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The Canadian Horticulturist and Beekeeper

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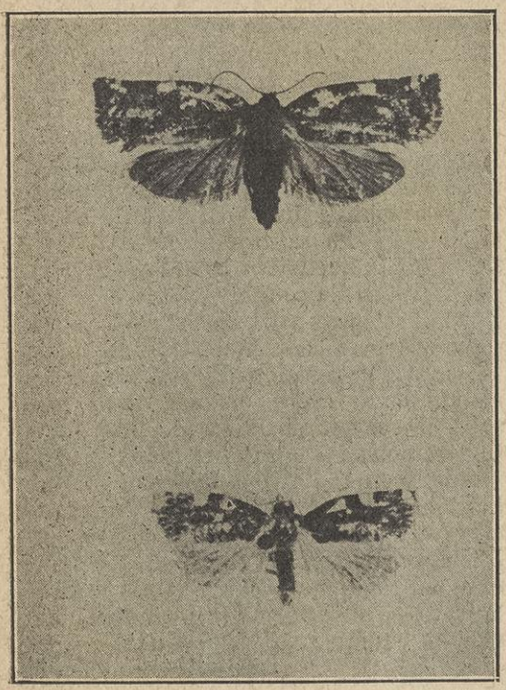
The Fruit-Tree Leaf-Roller

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

THERE are two moderately common leaf-rollers that attack fruit trees, especially apple and pear trees, in Ontario. One of these is known as the Oblique-banded Leaf-roller from



Moth of the Fruit-tree Leaf-roller; the larger one is a female, the smaller a male. (Both natural size.)

two broad bands that run obliquely across each of the front wings of the adult moth, and the other the Fruit-tree Leaf-roller. The former of these insects, though found in almost every orchard, has not to my own personal knowledge ever caused any appreciable amount of damage. The same has been true of the latter species until about three years ago. Up to that time it had evidently been kept in check by parasites, diseases or other factors, but for some unknown reason these controlling forces have of late become weakened so that this insect is now one of the most destructive fruit pests and one of the most difficult to combat.

This is not a new pest. It occurs from one end of the province to the other, but fortunately up to the present has, so far as the writer can tell, been very abundant, and, therefore, very destructive in only three orchards. One of these is situated near Trenton, another near Hamilton, and the third near Simcoe. In the first of these approximately 50% of the fruit during the last two years has been either destroyed or rendered culls. In the Hamilton orchard the loss has not been nearly so great, with the exception of a few trees which suffered severely. At Simcoe from 40 to 50% of the apples, as nearly as one can judge, were injured in the infested part, about 10 acres, of a large 60 acre block of apples.

A peculiarity of the insect is its habit of centering its attack upon a single orchard and scarcely doing any damage to neighboring orchards. Sometimes it will, as in the case of the Simcoe orchard, attack severely not the whole orchard, but only a certain portion of it. From this peculiarity one feels hopeful that the great mass of the orchards in the province may escape severe attack even though a considerable number should become badly infested.

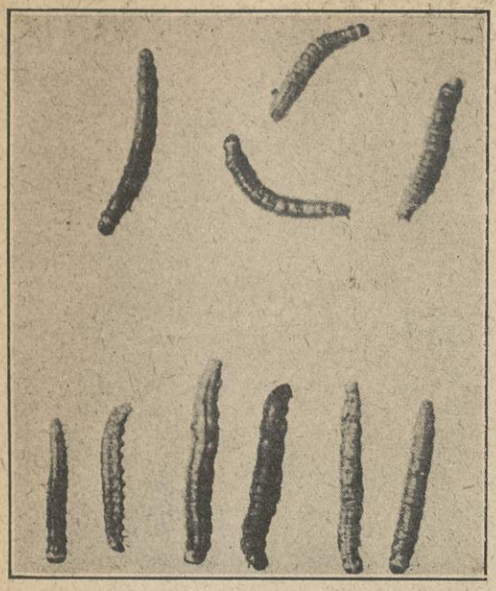
Ontario is not the only province or state troubled with this insect. During the last few years it has become a source of worry to fruit-growers in New York and several other states. It has been troublesome for many years in Colorado, but is gradually becoming of less importance there. I feel sure that since it is not a recently imported pest that in Ontario the forces which have kept it in check in the past will in a few years again gain the upper hand and reduce it to a position of insignificance. In the meantime it is well to know something about its life-history, habits and means of control.

Description of Adult and Larva.

The adult is a small moth about half an inch long when the wings are closed, but with a wing expanse of nearly an inch when these are stretched out. The upper wings are a rusty brown, with several silvery white markings, the hind wings are a light ashy brown without any markings. The larva, when full grown, is a somewhat slender caterpillar nearly an inch long, and of a pale, yellowish green color with a black head. They are usually to be found concealed in a leaf loosely rolled up. When disturbed they quickly wriggle out of the leaf, and drop down on a silken thread. When danger is past they crawl up by this thread to the tree again.

The Oblique-banded Leaf-roller larva looks very much like this one, and

Egg clusters of Fruit-tree Leaf-roller on apple twigs; the whitish ones to the right have hatched, the others are unhatched. (Natural size.)



Full-grown larvae of the Fruit-tree Leaf-roller. (Natural size.)

has the same habits, but is, as has been said, seldom at all abundant.

Nature of the Injury.

The larvae of the Fruit-tree Leaf-roller attack the leaves, fruit-buds, or blossoms, and also the fruit. The attack on the leaves begins about the time they begin to open. At this date the little larvae have just hatched out of the egg. They at once work their way in among the unfolding leaflets, fasten them together with a few silken threads and feed upon the inner tissues in this sheltered position, where it is clear one cannot reach them with a spray mixture. As the leaves get larger they roll them either up or down, but usually up, keeping them in this position by a little silken web. In these they feed, often eating holes right through them or devouring part of the top or base. The fruit buds are often bored into and destroyed and, when the blossoms have opened, these are often webbed together, and some of them destroyed.

Once fruit begins to form the caterpillars prefer it to anything else, and, coming out of their hiding places, they eat holes in it. These holes frequently extend to the core, but often do not go so deeply. The worst injured apples drop; the rest remain on the tree, but are deformed and seldom are good enough to grade as anything but culls. It is by the attack on the fruit that the chief injury is done.

Pears often suffer severely; plums are also subject to attack, but so far the chief injury has been to apples. The pest is not confined entirely to fruit trees, as it also feeds and breeds to some extent on forest trees. In the orchard the caterpillars will, where there are weeds or clover, drop down in large numbers and feed on these, but we have never found eggs on any of these plants but only on trees.

Brief Life-History.

At this time of the year (January) the insects are in the egg stage. The eggs are laid in small clusters and nearly always on the upper side of two or three year old twigs. This is the place to hunt for them. The clusters are, as seen in the photo, about one-quarter of an inch or less in length, and are oval and dark brown in color. After hatching they soon become nearly white, and show the little holes out of which the caterpillars come. Eggs do not begin to hatch until the leaf-buds have started to burst. Hatching, however, continues for nearly a month, especially if the weather is cool.

The young larva attacks first the opening leaflets, then the larger leaves, fruit-buds, blossom and fruit. About the middle of June they begin to be full grown, and by July 1st moths may be seen in the orchard. During the day the moths conceal themselves among the foliage, but if the branches are shaken they will rapidly fly out with a zig-zag motion and usually go down into the grass or weeds to hide. Late in the evening they begin to fly around, mate and lay their clusters of eggs on the twigs. The last of the moths is usually dead by the end of July, and as there is only one brood, the insect from July to the next May remains in the egg stage.

In our study of this insect we found that there were several kinds of parasites that attacked it, both in the larval and pupal stage. The larvae were also subject to disease. Birds and predaceous insects destroyed some, but it was clear that all these forces combined were not at present sufficient to keep it in check.

Means of Control.

Anyone who has ever seen the tattered foliage, and the holes eaten in the apples would think that all that was necessary to control this biting pest would be to spray the trees a couple of times with arsenate of lead while the injury was being done. I also had great hopes of success by this method, but, when I tried it I found that arsenate of lead, no matter when or how carefully applied, did not kill more at the most than 50%. It often did not seem to destroy even that many. The reason for this is that although the larvae will die, if they eat the poison while they are still small, yet their habit of feeding inside the little webbed leaflets prevents most of them from getting any of the poison on their food, and later on when they are half an inch or so in length they seem to be able to eat the poison and not be killed. Arsenate of lead does kill some, however, and we strongly advise any one troubled with this pest to give the tree two applications of arsenate of lead (4 lbs. to 40 gals. of dilute lime-sulphur or bordeaux mixture), the first application being just before the blossoms open and the second just after they fall. These are two of the regular sprayings that every apple and pear orchard should receive even if this pest were not present. Both sprayings should be thorough and every leaf, if possible, be covered both from above and below.

The Best Remedy.

Scalecide is a miscible oil spray, manufactured by The B. G. Pratt Co., 50 Church Street, New York City. It costs about $30.00 per barrel, and should be used at a dilution of 1 gal. to 15 gals. of water, so that one barrel will make 16 barrels of spray. When diluted the spray looks like milk, and is easy and pleasant to use. This or some other good miscible oil is the only substance yet known that will give real good results against the pest. The mixture must be applied just before the leaf-buds burst in spring, and at that date will destroy the eggs or prevent their hatching, but will not do so if applied in the autumn. Great care, however, is necessary to see that every egg mass is thoroughly wet; a mere light mist spray will, therefore, not do.

In order to save material and make the spraying easier badly infested trees should be severely pruned and the tops, if very high, lowered. In spraying we must keep in mind that the eggs are laid on the twigs, and not on the branches, hence the former must be carefully sprayed while the latter, unless there is San Jose Scale present, may be disregarded. It is very difficult to cover every twig, and so one should examine his work as he goes along and see that this is being done. A strong wind or high pressure to force the spray right through the tree helps greatly. The stronger the wind the better.

Cultivate.

Many larvae were found feeding on weeds, clover, etc., and also many pupae on the ground; hence we believe that good cultivation and discing throughout June would destroy many larvae and pupae. The last discing should be as deep and as late as is safe for the district. In some districts this would be about the last week in June, in others not until about July 10th.

Where fruit-growers have many chickens, these could be kept in the worst affected portion of the orchard, and would destroy great numbers of the larvae as they dropped down on their silken threads, or pupae whenever these were on the ground or on weeds, but poultry would give best results where the orchard was cultivated because they then would see the insects more easily.

Orchards Sprays

A. W. Cook, Guelph, Ont.

THE successful horticulturist of today has more to contend with than those of some few years ago. New insects and fungi have come to combat his efforts, and naturally such conditions have forced the fruit grower to experiment with modern appliances, leading sprays, and resort to putting into practical experience better methods of spraying and a thorough understanding of what to spray for, what to spray with, when to spray, and the results of thorough spraying methods. If he were to neglect spraying "the most important" of the factors which determine success in horticulture, his adventure in fruit growing is more than apt to spell disaster, not only on his part, but upon those who live about him. The key note of success in fruit growing is thorough, efficient spraying.

Spray materials are divided into two classes:—fungicides and insecticides—the former being used to control such diseases as scab, bitter rot, powdery mildew and brown rot. These are fungus diseases and are tiny plants, but live upon other plants. Fungicides are also used to control San Jose scale and Oyster scale, also a few minor insects. Insecticides are for the plant's protection against such insects as the bud moth, codling moth, and aphis; these being the most serious insect pests which we have.

There is no small amount of difference in the estimation of fruit growers with regard to the relative value of our two well-known fungicides, lime sulphur and bordeaux. Both of these have their strong advocates, but the happy medium is found to be a combination of the two. This opinion is firm with many of our leading authorities, and is being upheld with an increasing number of practical men who have proven it to be best to their own satisfaction. It is true that with some of our orchard fruits individual fungicides have proven to be superior over the others, but we find in our apple orchards that the combination of using lime sulphur for our dormant spray, bordeaux for our second spray, and lime sulphur for the succeeding sprays, will prove to be more efficient in controlling not only the apple scab, but also produce apples free from rust. Many years, when lime sulphur was used for the second spray, it left our apples with a russety coating, which was objectionable at packing time. The result was that many apples had to be discarded on this account. Lime sulphur is more efficient and more practical in most instances with all our orchard fruits. However, bordeaux can be used more successfully in the control of rot in sweet cherries than lime sulphur, because of the fact that it may be applied at later dates after the fruit has set, while if lime sulphur was used it would stain the fruit.

Arsenate of lead has been found to be more efficient as an insecticide than Paris green in controlling leaf-eating insects. It is mixed more readily in solution and is more convenient, besides being a great deal more effective.

Work of Fruit-tree Leaf-roller on young apples. (Natural size.)

However, it will not control sucking insects such as aphis. To control insects with such habits, we must resort to insecticides which will cover their bodies, and so block their breathing organs, or eat their bodies and so destroy them. Black Leaf Forty is most suitable, this being in a very convenient form to use to destroy such insects.

The three chief units in spraying are —spray in time, spray thoroughly, and know why you use a certain spray and the results from their use.

The size of our orchards should be understood, because of the necessity of completing our spraying in the proper time. A few days late, with an inefficient machine, will cost more than an outfit of the proper size. Where one has an orchard of from five acres up, a power outfit is almost a necessity. Unless one has all the help that is required to apply thoroughly, the spraying is apt to be only a partial success. One must always keep in mind that spraying must invariably be done at the proper season, especially where fungi is to be controlled, and there is no better insurance against a possibility of not being able, than an efficient spray outfit which is capable of spraying more trees than you have in your own orchard. When one is a little behind in his spraying, it is a general rule that the orchard does not receive a thorough spraying. The results from such spraying are not encouraging to others.

Thorough spraying means clean fruit, of a more saleable quality. To ensure thoroughness, one must have pressure behind the material which has been intelligently prepared. Spray with at least 150 lbs. pressure. This means that the uppermost limbs may be thoroughly covered, and it also means that our insecticides are driven into the calyx of our fruit. The importance of this cannot be overestimated. One must spray so that the mixture will drop from the limbs of our trees. It is best by far that we apply more than what is really necessary, rather than an insufficient quantity. The orchardist who trys to save on his spray material will invariably fall short at packing time. Beginners should apply until it drips, and with experience they will learn just what amounts are really necessary.

The importance of knowing one's materials, so that he may mix them to produce the best results, is great. It is of no material value how well the spraying has been done, so far as controlling fungi and the various insects, unless one has his spray properly and thoroughly mixed. While it is possible to deviate from set formulas to a small extent, it is always advisable to adhere to the regular proportions as have proven to be most satisfactory. These are to be had in the form of a regular

Spraying operations in an Ontario orchard. These trees need pruning.

calendar issued by the Department of Agriculture, of Toronto, and should be in the hands of every person who sprays. Always have at your disposal a hydrometer and a set of scales—two very necessary assets towards successful spraying.

Apples, pears, and fruits of a like nature, require a dormant spray to control all scale insects. This is best applied just before the leaf buds begin to burst. However, it may be done some few days ahead of this time, or as the buds are bursting. With the peach, however, the best results are to be obtained if the spraying is done just before the buds have begun to swell. This spray is to control leaf curl. The strength should be 1.032 to 1.035 for the lime sulphur wash. If one were to use weaker solutions, good results are not often obtained.

The second application for apples and pears should take place just as the fruit buds are showing a pinkish tint. This spraying is of great importance in controlling the apple scab, bordeaux being used. To it we add arsenate of lead at 2½ to 3 lbs. for every 40 gallons of diluted spray, to control bud moths and some minor insects. If peaches require a second application for the control of plum curculi, 2 to 3 lbs. of arsenate of lead can be used alone. This is applied when the fruit is one-third of an inch in size, and if it is deemed advisable to spray for brown rot, a solution of self-boiled lime sulphur may be applied about four weeks after the blossoms have fallen.

The third application should be applied when 90% of the blossoms have fallen. No time must be lost, because the poison must invariably be forced into the calyx end to control the codling moth. Use lime sulphur at a strength of 1.008. If bordeaux is used it will cause russeting of the apples. Apply very thoroughly in the case of apples to control the scab. If after a lapse of ten days the weather is cold and wet, it is absolutely necessary to apply a fourth application in the case of apples. Such weather is conducive to a fresh outbreak of the scab, especially on the Snow's and McIntosh. Apply the same mixture as in the third application, however, leaving out the poison. A fourth application should invariably be given in the far eastern counties along the St. Lawrence River.

Fall Conditions.

Towards the middle of August to mid September, cold weather is apt to cause a renewed attack of apple scab. In the fall of 1914, many sections of Ontario experienced just such weather. Fruit which was practically free from such scab became infected, not only on the calyx end, but on the stem. For this apply the same strength of lime sulphur as used in the third application.

The Department Spray Calendar and Bulletin 198, should be in the hands of every fruit grower. By frequently consulting them one may prepare his own fungicides. The directions for making the same are found therein. The cost when one prepares his own spray material means a saving of about $2.00 to $4.00 per barrel, all depending upon the facilities for boiling.

The fruit grower who sprays most thoroughly produces his crop at a greater reduction in cost than the man who plays at spraying. He has a greater quantity of higher quality, hence the larger number of barrels which he can place upon the market. Years of small prices, such as we are experiencing, make it imperative that we cut our operating expenses, so long as it is in keeping with approved methods. A few dollars invested in additional spray material will pay greater dividends than most men are aware of. The fruit grower may spend money in the pruning and cultivation of his orchard, aside from the interest on his money, rent of land, etc., and then by careless management at spraying time, practically throw away the possibility of high returns from his investment by using unintelligently prepared sprays, applied without the knowledge of why you spray.

If spraying is done methodically in conjunction with the purpose to produce clean No. 1 fruit, the fruit grower should overcome small returns. This is a day of "quality," and spraying produces in its highest perfection. Spray on time, spray with pressure, spray with a purpose in view, and other things being equal, a good dividend will be assured to the fruit man from the sale of high class fruit.

Pruning Peach Trees

Jas. Marshall, Hamilton, Ont.

Peach trees require more pruning than almost any other tree. The main limbs should be allowed to branch out near the ground. Do not have the trunk of the tree between the limbs and the ground more than one foot or one and one-half feet long. I prefer to have the trunks shorter than this, as you can then have a low-headed tree, if you keep the tops cut back. My plan is to begin to thin the limbs, and open out the centre of the tree and leave it vase-shaped, so that the sun can shine into the tree. Do this any time in the winter, when the trees are dormant. Towards spring, say in March when danger of bud freezing is over, cut back the previous year's young growth severely if the buds are good, as there are often too many good buds, and if too many are left the peaches will not likely be large. Thinning fruit is necessary where there is too much fruit on trees, in order to have a good sample.

We spray our peach trees thoroughly as early as we can in the spring with home-boiled lime sulphur. I am not finding fault with any other spray. The chief thing is to get the spray on while the buds are dormant. We finished our first spraying last spring in March. The work was done on fine sunny days when the ground was frozen. By doing it then, we did not cut up and tramp hard the heavy clay soil, it was easier on the horses to draw the hand and power sprayers, and it prevented curl-leaf almost entirely.

The Control of Fruit Insects, With Special Reference to Nova Scotia

G. E. Sanders, Field Officer in Charge Dominion Entomological Laboratory, Annapolis Royal, N. S.

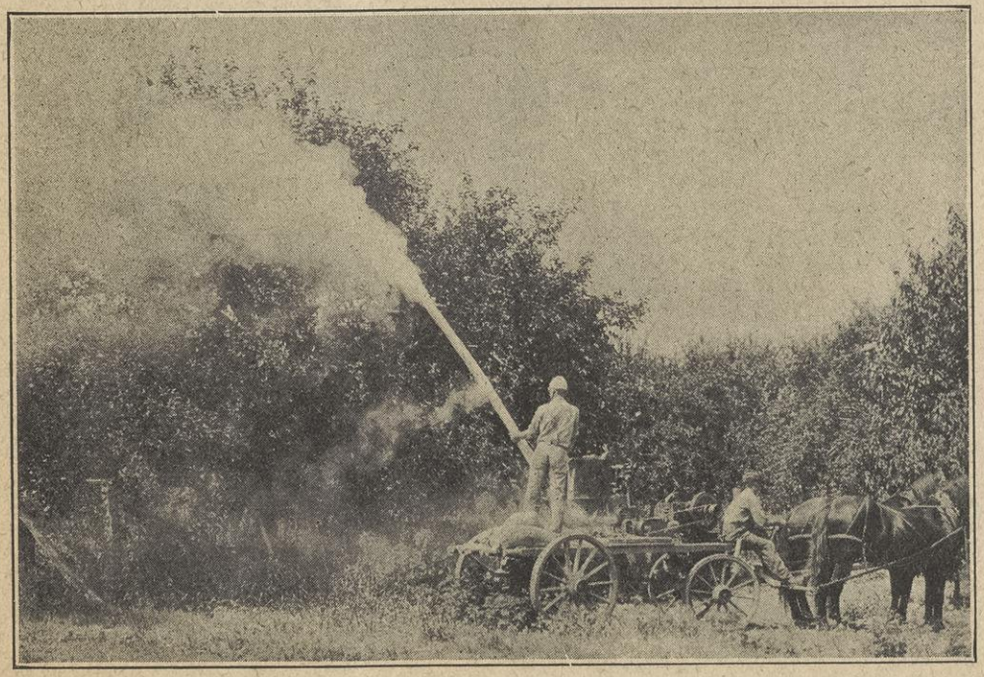
THE day when entomologists and plant pathologists laid down rules for spraying, and the control of insects which they considered applicable for a continent, is long past. The more the life histories and habits of insects and diseases are studied, the less are experts inclined to recommend treatments for districts outside those in which they have conducted experimental work or made careful observations. The making of blanket recommendations, supposed to be applicable to all conditions, has in the past been a frequent source of embarrassment, loss of confidence in experts and financial injury to the farmer or fruit grower following such recommendations.

To-day the expert knows that climatic conditions may cause unequal variations in the various periods of plant growth, which in turn may react in a different manner on each insect feeding on that plant. The life histories and habits of insects may vary with, or as sometimes happens, without any apparent change in weather conditions. Again the varieties grown in different localities are usually not the same, and varietal susceptibility is one of the things to be considered in recommending treatments. The tendency is now to have each insect or disease investigated locally, and local recommendations made therefrom, by this means effecting a saving to the farmer or fruit grower, either in material for treatment or in efficiency of treatment, as well as gain in prestige of the expert both as an individual and as a class.

The investigation of apple insects in Nova Scotia during the past four years has demonstrated the value of the study of local insects under local conditions in a striking manner.

First, in regard to the growth of the apple tree, in relation to the budmoths, which are the most destructive insects attacking the apple in Nova Scotia: in 1915, a period of twenty-four days elapsed between the time the first Gravenstein buds began to show green until they were out in full bloom, or from May 11 to June 4. The bloom in Gravensteins lasted six days, or from June 4 to June 9 inclusive. The period of emergence of budmoth larvae from their winter quarters covered a period of fifteen days, or from May 9 to May 23 inclusive.

It is not an unusual occurrence in Nova Scotia for the buds to start and the leaves to become, say, one-half inch across, and then a period of cold or rainy weather set in and hold the trees in practically the same condition for a week or ten days, insect life during such a period not being retarded to the same extent as the trees. A study of these dates easily accounts for the budmoth reducing the set in blossom clusters infested, by seventy-five to eighty per cent. in Nova Scotian orchards. They also show the futility of depending on a spray applied just when the buds are beginning to show green at the tips to control budmoth.

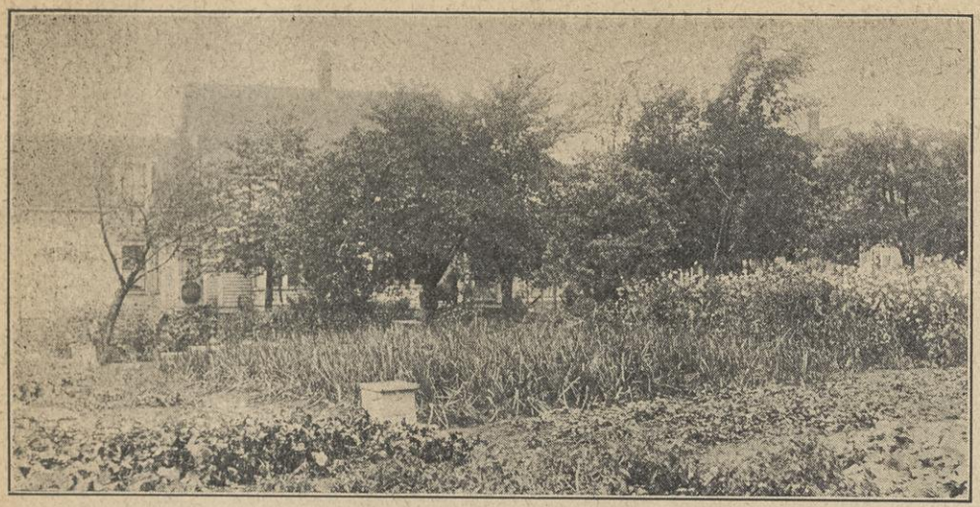


A dust sprayer at work in a New York State orchard. This form of spray has been giving unusually good results across the border.

In order to control budmoth we must find a means of getting poison to it after the bud has opened, and when some of the budmoths have drawn a cluster of partly eaten leaves about themselves. In this regard the Friend Drive Nozzle has proved our salvation. It has, in every case where it has been used, given greater control of budmoth than the mistry, whirlpool and calyx nozzles, against which it was tested; and where used twice before the blossoms in 1915, the first time on May 15 and the next on May 31, with of course two applications after the blossoms, gave us the greatest control of budmoth we have ever obtained, namely ninety-two per cent. of the larvae, which would normally become adults, killed. The poison used in this case was paste lead arsenate. The value of this nozzle in budmoth control lies in the high nozzle velocity of the spray, which when it strikes the clusters of leaves gathered together by the budmoth, does not settle on the outside without wetting the inside as the fog and mist sprays do, but drives in through the chinks and crevices of the cluster of leaves, thoroughly coating the inside of the cluster with poison.

The biting insects ranking next in importance in Nova Scotian orchards are the fruit worms, of which there are upwards of a dozen species, the most common being Xylina bethunei. We have found that the life histories of the various species are very similar; the eggs, which are mostly deposited singly on the twigs of the apple, begin to hatch just when the Gravenstein buds begin to show pink, but owing to the cool springs of Nova Scotia the period of emergence is long drawn out, the last of them hatching one month later. During the first two weeks of their existence as larvae, they feed on leaves and blossoms, later feeding mostly on the young fruit. When feeding on fruit they are very hard to poison as they eat so little surface for a meal. The control of fruit worms lies in having the leaves coated with poison during its period of emergence, or by applying poison in a spray when the buds are showing pink, and in another immediately after the blossoms. These two sprays will give on an average sixty-five per cent. reduction in injury to the picked fruit.

In 1915 it was thought that on account of the tendency in the larvae of the fruit worm to drop to ground when disturbed, that the mechanical effect of the drive nozzle in disturbing the leaves might increase control to a certain extent. To prove out this point, two plots were sprayed with water, one with the drive and one with a mist nozzle and two left unsprayed. Where



The residence of Mr. F. H. Johnson, of Bridgetown, N.S., and a portion of the apiary which plays an important part in his orchard operations. Note the article on this page.

the water was sprayed on with a mist nozzle, five per cent. of the apples were injured by fruit worms; where water was applied with the drive nozzle 2.25 per cent. of the apples were injured, and where the trees were not sprayed, the injury amounted to 4.1 and 4.25 per cent. respectively. In six of the seven comparisons that we had in 1915 between the drive and the mist nozzles in fruit worm control, the use of the drive resulted in the fewest apples injured. In the seventh there was no difference.

The Codling Moth.

Turning now to the Codling moth in Nova Scotia: for some reason it is an insect of very minor importance, the greatest infestation recorded for the year being from an unsprayed plot, where 1.7 per cent. of the apples were found to be wormy. As far as we have been able to ascertain, it is single brooded in Nova Scotia. There is only two per cent. second brood in Maine, where the season is both longer and warmer than Nova Scotia. In view, therefore, of the fact that the Codling Moth is of so little importance in Nova Scotia, the first spray after the blossoms may be advanced or retarded as desired, with little or no injury to the fruit crop on account of Codling Moth. This is supported by the fact that the spray applied immediately before the blossoms controls 71.3 per cent. of the Codling Moth, the spray after the blossoms alone controls 89.2 per cent., while the spray two weeks after the blossoms controls 65.6 per cent. This shows that the life history of the Codling Moth is drawn out over an enormous period in Nova Scotia and that it feeds extensively on the leaves before entering the fruit, thus minimizing the already small importance of the spray immediately after the blossoms in Codling Moth control.

These notes on three groups of insects, in all something less than 17 species, go to show that the control of certain insects is somewhat different in Nova Scotia from their control in other parts of North America. The relative importance of the three in their relation to one another is also somewhat different. With 1.7 wormy apples, the highest infestation of Codling Moth recorded, we have in Budmoth a high infestation of 96.4 per cent. of the fruit buds in the spring, which resulted in a 72.3 per cent. reduction in the total set of fruit as well as an average of 40.5 per cent. of the picked fruit from the unsprayed plots in the same orchard injured by budmoth. In Fruit Worm we have this year a high infestation of seven per cent. of the picked fruit injured, which means 14.4 per cent. of the apples in that plot had dropped during the season as a result of fruit worm injury, or a total injury of some 21.4 per cent. of the total set by fruit worm.

The Apple Curculio has not, so far as I am aware, been recorded from the province, nor has the Lesser Apple Worm.

The Falise Tarnished Plant Bug, Lygus invitus, which is being investigated by Prof. Brittain, does thousands of dollars worth of damage annually, but in Ontario Prof. Caesar regards it as an unimportant species. The Apple Maggot, while present, has not yet affected the main fruit areas, and the San Jose Scale, thanks to the vigilance of the Provincial Entomologist, is not at present known to exist in the province. I mention these to show how different spraying conditions are in Nova Scotia from other apple growing sections, and the importance of investigating the problems of each locally.

A Nova Scotia Grower's Methods

A description of the methods of orchard practice which have enabled Mr. F. H. Johnson, of Bridgetown, N.S., to obtain an average profit of one hundred dollars an acre from a reclaimed orchard appeared in the August, 1915, number of The Canadian Horticulturist. A further account of Mr. Johnson's methods may prove equally interesting.

"For a spray, I used to use poisoned Bordeaux," said Mr. Johnson to a representative of The Canadian Horticulturist some time ago, "but now I use only lime sulphur with arsenate of lead. I boil my own lime-sulphur, using steam for boiling. With a test of 30 (Beaume), I dilute one gallon of lime-sulphur to thirty-one gallons of water, and mix five pounds of arsenate of lead to one hundred gallons of spray. The sprayer is kept at a pressure of two hundred pounds. Water is conveyed from a brook with a tank filler run by an engine.

"I spray first in the spring when the leaves are about the size of a ten-cent piece. The second spraying takes place when the blossoms first show pink; the third when the petals have about all fallen; the fourth ten days later, and the fifth about a fortnight later. My trees are most thoroughly sprayed until every leaf and stem and branch and trunk is covered. Drenching with the mixture I use does not harm the trees in the least. I begin to spray the trees as soon as they are set out, as it is a mistake to wait until they begin to bear. The fact that they have no blossoms makes it possible to spray them a little in advance of, or shortly after, the bearing orchard. They should receive the same number of applications as the older trees. Lime-sulphur is very effective in ridding the apple trees of oyster-shell bark lice. The trees should be scraped to remove the rough bark before applying the spray, to give it a better chance to work on the scales.

Bees Are Kept.

"A few colonies of bees are kept for the benefit of the orchard. They are proving a source of income from the honey, besides the good work they do in the orchard. I often suspect that fruit growers do not always fully realize the important part that bees play in distributing the pollen. At all events the increase of bees has not by any means kept pace with the increase in orchards. Growers whose orchards are not situated near an apiary would be well advised to keep a few colonies.

"I buy my stock from local nurseries, thus getting trees fully acclimated. The stock costs about twenty-five dollars

per hundred. The trees are set out as early in the spring as the land is fit to work. The standard trees are planted forty feet apart. In between I plant Wageners as fillers. The Wageners are upright growers, bear very young, and do not interfere with the development of the standard trees for a number of years. Moreover, the fruit is of good quality and appearance. I can recommend the Wagener as a filler.

"In planting, I dig a fairly large hole so as to fit all the roots in without any crowding. I put some of the surface soil in the bottom of the cavity and place more over the roots of the trees. The subsoil is placed on top and the ground thoroughly firmed.

The Right and Wrong way to Care for an Orchard

W. E. Biggar, Provincial Inspector of Insect Pests, Hamilton

IN planting a young orchard care should be taken on arriving from the nursery with the trees not to allow the roots to be exposed to the hot sun and drying winds. See that they are well heeled in with moist earth, as soon as possible, preferably in the field where you intend planting them. After the planting is done, the next thought and wish of the planter is to secure a thrifty,vigorous growth in the young trees. This can be done by cultivating frequently—say, once or twice a week up till the last of July or beginning of August—then cease cultivation. It is wrong to continue cultivation throughout the summer, because late cultivation keeps the trees growing, and does not allow the wood to ripen and harden, and then we get winter injury, which often kills from twenty-five to forty per cent. of the trees. I have witnessed a number of cases in different parts of Ontario of winter injury directly traceable to late cultivation.

In pruning a young orchard which has not yet reached the bearing age, do not prune too severely. Excessive pruning checks the growth of the young tree. A certain amount of pruning is absolutely necessary in order to form a well balanced head on the tree; but cutting away the top until there are but a few short stubs of branches left, as I have seen in some instances, constitutes excessive pruning. However, when a tree reaches the bearing age then we must prune.

While the pruning is being done, remove all the dried fruit found clinging to the branches. Practically all this dried fruit was diseased with brown rot, and contains the spores of the disease, which will start the Brown Rot in the fruit of the coming season. Also cut out all branches affected with Black Knot, cutting from four to six inches below where the knot is visible. This will insure removal of all spores which sometimes extend some distance in the bark, below the knots.

As soon as the pruning is finished, gather the brush and burn it. It is wrong to allow brush heaps to remain from one season to another before burning, because it is a breeding place for Shothole or Pinhole Borers. This insect does considerable damage to peach and cherry trees, especially the young trees, and the borers are one of the main factors in spreading pear blight.

Importance of Spraying.

Years ago people would buy scabby or wormy apples and ask no questions, until they made the discovery that such fruit was nearly half wasted when the diseased and wormy parts had been removed. Now the demand is for clean, perfect fruit. This it is impossible to obtain without spraying. In spraying for San Jose Scale, prune and scrape the trees thoroughly and use concentrated or commercial lime and sulphur, testing by the hydrometer 1.300 specific gravity. Add one gallon to six of water and you have it strong enough to kill scale.

Where many fail to control the scale it is because when spraying they fail to get the under sides of the branches and the tips of the limbs covered with spray mxture. All parts of the tree must be covered with spray if we expected to control San Jose Scale. It is a mistake and decidedly wrong to expect to keep scale under control in an apple orchard without thorough spraying.

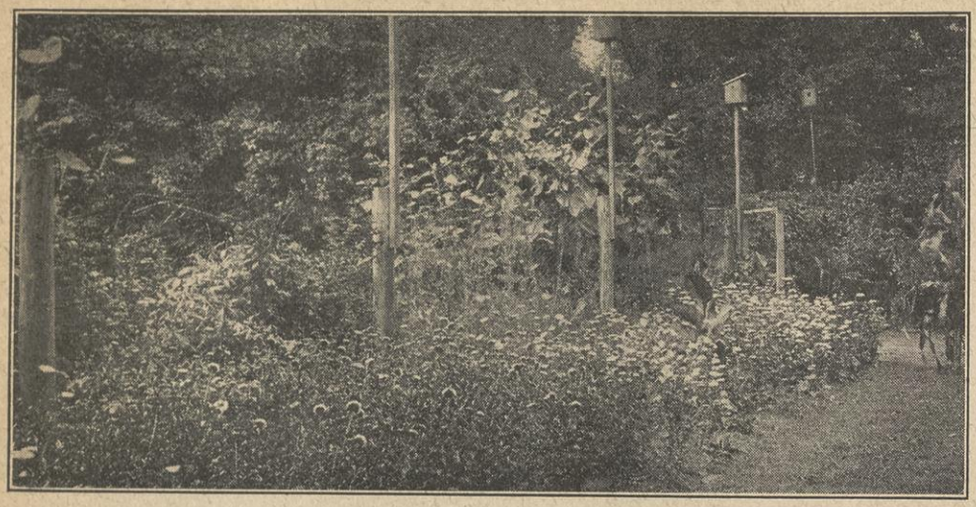
Spraying should never be done soon after a rain and while the branches are still wet, for it is an absolute waste of time and money, as the spray material will have but little effect in killing scale if applied while the trees are wet. If it is a peach orchard you are spraying, be sure and spray before the terminal buds begin to swell, and then you will positively control curl leaf. A peach tree attacked by curl leaf is certainly a sick tree for the one year, and will in all probability cause a loss of that season's crop of fruit.

Remove trees affected with Yellows. It seems hard to convince some fruit growers that it is a dangerous practice to leave Yellows or Little Peach diseased trees standing in the orchard after being marked by the inspector. By promptly removing the diseased trees, the spread of the disease will be kept well under control, but those who are careless and allow the trees to remain standing for weeks after being marked, pay dearly for their neglect.

I want to mention one instance. In 1914 an orchard was found with thirty-eight diseased trees in it. Being short of help the owner allowed the trees to stand for some weeks after they were marked. This past season of 1915 I was requested to go with the local inspector and together we marked three hundred and eighty-seven trees diseased with Yellows and Little Peach in this orchard. When we told the owner the number of trees we had marked he immediately sent a man with the axe and cut them down. It seems to need an experience of this kind to awaken some men to the fact that Yellows and Little Peach are a very dangerous disease to trifle with.

We now have a staff of well trained and efficient local inspectors, and for the past three years the number of trees diseased with Yellows and Little Peach has been reduced each year, until the loss is but trifling. Sometimes new men are elected in the Township Councils, and a trained experienced inspector is discharged and an inexperienced man is appointed in his place. This practice hinders and obstructs our work and often results disastrously.

There are numerous large plantations of small fruit in Lambton County. The raspberry plantation here shown is that of Robt. W. Riggs, of Arkona, Ont.



The garden of one who loves birds as well as flowers. Note the simply constructed type of birdhouse used.

A Chat About Roses*

Percival H. Mitchell, Toronto, Ont.

THE qualities which are essential to a good garden rose may be readily stated; their order of merit, however, being of personal preference. For myself I would choose form as the first requirement; second would be color; third, continuity of bloom; fourth, hardiness and vigor; fifth, fragrance, and sixth, freedom from inherent diseases.

The form of a rose varies greatly from the massive flattish blooms generally found in hybrid perpetuals, through the globular shapes to the more or less pointed blooms. They all have their charms, although personally I do not take kindly to the globular shape such as the rose Caroline Testout possesses. In fact in the list to follow the shape is my main reason for disqualifying Caroline Testout from among the first choice in the color, pink.

Rose colors are marvelous and very often are quite as gorgeous as painted by the raisers. Let me quote the color description of Irish Fireflame, a recent development in the single roses:—"In the spiral bud state it is deep maddery orange, splashed with crimson, which as the bud develops becomes fiery orange-crimson, changing to solid delicate orange which becomes, as the flower fully opens, rich, satiny, ochrey-old-gold delicately sheened and veinated, crimson and pure lemonzone. Its gorgeous superimposing intense color gradations spontaneously convey the idea of a flame. The handsome, graceful wood is shiny purple chocolate, and is festooned with varnished, deep, bronzy, green, ovate foliage."

This is rather conjuring with the spectrum, but the delicacy of the shadings of many of the newer roses is really beyond description.

The majority of the newer roses are capable of producing four or five sets of blooms within a period lasting from June until November. While a number of the hybrid perpetuals have really a good second blooming period, the majority make a wonderful display in June and are extremely shy during the balance of the season. So far there are but few climbing roses which flower more than once during the summer. Several of the roses with most pleasing form and color are deficient in vigor and the bush hardly aspires beyond the straggling stage; two indispensible roses, Madame Ravary and Arthur Goodwin, are of this nature; the balance of the roses, however, which I list have good growth in the plant.

Fragrance.

One cannot think of roses without associating fragrance. It is unfortunate that quite a number of our best roses are deficient, and the best white rose, Frau Karl Druschki, is absolutely lacking in perfume; the many other representatives of the hybrid perpetuals, however, quite make up for this, but it is one of the greatest aims of the hybridizers to produce a fragrant Frau Karl Druschki. The hybrid teas are in general fragrant, but after several years, when fragrance was not one of the aims in the hybridizing, the demand has come that the modern rose shall be fragrant, and it is notable that several of the best perfumed roses have been among the most recent productions. The teas as a class have a delicate odor, and while they are described as tea-scented, the fragrance is of widely varied character. One of the sweetest scented roses is Conrad Meyer, one of the hybrid Rugosa roses.

The greatest ills we have to contend with here in roses are mildew and black spot. Many roses are specially subject to mildew, and the naturally vigorous rose is not immune, for Frau Karl Druschki and Conrad Meyer, two of the strongest roses, are quite addicted. Black spot seems to have been imported and is particularly noticeable on the Pernatiana roses. Thus some of our strongest and finest roses are peculiarly susceptable to such diseases, and we must accept such roses and combat their ills as they occur.

The development of new roses is now followed along scientific lines. In England and Ireland, especially in Ireland, the production of novelties reaches large numbers yearly. The catalogues of such noted Irish raisers as Alex. Dickson & Sons, Hugh Dickson, and McGredy & Sons, all in the neighborhood of Belfast, continually show wonderful new roses. The raisers in England, such as Paul, Cant, Merryweather & Sons, and the noted amateur, Rev. J. H. Pemberton, also produce many, but the most striking are of Irish origin from the companies named. In France there are many noted raisers, the most important productions from France today being from Pernet-Ducher, of Lyons.

In purchasing roses it is essential to secure the bushes from the most reliable growers. The roses which are the most satisfactory have generally been budded on seedling briar stocks, and thus a vigor of growth is attained which could only be produced by many years of growth of the rose on its own roots. Moreover, the hybrid teas and several of the hybrid perpetuals will bloom the same season as when transplanted when on the briar, so that the rose garden may be realized soon after planting. In some cases the own-root roses are to be preferred, and again some are better on the manetti stock than on the briar, and the choice may lie further with the soil. Most of the reliable growers, however, have determined the proper stock which is most suitable for garden growth and furnish them in accordance.

*Extracts from a paper read at the recent annual convention in Toronto of the Ontario Horticultural Association.

Bird houses may be made and put in convenient trees. The birds seem to prefer boxes that have weathered a little.

Lobelia, snapdragon, forget-me-not, salvia and verbena may be sown in the greenhouse late this month for early plants.

The old-fashioned bleeding heart makes a good plant at a corner of the shrubbery and as it is a perennial will return each year.

The Care of House Plants

Henry Gibson

AT this season of the year, when the garden is garbed in a mantle of white, our thoughts naturally turn to the window garden, where every green leaf is doubly appreciated. With what tender affection we enjoy such plants as have been reserved for beautifying the home during these dark and often dreary days.

When we consider the extent to which flowers are grown in the home, and the pleasure that is derived from them, not to mention the tender and affectionate regard many people have for them, it is surprising that the study of their habits and needs is not more thorough and general.

The most essential need of house plants is light; direct sunlight if possible; but daylight and plenty of it. The importance of plenty of light cannot be overestimated. If this one condition can be complied with, all others can be so easily provided as to assure success with but little effort. This is worth remembering in every phase of gardening experience. It will cause you to pull aside the curtains, and roll up the shades in the early morning so that the plants will get the first gleams of daylight.

Many householders, having become disappointed at their inability to grow plants and flowers in the living rooms, have improvised plant rooms made out of existing sun parlours, enclosed piazzas, or they have built a small addition to the house for this particular purpose. These, when properly designed, prove most successful, not only as conservatories but as delightful sitting-rooms. Indeed the combination of sitting-room and conservatory is the principle of an arrangement that is likely to prove a feature of the building operations of the future among the more enthusiastic amateur gardeners.

In those homes where only the living-room is available it is possible to keep a variety of plants in a comparatively healthy condition in rooms on the south-east or south-west corners that have good-sized windows on both sides, provided that one is prepared to consider their needs as of prime importance and is willing to give them the constant attention that every living thing requires.

During the day allow the window to perform its one essential function, which is to admit daylight to the room. With the room thus flooded with light many foliage plants will thrive even at considerable distance from the window; in fact some plants have a marvellous capacity for adapting themselves to conditions that are far from ideal. On the other hand flowering plants are most exacting and will tolerate no position short of the immediate window-sill.

Proper watering is important. How much water should this plant have, and how often should it be given? is a question that has been asked over and over again, and as many times answered with but little satisfaction to the enquirer. The watering of plants is one phase of home-culture that is the least understood by the average amateur, yet when one comes to give it a little careful thought there is nothing mysterious about it. It is very difficult for any one to lay down hard and fast rules as to when a plant should be watered, because the amount of foliage that a plant may have, the atmosphere in which it is growing, and the effectiveness of the drainage to carry away all superfluous water are factors that have to be taken into consideration

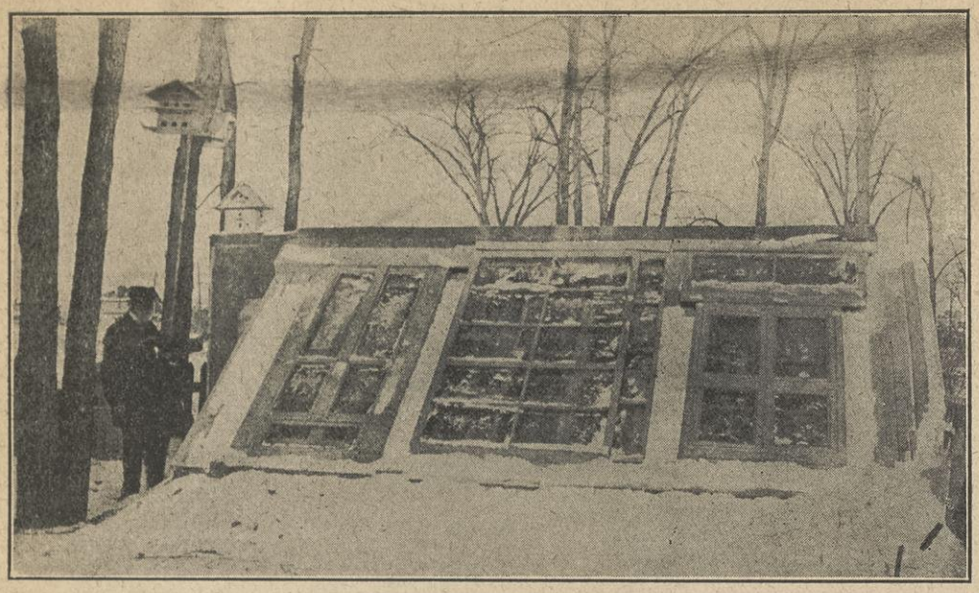
A plant with a relatively large amount of foliage and blossoms in a small pot will need water more frequently than a plant with less foliage in a comparatively larger pot. The plant with considerable foliage will lose more moisture through the leaves than one with less foliage. In addition to this the former has less soil about its roots to retain moisture for any length of time, whereas the plant with the larger amount of soil to hold the water, and less leaves to evaporate it, will eventually die if adequate drainage is not provided at the roots to carry off the excess water.

A plant growing in a dry atmosphere will demand more water than one growing in cooler and more moist quarters. Plants do not like a dry, arid atmosphere. The greater demand made by the leaves upon the roots for water is very trying to even the most vigorous, and few survive this condition long. There is no royal road to tell when a plant should be watered. The successful professional grower relies entirely on his daily observation of conditions as to the frequency of watering.

Plants in the living room have to put up with what heating and ventilating they can get, but even these conditions can, to a large extent, be made more favorable by the exercise of a little care. As already mentioned, excessive heat, and a dry atmosphere are not desirable. This condition is frequently aggravated by the other extreme of throwing open the doors and windows to air the room, and by poorly fitting sash that allow direct drafts to strike the plants. Rooms heated up to seventy-five and eighty degrees, by steam, hot-air, or hot water, are not really healthy for human beings to say nothing of plants. A certain amount of humidity in the atmosphere is necessary for our health, and so it is with plants. The kitchen is bad enough, with the cooking range and the intense heat that radiates therefrom, yet here we do get some moisture in the air from the boiling water, and steam that escapes from the kettles and pans.

To offset the dryness in the atmosphere of the living-room at least one receptacle containing water should be set in each room. A good place to set

An attractive border on the sloping edge of the lawn of Geo. Vickers, Barrie, Ont.



The modest greenhouse of Mr. H. Goodchild, St. Lambert, Que., made out of odds and ends, at an expense of about fifteen dollars.

them is on the radiator. An even better method of providing moisture in the room is to have a flat tray of galvanised iron, two inches deep, for the plants to stand on. Fill it with a layer of white pebbles, one and one-half inches deep. The tray can be made the length and width of the window shelf. This arrangement is a wonderful aid in watering, since the superfluous water runs away among the pebbles, and quickly evaporates, thus saving the necessity of having to devise some means of getting rid of it and at the same time supplying much needed moisture. Moreover, the whole affair is neat and practical.

The same idea can be carried out to a certain extent by filling the saucers that the plant-pots stand in with pebbles, but the saucers are much more trouble to look after. The evil of letting plants stand in saucers half full of water is an old one, that should be avoided. Try and remember that your plants are living things that have certain functions to perform in order to live. It is impossible for air to pass into the soil of a plant if the pot is standing in water, yet in order to properly carry on their work the tiny roots must have air to breathe.

Every window devoted to plants during the winter, should be double glazed, if at all possible. Great care should be exercised in airing the room on very cold days, as it only takes a few minutes to freeze a plant when the temperature outside is much below the freezing point. When circumstances compel you to subject your plants to a high temperature during the day they should have a correspondingly low temperature at night. A temperature of seventy-five to eighty degrees during the day should fall to fifty-five to sixty degrees at night.

The cultivation of plants does not depend so much on a study of formulas ,or on higher education or deep studies in botany, nor is it altogether one of soils and fertilizers. It is simply a question of whether or not you are sufficiently enthusiastic to study the needs of your plants, and willing to supply them.

The Gloxinia

H. J. Moore, Queen Victoria Park, Niagara Falls, Ont.

THE gloxinia is one of our best tender perennial flowering plants. It is easy to grow, and as it flowers in six or seven months from seed it usually affords a quick return to the grower. The tubers may be carried over for another year if desired, although it is hardly necessary to do so except in the case of desirable varieties. Seedlings will furnish well flowered and saleable plants.

Sow the main batch of seeds in February or March. The plants from these will flower in September and onward. Seed sown in July or August will produce an early spring display which will be most desirable at that time.

Gloxinias require a light porous soil. Fibrous loam, leaf soil and sand in equal proportions will suffice if good drainage is afforded to the pot. When sowing the seed see that the pots are clean. Fill them to within one-half inch of the top, sprinkle or screen a layer of fine soil over the surface upon which sow the seed thinly. It is not necessary to cover the seed, but if such is done the lightest covering of soil possible will be sufficient. Immerse the pots in water until the soil is saturated. Do not sprinkle the fine seeds overhead. Place them in a warm position with a humid atmosphere, and shade from sunlight.

When the seedlings are ready to prick off do this singly in small pots, lifting them carefully and planting them so that their leaves rest directly upon the soil. Do not cover the heart under any circumstances. Shade from intense sunlight through summer, and air on all favorable occasions. Do not crowd the plants, but allow their larger and handsome leaves room to develop. Crippled foliage will spoil the appearance of the plants, the leaves being equally as valuable as the flowers.

Repot finally into five-inch pots, and as the flowering stage is reached reduce the humidity of the atmosphere by ceasing to sprinkle the benches and floors. The gloxinia requires aerial moisture when in a growing state, but resents it when the flowers appear. Great damage may be done through the damping of the flowers, their beauty being marred and the sale of the plants thus precluded.

A temperature of 60 to 70 degrees eminently suits the gloxinia. See that it does not fall or rise to any great degree beyond these points. Afford liquid manure twice every month, discontinuing this when the plants show their flowers.

The gloxinia is one of the plants it pays to hybridize, for the seedlings may produce nearly all the known colors and shades. The fall is the time to do this work. The seed of all good varieties should be collected by the grower. One plant of each will produce more than enough for his requirements, and he will have the satisfaction of knowing that his next year's plants will be at least equal in quality to the parents. A well flowered batch of gloxinias for beauty of foliage and of flower is hard to surpass. When dying off the gloxinias for their winter's rest the amount of moisture at the roots should be gradually reduced. A gradual dying off is the only satisfactory method of preparing the tuber for winter storage, as the leaves will fall naturally, leaving the tubers plump and solid. Store them away on shelves, spreading them on a layer of peat or cocoanut fibre, also cover them lightly with this material to prevent undue evaporation of moisture from their tissues. Prevent excessive dryness and dampness, which alike are deleterious to the tubers. It is usually well to discard the old tubers after the second or third year, as at this age deterioration usually occurs.

Useful Appliances for Extracting Honey*

Morley Petitt, Guelph, Ont.

EXTENSIVE tests have been made of appliances for taking extracted honey. The importance of having sufficient extracting supers to contain the season's crop is recognized. From years of experience I have found it most satisfactory to leave the white honey with the bees until they are practically done gathering. Then, by having the right kind of machinery for rapid work, extract as quickly as possible, returning the empty combs for any dark honey that may be gathered later. The beekeeper soon learns to know his locality, so as to get this work done in time, and at the same time not too soon to avoid having the white honey darkened on the one hand, and having a lot of white honey left to be mixed with the buckwheat on the other. If, after waiting as long as it is safe, there is still unripe honey in the supers, it is better to return these to the hives to be filled with buckwheat than to extract unripe honey and thus lower the grade of the white honey crop.

For taking off the honey it has been found that the bee-escape is most satisfactory. If there is no brood in the super, ordinary Porter bee-escapes placed in boards will practically clear the supers of bees in a short time. Where spacing is not very good in the supers, or where the bees have been crowded for room so that burr-combs are built, it is well to loosen the supers, breaking the burr-combs a few minutes before going around to put on the escapes. This will cause the bees to take the honey from the burr-combs and avoid much dripping and daubing when the escape boards are put on.

*Extract from a paper read at the last annual convention of the Ontario Beekeepers' Association.

For rapid work the beekeeper should have enough boards to put under as many supers as he would extract in half a day at least. Starting at the end of the row these should be put under every super in succession. Then, as the first escape board is liberated by removing the super, that board should be put on the next hive at the end of the line beyond the boards that are in place. The second board when liberated should immediately be put under the hive beyond the first, and so on. Even if the bees are not all out when we start to remove the first super they will be so subdued by their separation from the brood and by their confinement in the super that they will fly out as soon as liberated, and may be easily driven off the combs.

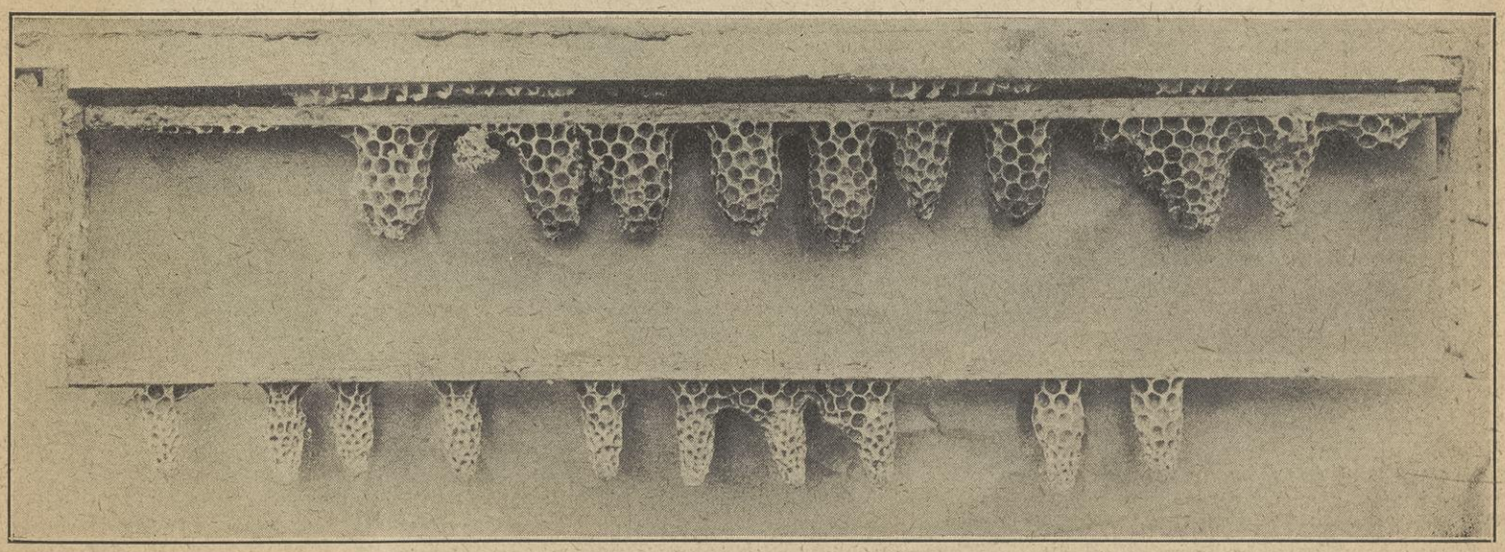
For taking in the honey a wheelbarrow should be provided, or if the ground is sufficiently level a hive cart carrying several supers at once. The beekeeper should on no account carry supers of honey to the honey house, as human strength is too valuable these days to be wasted in that way.

The honey-house should, if possible, be provided with an ante-room into which the supers of honey are first carried and stacked in front of a window with screen and bee-escape. If the supers are piled loosely here the few bees that came in on them will soon fly to the window and go back home. They can then be carried into the extracting room, practically free of bees.

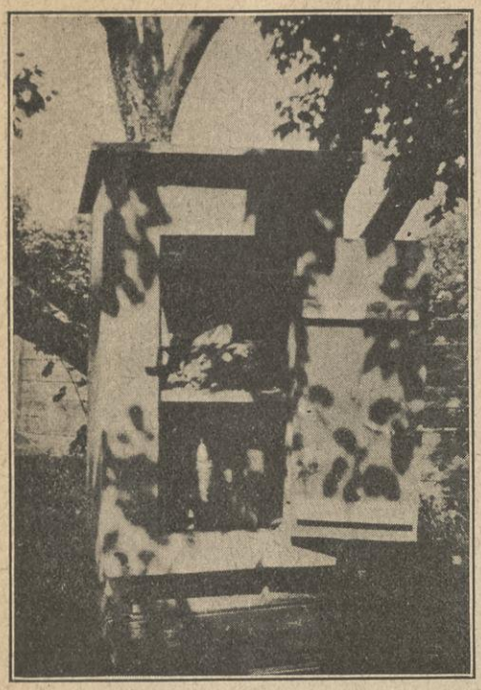
All windows should be provided with screens, but there should on no account be any screen on the door, as bees soon learn to hover around the screen door following in every time and causing trouble.

For extracting I have found the most satisfactory knife to be one with a straight blade 10 or 11 inches long. I do not know of any honey knife on the market with a blade long enough for satisfactory work on Langstroth combs. If one or two inches longer than the width of the frame, which is nine and one-eighth inches, the skilful operator can uncap one side of the comb practically at one stroke. The shorter blade with which the manufacturers provide us, makes it necessary to go over the side of the comb twice, taking about twice as long. The bent shank of the Jones or Bingham knife, is, according to my experience, quite unnecessary, and only tends to tire the wrist. By standing the Langstroth frame on end and using a knife with a sufficiently long blade and the handle straight with the blade, having this blade heated either by the steam jacket or by previously dipping it in hot water, one can do such rapid work uncapping that any attempt to invent an uncapping machine seems quite superfluous. It is necessary, of course, that combs in supers be spaced wider than they would be in brood-chambers to get them nicely bulged for uncapping.

To receive the cappings there has not been anything invented yet to equal the Peterson Capping Melter. This machine presents a flat surface slightly sloping and heated by a hot water jacket underneath. The cappings have begun to melt when they fall from the steam-heated knife onto this hot surface and immediately start sliding towards the lower end where they run off liquefied into a wax and honey separator. The melter is kept hot by means of a gas or gasoline stove, and, of course, care is necessary to see that the water is not too hot. In fact, it is not



A frame of prime cells ready to distribute to the nuclei in the apiary of John A. McKinnon, St. Eugene, Ont.



A smoker house used for tools and supplies in the apiary of F. W. Jones, Bedford, Que.

necessary for it to boil at all, although a little boiling water will not injure the honey seriously, as it gets away from the surface so rapidly. The operator requires a scraper to help the melted cappings along towards the outlet occasionally, and although some refuse is inclined to accumulate it is all pushed off and no effort is made to clear it from the honey and wax until it gets into the separator below.

The separator is made of an ordinary clothes boiler with a partition across one end reaching from the top to within an inch of the bottom. As the boiler fills up with wax and honey the honey runs under this partition, leaving the wax in the larger compartment, and nothing but honey in the smaller one. Near the top of the smaller compartment a spout opens into a connecting tube running into the extractor, and from this spout the honey which has been separated from the cappings flows back into the extractor and mingles with that which is being thrown from the combs. It is true that if this honey were kept separate an expert would be able to detect a flavor of the wax, but with ordinary care there is practically no change of flavor due to overheating, and when the small quantity of honey from cappings is mixed with the large quantity thrown from the combs, it is impossible to detect any taste of wax in the article which is prepared for market. At the end of the day's work any honey remaining in the separator is drained out to avoid it being injured by remaining in contact with the hot wax over night. The next morning there is a cake of wax to come out of the separator which will need to go through a wax-press to be in shape for market, but there is absolutely no spoiled honey and no boxes or barrels of cappings to sit around in the way waiting for some convenient day to render them up. I consider the Peterson Capping Melter one of the most important inventions that have been given to beekeepers in recent years.

It hardly seems necessary to dwell on the importance of the power honey-extractor, although I think some beekeepers are making a mistake in putting in four-frame and six-frame extractors to be run by power when they might as well go one better and make it an eight-frame extractor while they are at it. Aside from the saving of strength and labor, the power extractor gives you an evener motion and will continue revolving the combs as long as you wish. A mistake made by some beekeepers is not turning the combs long enough. It is probably true that whatever honey is left in the combs is wasted, and perhaps injures the bees by their gorging it when the combs are put back into the hives. After going to the expense of getting a power extractor and getting the combs from the bees, uncapped, placed in the machine, and in motion, it seems but a small matter to allow them to run a few moments longer so as to take out practically the last drop. One good expert uncapper with proper knife heated, and combs nicely bulged, will just about keep an 8-frame machine going.

For taking the honey from the machine two methods may be considered, namely: by gravity or by pump. Where the extracting house is one a side hill it is probably best to use the gravity method. Otherwise, the pump is more satisfactory. For best results the pump should be attached directly to the engine or power shaft, and not to the gearing of the extractor as is the common practice. It should then be fitted with a loose pulley for throwing it out of gear whenever the honey gets too low in the machine. Some have objected to the pump on the ground that it churns the honey, filling it with bubbles and causing it to granulate sooner. This can be overcome by not allowing the pump to operate except when it is running full of honey.

For delivery of honey from the pump to the store tanks I have found it very satisfactory to use rubber hose. Being flexible it can be handled and put wherever wanted. It is also convenient to coil up and move to an out-apiary. While the pump sold by the A. I. Root Company gives good satisfaction, it does not lift the honey as high as some might want to raise it on occasions. About nine feet is as high as cold honey can be pumped satisfactorily, but, of course, this answers all ordinary purposes.

The question of straining honey has always been a live one, and I am not perfectly satisfied with any device that we have tried yet. For ordinary work where great speed is not required it is a simple matter to strain it through cheese-cloth or linen, but where several thousands of pounds a day are being extracted, it is perhaps most satisfactory to use gravity entirely. For this purpose tall galvanized tanks are made about thirty or thirty-two inches in diameter, and six or seven feet high. There should be sufficient of these tanks to hold two or three days' extracting, so the honey could stand in them for that length of time, allowing all particles of wax and bubbles of air to rise to the surface. When these are skimmed off the honey is clear enough for all purposes except fancy bottles. Honey for bottling should always be thoroughly heated and strained just before putting into the bottles so that any particles of wax which did not rise to the surface in time to be skimmed off will be taken out by the strainer at the time of bottling, so that for the extensive beekeeper the gravity clarifier allowed sufficient time to do its work has no serious objections.

Losses from Maple Honey

F. W. Krouse, Esq. Guelph, Ont.

We should guard against losses from hard maple honey. If you are in a district where you get much of it you should by all means see that it is out of the brood-nest before winter. If you have very much of it in the brood-nest you are almost sure to lose the colony of bees. We have a lot of hard maple in our district, and every colony that went into winter quarters with mostly hard maple honey died in the spring, not early, but later on. When I examined the hives, I found this honey granulated hard in the brood-nest. When I extracted this honey I noticed that it granulated quickly. We left the extractor full of honey from Saturday night until Monday, and on Monday it was so thick that it would not run out.

Mr. F. P. Clare, Toronto: Will you kindly tell us how we are to know maple honey from clover honey?

Mr. Krouse: It is not as light as clover honey and comes in before the clover honey. It comes in early in May. If you have a lot of that honey stored in the brood-nest, the best way is to work it in the brood-nest or take it out and extract it. I was foolish enough to leave quite a lot in a year ago last summer. That seemed to be about the only honey I got, and there was lots of it in my big hives, and I left it there.

Mr. C. Blake, Snow Road: I do not suppose there is much danger of that unless we have a short season?

Mr. Krouse: No. A year ago we had no clover honey in our district.

Experimental Work in Manitoba

R. M. Muckle, Deparment of Agriculture, Winnipeg, Man.

THROUGHOUT the cold weather of the winter of 1914-15 the bees in our apiary were wintered in the basement of the Dairy Building at the Agricultural College. They were taken from their winter quarters on the evening of the fifth of April. Of the fourteen hives one was set aside for queen rearing; the young queens hatched in this hive were the progeny of a select imported queen. From this hive all the queens needed for the College Apiary were reared. It was found that queen rearing is not a difficult operation during a honey flow.

A number of colonies were used for an experiment in the control of swarming in extracted honey production, by giving sufficient hive space and proper ventilation to check the tendency. We were fairly successful in the prevention of swarming.

One colony was set aside for experiments with laying workers. Our experience during the past summer goes to show that the smoke method of introducing queens, when the hive has laying workers, is of considerable value.

Different methods of introducing queens were tried. It was found that queens were more easily introduced during a honey flow, with greater difficulty just after a honey flow, especially if the bees were inclined to rob. It was found wise not to disturb the colony until a week after the queen had been introduced.

A number of colonies were packed in straw to conserve the heat during the cold fall weather. The protected colonies were found to contain brood eggs, etc., on October 20th, while colonies not protected did not contain brood on this date. From this experiment we do not hesitate to recommend the double walled hive for Manitoba.

The average yield per colony for the entire apiary for 1915 was 70 lbs. per colony spring count. We increased the colonies from fourteen to twenty-eight. Four colonies were packed in a box with chaff for an experiment in outside wintering.

The advantages of cellar wintering are these: The beekeeper has absolute control of the temperature and also of the time when he will set his bees out of doors, so that if spring should prove cold and late he can keep his bees inside until settled warm weather comes. This is an important point. Bees wintered in the cellar do not require to be fed so much as those wintered out of doors, as there is a difference of two or three pounds in favor of inside wintering. Against these advantages must be placed the transport of the bees into the cellar and out again.—H. W. Jones, Bedford, Que.

The apiary of a Polish beekeeper, Mr. Werct, Beausejour, Man., is here shown. Last summer this apiary produced five tons of honey. It contains Langstroth hives side by side with well-made double-walled hives. Mr. Werct prefers the latter type because it conserves the heat. (Photo by R. M. Muckle.)

QUESTION DRAWER

Conducted by Jno. A. McKinnon, St. Eugene, Ont.

Q. If you were starting an outyard of 100 colonies how close would you go to a neighbor who had about the same number of bees, and still expect him to be your neighbor? There being no excessive honey-flow at any time.

If I were starting an outyard I would not want to have that number of colonies any closer than three miles. I think five miles would be better. If I were starting out a yard where there were bees I would not start them closer than three to five miles. There might be some difference in some locations. Some localities might support more bees than others. I think 100 colonies is sufficient in any one location.

Q. Do you advise the use of a queen-cell protector?

I used to use Queen-cell protectors, but this year I have not used any, and I think I get on better without them. I had a surplus of queen-cells all the time. I used to distribute the queen-cells on the tenth day, but this year I did not do it until the eleventh day, and then they were just ready to emerge from the cell. When the queen is fully matured they won't destroy that baby queen, but they will destroy her if she is in the pupa stage.

AN AUTUMN TRAGEDY.

A fat old drone flew down the trail,
With angry buzz,
And rumpled fuzz,
Ragged wings, and his face quite pale.

"Here's a pretty to-do," he said,
"An honest bee,
"As you can see,
"Driven away from board and bed!

"What I like is a peaceful life,
"In flower bells,
"And honey cells,
"Far from the sight and sound of strife.

"And now when days are growing cold,
"The workers say,
"'No work, no pay!'
"Flourish their stings, and start to scold.

"I hear each time I show my face,
"'Your ways aren't neat,
"'Go wipe your feet!
"'Pretty soon we'll tend to your case.'

"Long ago the head was a king*,—
"'Twas 'women's right,'
"Stirred up these fights,
"O!" cried he, "for a good stout sting!"

Rose A. Hambly.

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*All the old writers fell into the curious error of calling the mother of the colony, the "King."

Honey Sources of Northern Ontario

J. M. Munro, State River Valley

NORTHERN Ontario is not the snow clad, ice bound country that many imagine. A trip through here during July would be a revelation to many. Our honey sources are many, varied and continuous from early spring until late in the fall. In fact before the snow leaves or the frost is out of the ground, when setting out our bees we are never at a loss for abundance of pollen, as the black alders, which we have in abundance, are loaded with pollen dust, so that we never need to feed flour or meal as substitutes. Then immediately following, the white poplars are in bloom, and judging by the noise the bees make it must be a good yielder of nectar.

By this time several varieties of willows come into bloom in rotation, which lengthens the season considerably. Before they are done the inspiring chirp and song of the robin-red-breast is heard and creation seems to waken up out of her long winter sleep, reminding us of the "Glorious resurrection." All nature seems to take on a new life. As a rule the snow disappears like magic and the balmy rains of spring wash the earth. Grass and flowers spring up everywhere. This sudden transition from cold to heat is the secret of our wonderful success in the clover seed industry, in fact the clover in New Ontario is considered a weed, it grows everywhere, and is a perennial instead of a biennial.

You may notice the bees darting in every direction, and dropping with a thud on the entrances panting for breath. You don't need to look far for the cause. The dandelions are a carpet of gold under your feet, and as far as your eyes can see; truly a lovely sight, and this flower continues to bloom all summer, till killed by winter frost, entitling it to rank as our national flower. From this source the bees get, not only abundance of nectar for brood rearing, but lay by a goodly store of surplus, and if you choose, can rig up the extractor and send it whirring around, thereby retarding swarming and securing a nice crop of dandelion honey, which, by the way, our medical doctors and druggists prefer to buy ahead of any other honey on account of its medicinal value, and its active nature on the liver. One who uses dandelion honey need take no pills or physic.

The currants, gooseberries and scores of other wild flowers are now in bloom and the bees leave the dandelions in preference for them. They work on these from early morn till late. We have up here, for a great part of the summer, daylight from four o'clock a.m. till ten o'clock p.m., averaging on the whole as much daylight as you have at the equator. This is the cause of our crops growing and maturing so rapidly.

Next comes the raspberry, of which we have thousands of acres growing wild on our Government lands, and foot hills, this produces an exquisite honey and lots of it. Before this is done the native white and alsike clovers are in full bloom. Now comes the dance and you can move to a goose step or a turkey trot, but I would advise a gallop. As the air will be darkened with swarming, if you haven't been forehanded enough to provide the bees with ample room by the Shook method, the Alexander method or the Demaree.

With clover comes numerous other honey plants, viz.: buckwheat, Canada thistle, mints, mustard, and lilacs, especially a late white hybrid, a perfect beauty, like a cone of snow remaining in bloom about ten days; a good rival to the basswood, which we cannot grow here. We have no milk weed, burdock, catnip or mandrakes, but we have the willow herb, a plant of plants for honey and like the faithful old dog Tray never fails in giving a good crop of water white honey. It, like the raspberry, grows in great profusion, and continues until killed by frost. The same may be said of the goldenrod.

Last of all we have the asters in great variety from a delicate mauve to a deep purple in color. Before these are done the unwelcome breath of Jack Frost is felt. The leaves drop, the flowers fade, the apiarist has his harvest of honey secured, and our little pets are tucked away for their long winter rest.

Short Course at Guelph.

A short course in apiculture was held at the Ontario Agricultural College, Guelph, January 11th to 22nd, 1916. Owing to war conditions a large attendance was not anticipated. On the opening day, however, there was an attendance of twenty-seven, later increased to thirty-five young men and a few ladies. Practically every one of these had been previously engaged in beekeeping. They included beekeepers owning one hundred and more colonies, sons of successful beekeepers, and in one case a beekeeper's hired man. Many different parts of Ontario were represented, also Quebec and the State of Michigan.

Fifty-nine lectures and demonstrations were given, covering the different phases of beekeeping. As far as possible the lectures were illustrated with stereopticon views and the actual objects under discussion. Members of the class were also given laboratory practice in hive construction, and a visit was made to the apiary of a successful beekeeper in the neighborhood of the College.

One important feature of the work was the display of apiarian apparatus and implements. The educational value of this was clearly demonstrated by the keen interest shown by those present.

In conducting this course, the Provincial Apiarist, Mr. Morley Pettit, was assisted by F. W. L. Sladen, Apiculturist, Central Experimental Farm, Ottawa; F. E. Millen, B.S.A., Lecturer in Apiculture and State Inspector of Apiaries for Michigan; F. W. Krouse, President of the Ontario Beekeepers' Association; James Armstrong, Selkirk; Vice-President of the Ontario Beekeepers' Association; also some of the apiary inspectors of Ontario. Lectures on allied subjects were given by other members of the College staff. Mr. Frank C. Pellett, State Apiarist of Iowa, paid the class a visit and lectured on beekeeping conditions in his state.

It is proposed to hold a summer school for beekeepers at the Ontario Agricultural College, some time in June when bees are active and apiary practice will be possible.

A Book on Beekeeping

Those who take an interest in studying books relating to apiculture will find much of value in the book "Productive Beekeeping," by Frank C. Pellett, which is just off the press, and which is one of Lippincott's Farm Manuals. The author, Mr. Pellett, is State Apiarist of Iowa. This book, which contains some 300 pages is profusely illustrated, is printed on a high quality paper, and the subject material is well arranged. In all, there are over 130 illustrations.

The subjects dealt with include the business of Beekeeping, Making a Start with Bees, Arrangement of the Apiary, Sources of Nectar, the Occupants of the Hive, Increase, Feeding, Production of Comb and Extracted Honey, Diseases and Enemies of Bees, Wintering, and Marketing the Honey Crop. The book may be purchased through The Beekeeper for $1.50, with 15c added for postage.

Random Notes.

Editor The Beekeeper:—While waiting for a train to Ottawa (Jan. 24th) I am going to write you some random notes. Within the last two weeks I have had to refuse a request for a car load of honey, and received another for names of Ontario men wishing to ship in car lots. It is not to the best interests of the honey market that it should be so bare as it is at present. Requests for smaller lots are being refused frequently. The result is that buyers will turn to cheap syrups, etc., of which the supply is constant.

The most gratifying features of the beekeeping short course at Guelph just closed, (Jan. 21st) were the attendance—forty some days—the fact that all were more or less experienced, and successful beekeepers found it profitable to attend, or send their sons.

In the teaching, principles of bee nature and behavior were given prominence. For instance, it was somewhat of a novel experiment to give a whole lecture on the principles of queen rearing without describing any methods until the next lecture, or on principles of queen introduction, relegating the few methods described to the last few minutes of the lecture. But if the close attention of the class, and the intelligent discussion afterward was any criterion, the experiment was a success.

The Western Honey Bee heralds the fact that California University has a general course in apiculture comprising nine sub ccurses; also a correspondence course having at present 900 students. The same paper reports an address by a former Consul-general to China, urging the development of a market for American honey in that country, and the enormously large wealthy class there, in spite of the general poverty of the people. If the time ever comes when a healthy Canadian market has an all-year-round supply, Canada can also look that way for an outlet.—Morley Pettit.

The Canadian Horticulturist and Beekeeper is in receipt of a letter from Mr. H. A. Clark, 332 Grant St., Buffalo, N.Y., asking for information as to where he can secure copies of The Canadian Bee Journal for the years 1910, 1911, and 1912, either bound or unbound. Should any of our readers have copies of The Canadian Bee Journal for the years mentioned they might write direct to Mr. Clark, and inform him as to the price they will want for the issues they have.

A local demand for honey is easily created. Wholesale prices for extracted honey range from seven to ten cents per pound for dark and amber colored honey, and from nine to twelve cents per pound for clover honey. Selling direct to consumers, ten to twenty cents per pound may be got for extracted honey, and fifteen to thirty cents for sections of comb honey.—F. W. L. Sladen, C. E. F., Ottawa.

Members of the Province of Quebec Beekeepers' Association, as they met recently at the time of their annual convention.

British Columbia

A meeting of Beekeepers and those interested in advancing the beekeeping industry in British Columbia, will be held in Vancouver, February 2nd, under the auspices of the provincial Beekeepers' Association. The object of the association is to promote the beekeeping industry by assisting members to dispose of their produce, arrange local exhibitions and conduct other similar work. It is intended to incorporate the association, under the Agricultural Association's Act.

The business of the meeting will include the election of the first set of officers. Papers will be read by Mr. John Brooks, on "The Work of the Queen," by Mr. F. E. White on "Honey Exhibits at Fairs," and by William Hugh on "Beekeeping, a Profitable Hobby." A question box will be in charge of Mr. F. Dundas Todd.

The provisional committee is as follows: D. Mowat, chairman, pro tem, McKay, B.C.; Messrs. John Brooks, F. E. Smith, W. C. F. Gillam, of Vancouver; W. M. Smith, B. A. Dewdney; F. Markey, Fruit and Farm Magazine; Williams Hugh, Hon. Secretary, pro tem, 318 Cobourg Street, Victoria, B.C.

Notes from Manitoba

R. M. Muckle, Department Agriculture

Farmers' week, February 14—19th, will be a gala week at the Manitoba Agricultural College, when conventions will be held in connection with the many farmers' organizations in Manitoba. The Beekeepers have decided to hold a two days' meeting.

It is of interest to Manitoba Beekeepers to note that Mr. Byer, of Markham, has changed his opinion. Extract from "Gleanings": "When hives are completely covered with snow for several months it is enough to kill any bees." Mr. Byer says: "I used to think so, but in the light of experience for the past few years I am forced to change my mind on this question." When winter came last November we decided to leave one colony of bees out at the Agricultural College until the first of the new year. This colony is still out and we have had our coldest weather, so we will know something about having a hive of bees covered with snow for four months.

Short courses in Agriculture and Home Economics are being held at Neepawa, Virden, Morden, and Bossevaine. At each of these places three lectures on beekeeping are to be given. One is an illustrated address, showing views of many apiaries in Manitoba.

It was a surprise to find a person, keeping bees in well-made Langstroth hives, who kills the bees to get the honey. We thought the days when sulphur was used, instead of our modern methods, were past. There is a constant demand for bees in Manitoba, and if a person has all the bees they want to keep, they could sell their surplus stock at a good figure, so why sulphur them?

Mr. H. Pearson, of Stonewall, says: "Some of my hives went into cellar with drones among them." This would lead us to believe that the hive did not contain a laying queen when put in winter quarters. We should keep a record of the age and performance of the queen bee in each colony if we wish to be successful. Old queens often die during the fall or winter. Young queen bees will lay late in the fall and give us a hive full of young bees which are almost sure to winter well, hence their value.

New York State Conditions

N. D. West, State Apiary Inspector, Middleburg, New . York: Over here in Eastern New York, we have had rather a wet season, with a little rain more or less every day or two. Crops generally were good, clover being extra good. We had a continuous clover bloom from the first of June. I never saw more of it. Had it not been for so much rainy weather the clover honey crop would have been ahead of anything I ever experienced. The crop has been better than any time in the past seven years, on clover and other light honey. Buckwheat honey has been almost a failure, due to wet weather. European Foul Brood is now scarce with us, and we are glad of it.

"Our winter loss in bees in New York was heavy last winter and spring. Cause: lack of late brood rearing, and starvation. We had a great deal of honey that candied so hard that my colonies starved with lots of it in their hives. Colonies run for comb honey had lots of dandelion honey in the brood nest that candied so hard that the bees could not use it. Colonies run for extracted honey were so short of honey in their hives that many apiarists would not feed them, and let them go, knowing that they would starve to death. Where colonies had a late fall brood and were fed 10 lbs. of sugar syrup, they generally wintered well, and took care of their candied honey when the weather got warm enough."

Nova Scotia

The importance of preventing a further spread of the Foul Brood in Nova Scotia, was again recognized at the recent annual convention of the Nova Scotia Fruit Growers' Association, held in Wolfville, January 18th to 20th.

The matter was first discussed by a committee and later on the committee's recommendation, the following resolution was adopted by the convention:

Resolved: That, whereas in pursuance of our resolutions of last year asking the local government to assist the beekeeping industry which is threatened with extinction by Foul Brood Disease, and whereas the government sent experts into our province to investigate the situation and advise beekeepers, that we, the Nova Scotia Fruit Growers' Asociation again respectfully bring to the attention of the Secretary of Agriculture the immediate need of having a competent person appointed to inspect apiaries and give instructions to beekeepers how to combat the foul brood disease.

And further resolved: That the local legislature at the next session be asked to pass an act for the suppression of bee diseases similar to the acts of Quebec and British Columbia.

Manitoba

The program prepared for the annual convention of the Manitoba Beekeepers' Association is intended to be of special interest to beginners, but advanced beekeepers will find much in it of interest to them. The convention will be held at the Manitoba Agricultural College, February 15th and 16th. The program is as follows:

February 15th, 2.00 p.m., Minutes, Professor S. A. Bedford, Winnipeg, Sec-Treas.; President's Address, Rev. R. A. Rutledge, St. Charles; Business Discussion and election of officers; a social half hour including a visit to the College Greenhouse; Discussion, "Cellar wintering of bees in an outside cellar."

February 15th, 8.00 p.m., Mrs. W. H. Hambly, Rosesle, "Last Summer's experience in running for comb honey by the Miller and Doolittle plan"; R. M. Muckle, Winnipeg, Illustrated lecture; Question box.

February 16th, 2.00 p.m., Mr. G. H. Ball, Dominion City, "My experience with laying worker bees", Isaac Spillett, Dauphin, "Outside wintering of bees in Manitoba"; W. J. Boughen, Valley River, "Sweet Clover and other honey plants in the Dauphin District"; Discussion on the buying of supplies.

February 16th, 8.00 p.m., Mr. B. Brewster, Green Ridge, Methods of swarm control that have proved successful. The sale, grading, and advertising of the honey crop will be discussed. Professor S. A. Bedford will introduce the subject.

Ten years ago there were very few beekeepers who had 100 to 150 colonies. To-day these same men have 300 to 350 colonies. It often is hard for us to realize the progress we are making, it is so gradual, yet a look back over the past shows how steady it has been.—Wm. Couse, Streetsville, Ont.

Business Problems Discussed by Ontario Fruit Growers

PROBLEMS relating to the marketing of the fruit crop were much to the fore throughout the sessions of the annual convention of the Ontario Fruit Growers' Association, held in Toronto, January 19th to 21st. Where in other years much attention has been given to matters relating to the growing of the crops this year such subjects were scarcely considered.

The sesions were business-like throughout. Practically every speaker was present in person and on time. The attendance was large, and the interest keen. President Elmer Lick kept things going expeditiously.

What Was Done.

The convention placed itself on record as being in favor of dividing the No. 2 grade of apples in the Fruit Marks Act into two classes, in order that the requirements of this grade may be more clearly defined. It favored the carrying out of a comprehensive plan of advertising domestic fruits, the enactment of legislation to regulate the shipping of immature fruit, and appointed a committee to consult with the basket manufacturers to see if a standard for basket packages cannot be devised. A warning was issued to fruit growers to beware of undated testimonials published by manufacturers in their catalogues of spraying materials, etc. it being shown that some of these testimonials were ten to twenty years old. It appointed a committee to lay information concerning the status of the fruit industry in Ontario before the Dominion Economic Commission.

Officers Elected.

The following officers were elected: Pres., Dr. A. J. Grant, Thedford; Vice.-Pres., F. A. J. Sheppard, St. Catharines; Sec.-Treas., P. W. Hodgetts, Toronto; Executive Committee, the officers, Elmer Lick, Oshawa, and R. H. Dewar, Winona. Directors, C. W. Gurney, Paris; Albert Stevenson, Longwood; R. B. Whyte, Ottawa; C. Casselman, Iroquois; F. S. Wallbridge, Belleville; J. G. Waite, Wicklow; W. F. W. Fisher, Burlington, and Paul Angle, Simcoe. Delegates to the Ontario Horticultural Exhibition: Messrs. Lick, Dewar, Foster and Hodgetts.

Financial Statement.

The financial statement showed total receipts of $2,745, including a government grant of $1,700, members fees, $309 and a balance from 1914 of $708. The chief expenditures were transportation investigations $1,392, periodicals $728, committees $144. The balance on hand at the end of the year was $307.

Mr. W. T. Macoun, Dominion Horticulturist, had on exhibition an interesting collection of seedling apples originated at the Central Experimental Farm, Ottawa. These included several promising varieties which were commended by all who examined and tested them.

President's Address.

President Elmer Lick referred to problems growing out of the war, including the increased cost of transportation and in some cases lessened demand for fruit. One result of the war will be a necessity for increased revenue for war purposes with a certainty of higher taxes. Owing to the war there is bound to be a shortage of labor this year. Fruit growers were urged to economize on labor and expenses and to pack and grade to standard.

The transportation agent of the Association, G. E. McIntosh, of Forest, urged that the powers of the Railway Commission should be extended. The Commission has no power to award damages for delay in transit, cannot issue an order in reference to rough handling, has no jurisdiction over the settlement of claims, cannot issue an order in reference to delays, jolting or rough handling, has no jurisdiction over navigation companies other than those controlled by railway companies, and cannot issue an order for the extension of a privilege. Were its powers extended it could aid the fruit growers in many ways such as to secure cars in reasonable time, promptly market perishable fruit, secure a minimum speed limit, ensure proper handling of shipments and secure proper rules for the unloading and releasing of cars. Portions of Mr. McIntosh's report will be published later.

Attention was called by Mr. McIntosh to the fact that the railways having failed to secure an increase they asked for in the charges for handling fruit, recently announced that they proposed to change the tariff on the first of December for heated cars by increasing the rates as follows: From Ontario to Winnipeg, $14; and to other points in Manitoba, $16. To Saskatchewan, $19; and to Alberta, $22.60. In addition there will be a charge of 50c per heater per day. The convention passed a resolution recommending the Association to file a protest with the Railway Commission against the proposed change in the tariff.

Historical Committee.

In presenting the report of the Historical Committee, Mr. A. W. Peart of Burlington, pointed out that these reports may not be of great immediate interest because of the familiarity of the public with the subjects discussed. Nevertheless these reports, covering as they do the events of greatest importance connected with the fruit industry, may be of great interest 25 or 50 years hence when future historians may strive to trace out the important incidents connected with the fruit industry of to-day. The report presented by Mr. Peart was concise yet comprehensive. It dealt with such important matters as the formation of the Ontario Co-Operative Apple Growers' Association, the establishment of the Vineland Experimental Station, Reciprocity, the early investigations of the late Dr. Wm. Saunders, and the results that have flowed therefrom; a history of the valuable work accomplished by the late Robert Thompson, of St. Catharines, and concluded with a reference to the interest taken by fruit growers in the great European war in which Canada is playing such an important part.

A Government Fruit Dealer.

Great interest was taken in an address by Mr. H. A. Emmerson, of the Markets Division of the New York Department of Agriculture. A few years ago the New York State Department of Agriculture found that the dealers in live poultry in New York city had a combine which regulated the quantity and prices of the poultry sold. Prosecutions were laid against members of this combine, as a result of which thirteen were sent to prison and two died. It was found that somewhat similar conditions governed the sale of fruit. The Department engaged a warehouse and opened up auction rooms to which fruit growers were invited to consign their high grade fruit. The result was that prices to the producer were increased about 25 per cent. and reduced to the consumer about 20 per cent. Efforts were made by the dealers to buy up the crop in the State, but the Department conducted auction sales in the orchards and thus frustrated the plans of the dealers. Mr. Emmerson left the impression that the work of the Department had proved a great success, and invited Ontario growers to ship their high grade fruit to that market.

Package Problem.

An afternoon session was devoted to the consideration of the best packages to use in the handling of fruit. Mr. J. B. Fairbairn, of Beamsville, spoke on berry crates and containers; Mr. J. W. Clark, of Cainsville, on the economy crate for apples; F. M. Clement, of Vineland, on baskets, and C. W. Baxter, of Brighton, on boxes and barrels. The papers by Messrs. Clement and Baxter will be published in full in The Horticulturist. The discussion of basket packages showed that there is a need for the adoption of standard sizes, and a standard of construction. The following committee was appointed to deal with the matter: W. T. Glover, Burlington; B. Piott, Stoney Creek; W. H. Bunting, St. Catharines; R. H. Dewar, Winona; W. F. W. Fisher, Burlington; J. R. Hastings, Winona; F. M. Clement, Vineland; P. J. Carey, Toronto; Mr. Gardener, St. Catharines; Hewson & Farrell; Merritt Bros.; The Northern Veneer Co., Grimsby; Keenen Woodenware Co., Owen Sound; The Orillia, Leamington, Forest, Oakville, and Arkona Basket Companies, and the Gull River Lumber Co.

The Economy Crate.

The discussion of the "Economy Crate" led by J. W. Clark, of Cainsville, proved a lively one. This crate has been used extensively in British Columbia. It is understood that nearly 50 per cent. of the British Columbia apple crop this year was marketed in this style of crate. It was never used in Ontario before last fall.

Last fall owing to the wet weather, during the growing season, a large percentage of the apple crop had either to be sold as No. 3 grade or in some other way. This led the Ontario Co-operative Apple Growers' Association to use this crate for the lower grade fruit. Mr. Clark urged in its favor that it was cheap, its use saved space in shipping, and it admitted air to the apples and thus prevented the development of scab. Its inside measurement was 12 1-4 x 10 x 18 inches. This gave it a capacity of 2,213 cubic inches, or 13 inches more than the standard box. It was a more convenient shape than the standard box, which is 20 inches long. It is also cheaper than the standard box, which costs about 12c flat, while the crate costs 11c to 12c made up. Because the consumer could see what he was buying he was more ready to purchase than where No. 3 apples are sold in closed packages. Mr. Clark considered that this type of package had come to stay, as it helped to market a grade of fruit that it has been difficult to market heretofore. His Association had marketed different grades of apples in these crates, and had marked their crates 1, 2 and 3X respectively.

In the discussion which followed, objections to the use of this style of package were freely expressed, on the ground that it might encourage an increased production of low grade fruit, and that there was nothing to prevent the use of crates of all kinds and sizes. This would ultimately lead to great confusion and its use would interfere with the sale of high grade apples in standard boxes. Mr. W. H. Dempsey, of Trenton, pointed out about 90 per cent. of apples tend to harden and deteriorate when exposed to the air, as they are when they are in

(Continued on page 40.)

The Grading of Basket Fruits*

F. M. Clement, Horticultural Experiment Station, Vineland, Ont.

THE leading basket fruits are peaches, pears, plums, grapes and cherries. Cherries are seldom graded, the only practice being to throw out all decayed, cracked, damaged, under-ripe, and not attractive fruits while picking or to look them over and discard at the packing table those unfit for shipment and sale.

Grapes are seldom graded. The poorer packages are discarded, but it is not considered good practice to ship No. 2 grapes.

Plums, too, are ungraded. The best trees of a variety may be sold as fancy while the rest are sold as No. 1, but it is seldom that the fruit from any one tree is graded into two or three sizes.

Pears must be graded into at least two grades for size, color, uniformity and freedom from blemishes.

Some apples are shipped in baskets, but this cannot be considered a specialized trade. Only the earlier varieties are sold extensively in baskets.

Is it advisable to fix by law certain standards for basket peaches somewhat after the plan enforced for apples under the "Fruit Marks Act"? It has been maintained that the standardization of grades and packs is the work of individuals and associations. Possibly it is, but if so, it is the work of individuals and associations for apples also. It seems to me that the best aid it is possible to give the grower to-day is to fix by law certain standards that basket fruits must come up to. Many objections can, of course, be raised to such a policy because of the multiplicity of varieties and the variation in the size and color of varieties depending on the season, but apples vary in size and color also and with them the "Fruit Marks Act" works comparatively smoothly. The number of grades advisable would possibly be three or four. I give this only as an illustration—Fancy, Choice, No. 1, and No. 2. For each grade, I believe it will be possible with a little practice to fix the maximum number of peaches that could be put into that grade. Below a certain fixed number the fruit might be considered Fancy. Between this and another number a little higher, the fruit would be Choice, and between this number a little higher, the fruit would be No. 1, and last above this number, the fruit would be No. 2. This would necessitate also the establishing of a minimum weight per basket and would apply only to the layered peaches in closed packages. This may be far in advance of what is possible at present, and I realize such a law could not be put into force without a great deal of discussion and possibly opposition, but still I believe it is an ideal worth aiming at.

Suppose to-day, for instance, a big dealer places an order with one of the buyers and another order with one of the leading Associations, or he places orders with Associations for Fancy and No. 1 fruit. Has the dealer any guarantee that he will receive a uniform grade of No. 1 from both Associations or a uniform grade of Fancy? He has only the reputation of the association as a guarantee that the fruit will be of good quality, but he has no guarantee that the fruit will be up to a certain standard.

*A paper read at the recent convention in Toronto of the Ontario Fruit Growers' Association.

Is it possible to fix standards and grades for peaches? The grades mentioned would, of course, have to be regulated for uniformity, color, maturity and freedom from blemishes, the same as apples are.

Another objection that is raised to such standards is that they would necessitate certain standard packs as well. The greatest quantity of No. 1's are packed in three layers, three peaches wide. The pack is known as a straight pack, that is, the peaches are placed directly on top of each other. It is maintained that when packed in the interspaces, as is necessary with apples in order to get a good pack, the fruit will not stay in place and the pack is loose and out of order by the time the package reaches its destination. This may be true to some extent, but I cannot understand how it is generally true if the packing is carefully and tightly done. By packing in the spaces, a basket will take a larger peach than when a straight pack is used.

The work of grading must be done by hand as all varieties of peaches, except possibly green Elbertas, are too soft for machine grading.

One other method, or plan, might, I believe, be followed that would protect those who wish to establish higher grades or standards. A plan has been worked out by one of the States to the South of us whereby fruits packed according to certain standards and grades are stamped with a Government stamp. These stamps are sold to growers and shippers who wish to use them. The standard is high and the stamp is a guarantee of quality. Shipments are closely inspected and a very heavy penalty is fixed for any who may use the stamp illegally. This particular brand of fruit is extensively advertised and the trade is beginning to know it.

One other point also that might be mentioned here is the advisability of conducting packing schools throughout the tender fruit districts. This seems necessary whether a law regulating uniform grading and packing is put in force or not.

The N.Y.Fruit Growers' Convention

Prof. J. W. Crow, Guelph, Ont.

In reply to a request of the editor for information in regard to the proceedings at the recent convention of the New York State Fruit Growers' Association, I might

state I did not arrive in Rochester in time to hear the discussion on "Dust Sprays," but I, nevertheless, heard a great deal about it from Mr. D. Johnson, Dominion Fruit Commissioner; Mr. Walter Dempsey, of Trenton; Mr. W. F. Kydd, Toronto, and from many others who were there. The fruit growers seemed inclined to accept the statement of the experimenters with regard to results secured, and these results I may say show satisfactory returns for codling moth and scab when compared with results of careful spraying. Unfortunately, the dust idea seems at present to be limited to codling moth, and scab, and will not apply in the case of San Jose Scale, peach leaf curl, or pear psylla, at least at present.

The advantage of working with dust is that one man and one horse can do considerably more work in one day than can be done by three men and two horses with an ordinary power sprayer. The dust outfit costs from $125 to $250, and it is claimed that forty acres of bearing apple orchard can be thoroughly dusted in one day.

The Ontario delegates were much interested in the work of the New York State Commissioner of Foods and Markets, which was thoroughly discussed before the convention, and which received from the convention a very hearty vote of confidence. The commissioner is, of course, a government officer, but the strange thing is that he is established in business for the purpose of marketing New York State food products. Any grower in New York State, or for that matter in any other state, may consign a shipment of any size to the commissioner. The goods are handled under contract with one of the large auction sales rooms, and a five per cent. charge is sufficent to place the shipment into the hands of the retailer.

DUST SPRAYS.

Very successful experiments in the use of dust sprays have been carried on in New York State, for several years. Cornell University of Ithica, New York, have been experimenting for five years and this year have issued a bulletin No. 369, showing the results of their experiments and the many advantages of dusting.

During the recent New York State Fruit Growers' Association the most important address at the meeting was one by Professor Reddick on the use of dust sprays. He told the growers that they would have to use dust, particularly those who have large orchards and find it impossible to get over their spraying in three or four days or who have trouble securing labor.

He showed twelve different advantages of dusting over spraying for summer application. The most important of which was the great saving in time and labor. Our man with a dusting machine being able to do more work in one day than three men with a power sprayer would do in four days.

Besides these experiments the Niagara Spray Companies have been carrying on some extensive investigations and during the past year dusted a good many large orchards. They have issued a special bulletin on the result of their work.

The Niagara Companies have always been foremost in all matters of sprays. They have worked out the most approved and up-to-date dusting machine in the world. They have installed complete machinery for grinding and preparing all kinds of dust sprays, so are in a position to take care of any requirements for either machines or materials.

The Niagara Brand Spray Co. of Burlington, will be pleased to give any information on this important subject.

Business Problems Discussed by Ontario Fruit Growers

(Continued from page 36.)

an open crate. Strong exception was taken by several of the growers to the fact that the crates had been marked 1, 2 and 3X, as it was felt that the use of these grades might tend to deceive that portion of the public not aware of the fact that these markings have been discontinued under the Fruit Marks Act.

Mr. R. M. Winslow, of British Columbia, showed that the use of this crate in British Columbia has resulted in many different styles and sizes of crates being used and that these vary greatly in their construction. Their use is constituting quite a problem, but apparently it is a package which has come to stay. No action was taken by the convention. It seemed to be the general opinion that ultimately legislation will have to be adopted covering the style and construction of this style of package.

Marketing Tender Fruits.

A morning session was devoted to problems arising out of the marketing of tender fruit. A carefully thought out address on the necessity for amalgamation among the fruit growers in the Niagara district in the marketing of their crop was given by Mr. J. R. Hastings, of Winona who showed that the time for such action has come and why it is required.

The results of the advertising campaign conducted by the fruit growers of the Niagara district last fall were described by Mr. W. H. Bunting, of St. Catharines. Although the crop was large and the season at times unfavorable, and trying financial conditions prevailed throughout the country, the advertising campaign had prevented any serious retardation in the movement of the crops during even the heaviest shipping season. A demand had been created in many districts where fruit had not been sold before and in other districts the outlet enlarged, with the result that distribution had been better than ever before known. The prices realized had not been large, but this condition had been anticipated. The growers were well satisfied with the results of the campaign.

Mr. T. B. Revett, of Niagara-on-the-Lake, criticized the campaign to some extent, on the ground that it had not increased the price for fruit, and that it had not enabled individual growers to make direct sales. He thought the campaign should have been so conducted as to have established a uniform price. By way of reply, Mr. Bunting quoted from a London, Ontario, paper which showed that on one day in that city alone, eight car loads of fruit had been sold, where formerly the consumption was about eight car loads in a week.

The results of pre-cooling experiments at Grimsby were given by Messrs. Edwin Smith and J. M. Creelman, of Grimsby. These papers will be published later.

The Fruit Marks Act.

Great interest centred in a discussion of what constitutes a No. 2 apple, as led off by Dominion Fruit Commissioner, D. Johnson, of Ottawa. Mr. Johnson stated that no trouble has been experienced in regard to the No. 1 grade. The difficulty centred around the No. 2 grade. In brief, Mr. Johnson contended that it was absolutely necessary that a definition shall be prepared for the No. 3 grade, or that two grades be established for the No. 2 grade. A committee was appointed to consider the matter. This committee later recommended in favor of two grades being established as follows:

A "Quality" grade, which must not include any culls, and be sound, of not less than nearly medium size, and of fair color for the variety, and not less than 85 per cent. free from scab, worm holes, bruises and other defects, and properly packed.

A "Domestic" grade which must include no culls, be sound, of not less than nearly medium size and fair color for the variety, ninety per cent. free from worm holes, but may be slightly affected by scab and other minor defects, and properly packed."

This recommendation was approved by the Association. In view of the fact that the matter would probably be considered by other provincial associations the matter was left in the hands of Messrs. W. H. Gibson, Newcastle; W. H. Dempsey, Trenton; C. W. Gurney, Paris; Elmer Lick, Oshawa; P. W. Hodgetts, Toronto; W. F. W. Fisher, Burlington, and the president, Dr. Grant, of Thedford, who will consult with the Dominion Fruit Commissioner in regard to the taking of further action.

A paper on the grading of basket fruits was read by F. M. Clement, of Vineland. This is published elsewhere in this issue. Dr. A. J. Grant, of Thedford, and C. F. Howard, of Hagersville, spoke on the obtaining of better net returns by local associations. Both these papers will be published later. Prof. L. Caesar, of Guelph, spoke on the Leaf Rollers. A paper by him on this subject appears elsewhere in this issue.

Ontario Apples Inferior.

Throughout the convention frequent reference was made to the fact that apples grown in British Columbia and the Pacific Coast States were being sold regularly in Toronto for higher prices than Ontario packed fruit could command. It was explained that one reason for this was that the western fruit was better colored, it was packed more uniformly and each box contained a certain number of apples, the number of which was marked on the outside. Doubt was expressed by Mr. P. W. Hodgetts as to whether Ontario would ever be able to hold its own with late varieties of apples against this western fruit. The opinion seemed to be that Ontario could do better than she has been doing and that as soon as co-operative methods have been adopted more extensively an improvement would be effected.

British Columbia Conditions.

That all is not well with the fruit growers of British Columbia, was shown by the address given by Mr. R. M. Winslow, Secretary of the British Columbia Fruit Growers' Association. Mr. Winslow showed that in spite of the fact that the fruit growers of the province have steadily improved their methods of production, and of marketing their fruit crops, they are being seriously handicapped by the large quantities of fruit shipped into Canada by the Western Pacific Coast states. Each year some 1,000 car loads of apples are sent into western Canada and sold at the lowest American quotation. The Northwestern States have planted enough apples to supply their markets several times over. For years past their product has not been sold at a price that averaged the cost of production, and a large part of their orchards are being cut down. As the cost of production is lower in the Pacific Coast States than in British Columbia, this competition was proving most trying to the British Columbia grower. It is expected that the 1916 crop will be at least double the 1915 crop. Mr. Winslow estimated that for four years to come the average selling price of Northwestern apples will be below the cost of production. To meet the situation the executive of the Brit-

ish Columbia Fruit Growers' Association has urged the amendment or interpretation of the Anti-Dumping Clause of the Tariff Act so as to impose an adequate dumping duty on fruits imported at less than the cost of production.

Final Resolutions.

Resolutions passed referred with regret to the death of the late Robt. Thompson, of St. Catharines, and Major A. E. Kimmins, of Winona, thanked Hon. Martin Burrell, Dominion Minister of Agriculture, for the appointment of Mr. D. Johnson as Fruit Commissioner, thanked Hon. Mr. Duff, Provincial Minister of Agriculture, for work done by the fruit branch under Mr. P. W. Hodgetts, at the Vineland Station by Mr. Clement, and for the work of Prof. L. Caesar. Cold Storage Commissioner, J. A. Ruddick, was congratulated on the success of the work his Division has done, in regard to the pre-cooling of fruit. The association decided to amend the constitution so that the fees to local associations will be 50c hereafter, instead of 25c as formerly.

Items of Interest

A free short course in fruit growing and vegetable gardening will be held at Macdonald College, Quebec, February 7th to 11th.

The well known seed firm, "Kelway's," of England, has issued a little booklet entitled "Lest we Forget," giving a list of the employees of the firm who have enlisted in the British Army or Navy since the war started. The list includes almost fifty names. In addition a still larger list is published of former employees who have also enlisted.

Manitoba

J. A. Neilson, Manitoba Agricultural College, Winnipeg.

The Manitoba Horticultural and Forestry Association will hold their joint annual convention at the Manitoba Agricultural College on February 17th and 18th, 1916. The convention this year promises to be a very interesting one, as experts of the various branches of horticulture will be present to contribute to the success of the programme. Mr. Robson Black, Secretary of the Canadian Forestry Association, will provide an illustrated lecture on Forestry Problems. Mr. Norman Ross, Chief of Tree Planting Division, Forestry Station at Indian Head; Mr. A. P. Stevenson, of Morden; Dr. H. M. Speechly, of Pilot Mound; Mr. J. J. Ring, of Crystal City, and other leading horticulturists are expected to take part in the programme. Representatives are expected from Neepawa, Souris, Pilot Mound, Stonewall, Killarney, Dauphin, Brandon and other Societies. The discussions on the programme, and the exchange of views and experiences by the delegates from the different sections will doubtless provide a considerable stimulus to the growing interest in the work of Horticulture and Forestry in Manitoba. The various local societies have already done good work, but much more remains to be done.

The following is a provisional programme:—

Thursday Afternoon, Feb. 17th.

WOMEN'S MEETING.

1 p.m.—Inspection of buildings and greenhouses.

2 p.m.—Invocation.

Paper—"The test of house plants and how to comfort them"—Miss Barbara Stratton, Stonewall, Man.

Paper—Mrs. S. E. Clarke, 325 Vaughan St., Winnipeg.

Address—"The Farmer's Vegetable and Fruit Garden"—President J. B. Reynolds.

Illustrated lecture—"What Bees do with Flowers"—R. M. Muckle, Lecturer in Beekeeping, Manitoba Agricultural College.

Address—"Vegetables as health preservers"—Miss Ethel M. Eadie, Prof. of Household Science, Manitoba Agricultural College.

Illustrated lecture—"Birds in their relation to Horticulture"—Dr. H. M. Speechly, Pilot Mound, Man.

Thursday Evening.

7.30 p.m.—Business Meeting—appointing committees, receiving reports from local societies, draughting resolutions.

Friday Morning.

9.30 a.m.—Demonstrations in preparation of spray mixtures—J. A. Neilson, Assistant

Don't forget to tell advertisers that you saw their advertisement in our Annual Spraying Number

in Horticulture, Manitoba Agricultural College.

Address—"Vegetable Storage" — James Tribe, West Kildonan, Man.

Paper—Edward Mancer, Lot 12, St. Pauls, Man.

Paper—"Markets and marketing garden produce"—F. W. Hack, Lot 119, St. Vital, Man.

Address—"How to have a successful farm garden during a dry year"—J. J. Ring, Crystal City, Man.

Address—"Spore production in plant diseases"—V. W. Jackson, Prof. of Botany, Manitoba Agricultural College.

Friday Afternoon.

1.30 p.m.—Demonstration of grafting—J. A. Neilson.

Paper "Horticulture at Souris"—S. E. Clarke, Souris, Man.

Paper—"Horticulture in and around Dauphin"—J. E. Boughen, Valley River, Man.

Paper—"Investigational work in Horticulture at the Brandon Experimental Farm"—S. A. Bjornason, Brandon, Man.

Address—"Horticultural experiences for the year 1915"—A. P. Stevenson, Morden, Man.

Paper—"Cultivation of the Iris"—F. L. Skinner, Dropmore, Man.

Address—"Forest Notes for the year 1915"—Norman M. Ross, Chief of Tree Planting Division, Indian Head, Sask.

Address—"Cutworms and their control"—E. H. Strickland, Supt. Entomological Lab., Lethbridge, Alta.

Friday Evening.

Address—Hon. Valentine Winkler, Minister of Agriculture, Winnipeg.

Illustrated lecture—"Forestry" — Robson Black, Sec. Canadian Forestry Association, Ottawa.

Address—"How plants live"—V. W. Jackson, Prof. of Botany, Manitoba Agricultural College.

Saskatchewan's School Gardens

The furthering of agricultural education in the primary schools of Saskatchewan, inaugurated about a year ago, has already given most encouraging results. Since the formation of an agricultural instruction committee last winter and the appointment of Messrs. Cocks and Bates as directors of School Agriculture, much preparatory work has been done by them to encourage the formation of school gardens, by interviewing teachers and trustees, and by giving lectures and addresses to public meetings. A Farm Boys' Camp held at Regina Exhibition was a pronounced success, and the number of excellent Junior Fall Fairs, which have been held at various points, show clearly the good results obtained.

The benefit derived from bringing all the children in the Province on an equal footing in school garden competitions is very evident, and has been pointed out by many public speakers, for not only have the children of non-English-speaking communities had their share of successes in these competitions, but several scholarship winners are to be found amongst them.

The latest evidence of co-operation between the Departments of Education and Agriculture is that the latter has undertaken to provide the seeds of vegetables, flowers, grasses, cereals and trees at a reduced price. A catalogue of the seeds is now in course of preparation, and will be sent out to every school district before the end of the year.

League for Civic Improvement

A Civic Improvement League for Canada was formed in Ottawa, January 19th and 20th when about 150 delegates from different parts of Canada attended a meeting held for that purpose. The conference, which was held in the Railway Committee Room of the House of Commons, was opened by His Royal Highness, The Duke of Connaught.

The objects of the proposed League were explained by Mr. Thos. Adams, the Town Planning Expert of the Commission of Conservation. In a broad way they include the advancement of general civic improvement, the bettering of local forms of government, the drawing of town planning schemes, the re-planning of old districts on modern lines, the improvement of housing conditions in cities; the making and preservation of parks and open spaces in cities; the regulation of public advertising, the public performances of music; the physical recreations of the young and the cultivation of idle suburban land.

A proposal by Mr. Adams that the League should aim at the institution of a department of municipal affairs in each province, met with general approval as did a suggestion that efforts might be made to promote an International League, which could approach such a body as the Russell Sage Foundation, and ask for a bequest which would enable the League to make known how various cities in the world promote civic improvement. Those present included many prominent men among whom were Sir John Willison, of Toronto, Dr. Jas. W. Robertson, of Ottawa, Mayor Walters, of Hamilton, Mayor Waugh, of Winnipeg. A provisional council was elected which will be representative of all the provinces.

I don't get one-tenth as much out of The Canadian Horticulturist as I ought, but I get far more than the value of the subscription. The fault is mine as the information is certainly in the paper. It is for us readers to use it.—A. C. Campbell, Aylmer East, Que.

The Poultry Yard

F. C. Elford, Experimental Farm, Ottawa

Though February is not by any means the hardest month of the year to get eggs, still in most parts of Ontario it is a month in which we look for cold weather, and because of that it is usually somewhat trying on the layers. The cold weather, however, should not have a detrimental effect upon the pullets, if care is taken that the house is properly shielded. It is not necessary to have a warm house, or even a house in which water will not freeze, but it is necessary to have a house through which the wind does not blow. Though the air may be admitted in the front of the house, the other three sides should be wind proof. Take a look through your henhouse and see that the north side, and the two ends, are well battened. If this is not the case, take building paper and neatly line the inside of the house. Do it, however, with as little excitement as possible, as undue noise or commotion in a pen of pullets may mean a good many dollars loss in eggs.

Dampness.

At this time of the year, on days when the weather is cold, too many poultrymen in wanting to provide against dampness, close up the poultry house, so as to keep the hens warm, and as a result dampness is experienced. There are two ways to get rid of dampness, either by putting a stove in the building, or giving better ventilation. Though at one time the stove was used, it is not by any means to be advised. The better plan is to open up the front of the house and give the house lots of fresh air, which should be introduced by ventilation without draught.

The south side of the poultry house should have practically no solid wall, except about eighteen inches up from the floor, which is there merely for the purpose of keeping the draught away from the hens when they are scratching on the floor. From that to the roof we should have cotton and glass. Our experience here shows that about one third glass to two thirds cotton is a good proportion. Both glass and cotton should be hinged so that it can be opened up whenever the sun shines.

It is also a good plan, where the ceiling is high, to have a straw loft. This can be done by putting a few boards about six feet from the floor and covering them with straw. The straw will allow the air to filter through, but not fast enough to cause a draft.

Feeding.

It is not a good plan to change the method of feeding at this time of the year. A suitable system should have been started when the pullets were placed in the pens, but in case the system is not good, then the sooner it is changed, the better, and in adopting any system one must consider the local conditions and the amount of work it will entail. A good system, which many use, is to feed grain night and morning in a heavy litter on the floor, and dry mash in a hopper, or a wet mash, once a day.

Grain mixtures may be composed of two parts wheat, 1 part corn, one part oats, or barley, or if corn is not available and buckwheat can be obtained, it might be fed instead. The wheat should be good feeding wheat, that is, wheat in which the grains are solid, and not that in which there is a considerable portion of dirt, and the only oats to feed hens should be plump and heavy.

Feed this grain, but throw it on the litter in the morning between seven and eight

o'clock, and in the evening long enough before dark that the hens will get a good feed before they wish to go to roost. As to how much to feed depends upon the birds. Feed just what they will clean up, and whether you are feeding too much or too little can be easily ascertained by examining the litter. Scrape a little of the straw off the floor, and if you find any quantity of grain on the floor you are feeding too much, on the other hand, if there is practically no grain, you are not feeding enough. The hens should have just enough grain to keep them scratching and not enough that they will become discouraged and not scratch.

As a rule the dry grain does not contain enough protein for the high production of eggs and the lack should be made up in some other way. This is frequently done by feeding a mash. The mash may be fed dry or, as is the case in some small flocks where there is plenty of table scraps, it might be mixed with the scraps and fed in a moist condition. In this case a mash mixture of the following: One part bran, two parts shorts, one part corn meal or oats, makes a good feed. If, however, the oats in use are not very good, the hull should be removed. This dry material can be mixed in with the table scraps and milk and fed at noon, just what the hens will clean up in about twenty minutes. Should it not be possible to use table scraps, put the dry mash into a self-feeding hopper, where the birds can have free access to it, and add to the dry mash ten per cent. of good beef scrap.

One of the most valuable poultry foods is milk. Skim milk or buttermilk will bring a better price in new laid eggs than in any other product, and if milk is at all available, it ought to be given to the hens. Milk is used to advantage in the mixing of wet

mash when the wet mash is preferred.

Green food must be supplied for poultry when they cannot obtain it themselves. This can be given in the shape of roots, such as mangels, beets, turnips, or vegetables, such as cabbage, or if none of these are available, nicely cured clover leaves or sprouted oats answer, but green food of some kind should be available. If roots are fed it is a good plan to split the root down the centre and allow the hens to pick out the pulp.

Niagara District Notes

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

The winter has been favorable to pruning operations, and a great deal has been done in the Winona and Grimsby sections. In a number of vineyards the work has been finished, and in some of them the brush has been removed. A lot of tree pruning has also been accomplished. On large fruit farms, teaming has been suspended and the permanent staff has been employed in pruning almost exclusively.

On January 7th a number of the heads of co-operative fruit companies in the Niagara Peninsula, with some of the dealers and growers, met in conference with Messrs. F. C. Hart and J. B. Fairbairn, of the Markets Branch of the Ontario Department of Agriculture, in an endeavor to map out a comprehensive and satisfactory scheme for a central organization to control at least 60 per cent. of the fruit output of the Niagara district. Two different schemes were discussed, but no decision was reached. The standardization of baskets was also considered. Most of those present were in favor of a pint berry box and a four-fifth quart box. Climax baskets were generally favored. The present 6-quart basket and a deeper 11-quart basket were also in general favor. A number fancied the 9-quart, and others wished the retention of the present 11-quart basket for plums and cherries.

On January 8th a well-attended meeting of the Niagara Peninsula Fruit Growers' Association was held in the Court House, St. Catharines. The meeting opened with a short address on "The Standardization of Fruit Baskets," by F. M. Clement, of Vineland, in which he pointed out the great need of standard baskets for the packing and shipping of fruit. A general discussion showed that most of the members were in favor of the following packages: The bushel basket, the climax basket, the four-fifth quart and two-fifth quart berry boxes, and the standard apple, plum, and peach long distance shipping crate. A strong committee was named to investigate and determine the sizes of climax baskets best adapted to fruit shipping and to report at the annual meeting. Mr. Haycock, of Winnipeg, spoke in the interests of the Winnipeg retail dealers, urging a standard 6-quart climax basket.

A meeting of the Lincoln and Welland Vegetable and Fruit Growers' Association was held in St. Catharines on January 8th. It was decided that there should be no more tomatoes raised and sold at 25 cents per bushel, and that the canning factories must not regulate the grower's sale price on that product in future. An address on combination and co-operation was delivered by Thos. Delworth, of Weston, who attached a great deal of importance to the need of growers being able to determine the cost of production. He advocated the establishment of a central headquarters, where information could be procured by the growers with a

view to establishing a standard price. He held that the association should endeavor to help the growers avoid losses. The growers, too, should realize their situation, and join either one or both of the local organizations.

On January 13th, the regular annual meeting of the Niagara Peninsula Fruit Growers' Association was held in the Court House, St. Catharines. Retiring President, R. H. Dewar, of Fruitland, occupied the chair. The financial report showed the total receipts for the year to be $994.24, and expenditures $625.91, leaving a balance on hand of $368.33. The chief subject of discussion was the question of a change in the 11-quart peach basket, to permit its holding three layers of No. 1 peaches by taking in the flare, using the same bottom, but giving a quarter inch added height. The meeting passed a resolution favoring the amended 11-quart basket recommended by the committee, but referred the question back to the committee for further consideration.. W. H. Bunting, of St. Catharines, explained the style of basket necessary. In packing No. 1 peaches, the present height of basket is not high enough. If the height of the basket were increased from one-eighth to one-quarter of an inch, and the flare at the ends of the basket reduced to the same amount of flare on the other side, making a flare of one-quarter inch all round, the best interests of the fruit growers would be served. David Allan, of Grimsby, was strongly in favor of the change, declaring that the marketing public does not want two-layer baskets any longer. Many of the members felt that the present standard 11-quart was an ideal package. President Dewar contended that in the majority of years the present basket would easily accommodate No. 1 peaches. He had no objection to cutting an inch of the flare off the ends of the basket. Complaint was made of the changes in the sizes of basket covers by different firms, and a suggestion made that the association take up the question, and ask the Government to standardize the basket covers. The matter was referred back to the committee without any definite conclusions being reached. Officers for the ensuing year were elected as follows: President, J. H. Broderick, St. Catharines, 1st Vice-President, J. R. Hastings, Winona; 2nd Vice-President, S. H. Rittenhouse, Jordan Harbor; 3rd Vice-President, D. Allan, Grimsby; 4th Vice-President, F. J. Stewart, St. Catharines; Secretary-Treasurer, C. E. Fisher, St. Catharines, elected for the 20th year.

A case of considerable interest to fruit growers was decided at the Wentworth County Court recently, when the jury found S. H. Rittenhouse, a well-known fruit grower, of Vineland, not liable for the injuries sustained by Mike Lukatchik, while working on defendant's farm. The plaintiff was engaged in spraying trees last spring for the defendant, and claimed damages for injuries he suffered when septic poisoning developed in his right hand, due, he alleged, to the mixture used in spraying. He charged negligence on the part of his employer for not supplying gloves before the poisoning set in. The defence was that it was not the custom of farm laborers to wear gloves, and that this was the first case of poisoning known, although the mixture was a standard one, and had been in use by fruit farmers for years.

Mr. R. L. Innes, Hamilton, formerly secretary-treasurer of the Dominion Canners, has been appointed general manager, in room of J. J. Nairn, who resigned on account of ill-health.

Potatoes are scarce and prices have risen

accordingly. On the Hamilton market they have been retailing at $2.25 to $2.50 a bag, and $3.00 is talked of. Apple prices are steady and good apples are in demand, but a lot of inferior apples are coming on the market.

The annual meeting of the Burlington and Nelson Horticultural Association was held during the middle of January in Burlington. A committee was appointed to secure new members for the purpose of enlarging the organization. Geo. Blair and Paul Fisher were appointed to look after the purchase of spray material this year. The following were elected as officers and directors: President, H. T. Foster; Vice-President, G. S. Freeman; Sec.-Treasurer, W. E. A. Peer; Directors: W. F. W. Fisher, W. V. Hopkins, J. S. Freeman, R. C. Fowler, A. W. Peart, and Arthur Lindley.

Problems of Fruit Growers

DIFFICULTIES that confront Ontario fruit growers were discussed in a helpful way at meetings of fruit growers held in connection with the recent Lambton County Horticultural Exhibition. In this connection Mr. D. J. Johnson, Dominion Fruit Commissioner, Ottawa, outlined work his department has undertaken on behalf of fruit growers.

When Mr. Johnson took office a little over a year ago the inspectors appointed to adminster the Fruit Marks Act were regarded by the growers as spies. They worked in large centres, and men who were ignorantly violating the Act were frequently summoned. To-day the inspectors are going up and down the concessions and side roads educating growers how to pack and ship their fruit. Inspection is being made at the point of shipment, and where asked for, certificates are issued to the shipper of the car. In this way the inspectors are coming to be regarded as the growers' friend. The matter of fruit packages is now being considered by the Department. There is great difference of opinion among growers on this point, and Mr. Johnson stated that the question would be discussed at a series of fruit conferences before action would be taken.

Advertising fruit as an article of daily use rather than a luxury is being actively taken up by Mr. Johnson. Increasing quantities of fruit are being placed on the market every year, and the grower must not look for high prices. It is better to move all the crop at a fair price and let the consumer have more fruit for his money. During the past year fruit advertisements appeared in almost every paper in the Dominion. The consumer was advised as to the quantity of fruit, when best to preserve fruit and what are the most desirable varieties. New ways of cooking and preparing fruits are also being brought to the attention of the housewife.

Efforts are being made by the Dominion Fruit Branch, in conjunction with the Department of Trade and Commerce, to open new markets for Canadian fruits. Forsyth Smith, a successful British Columbia fruit grower, has been placed in an office in Liverpool, and has started a campaign to place more Canadian fruit on the English market. When conditions abroad are more normal, men will be placed in other large centres of consumption. Cold storage transportation for tender fruits is also being arranged. It is hoped by this means to create markets for the enormous crop which will be produced in Canada in the next few years.

Carefully prepared and accurate tele-

graphic reports are compiled twice weekly at the office in Ottawa and mailed to every grower in the Dominion. Many fruit dealers resent this action, stating that it is the growers' business to produce the fruit and let the dealers look after the marketing. Mr. Johnson views the matter differently, and says it is the object of the Department to give the smallest fruit grower in the Dominion as much information on the fruit situation as the largest dealer or shipper.

British Columbia

The war in Europe is apt to have a disastrous effect on one branch of the fruit industry in this province next year, judging from the fact that about 80 per cent. of the expert fruit packers in the province have enlisted. The Provincial Government is endeavoring to deal with this situation by holding as many packing and pruning schools this winter as possible.

Recently only about twenty applications for schools had been received by the Department. This is not considered to be nearly enough to meet the demands of the situation, and the fruit growers of the province are being urged to do all they can to encourage pupils to attend in the expectation that their services will be urgently required next fall.

Bulletins and Reports.

Recent bulletins and reports which have reached The Canadian Horticulturist include the following: The November issue of The Manitoba Horticulturist, which is published by the Manitoba Horticultural and Forestry Association: Bulletin No. 24 on Fruit Tree Diseases of Southern Ontario, by W. A. McCubbin, of the Dominion Plant Pathological Laboratory, St. Catharines, Ont. This is one of the second series of bulletins on this subject. The Twenty-ninth Annual Report of the Commissioners of Queen Victoria Park, Niagara Falls, Ont., gives an account of the work accomplished during the past year. Excellent work is being done at this park, which is becoming national in character.

The New Jersey Agricultural Experiment Station, New Brunswick, N.J., is distributing circulars on "Marketing White Potatoes in New Jersey" and "Marketing Tomatoes in New Jersey," by Charles M. Arthur. Circular No. 153, on "Mushrooms, Edible and Poisonous," by D. C. Babcock, and Circular No. 154, on "Some Important Insect Pests of the Greenhouse," by R. D. Whitmarsh, are being sent out by the Ohio Agricultural Experiment Station, Wooster, Ohio.

Bulletin No. 160, on "Grape Pruning" and Research Bulletin No. 21, on "Hardiness in the Apple as Correlated with Structure and Composition," are being distributed by the Horticultural Experiment Station, Ames, Iowa. Bulletin No. 186, on "Farm Apple Storage," is issued by the Vermont Agricultural Experiment Station, Burlington, Vt., and Bulletin 37, entitled "Germination and Infection with the Fungus of the Late Blight of Potato," by the Agricultural Experiment Station, Madison, Wisconsin. These last circulars are well illustrated and will be found of interest and value.

The Wisconsin Agricultural Experiment Station, Madison, Wis., gives the results of experiments in the control of cabbage yellows through disease resistance in Research Bulletin 38. "Pink and Green Aphid of Potato," is the title of Bulletin 242 of the Maine Agricultural Experiment Station, Orono.

The N. S. Fruit Growers' Convention

WITH the holding of the annual convention of the Nova Scotia Fruit Growers' Association, the fruit growers of the Annapolis Valley feel each year that they have concluded the work of one season, and they begin to plan for the season that lies ahead. This year's convention was held at Wolfville, January 18th to 20th. It included new features such as a public debate, on the subject "Resolved that the general adoption of mixed farming, by which is meant the keeping of live stock, and the raising of feed for the same, in addition to fruit growing, is in the best economic interest of the farmers of the fruit growing counties of Nova Scotia." The leaders for the affirmative were: F. W. Foster and R. J. Messenger. The negative leaders were: W. H. Woodsworth and A. E. MacMahon. Dr. G. B. Cutter, of Acadia, acted as judge.

The speakers brought out many interesting features. Others later joined in the discussion. Mr. S. B. Chute, speaking in favor of specialized fruit growing, showed a gross

See advt. also on page IX

income for 1915 of $21,440, and an expenditure of $11,275, leaving a net balance on the year's work of $10,165. Nevertheless, the judge decided in favor of the affirmative.

Officers Elected.

The election of officers resulted as follows: President, F. A. Chipman, Nictaux; Vice-President, Prof. W. S. Blair, Kentville; Secretary, Manning K. Ells, Port Williams; Assistant Secretary, F. W. Foster, Kingston; Treasurer, Geo. W. Munro, Wolfville; Executive, A. S. Banks, Berwick; S. C. Parker, Berwick; Fred. Johnson, Bridgetown; J. Elliott Smith, Wolfville. The Advertising Committee, A. E. MacMahon, F. W. Foster, S. C. Parker, E. H. Johnson and J. E. Shaffner, were reappointed.

The report of the secretary-treasurer, Mr. Manning K. Ells, showed total receipts of $1,063.44, and a cash balance on hand after all bills had been paid of $182.12.

President's Address.

President A. E. McMahon pointed out that in spite of the war Nova Scotia Fruit Growers had not suffered from existing conditions, but in many respects had been benefitted. This was due in part to the fact that Nova Scotia had unusual advantages for the marketing of its apple crop, inasmuch as it was possible to land the apples of the province on British markets at lower prices than any other fruit growing district on the continent. The cost including such items as inland rail, ocean freight, dock dues, cartage, insurance, commission, and handling, of landing a barrel of apples from the Annapolis Valley, via Halifax in Great Britain last season was $1.90. From Cobourg, Ontario, the cost was $2.57; Forest, Ontario, $2.70; Portland, Me., from $2.43 to $2.68, and New York from $2.54 to $2.79. Nova Scotia growers therefore, had an advantage by virtue of their location of from 53c to 78c a barrel over the State of Maine, and 67c to 80c over Ontario.

The war has advanced the cost per barrel of shipping to Great Britain materially. From 1912 to 1913 the cost was $1.25 per barrel. In 1914 it was $1.40, and last year it jumped to $1.90. The shortage of labor in England, consequent upon the war, has made it difficult to unload apples promptly. The advertising campaign conducted by the Dominion Government was commended.

The Addresses.

A number of interesting addresses were given including one on "Sucking Insects of the Apple," by Prof. Brittain, and one on "Pruning," by Mr. M. B. Davis, of the Central Experimental Farm, Ottawa, both of which were illustrated by lantern views. Further mention of these addresses will be made in the March issue of The Canadian Horticulturist as well as of an address by Prof. Geo. E. Saunders, entitled "Results obtained at the Dominion Entomological Laboratory during 1915."

Owing to illness Prof. W. S. Blair was unable to be present, but two papers by him, one entitled "Fertilizing Orchards in Nova Scotia," and the other "Scab Control in the Dominion Experimental Orchards in Nova Scotia," were read by his assistant, Mr. Lindsay Bligh. Mr. W. H. Woodworth spoke on "Lessons Learned from New England Fruit Growers," and the subject "Commercial Strawberry Growing and Marketing," was dealt with by W. D. Fawcett, of Sackville, N.B., possibly the largest grower of strawberries in the Maritime Provinces.

The Economic Commission.

The convention passed two resolutions for submission to the Dominion Industrial and Economic Commission. One urged that the possibility of the increased production of dog

fish fertilizer should be looked into, and the other the urgent necessity for placing all fertilizers on the free list, thereby enabling the farmer and fruit grower to cheapen production. The convention was a success throughout.

Niagara District Notes.

The Bell Fruit Farms Canning Factory at Grimsby has been rented by a new company, known as "Bells, Ltd.," for the purpose of making war munitions. About 75 men will be employed there this winter.

What with men enlisting and going to the cities to engage in munition work at high wages, it looks as though the fruit growers and farmers in this district would be up against the labor problem worse than ever during the coming season.

A new process of great commercial importance for the production of potash has been discovered by Howard F. Chappell, one of the leading chemists of the United States and President of the Mineral Products Co. Not only does the new process produce potash, but also aluminum, and both in quantities sufficient to make the labor profitable even in competition with the German market for the mineral. A mine in Utah, 200 miles south of Salt Lake City, is already in operation, about 25 tons of potash and 50 tons of aluminum being made every day from 100 to 150 tons of ore. Although the process is a new and secret one, the material is an ore that up to now has been considered valueless. It is alumite, from which potash alum is made, and which was used for that purpose before the Egyptian civilization. This ore is made to yield potash instead of alum by a process whose chief feature is intense heat.

Classified Advertisements

Advertisements in this department inserted at rate of 3 cents a word for each insertion, each figure, sign, or single letter to count as one word, minimum cost 30c., strictly cash in advance.

REAL ESTATE

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

NIAGARA DISTRICT FRUIT FARMS—Before buying, it will pay you to consult me. I make a specialty of fruit and grain farms. Melvin Gayman & Co., St. Catharines.

FARMS—All kinds, all sizes, for sale, fruit, stock, grain and dairy farms. Let me know what you are looking for. H. W. Dawson, Brampton, Ont.

WANTED—To hear from owner of good farm for sale. State cash price and description. D. F. Bush, Minneapolis, Minn.

THIRTY-FIVE ACRES, house, and orchard. Splendid beekeeping location. H. Twigg, Orangeville, Ont.

SEEDS.

Bulbs—1916 Catalogue now ready. Ask our special offer on Gladioli. State varieties and size you require. Van Til-Hartman, Hillegon, Holland, c|o P. C. Kuyper, 10-12 Broadway, New York, N.Y.

Canadian Grown Seed—Superior Tomato Seed, "Herolds Earliana," highest germination, hardier, producing earlier crops than others: 1-4 oz., 20c.; packet, 10c.
Onion Seed of Selected "Yellow Globe Danvers": 1 lb., $2.25; 1-4 lb., 75c.; 1 oz., 25c.; packet, 10c. Growers: Herolds Farms, Beamsville, Ont.

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

SPRAYING.

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

BEE SUPPLIES.

BEEKEEPERS—Please write for our Catalog. Morgan's Supply House, London.

WANTED—Clover and Basswood Honey. State price. Also a lady and gentleman to assist in my apiary in Merlin from June 1st to August 15th. G. A. Deadman, Brussels, Ont.

FOR SALE.—8 Frame Hive bodies. T Supers—good condition. Will Ellis, R.R. No. 3, Niagara Falls, Ont.

MISCELLANEOUS

1,000 GUMMED HONEY LABELS, two colors, any wording, for $1.30. Catalogue free. Eastern Label Co., Clintonville, Conn.

FREE to stockmen and poultrymen, our 80-page illustrated booklet on feeding: how to construct a house which will accommodate 100 hens: gives dimensions, and measurements of every piece of lumber required. Deals with the common diseases of stock and poultry, and the remedies. Tells how to cure roup in four days. Contains full information about Royal Purple Stock and Poultry foods and remedies
THE W. A. JENKINS MFG. CO., LONDON, CAN.

Helping the Grower.

Speaking at a meeting of fruit growers in Lambton County recently, Director F. M. Clement, of the Vineland Horticultural Experimental Station, stated in conjunction with the vegetable growers' associations they had grown with fair success a quantity of beet, carrot and onion seed. Certain roots had been selected as parent stock from which to develop strains. A quantity of this seed was being tested for germination, and if found good will be distributed to members of the vegetable growers' associations for test. The tomato seed selection work was also developing favorably. Twenty-five varieties are under test. In the Niagara Peninsula fruit growers had made many mistakes. They had planted indiscriminately without thought of markets, and though they had met with success it was only through the marketing agencies that what might have proved a glut of fruit had been marketed this year.

Fruit Problems Discussed.

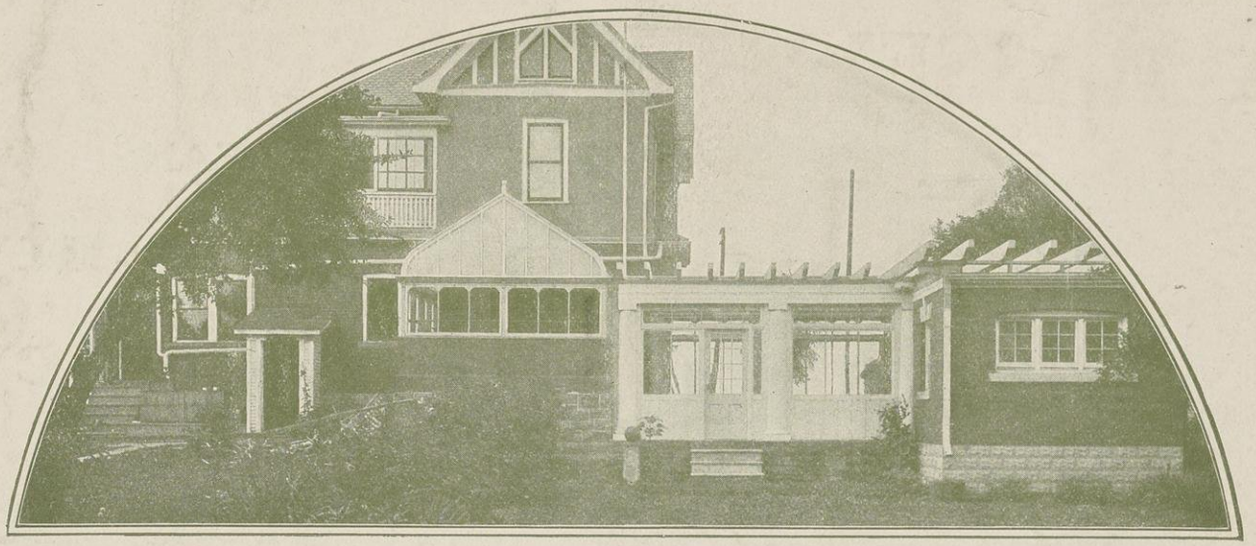
Prof. J. W. Crow, of the Ontario Agricultural College, said: "The apple orchard in Western Ontario is a side line and does not get uniformly good care and attention year after year. There is an excellent opening for growers who will plant a larger acreage of good varieties and stay with their orchards consistently one year after another. Many troubles arise from the fact that we do not grow enough apples, or rather that our units of production are too small. I believe there is every encouragement for the planting of orchards of from twenty to fifty or sixty acres.

"One of the most serious orchard troubles in Ontario is winter killing. This may take the form of root killing, bark splitting or of injuries similar to the sun scald. The greatest contributing cause of winter killing is late growth of trees caused by late cultivation, lack of cover crop, or perhaps by poor drainage of the soil. Apple, pear, plum and cherry trees of bearing age should not be cultivated after July 1st in any year. Peaches should not be tilled after July 15th in any case. Sow a quick-growing cover crop at the last cultivation. Oats, rye and vetch or red clover are good. This cover crop ripens the tree growth, and a cardinal aim of the fruit grower is to secure mature, well-ripened wood in order to insure winter hardiness. My own preference is for plowing orchards in the fall, but not too early. The latter part of October or beginning of November is early enough. On light land, especially if wind swept, fall plowing might be risky, but on clay land it effects a great saving of time in the spring."

BULLETINS AND REPORTS.

Bulletin 74 of the Michigan Agricultural College, East Lansing, Mich., gives the results of analyses of some materials sold as Insecticides and Fungicides.

A number of interesting bulletins and reports have reached The Canadian Horticulturist during the past few weeks. In Circular 184 entitled "The Prairie Spirit in Landscape Gardening," by Wilhelm Miller, the Illinois Agricultural Experiment Station, Urbana, Illinois, is distributing a booklet of some thirty-six pages that will prove a delight to all lovers of the beautiful in horticulture. It is one of the most profusely illustrated government booklets of the size we have seen, and the illustrations are of an exceptionally fine character.



Mr. Fraser's Conservatory and Glassed-In Pergola.

Two Interesting Glass-Garden Linkings

MR. GORDON K. FRASER, of Hamilton, Ontario, had an attractive garage and pergola treatment adjoining his residence.

He conceived the clever idea of enclosing the pergola in glass, and connecting it to a conservatory opening with large double doors, just off the dining room.

It was our privilege and good fortune to be able to carry out Mr. Fraser's ideas for him.

The result, you will agree, is a decided success.

Mrs. J. E. Gordon, of Wallaceburg, Ontario, wanted a garage, and seeing our advertisement about garage and greenhouse combinations, came down to Toronto and talked it over with us.

As a result Mrs. Gordon concluded to build the garage and gave us the contract for the greenhouse.

You see how practically it has worked out.

When we took the photograph, Mrs. Gordon spoke most enthusiastically about the pleasure she derived from the greenhouse when it was cold and snowy outside, and a delightful bloom filled Palm Beach temperature inside.

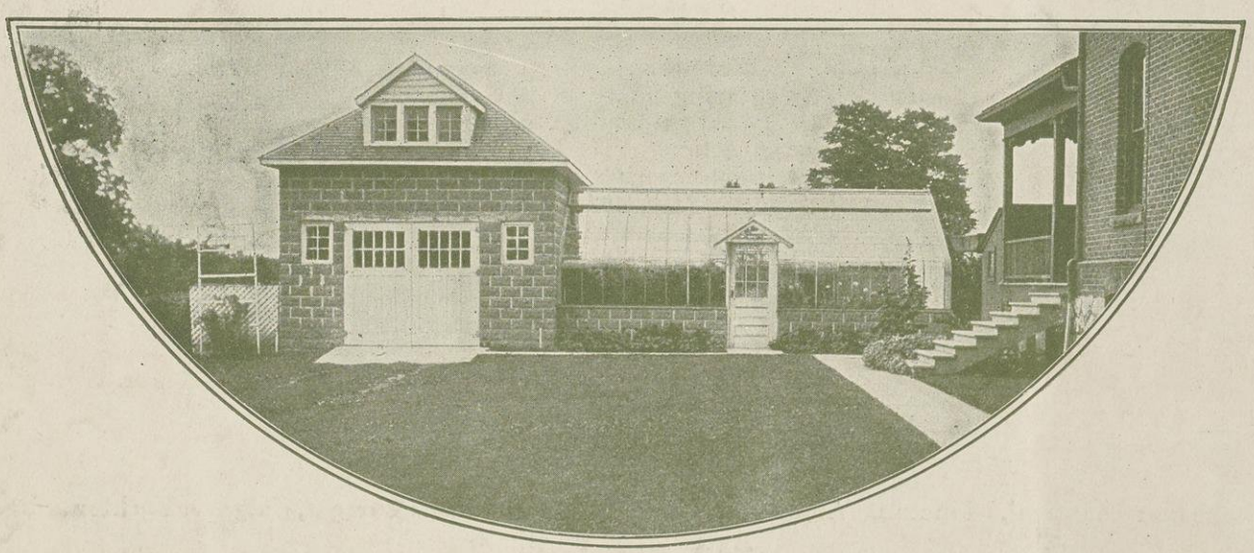
And now what assistance can we be to you?

Let us send you our Two G's booklet, Glass Gardens—A Peep Into Their Delights.

Lord & Burnham Co. *Limited of Canada*

Greenhouse Designers and Manufacturers

Royal Bank Bldg., Toronto **Factory, St. Catharines, Ont.** **Transportation Bldg., Montreal**



Mrs. Gordon's Greenhouse and Garage at Wallaceburg, Ont.