favorable for plowing and cleaning up generally, so that orchards and vineyards went into the winter in good condition. Apples and pears continued to move till the first week of December. Since then there has been but little doing. Some little pruning has been done, and several cars of manure have been distributed in the orchards. The high price and scarcity of sulphur is likely to have the effect of lessening the amount of spraying with lime-sulphur next spring. Baskets too, have gone soaring again, $65 and $75 per 1,000 being the estimated prices for 6-quart and 11-quart baskets.

In spite of the general shortage of apples a number of the orchards around Winona and Grimsby had a fair crop. One especially good orchard was that of Mr. A. Dunning, on the Grimsby and Queenston Road, a short distance east of Grimsby Beach. On this orchard more than 600 boxes of very clean and good-sized apples were marketed. Some of the apples measured 12 inches in circumference, and a number of them were 10 inches, and ran very even in size. Baldwins and Greenings were the chief varieties grown.

How were such fine apples obtained in this off year? Chiefly by extra attention to spraying. Three very thorough sprayings were given with lime-sulphur, to which was added arsenate of lead for the 2nd and 3rd sprayings.

The cost of spraying was $150 or over, and Mr. Dunning had the great benefit of Prof. Caesar's instruction and help. The crop turned out over 600 boxes, which sold at from $2.25 to $3 per bushel box. The boxes were packed in fine condition, the bottoms and tops being lined with corrugated paper, and the sides with plain building paper.

Mr. Dunning is of opinion that the extra care in spraying was what gave him his good crop of apples.

Sets a Standard

I am highly pleased with The Canadian Horticulturist. The other day I was talking to two subscribers I obtained for The Canadian Horticulturist in the spring and they also were enthusiastic over the paper, and like myself, looked anxiously for its appearance every month.

This month's issue is great. The several articles are just the thing for lovers of flowers and vegetable growers. "Storing Vegetables for Winter Use," by Allen of Toronto, is a timely article, so are all the others by Ross, Ferguson, Mrs. Potts, Tillett and John Gall. I greatly appreciate the illustrations contained in it every month. The articles provide a standard to work up to, in and around the lawn and flower beds. The two subscribers mentioned above said that they were going to do all they could to further the interests of The Canadian Horticulturist.—Jno. Taylor, Sydney Mines, Cape Breton, N. S.

Large quantities of pumpkins were delivered to the Burlington canning factory this season, by the local farmers and fruit growers. The supply this year was exceptionally large, and the quality above the average.

A report from Dundas says that a communication was recently received by the City Council from J. A. Kyle, secretary of the local horticultural society, requesting that action be taken to overcome the San Jose Scale and Tussock Moth menace which threatens to destroy many of the shade trees and ornamental bushes in the town. Clerk Fry was accordingly instructed to communicate with the Government officials on this matter, with the view of having a Government inspector sent there to make an investigation.

Recent experiments with the pre-cooling of peaches for long-distance shipment conducted at the Government pre-cooling station at Grimsby, have shown that varieties such as the Yellow St. John, Early Crawford, and Elberta can be shipped successfully to almost any part of Canada from the Grimsby district.

The shortage of tin and the embargo placed on that metal by the United States Government, while too late to affect this year's pack of canned fruit and vegetables, may seriously affect next year's pack. If the shortage of tin continues to grow more acute, it may present a serious aspect before the next canning season arrives.

The Dominion Canners, however, are apparently doing everything in their power to meet the situation. They have distinctly given out that they intend to rebuild their Simcoe plant, which was the can-making plant of the company. In addition they are going to materially enlarge it so as to protect themselves from the danger of being unable to contract for cans.

A special meeting of the Niagara Peninsula Fruit Growers' Association was held in the court house, St. Catharines, in November last. The chief matters considered were: 1. The report of the basket committee. 2. The question of the employment of the National Service girls another season. President Fleming said that the Fruit Commissioner was arranging for a meeting in Ottawa of all the basket manufacturers to discuss this question. Growers in the Niagara District had agreed on an 11-quart basket ¼ inch higher and with the flare considerably reduced. Collapsible baskets were exhibited made by Messrs. Lundy and Scott, of Niagara Falls, Ont., which attracted considerable attention. They are made of waterproof corrugated paper. It was decided that these packages should be submitted to the pre-cooling plant at Grimsby and reported on at the next meeting.

There being some difference of opinion exhibited regarding the standard basket,

S. H. Rittenhouse, said that the object was to have two sizes standardized—the 6-quart and 11-quart—so that the different makes might be interchangeable, which would be to the interest of all, both consumers and producers.

Protection of Fruit Trees from Mice

[Experimental Farm Note]

THE annual loss of fruit trees in Canada from mice is great. Some years they are much more destructive than in others, while in a certain year they may be very destructive in one part of Canada and do little or no damage in another. The scarcity or abundance of food, the number of mice which are in the vicinity when winter sets in, and the character of the winter all have an influence on the amount of injury which is done. Where the orchard is in sod or where there is rubbish about in which mice can harbor, the injury to trees, if left unprotected, is liable to be much greater than where the orchard has been under clean cultivation or even where a cover crop is sown the previous summer.

It frequently happens that orchards which have escaped much injury from mice for several years from the time of planting, will be badly injured, if not ruined, just when the first crop is expected. There is nothing more discouraging to a farmer or fruit grower than to have an orchard destroyed in this way after he has cared for it for a number of years. There must be many instances in Canada where farmers, after a loss of this kind, do not replant.

Although it is not every year that mice are troublesome, trees should be protected from them every year until about six inches in diameter; even a tree of this size will sometimes be partly girdled. If the protection is neglected for one year, that may be the year when mice are very abundant and much injury will be done. The mice usually are looking for, or feeding on, seeds close to the ground under the snow, and when they come to a tree they are likely to begin to gnaw the bark if it is unprotected, and before they have finished the tree may be completely girdled to a height of twelve to eighteen inches above the ground. This usually causes its death, although it may remain alive for most of the summer following.

The cheapest and surest method of protecting trees from mice is to wrap ordinary white building paper around the trunk of the tree. The paper is cut into strips which are the length of the breadth of the roll of paper, the width of the strips depending on the size of the tree. The strips should be just wide enough to lap over, as one thickness of paper is all that is necessary. The paper is wrapped tightly around the tree and tied in two places with twine. A little earth is hoed up about the base after the paper is tied, to cover any opening through which the mice might reach the trunk. Several thousand young trees are wrapped each year at the Experimental Farm in this way, and there have been practically no cases where the mice have gnawed through the paper to get at the trees. Tar paper is also effectual, but trees have been injured by using it, and it is well to avoid this, as building paper will do as well. A small mound of earth from eight to ten inches in height about the base of the tree will often prevent mice from injuring the trees. Snow tramped about the tree has proved quite effectual, but one cannot always depend upon it. Fine wire mesh wrapped around the tree, or lapped so that it will expand with the growth of the tree, while more expensive at first, is very durable and will protect the trees well.

Mice may be poisoned by making a mixture of one part by weight of arsenic with three parts of corn meal, and putting it in runways made by nailing two pieces of board, each five or six feet in length and six inches wide, to make an inverted trough, and putting about a tablespoonful of the poison on a shingle near the middle of the runs, renewing the poison from time to time. Poisoning would, however, be found a rather tedious method for a large orchard.

Persons who intend to replace trees in their orchards, or to set out new orchards, should not leave this important business for the future. They would surely be disappointed. Next spring, fruit growers will probably be able to secure trees at only slightly higher rates than obtained previous to the war. If they wait for another year or two, they will have to pay higher prices, and will have a smaller list to choose from. As most of the stock comes from France, it will be many years before the situation rights itself and growers will again be able to get satisfactory nursery stock at satisfactory prices.

Care of Roots in Storage

MANY tons of mangels, turnips and carrots are lost annually by neglect after being placed in storage. Everything may be done to insure a full crop and to harvest it at the proper time in good condition, yet, if not properly looked after during the winter months, a high percentage of this crop may become a total loss. Such loss can be prevented only by prompt attention to the details of storage requirements.

If a cellar is to be used for storage it should be thoroughly cleaned, the ventilators put into good working order, and thorough drainage and protection from frost assured some time before it is filled. Usually in filling cellars it is customary to dump the roots down through a trap door in the floor above, or roll them in over a shoot from windows at the ground level. No matter how much care is exercised in the performance of either of these operations, there will be accumulations of broken and bruised roots and earth at the ends of the shoots, or beneath the trap doors. Unless frozen, the broken and badly-bruised roots, in such a mixture will invariably rot, and by so doing generate heat that will help to spread the infection to the surrounding sound roots. It is therefore obvious that accumulations of this nature should be thoroughly cleaned out as soon as possible after the harvest has been completed, and the damaged roots fed before they have had a chance to decay.

Frequently, during the winter months, rotting will start among apparently sound roots, usually as the result of an unsound root becoming buried among the others. Infection spreads rapidly among roots in storage, and all such infected areas should be thoroughly cleaned out whenever detected.

All classes of roots lose a certain amount of moisture soon after harvest, by evaporation, or, as it is commonly called, sweating. If an adequate circulation of air among the roots has not been provided for, this moisture will condense and wet places will be formed which will favour the growth of moulds, and other plant life, which may directly or indirectly, cause rotting. It is, therefore, imperative that during the first few weeks of storage, and in fact whenever the outside weather permits, thorough ventilation be maintained.

The Right Temperature.

The temperature in the cellar should be such that the roots will neither grow to any appreciable extent, nor yet freeze. From freezing to 40° F may be considered as the extreme range. It is an excellent plan to hang a thermometer in a convenient place in the cellar and consult it daily. If the temperature is above 38° F the ventilators should be opened and, when it drops sufficiently, closed. When the warmer weather of spring and early summer has set in it is advisable to keep the ventilators closed during the day and open during the night, so as to admit only cool air, thus keeping the cellar cool as long as possible.

If roots are to be pitted outside it is essential that thorough drainage is assured, either by choosing a location on sloping or sandy land, or by providing artificial drainage.

After the roots have been piled and the ventilators inserted the pile should be covered only with straw to a depth of about eight inches. Later in the season, when cooler weather has set in, about four inches of earth should be placed over the straw. Still later, when this earth has become frozen to a depth of about two inches, another covering of straw and earth should be made. When cold weather has finally set in the ventilators should be plugged with straw.

Prevent Rotting.

If the pit has been properly constructed and covered correctly there is little danger of the roots rotting. As a precaution, however, it is advisable to hang a thermometer in every second ventilator and consult it occasionally. If the temperature in the pit gets higher than 45° F it is evident that heating is taking place, and the pit should be opened up and the infected area thoroughly cleaned out.

In the spring the layers of covering should be gradually removed, the ventilators opened and, generally speaking, the protection modified to suit the rising temperature.

An excellent hardy plum is the Omaha, which experiments at Ottawa have shown to be one of the best for that part of Canada, and, it is believed, for districts having a somewhat similar climate. This is a hybrid between the Japanese plum and the American and has combined in it the good points of both, being, like the American, hardier than the Japanese, but having the thin skin and firm flesh of the latter. The Omaha ripens about the middle of August, a time when there is usually a good market for plums.

See advertisement on page 18.

Poultry Feeding

THE problem of economical production, with feed at the present prices, is a question that has been worrying producers during the past few months. The question of what to feed is one that requires more careful consideration than ever before. Feed is high, therefore the flock should be culled closely and nothing but the most vigorous birds retained. They should not only be fed heavily, but should be fed such feeds as will give results. For this purpose it is necessary to supply cereal, animal, vegetable and mineral feeds.

Cereal or grain feeds should form the principal part of the ration and for best results a certain proportion should be ground. The question is what are the best and most economical feeds to use. During ordinary times, a mixture of corn, wheat and oats is popular, but under present conditions milling wheat should be conserved for human food and only the lower grades used for stock feed. Lower grade wheat, oats and corn, buckwheat and barley, these are all feeds that may be used to advantage. The extent to which each is used will depend on prices.

For ground feed, "buckwheat screenings" may be used to advantage, also mixtures containing bran, cornmeal, ground oats or other similar grains.

Vegetable or green feed is absolutely necessary to keep the flock in thrifty condition. For this purpose, sprouted oats is one of the very best. It not only supplies succulence, but grain feed as well. Mangels, turnips, cabbage, small potatoes or other similar waste products may all be used to advantage.

Animal or meat feed is a form of food that poultry keepers frequently neglect supplying. It is not possible for a hen to produce eggs profitably on an all-grain ration. Sour milk is sometimes available and no animal feed will give better results, as it not only supplies the necessary feed, but it also keeps the birds in good tone. If milk is not available, beef scrap, blood flour, green cut bone or similar feeds must be supplied to take the place of the grubs and insects which the birds get on range.

Lime for the egg shells and mineral salts for the growth of bone must be supplied. Small quantities may be obtained from such feeds as clovers, but it is necessary to feed oyster shells or something similar to supply lime in sufficient quantities for a heavy egg production.

Sample Ration.

Morning—A light feed of mixed grains scattered in a deep litter. **Noon**—Green feed, mangels, vegetable parings or sprouted oats. **Night**—Full feed of scratch grains.

The scratch grains should be a mixture such as lower grade wheat, oats and corn, —barley, oats and corn—barley, oats and buckwheat—or whatever grains are cheapest at the time. So far this season, oats have been the cheapest grain food, so it is advisable to use them to as great an extent as possible.

The present indications are that corn will be greatly reduced in price. When this happens it should be used extensively, as, supplemented with a high protein feed such as sour milk or beef scrap, it is one of the most valuable of feeds.

Besides the foregoing, a hopper of dry mash, such as ground buckwheat screenings three parts, blood flour, or beef scrap one part is kept constantly before the flock, also hoppers of oyster shell and beef scrap. If sour milk is available the beef scrap may be omitted or green cut bone may be supplied in place of either. A good time to supply this is at the noon feed when a mash made from the kitchen scraps in which is mixed the green cut bone, at the rate of about one-half ounce per bird and dried off with the meal mixture, may be fed.

Because feed is high in price, don't stint the flock. It takes a certain amount of feed merely for maintenance. It is only the feed over and above this amount that can be used for production, therefore feed and water liberally.

Pullets vs. Old Hens.

For profitable early winter egg production the early hatched pullet is three times better than the late pullet, four times better than the yearling hen and thirty times better than the "aged" hen. Early pullets are best for winter eggs. This has been demonstrated many times. The Poultry Division, Experimental Farm, has collected figures for several years and when the three months (November, December and January) only are taken into consideration the relative profitableness of the four ages is as noted. If the six winter months were considered the contrast would not be so striking for the hens and the late pullets were just beginning to lay when the experiment closed. However, if eggs alone are to be considered we cannot afford to feed birds until towards spring before they produce. Even if desired for breeding it is a question if, with the high price of feed, we had not better rely upon the well matured pullet for hatching eggs next spring, rather than feed hens that will not produce or only at a loss. Certainly there is no excuse whatever for keeping in our poultry houses late pullets whose eggs cost more than they are worth and birds that are absolutely useless as breeders.

Early pullets (hatched before May 1st) produced eggs at a cost for feed of 18.3 cents. The late pullets (hatched after May 15th) at a cost of 56 cents. The year old hens at a cost of 78.2 cents, and for every dozen eggs laid by the hens in the aged class the cost of feed was $5.73.

Sydney Experimental Station

Excellent work is being done at the Experimental Farm at Sydney, B. C., conducted by the Dominion Government, the manager of which is Mr. R. L. Stevenson, B.S.A., formerly of Ancaster, Ont. An editor of The Canadian Horticulturist spent some hours on this farm last summer and found that much excellent work is being accomplished, although the farm was started only five years ago. It has been under the direction of Mr. Stevenson only since 1915.

The neat appearance of the buildings, fences, fields and roads, as one passes this farm on the electric railway from Victoria, B. C., makes a most favorable im-

pression which is increased by a visit to the farm itself.

As the southern and eastern portion of Vancouver Island produces large quantities of fruit considerable attention is being given to horticulture. In all twenty-three acres are devoted to horticulture, including fifteen used for landscape art and as an arboretum. There are also six acres of nut orchard. Special attention is being given to flowering bulbs, garden and vegetable seeds and to testing fruits. On the main farm the management expects to follow a four-year rotation of wheat, clover, corn, rye and peas. They are specializing in fall seeding.

Annapolis Valley Notes

Eunice Buchanan, Berwick, N. S.

December was not a month conducive to much out door work. Even the woodsmen found the storms and snow-weighed branches difficult for working, added to this we have had zero weather.

The apple shippers have had to contend with a car shortage. Cars were promised which did not arrive. and then came the explosion at Halifax. Three hundred cars and twenty engines were thrown out of commission. The terminals at North Street and Richmond were destroyed, and 58 or more railway men were killed. In spite of the difficulty in obtaining labor, and the running of special relief trains, the train service gradually righted itself.

Most of the glass houses at the Nova Scotia Nursery were ruined and the dwelling house was burned to the ground.

Owing to the war, and hospital demands, there has been a good market for honey which was scarce. In some years it has been difficult to sell it for 15c a lb., but this year buyers paid 20c a lb. for it in wholesale lots.

Locating Railway Delay

A far-reaching plan designed by the railroads, the transportation department of the Dominion Fruit Branch, and the food administration to conserve railway equipment and foodstuffs has been in effect for some time. Railroads entering Montreal and Toronto and a few other central distributing centres report regularly to G. E. McIntosh, Traffic Officer for the Fruit and Vegetable Committee, and in charge of fruit transportation, Department of Agriculture, every car of fruit, vegetables and other perishable foodstuffs which has been delayed 72 hours and over, either awaiting unloading or reconsignment or other disposition. In all cases reported by the railroads of undue detention of cars loaded, an effort is made to fix the responsibility and then take such steps as may be necessary to remedy conditions and prevent a recurrence by the offenders.

The chief results which it is believed the new plan will accomplish are: The prompt unloading of cars containing perishable foodstuffs; the prevention of waste or loss of foodstuffs through deterioration because of undue detention in cars; the prevention of similar loss at shipping points because of lack of transportation facilities, owing to the undue detention elsewhere of loaded cars of perishable foodstuffs, and an increase in the amount of railway cars available for moving foodstuffs and other commodities necessary for the public national welfare. During the short time this plan has been made effective, absolute proof has been given that many cars are held by small dealers for storage purposes, while producers have been unable to move perishable products because of a car shortage.

Testing Experiment

E. F. Palmer, Director, Vineland Station, Ontario.

A valuable part of the work of the Vineland (Ont.) Horticultural Experiment Station is to test out various new varieties put on the market by nurserymen and others, and to secure for testing promising seedlings or bud sports which ofter occur throughout our fruit-growing districts. The station is now preparing lists of new or noteworthy varieties not growing in the test blocks and in this regard the station would be very glad to receive from any reader of The Canadian Horticulturist names of any fruits which he thinks should be tested.

There are doubtless in your neighborhood also occasional seedlings or bud sports of various kinds of fruits which have attained at least local prominence but which are little, if at all, known outside of the district of their origination. Many of these seedlings and bud sports are worthy of a more extended trial. It would materially assist the Experiment Station if readers would furnish us with sufficient information concerning such seedlings, so that we could secure buds, nursery stock or plants as the case might be. Address correspondence to E. F. Palmer, Director, Horticultural Experiment Station, Vineland Station, Ontario.

The Food Shortage

At the recent convention of the Quebec Fruit Growers and Pomological Society one of the members of the Association brought up the question of increased production. This occupied much of the time allotted for discussions. It was shown that there is a world shortage of food. It devolved on Canada and the United States to supply the necessary food stuffs, to relieve this shortage. Only imperishable goods such as wheat and bacon can be shipped satisfactorily to Europe. To supplement these two commodities fruit growers must do their part in the production of hogs, vegetables and fruit. The fruit farm has by-products which are not found on other farms. These could be utilized for pork production. Prof. Barton, of Macdonald College, emphasized the value of hog-raising as compared with other live stock. He pointed out that hogs may be raised more profitably, and more easily, and at the same time will provide meat much sooner than any other class of live stock.

Mr. Dan. Johnson, Dominion Fruit Commissioner, outlined in part the policy of the Food Controller. He pointed out the absolute necessity of increasing our meat supply and backed up what Prof. Barton had said about hogs. No action was taken by the Fruit Growers' as an Association. The opinion of the members, however, was that it is not only their duty, but that it is also possible for them to raise many more hogs than they have in the past. Many signified their intention of devoting more time to this industry during the coming year.

New Tests of Basic Slag

Mark Meredith, England.

THERE is much difference of opinion upon the manurial value of basic slag, and upon the correct method of determining that value in any given sample. Since the function of the basic slag as a fertilizer is that of re-furnishing the soil with the phosphates absorbed by successive crops, it might appear that its value could be measured by the amount of the contained phosphates; but this is not necessarily the case, for the reason that not all the phosphates in basic slag are soluble in the soil. The standard of valuation adopted by German manufacturers has been the citric solubility test, in which the slag is subjected to a 2 per cent. solution of citric acid, and its commercial value appraised according to the amount of phosphates dissolved in a given time. With characteristic pushfulness, the Germans have succeeded in advancing the sales of their slag on the strength of this test, but it has never been conclusively shown that solubility in dilute citric acid had any close correspondence to solubility in the soil, or that there was any special virtue in fixing the citric acid solution at 2 per cent. strength. In their paper to the Society of Chemical Industry, Professors Gilchrist and Louis assert the contrary. They state that experiments with basic slags of high and low citric solubility, and of finely ground mineral phosphates which contain practically no citric soluble phosphates, at various experimental centres in the North of England, have shown that the percentages of total phosphates had practically no relation to the manurial results—and they contend that the total phosphoric acid content of basic slags is a more reliable test of their manurial value than the citric solubility test. This is a matter of great importance to British steel workers and to British agriculture. Judged by the citric solubility test, only slag obtained from the basic-Bessemer processes has a high enough manurial value to make its use as a fertilizer worth while. Basic-Bessemer slag contains up to 20 per cent. of phosphoric acid, and responds freely to the citric solubility test. Slag from the basic open hearth processes contains on the average only about 10 per cent. of phosphoric acid and responds only to a limited extent to the test. Now the great bulk of the basic slag produced in Great Britain is a by-product from basic open-hearth steel, and because of the acceptance of the citric acid test, only a small part of this slag has been deemed worth grinding up for manure; the rest has been thrown away. It is computed that the total amount of basic slag of all kinds now produced in Great Britain is from 800,000 to 900,000 tons, and of this probably no more than 300,000 tons is being converted into artificial manure. If, therefore, the conclusions of Professors Gilchrist and Louis are correct, another 500,000 or 600,000 tons of basic slag of substantive manu-

rial value is available for agricultural use. Investigations are now being made with the object of ascertaining whether high-graded mineral phosphates can be added to basic slag immediately it leaves the open hearth. If by doing so the slag can be enriched, a considerable addition to the home supplies of artificials will result.

Will Control Potato Prices

Food Controller W. J. Hanna intends to prevent an advance in the prices of potatoes above the levels that have prevailed lately. In this connection he has issued the following statement:

A recent survey of the situation by this office indicates that there is still a large supply of potatoes in the hands of the growers and dealers, to meet a continuous and heavy demand until the 1918 crop will be available. All handlers of potatoes should understand the situation clearly, and realize that a special effort to keep the public plentifully supplied at reasonable prices is necessary, in order that no part of the large crop of the past season be wasted. Nothing can be gained by withholding supplies from the market, because higher prices will not be permitted, and any attempt in that direction will be dealt with at once by the Food Controller. The trend of the market is now towards lower prices, notwithstanding the recent severe weather which has made the movement of potatoes difficult. When spring opens it is anticipated that much of the surplus will come on the market.

Apple Scald

Apple scald of green and ripe fruit in storage can be entirely and easily prevented by an occasional renewal of the air of the storage room. Accumulations of carbon dioxid (carbonic-acid gas) produced by the apples in storage, the lack of air movement in the storage rooms, and the depositing of moisture on the fruit, are all factors that may play a part in the production of scald. Experiments indicate that high humidities may be maintained in storage without the development of scald, and prove conclusively that an occasional renewal of the air of the storage room will completely prevent the disease. This has been demonstrated in repeated experiments with several varieties of apples. Well-aerated apples remained free from scald, while in all cases poorly aerated ones, handled in the same way from the time they left the tree throughout storage, became badly scalded.

Scalded fruit was found to be more mealy and poorer in flavor than unscalded. Scald, in addition to rendering the fruit unsightly and reducing its market value, rendered the apples extremely susceptible to certain storage rots.

Avoid Smothering.

Apples were apparently little harmed by several weeks' storage under poorly ventilated conditions if better aeration was provided before the fruit reached a certain critical period in its storage ripening. The maximum length of time that the fruit can remain in poorly ventilated storage without incipient injury, however, has not been determined for many varieties. Final recommendations in regard to the frequency of ventilation, therefore, cannot be given as yet, but investigators state that the fundamental fact that ventilation will prevent the disease has been established, and advise storage men to avoid taking chances of smothering the fruit.

Fertilizers Advance in Price

Vegetable growers should realize that the plantfood problem is fast becoming serious. Potash is practically out of the market. Nitrate of soda can hardly be purchased, even at exorbitant prices. Meat scrap and digester tankage are demanded by the poultryman and pork producers in enormous quantities, because feed is so excessively high and several hundred thousand tons of ammonium sulphate are being used in the manufacture of explosives. This means that nitrogen will be exceedingly scarce. It is safe to say that heretofore more than half of our commercial fertilizers has consisted of acid phosphate. This "acid phosphate" is made from rock which is mined in the South. It contains approximately 30 per cent of phosphoric acid insoluble in water. This important plantfood is made available (soluble) by mixing it with an equal part of sludge acid, which is made from crude sulphur, called pyrites. Most of this material formerly came from Spain. Now this supply is quite limited because there are not enough boats available to transport it. Add to this shortage the fact that the powder industries demand enormous quantities of sludge acid.. It means that this material formerly worth $5 per ton is now selling for $22 per ton with the prices advancing

Potato Improvement

As the result of a conference of the recently appointed Advisory Potato Council of Ontario, it was decided to grow potatoes on the provincial farms, at Fort William, Burwash, New Liskeard and Monteith. The seed will be distributed among northern farmers. In the meantime seed potatoes from New Brunswick will be distributed to northern farmers at cost, less freight.

One thousand farmers in older Ontario are to be supplied with seed grown in New Brunswick, Northern Ontario and older Ontario for experimental purposes. Acting on the recommendation of experts, the province will specialize on the two standard potatoes, "Irish Cobbler" and "Green Mountain." All experimental work of the Department of Agriculture will be co-ordinated with a staff of experts to insure production only of potatoes free from disease.

While the two standard potatoes will be grown for seed, only the one line will be grown in one district. The scientific experimental work will be co-ordinated under the

direction of a committee composed of Prof. Zavitz, of the Ontario Agricultural College; Mr. W. T. Macoun, Dominion Horticulturist; W. G. Nixon, in charge of development work in Timiskaming; R .S. Duncan, Supervisor of District Representatives; and Justus Miller, the Assistant Commissioner of Agriculture. Prof. J. E. Howitt, of the O. A. C., has been placed in charge of the inspection of all potatoes in the field being grown for seed, to see that all diseased plants are removed. Mr. Justus Miller has been appointed potato specialist in order to co-ordinate the work of the different agencies.

Fruit and Vegetable Regulations

Hon. W. J. Hanna, Food controller, has announced that on and after February 1, 1918, no person or firm dealing, wholesale, in fresh fruits or fresh vegetables, either at producing points or in distributing centres, will be permitted to operate without a license from his office. Any attempt at speculation, or the taking of undue profits by any license-holder, may result in the immediate suspension or cancellation of such license. Regulations to this effect have been signed by Hon. Mr. Hanna upon the recommendation of the Fruit and Vegetable Committee of his office.

As a result of a careful study of the distribution of fruit and vegetables in Canada, and after conferences with representatives of the wholesale trade, the dealers have been divided into a number of classes and sub-classes, and their operations have been made subject to the following regulations:

(1) No license-holder shall charge more than a reasonable profit or commission, or make any contract for future delivery or store in order to acquire speculative profits from a rising market.

(2) No license-holder shall sell to any other license-holder of a like class and division except on a split profit or split commission, and only one such sale of the goods may be made.

(3) No holder of a broker's license shall charge any brokerage or commission on goods shipped to him for sale, if such goods are transferred by him to any wholesale commission merchant to be sold on commission.

(4) No holder of a commission packer's or a wholesale commission merchant's license shall sell to himself any goods received by him to be sold on commission.

(5) Every license-holder shall keep such books, invoices, vouchers and other papers and records as will enable the Food Controller, or any person by him thereto authorized, to verify any report or statement that such license-holder is required to make to the Food Controller.

The regulation of the wholesale trade is expected to result in the more efficient and less costly distribution of fresh fruit and vegetables, to eliminate speculation, and to protect the legitimate dealers against unfair competition by those employing improper methods. A license fee of $10 or $20 will be charged, depending upon the class or sub-class to which the applicant belongs.

Small tubers have been used for seed for one season without serious reduction in yield in the gardens of the Ohio Experiment Station. The continued selection of small seed, however, is not recommended. Yields would eventually decline under such a practice. Potatoes weighing less than two ounces yielded only 10.7 bushels an acre less than tubers weighing more than 6 ounces, whole tubers being planted in each case.

PRACTICAL SUPPORT

If more readers of The Canadian Horticulturist would send us letters like the following it would soon enable us to make The Canadian Horticulturist of still greater value and service to its readers:

"Many thanks for the October number of The Canadian Horticulturist. I enjoyed it very much, and would like my friends to know its value, so am sending you twelve names and a money order for $3.00 to pay for a year's subscription for each. Kindly start the year with the November number and oblige,

MRS. SEAMAN,
Antigonish, N.S.

Hardy Plums

There are great areas in Canada where the European plums, such as Lombard and many others, do not succeed, either the fruit buds or the trees being injured or killed by winter. There are two species of wild plum, however, in Canada, the cultivated varieties of which enable one to grow this fine fruit in very cold regions. In Eastern Canada the common wild species is the Canada plum, "Prunis Nigra," while in Manitoba the common native species is the American plum, "Prunis Americana." It is surprising that trees of these plums are not planted by everyone having a garden when there is room enough to have a few trees, as they bear young and bear abundantly, and the fruit of the best cultivated varieties, while not as good as the best of the European sorts, is excellent when eaten raw and makes very good jam when properly cooked.

At the Experimental Farm, Ottawa, over 100 varieties of these plums have been tested during the past twenty-eight years. The outstanding or most widely useful variety of the Canada plum has been found to be the Cheney, a red variety of fairly good quality, which cooks well. The Assiniboine, a new variety, is very promising. On account of its earliness, the Cheney is particularly useful in the Prairie Provinces, where many of the varieties are too late to ripen. Few of the American sorts usually offered for sale are sufficiently early for the prairies, most of them having been originated in the States of Minnesota and Iowa, where earliness is not so important. Seedlings of the native Manitoba sorts are now being grown at the Experimental Farms on the prairies to obtain other and better ones. The Major plum, which has been brought to notice by the Brandon Farm, is a very early sort.

At Ottawa, where the season is long enough for most of the American varieties, the Brackett, Terry and Admiral Schley have proven to be three of the best. Other sorts more generally are De Soto, Wolf and Hawkeye. The wood of the American plums, being brittle, does not stand the heavy snow in Eastern Canada very well, the result being that the trees are often badly broken unless they are headed back each year to make them stocky. The Canada plum, however, makes a very strong tree, hence the Cheney is additionally valuable on this account. The earliest varieties of the Canada and American plums are ready for market before the European ones, hence it has been found at Ottawa that the prices obtained for them are nearly always quite remunerative, and the profits probably greater than from plums in the best plum districts.

Insect and Pest Act

The regulations under the Destructive Insect and Pest Act have been amended with reference to the importation of nursery stock into Canada. It will be necessary that Canadian nurserymen and other importers of nursery stock be guided by these regulations in making their shipments into Canada. It would be advisable for Canadian importers to call the attention of shippers to these new regulations.

The new requirements with reference to the importation of nursery stock are as follows:

(1) Regulation 3, last paragraph requires that "Nursery stock subject to fumigation shall not be included in cars, boxes, bales or other containers with plants that are exempt from fumigation or inspection, but shall be shipped in separate containers."

(2) The requirement under regulation 4 is that "The port by which it is intended that nursery stock subject to fumigation or inspection shall enter Canada, shall be clearly stated on each car, box, bale or other container which shall also bear a declaration of the nature of the contents."

All the quarantine regulations have been combined into one regulation, No. 7. A new quarantine has been established with respect to all species and varieties of gooseberries and currants, the importation of which is now prohibited on account of the white pine blister rust.

The Possible Wayne County Farm

Bulletin 304, Ohio Agricultural Experiment Station, Wooster, Ohio.

This is one of the most interesting bulletins on soil fertility that has been issued for a long time. It interprets and applies the findings of the experiment station, which is located in Wayne county, to the farmers of the surrounding territories. The same ideas and lessons would apply to other sections.

Director Thorne shows the acreage and average production of the principal crops in Wayne county for the ten years, 1905 to 1914. He points out the fact that there is but little more than a ton of manure available for each acre under cultivation in the county. There is also but 60 pounds of fertilizer for each acre under cultivation, or 300 pounds for each five-year rotation. It is shown that the average Wayne county yields of corn, oats and wheat is but 39.8 bushels, 36.96 bushels and 19.33 bushels respectively for the different crops, when by practicing the methods that have proven successful on the same soil at the station the yield might be 61 bushels of corn, 57 bushels of oats, 31 bushels of wheat. This increase might be secured by using 600 pounds of fertilizers to the acre along with two tons of limestone, which would cost but $3.20 an acre annually. Allowing for extra cost of harvesting, there would still be a clear gain of $4.50 for each acre under cultivation in the county, or a total gain of $787,000 for the 175,000 acres under cultivation. These figures are not based on the best results of the experiment station. When the best results secured by the station are used as a basis for estimating the possible Wayne county crop production there would be a total net gain for the county of more than a million dollars annually.

Director Thorne also points out that the tenant who uses no fertilizer nor manure on his land in Wayne county receives but $1.34 per day for his labor, which is part man and part team, and the landlord receives but $5 per acre for the land actually under cultivation. Where fertilizers and lime are used the tenant's share amounts to $1.70 per day while the landlord receives $9 per acre as rent for his land. Where fertilizers, lime and manure are used the income of the tenant is more than $2 per day and the landlord receives $12 per acre for the land actually cultivated.

Scarcity of Nursery Stock

At the outbreak of the war, nurserymen generally had a fairly large stock of fruit trees. The spring previous to the war, they had planted heavily. The outlook for the large-fruit industry was bright. Our markets were developing rapidly. Europe was taking most of our surplus fruit. British Columbia had also opened up a new market with Australia. The home market was also being developed to an extent never before experienced. Apples, peaches and pears were gradually going up in price. The nurserymen were justified in believing that more and more ground would be devoted to fruit-growing. They therefore stocked up their nurseries with standard varieties.

When war broke out, business was uncertain for some time. The nurserymen, therefore, made very small plantings. Later, when confidence in the industry was restored, they found it impossible to get their usual supply of seedlings. They are imported from France, where the supply is depleted on account of war conditions. It will be many years before the usual supply will again be forthcoming. This will make fruit trees scarce for many years. Even now the wholesale price of apple stock is nearly double what it was previous to the war.

Advices from various nursery firms in the country state that they have now a fairly large stock of trees which should be saleable during the coming year. They are young seedlings which were imported during the year 1914. These had to be budded or grafted, and are now saleable trees. On account of the very small amount of stock

coming from France, however, these nurseries have very few seedlings to graft now for future use.

Cull Apples for Hogs

It is expected that apple marketing conditions will be more or less congested on account of the British embargo. If a market is to be found for all the high quality apples it will mean that culls must be kept off the market. In connection with the utilization of these culls the experience of Mr. John Stewart, Nanaimo, B. C., may be of interest. He says:

"About six years ago I commenced to feed cull apples to pigs. At first the apples were fed whole, but the pigs did not do well on whole apples. The experiment was then tried of grinding the apples into pulp through a cider mill by hand and the pulped apples were mixed with shorts. The pigs made rapid progress on that ration. For several winters the practice of grinding the apples was done by hand, but it is rather hard work grinding apples three times a day—it made one think of an easier way to get the work done. I owned a good gasoline engine, which had been attached to a spray pump for several years. The engine was detached from the pump and a 5-inch pulley put on the fly wheel. The engine was screwed down to a piece of plank and the plank nailed to the floor and a 2-inch belt harnessed the engine to the cider mill, which was set close to make fine pulp.

"In feeding pigs we have to remember that the pig does not chew the cud. This winter two pigs were purchased, and they were weighed—one a runt weighed 66 pounds and the other a mongrel, part Berkshire, part Tamworth and part Yorkshire, weighed 81 pounds. These pigs were fed a 36-pound box of apples and five pounds of shorts a day divided into three feeds. They were kept two months and killed and weighed. The runt made a gain of two-thirds of a pound and the other one pound a day.

Getting Results with Potatoes

It is very important to prevent the tops of potatoes from being eaten by insects, particlarly by the Colorado Potato Beetle. The old "bugs" do not do much harm to the foliage, as a rule, and usually the plants are not sprayed to destroy these, although the fewer there are to lay eggs the less difficulty there will be in destroying the young ones. These begin to eat rapidly soon after hatching, and close watch should be kept so that the vines may be sprayed before much harm is done. Paris green kills more rapidly than arsenate of lead, but does not adhere so well, and in rainy weather it is desirable to have something that will stay on the leaves so that they will be protected until it stops raining and thus prevent the tops being eaten. At the Central Experimental Farm a mixture of Paris green and arsenate of lead is used in the proportion of eight ounces Paris green, one and a half pounds paste arsenate of lead (or twelve ounces dry arsenate of lead) to forty gallons of water in order to get the advantage of both poisons. It may be that it is not convenient to get both poisons, when either twelve ounces of Paris green or three pounds paste arsenate of lead (or one and a half pounds dry arsenate of lead) to forty gallons water could be used. In smaller quantities, one ounce Paris green to three gallons or three and a half ounces paste arsenate of lead or half that quantity of dry to three gallons of water would be the proportion. An experiment conducted for six years at the Ontario Agricultural College, Guelph, showed that, on the average, where the tops were sprayed to kill "bugs," the yield was one hundred and eighty-six and nine-tenths bushels per acre, while when the tops were not sprayed and allowed to be eaten, the yield was only ninety-eight and one-fifth bushels per acre. It is desirable not to stop with one spraying, which usually does not kill all the bugs. Spray several times, if necessary, so that as little foliage as possible is eaten.

Protection of the Potato Plants from Late Blight and Rot.

In some years the crop of potatoes is much lessened by the Late Blight disease, and when rot follows little of the crop may be left. It is, therefore, very desirable to prevent this disease from spreading. This is done by keeping the plants covered with Bordeaux mixture from about the first of July, or before there is any sign of the disease, until September. Sometimes the first application of Bordeaux mixture is made before the potato beetles are all killed. The poison then may be mixed with the Bordeaux. While the disease is not very bad every year it is well to be prepared. There was an average increase per year of ninety-four bushels of potatoes from spraying with Bordeaux mixture in three years.

The formula for Bordeaux mixture for potatoes is six pounds copper sulphate or bluestone, four pounds freshly slaked lime to forty gallons of water. Bluestone will dissolve more quickly in hot water. If it is not convenient to get this, it may be suspended over night in a cotton bag in a wooden or earthen vessel containing four, five or more gallons of water. The lime should be slaked in another vessel, and before mixing with the copper sulphate solution should be strained through coarse sacking or a fine sieve. The copper sulphate solution is now put into a barrel, if it has not already been dissolved in one, and enough water added to half fill the barrel. The slaked lime should be diluted in another barrel with enough water to make half a barrel of the lime mixture. Now pour the diluted lime mixture into the diluted copper sulphate solution and stir thoroughly. It is then ready for use. The concentrated lime mixture should not be mixed with the concentrated copper sulphate solution. If this is done, an inferior mixture will result. If the barrels are kept covered so that there is no evaporation, stock solutions of the concentrated materials may be kept in separate barrels throughout the season. It is important to have the quantities of lime and copper sulphate as recommended. In order to be sure that enough lime has been used and there is no danger of burning the foliage, let a drop of ferrocyanide of potassium solution (which can be obtained from a druggist) fall into the mixture when ready. If the latter turns reddish-brown, add more lime mixture until no change of color takes place.

Reduce Car Shortage

The transportation situation is still serious and shippers of farm commodities are reminded that patriotism demands of them the heaviest loading possible, consistent with the safe carriage of the goods. The failure of one shipper to load cars to the maximum may prevent other shippers from getting any cars at all, with a consequent loss of those foodstuffs on which the winning of the war depends.

Free Short Course in Horticulture

at the

Ontario Agricultural College, Guelph

1. Fruit Growing—(two weeks) January 21st to February 2nd.
2. Vegetable Growing—(two weeks) February 4th to February 16th.
3. Floriculture and Landscape Gardening—(two weeks) February 18th to March 2nd.

The Fruit Short Course.—Concise, reliable information on practical methods for large and small growers. Fruit is a necessary article of diet and offers excellent opportunities for profit just now.

The Vegetable Short Course.—The first week will be for commercial growers and the second for the amateur with a backyard garden. Attend this course and help win the war with food crops.

Floriculture and Landscape Gardening.—"Home" means even more now than it did before the war. Every home—city or country—should be a place of beauty—attractive and pleasant.

Printed schedule of lectures of any course will be mailed to any address on request. The college staff will be assisted by some of the best commercial growers (practical fruit men and gardeners) of the Province.. War gardeners specially invited—men, women, boys or girls.

G. C. CREELMAN, President.

The Palm Room from which opens the glass enclosed Swimming Pool.

Sir John Eaton's Glass Gardens

IN point of elaborateness and uniqueness, combined with practicalness and attractiveness, these Glass Gardens are credited with being quite the finest in the Dominion.

It has many features which you might find hold welcome suggestions for adaptation in the greenhouse you intend building. With this in mind we should indeed be glad to send you a collection of half a dozen photographs.

Our new Catalog No. 306, will also be sent at your request.

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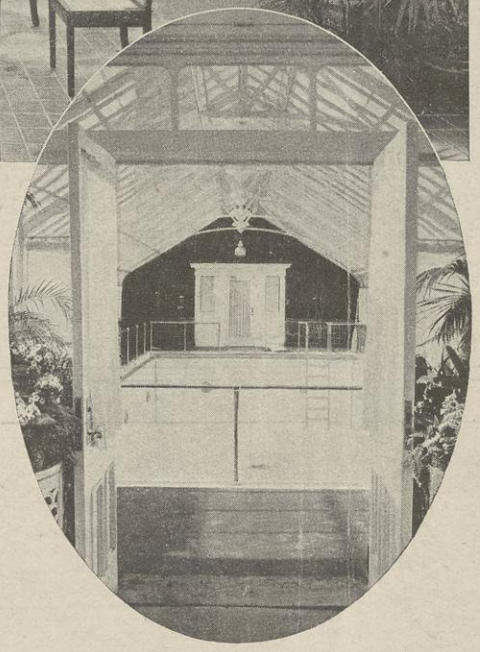

Glimpse of the Swimming Pool. To get any idea of its completeness and attractiveness you should see the other photos.

Winter Scene taken looking across the Tennis Courts.