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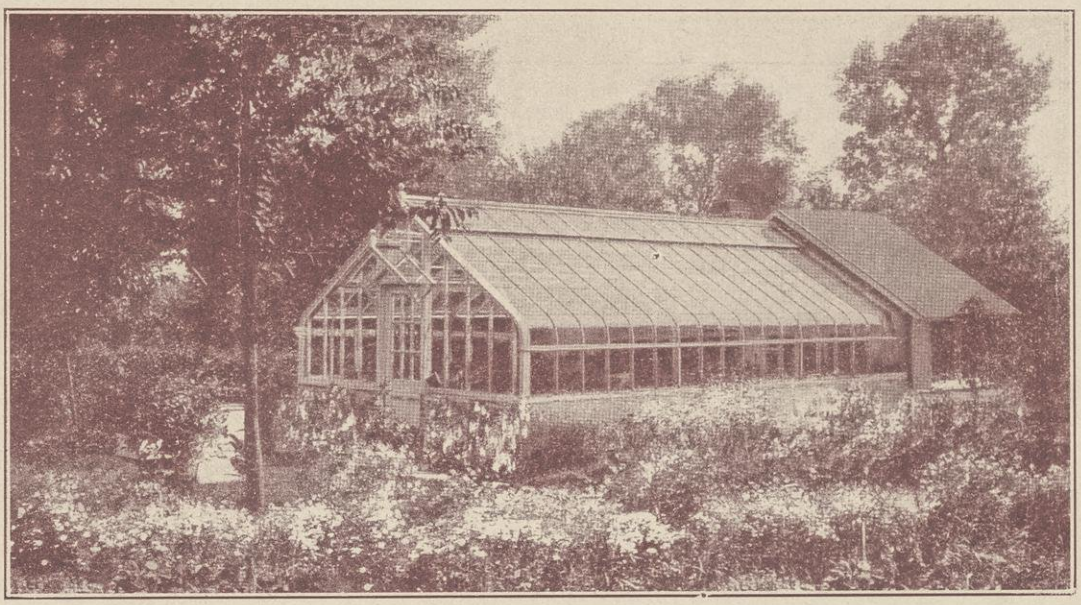

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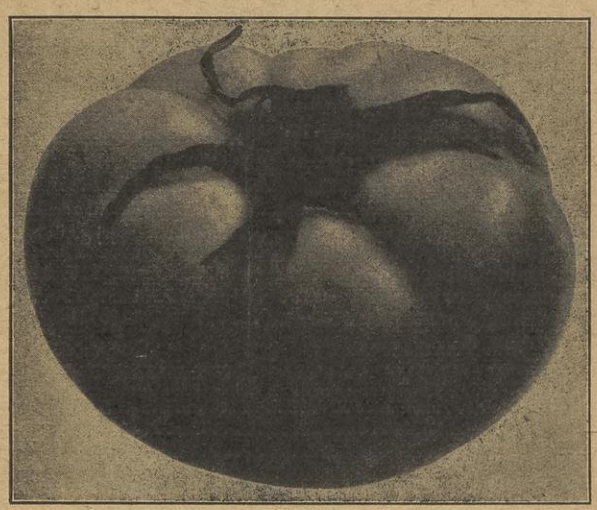

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The Canadian Horticulturist and Beekeeper

(See Pages 103-108) (See Pages 103-108)

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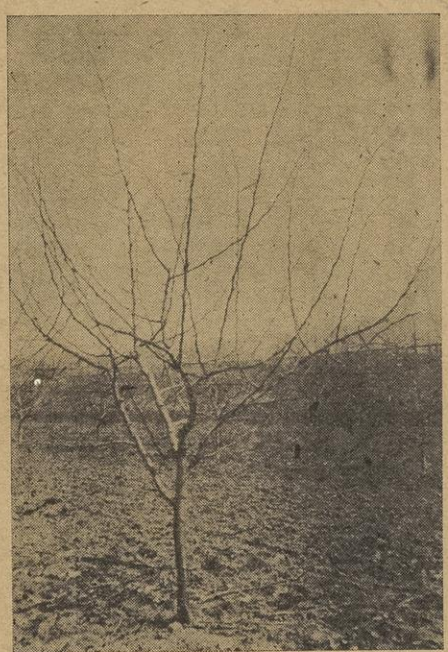
Shaping the Apple Tree*

Prof. W. H. Chandler, Ithaca, N.Y.

ON the subject of shaping apple trees by pruning, little or nothing conclusive is known. Some people are inclined toward what is known as the "central leader" or as it is sometimes called "the two-story tree" where all the branches are young and the growth is thrown into a central trunk. This is supposed to give a better union of the branches to the trunk; it may be said, however, that in case of some varieties a very injurious amount of pruning would be necessary to secure such a tree. Further, when the trees are old the branches are found to be too thick and when the trees become tall, it is very difficult to correct forks that form near the top.

In the Pacific Northwest, the trees are almost uniformly shaped to an open head. The top with this system consists of about five branches, one preferably larger than any of the others, which, though constituting one side of the tree, in fact serves as a leader from which the other branches grow and to which they are united perhaps by a stronger union than would be made with branches of equal size. Each of these branches is shaped, the secondary branches being clipped back enough to prevent crowding out of secondary branches along portions of the main branch, thus a good distribution is secured; in fact, each of these main branches would constitute a central leader for the secondary branches and would be handled much like the central leader form of tree. While such a tree is considered an open head tree, in actual fact, none of the main branches would be exposed to direct sunlight and the centre of the tree would be partly filled with bearing secondary branches; yet it is expected that the sunlight would be able to penetrate more nearly to all parts of the tree than with other systems.

In the Pacific Northwest, the average yields are much larger than we secure in New York but it seems more probable that this would be explained by climatic conditions than by the system of pruning. Yet, their system of pruning does permit a very uniform renewal pruning of old trees like that



A 3-year-old Hyslop crab apple tree, Rutland, B. C., unpruned.

mentioned. All of the spurs could be kept younger and more vigorous and it is not impossible that when the tree is at its maximum bearing age better fruitfulness would be secured and perhaps better fruit. When this shape is secured, however, with the smallest possible amount of pruning it still dwarfs the tree and delays fruiting. Thus, in our seven-year-old orchard the average yield so far from each tree receiving very little pruning is 146 fruits, while that for trees pruned to an open head was 83 fruits. Yet the pruning given to secure the open head was probably much less than is ordinarily given in shaping trees. Whether by increased fruitfulness when the tree is older this style of shaping will be worth what it costs in reduced fruitfulness while the tree is young we cannot say.

The system most commonly recommended, if not practiced, in New York State, is one of very little pruning. The branches of the young trees are not permitted to come out so near each other that there will be injurious crowding; otherwise, the tree is permitted largely to shape itself. Unquestionably, by this system more fruit will be secured during the early life of the tree. As to whether or not this would be true throughout the life of the tree, we have no information. In following it one takes the least risk since most apple growing sections really practice little shaping. Of course, more pruning during the early life of the tree will be required to secure the open head than to secure this last form. But as to which of these shapes would be most profitable in the long run, there is no information. It should be borne in mind that in most cases, more pruning is done in an attempt to secure the shape wanted than is necessary. During the first three or four years of the life of the tree all the pruning would be to remove all but the four or five branches that are wanted. Such pruning as this would seem desirable for any system. It is more than probable that with many trees one of the branches will naturally be larger than the others, so if the shaping of the secondary branches such as one would want for an open head is not begun before the trees are several years in the orchard the final success may be just as marked and the trees will not be dwarfed so much. It is seldom, if ever, necessary to prune the secondary branches of the young trees in this climate to secure stockiness, though such pruning seems to be necessary in drier, hotter sections. I am inclined to the opinion that the partially open head tree, secured by as little pruning as possible with the idea that when the tree is twenty-five to thirty

* Extract from a paper read at the recent annual convention of the Ontario Fruit Growers' Association.

years old a renewal pruning well distributed throughout the tree both in the lower and upper branches will be practiced, would be best for the permanent trees in the orchard. I am very strongly of the opinion, however, that almost no pruning whatever would be best for filler trees.

As to other fruits than the apple, the pruning is somewhat more simple. All of these fruits are planted rather close and there is in my mind not the slightest doubt that with the exception of the cherry, which seems to need little pruning, all should have renewal pruning. By the time they have reached maximum bearing they will in all cases have occupied the space available. Further, growth can be only upward and it would seem inadvisable to have the bearing surface any higher than necessary. Pruning, then, in this case would serve not only to keep more healthy fruiting wood but to keep the bearing surface lower so orchard operations could be done more cheaply.

Calcium Arsenate as a Cheap Arsenical Substitute*

Prof. P. J. Parrott, Geneva, N.Y.

EXPERIMENTAL activities of the past year do not forecast any important changes for the coming season, either in methods of spraying or in selection of spraying materials. The present indications are that lime-sulphur solution and arsenate of lead will form the bulk of the insecticides to be applied to fruit trees.

Of the new spraying arsenicals that have appeared on the market, interest centres largely about calcium arsenate (lime arsenate), which in some quarters has been highly endorsed as a satisfactory substitute for lead arsenate for the treatment of orchards, with the exception of the stone fruits. The determining consideration is that considerable saving can be effected by its use. Owing to its high arsenical content less of it is required than of lead arsenate, and as there is at current prices a difference of five to ten cents per pound in its favor, the cost of calcium arsenate varies to approximately from one-half to two-thirds that for lead arsenate. In these days of enforced economics, this consideration will make a strong appeal to some growers.

The calcium arsenate as exhibited by the more reliable manufacturers appears as a finely-divided powder which mixes well with lime-sulphur without the formation of "sludge," as is characteristic of lead arsenate, and with thorough agitation keeps well distributed in the spraying mixture. Growers who are contemplating an experiment with calcium arsenate should remember that its merits are not thoroughly established and that there is doubtless much to be learned regarding it, both with respect to its manufacture at the factory and its behavior in orchards under New York conditions. Attention is especially called to the fact that the poison may cause yellowing of foliage, and in some instances this has been of disastrous extent. The damage may arise as a result of applying an unreliable brand or by the decomposition of the lime arsenate upon exposure to the air. Experiments indicate that the latter form of injury may be entirely checked or be reduced to an unimportant extent by the addition of lime. Warning is therefore given to intending purchasers to buy only from reliable dealers and apply according to directions of the manufacturers. For the more common chewing insects use three-fourths of a pound of dry calcium arsenate to fifty gallons of bordeaux mixture or lime-sulphur solution and add milk of lime by slaking two or three pounds of stone lime.

It may also be added that at the Geneva station nine brands of calcium arsenate were tested during 1918 and, from the standpoint of effectiveness against biting insects and safeness to foliage and fruit of apple trees, no important differences in results were noted with the various preparations. Moreover, plants sprayed with lead arsenates were not distinguishable from those treated with calcium arsenate.

* Extract from a paper read at the annual convention of the New York State Fruit Growers' Association last January which was attended by a number of Canadian growers.

San Jose Scale Killed

Speaking to The Canadian Horticulturist recently, Mr. A. W. Peart, of Burlington, one of the best known fruit growers in the Niagara district, stated that he believed the severe winter in 1917-18 had destroyed 75 per cent of the San Jose scale in his portion at least of the Niagara district. He added that reports he had received from St. Catharines, just across the lake, indicated that the scale had been killed off there as well. Mr. Peart said that he had examined an orchard of 900 trees at least, in which, until the time of the freeze, there had been some scale, but had failed to find a living scale. When asked if he had seen any scale last summer Mr. Peart replied that he had not. Mr. P. W. Hodgetts, secretary of the Ontario Fruit Growers' Association and director of Horticulture for Ontario, who was present, agreed that there was a substantial foundation for Mr. Peart's opinion.

Lime in the Orchard

Prof. R. Harcourt, O.A.C., Guelph, Ont.

If we want an active soil with plenty of soil bacteria we must have an abundance of lime. The better you farm and the bigger the crops you produce, the more you lose the lime. There are two forms of lime. (1) Burned lime, which should be well slacked before applying to the soil. It is not suitable for a light, sandy soil, but is all right to apply to heavy clay soils at the rate of one ton to the acre.

2. Ground limestone rock. This requires to be ground fine and should be applied at the rate of two tons to the acre.

Practically all the orchards in the Niagara District need regular applications of lime, except a few special spots just under the escarpment, which are well supplied with lime washed down from the mountain side. In most cases ground rock is the best form in which to apply the lime. It should be applied on the surface and harrowed in, not plowed, as the nearer the surface it is kept the better. The early spring is a good time to apply it to fall-plowed lands, but when land is to be plowed in the spring, it is better to wait until after plowing to apply it.

Horticultural Notes

Don't fail to clean the machine thoroughly after each spraying; it saves much trouble when the time comes for the next application.

The spring cultivation in the fruiting strawberry bed will perform the same functions as it does when cultivating new-set plants; that is, it will make conditions favorable to bacteria, aid in retaining moisture, eliminate weeds, and it will in every way assist the plants in perfecting a full and profitable crop of berries.

Lime-sulphur or Bordeaux with lead-arsenate, applied while the trees are yet dormant, again when the leaf-buds are beginning to open, before the blossoms open, and again after the blossoms have fallen, will prevent the ravages of the scab, codling moth, scale and worm. This must be done consistently, however. It is useless to spray well one year and neglect the orchard the next. Every year the orchard is neglected, the insects get a stronger footing.

Orchard Cultivation*

Prof. W. S. Blair, Kentville, N.S.

THE management of orchard soils so that the trees can do their best requires no small amount of thought, and probably no part of our orchard work has been given so little thought as this during the past few years. It seems there is no one best way of managing an orchard. There may be several good ways, and because a certain method may suit certain conditions best does not mean that such a method can be adopted universally and prove successful. If we could but realize that conditions do vary for every person who grows fruit and that there must, therefore, be more or less diverse ideals, diverse methods and diverse results, it would help toward a better understanding of the cause for the many local differences in respect to methods. It seems reasonable, however, that there should be some certain practice, if followed up consistently, which will prove most satisfactory over the greatest range of orchard soils and under varying climatic conditions.

It may not matter much whether clean cultivation, cultivation and cover crops, or sod mulch is practised in orchard management, provided certain conditions are met. The first thing, therefore, is to determine the conditions which are best suited to the tree. We all know that heat is necessary for well colored and well matured fruit, and that some varieties require much more heat than others to mature properly, heat being in some cases a determining factor as to whether a variety is a commercial success in certain places. Soil temperature may be modified by the moisture condition of the soil, and for that reason a variety may do better on some areas than on others, the atmospheric temperature being the same in both cases.

Soil moisture, as we well know, is a large factor in the success or failure of any crop. Not only has moisture an important part to play in the liberating and transporting of plant food, but when reduced below a certain point plants suffer as do animals for the want of it.

You know from your own observation that plants under certain atmospheric conditions will transpire much more moisture than under others; on dark, cool, calm days it is not nearly so great as during bright, hot, windy days. You also know that the moisture condition of your land is determined to a very great extent by the nature of the subsoil; that in general a cool, heavy, close subsoil is not satisfactory for fruits, and that, on the other hand, an open sub-soil is unsatisfactory. We have very little of the latter in the Annapolis Valley, for the most of our subsoil, while gravelly enough to permit of good drainage, is mixed with finer materials, giving good water holding capacity, and favours a good moderate capillary flow of soil waters from the subsoil to the surface, giving what might be termed ideal fruit soil. It is this condition, coupled with natural wind protection, both of which influence the moisture supply, which makes the Annapolis Valley a good fruit country.

Two Important Factors.

In the growth of fruit trees, as in other plants, two distinctive forces are at work, one the vegetative, the other the reproductive. Any checking in the vegetative growth tends to reproduction, but, at the same time, vegetative vigour is necessary if satisfactory production of fruit is to take place. Excessive vegetative growth tends to wood and foliage growth at the expense of reproduction. In the case of an orchard making an excessive vegetative growth, a June plowing to the extent of a severe root pruning may throw the orchard into fruiting, whereas such plowing in an orchard low in vitality may prevent the tree from securing the nourishment necessary to develop vegetative growth sufficient for proper production development. In addition to the building up of wood tissue, and the development of twigs and buds, together with reserve food material for another year, fruit is also being produced by the tree. Therefore, to encourage such growth as will maintain vegetative vigour, give good strong fruiting buds for the next year's crop, and well developed fruit, all at the one time, is no small undertaking, and to devise a set of rules to guide one is a difficult task; for, with

*Extract from an address delivered at the recent annual convention of the Nova Scotia Fruit Growers Association.

The tractor has been so improved it is becoming an important factor in orchard cultivation. This tractor as shown at work in the orchard at Macdonald College, Que., is capable of turning in as short a space as will a team.

variable factors such as soil temperature, soil moisture, amount of plant food, insects and diseases, any one of which may modify results, the problem becomes complicated; hence the aim should be to preserve an even balance by attention to certain operations, so that moderate and constant vegetative vigour may be maintained as fully as possible, and this in turn will likely give moderate and constant production. It is well known that moderate vegetative growth is necessary if we are to have healthy branches to produce strong fruit spurs to carry and nourish large crops of well developed apples.

Nature has arranged matters so that the different processes in plant development may occupy certain periods. The most active vegetative growth—the development of leaves and twigs—takes place in the early spring, and the development of fruiting buds takes place later, along with the storing up of the materials necessary to start the tree into growth the following spring. It can quite readily be seen, therefore, that any retarding of development in the spring may mean a serious loss in retarding development of the reproductive processes in the late summer, hence the importance of aiding nature that vigorous growth may take place during the normal growing season, so that the later processes which make for production may continue unhampered.

The fact that a fruit tree has deep running large roots may lead us into the error of supposing we can grow a crop on the surface soil and not interfere with the development of the tree. That the continuous cropping and removal of an early growing crop such as grass is decidedly unsatisfactory in ultimate results to fruit we know to be true. Yet it is possible that a much heavier crop of millet or other crop may be secured from the same area during the late summer, without lessening the crop, and may, in fact, increase ultimate production, the reason being that in the first case we have checked the vegetative growth at the very time it should have been stimulated, and in the other have helped to check vegetative growth when a check was desirable and aided the reproductive processes; so, while it may not be desirable to crop an orchard in the early summer it may be desirable to do so in the late season; and it is because of this fact that early cultivation, followed by cover-cropping, is practised.

Those of you who have had to do with garden crops know something of the effect on the crop of an early hoeing, even if no weeds are present. You work up the soil, and in a day or two you are surprised at the growth. You have aided nature and produced conditions of aeration, heat and moisture suitable for the plant and soil organisms which aid in plant food development.

(To be continued.)

Some Fruit Pests of Last Season*

W. A. Ross, Dominion Entomological Division, Vineland, Ont.

DURING June and July last year, pear, cherry and plum trees in various parts of Ontario were seriously damaged by a leaf-feeding, blackish, slimy, slug-like insect called the pear and cherry slug. This insect feeds on the upper surface of the foliage, on the green tissues, leaving only the network of veins. In many orchards, the foliage, particularly of pear and sour cherry, was almost wholly destroyed. At picking time much of the fruit on badly infested sour cherry trees was wizened (dried out, as a result of the loss of foliage), slug-eaten, and unfit for sale.

The adult insects are black, four-winged flies called sawflies, which emerge from the soil in May and June and lay their eggs in the tissues of the leaves. There is a second brood, but this was not large last year, because of the work of a minute egg-parasite, a small four-winged fly which breeds within the egg of the pear and cherry slug and thus destroys it. I shall not be at all surprised if the slug is not injurious this year because such a large number of the second brood eggs were destroyed by this useful little parasite.

The slug is easily controlled. Spray with arsenate of lead at the rate of 2½ lbs. to 40 gals. of water as soon as the insects are present in fairly large numbers.

WHITE MARKED TUSSOCK MOTH.

Many apple and plum orchards throughout the Niagara District and Western Ontario were badly infested with tussock caterpillars last year. The caterpillar when full grown is about one inch to one-and-a-half inches long, and is readily recognized by its bright red head, by two long black tufts of hair projecting from the front end and a single black tuft from the rear end, and by the four dense creamy tufts of hair on the back.

The caterpillars feed on the leaves, but the most serious damage is caused by their attacking the fruit and eating out holes or shallow areas here and there, which later become covered over with a brown callous growth.

Very fortunately for all concerned, this insect was so heavily parasitized by four-winged and two-winged flies that only an insignificant number of the caterpillars reached the moth stage, and as a result few eggs were laid. In view of this, I feel quite safe in prophesying that our orchards will be free or comparatively free of this pest this year, and for several succeeding years. Last year's infestation demonstrated that the simplest method of controlling this pest is to remove and destroy during the winter months the conspicuous white egg-masses which are situated on the trunks and limbs and to some extent on the branches.

PEAR PSYLLA.

Certain orchards in this section and in the Burlington District are subject to the attack of the pear psylla. The adult psylla is a small four-winged insect about one-tenth of an inch long, and resembles a miniature cicada. When disturbed it jumps and for this reason it is sometimes called a jumping plant louse. The immature forms or nymphs are flat, oval, yellowish or brownish creatures usually found on the leaves enveloped in a sticky liquid.

The psylla causes injury by extracting with its sucking mouthparts the sap from the leaves, leaf stems and fruit stems. On badly infested trees this continual sapping of the life juices by myriads of psyllas robs the trees of vitality, dwarfs the fruit, produces brown, dead areas on the leaves and in extreme cases causes the foliage to drop prematurely. Trees seriously weakened by the psylla are especially susceptible to winter injury, and in a hard winter like that of 1917-18 readily succumb to low temperatures. The insects excrete a sweet, sticky liquid called honey-dew and on attacked trees the foliage, fruit and twigs may be covered with this material and with an unsightly black fungus which grows in it.

In pear orchards subject to psylla injury the spraying practices should be modified as follows: Delay the dormant application of lime sulphur (scab strength) until shortly before the trees bloom and then apply it with great thoroughness so that all parts, including the undersurface of the twigs and branches, will be coated with lime sulphur. This application destroys the eggs and newly-hatched nymphs. Supplement this spray by adding Black Leaf 40 or Nicotine Sulphate to the codling moth spray at the rate of three quarters of a pint to 80 gallons of spray and again thoroughly drench the trees. This application kills the nymphs which at this time are situated chiefly in the axils of the leaf and blossom-stems. It cannot be too strongly emphasized that thoroughness is more than half the battle. In order to control this pest it is essential to coat every, or practically every, egg or nymph with the spray.

* Extract from a paper read at the recent annual convention of the Niagara Peninsula Fruit Growers' Association.

Setting Out a Blackberry Plantation

Albert Durand, Waseca

THERE seem to be some people who would like to grow blackberries and also raspberries who have no experience in either one. Any one who has had experience in either can grow both, for the culture is the same, only that we have hardy raspberries, but I have not found a hardy blackberry. In cold sections they must be laid down in the fall and covered with earth to insure against winter-killing.

Blackberries are propagated in two ways, from suckers and from cuttings. The suckers are the young plants that come up in the spring from the canes that are standing. The second method is done by taking fair sized roots and cutting them into pieces and planting them in rows and covering with earth. The first method is most extensively practised.

To start a blackberry plantation, I select my ground—if possible a bottom ground, and by this I mean a piece of ground lying at the foot of a hill, but which must not be wet or sour. It must have drainage. A black sand loam is much preferred to a clay soil, although I have raised fair crops on a clay loam, but berries that are grown on a sand loam are of better quality and much less liable to be attacked by the many diseases which blackberries are liable to have.

Select a piece of ground, and plow it in the fall. When the frost is out in the spring, work the ground as fine as possible by harrowing and discing. Make a hand marker of wood like the old common corn marker. Have three runners, eight feet from centre to centre, and use a light pair of shafts so a man can draw it across the piece of ground which you intend to plant, making a shallow mark, letting one runner run in the outside mark, so you can get the rows straight. After this I take a one-shovel plow, ten inches wide, and one horse and follow this shallow mark. When this is finished I take again my wooden marker and nail two more runners, which makes the runners four feet from centre to centre, and draw this across the file in the opposite direction. This gives you a guide to set your plants by, four feet by eight feet.

Now we have plants that we dug and heeled in when we were laying them down the fall before in our old field, which we intend to let remain until our new one comes into bearing. By "heeling in" we mean taking well rooted plants, well dug and not bruised, leaving eight to ten inches of the cane for a hand hold. Then find a place where we can dig a trench twelve inches deep, and place the plants in the trench, leaning against the sloping bank, and cover them with fine earth, and see that the dirt is sifted well among the roots so no air spaces are left between them and pack the dirt well around the roots.

In the spring when we are ready to commence to set out we remove part of the earth and take hold of the hand hold and lift them out. It requires two people to do the setting out. Take a basket with a handle so you can hold it over your arm. Place your plants in it. The other party takes a common garden hoe. The man with the plants gives out one plant at a time, and the one with the hoe places it at the cross mark and with the hoe draws dirt enough to cover the roots. This way you can set a large patch in a day.

After we have gone over our patch with the plants we go back and finish filling the mark with the hoe firming the dirt around the plant. After this is finished we again take our one-horse plow and make a mark between the rows the wide way and plant potatoes. Give good culture through the season. To lay the canes down for winter, we take three people, two to bring the canes down to earth, and the third party to cover with earth enough so they are not visible. Take a common spading fork and remove earth from the side of the plant the way you intend to bend it down. One party pulls on the plant while the other one places the foot close to the plant and pushes, bringing the plant to the earth, and throws a little dirt over the tip of the cane to hold it there until the third party comes and finishes covering. In the spring work the dirt back between the rows with a spading fork, using two people, one right-handed and one left-handed, one on each side of the row, working the same way they were laid down—but never go against your canes, or you will break and destroy your canes.

The second year I work my ground up well between the rows and mulch them down with marsh hay to the depth of about four or five inches and continue this process as long as I let them remain.

I have grown blackberries in great quantities in this way. I have seen places on my patch where two or three laterals would lie close together, bent down on the mulching, loaded with berries that looked as if there was a half a pail of berries dumped there.

As to varieties, that will depend altogether on one's taste. I have not found any that will give me any better returns than the old Ancient Briton. All markets are not good blackberry markets. I deliver all my fruit direct to customers. When I commenced with blackberries there were hardly half of my customers who used strawberries and raspberries that would bite on blackberries. Sometimes it is difficult to get pickers, as they are afraid of the thorns.

Although the war is over the labor question is far from settled and National Service Girls are likely to be in demand again this season. Some Toronto college girls are here shown as photographed last season on the farm of F. H. Gallinger, Stamford, Ont.

Winter Injury to Small Fruits

J. A. Neilson, O.A.C., Guelph, Ont.

WINTER injury to small fruits is not an unusual occurrence in Ontario. As a matter of fact, more or less injury occurs nearly every winter. In some years, however, owing to unusual climatic conditions, the loss is very heavy. The winter of 1917-1918 was one of the most disastrous in the history of Ontario, all kinds of small fruits and nearly every section being affected, the extent of injury varying with the locality and the varieties grown.

From observations made during the past summer while studying winter injury to fruit plantations in Ontario and from information gleaned by correspondence, the writer has obtained some data relative to the damage done in various districts and the kinds and varieties affected.

St. Catharines District.

Red Raspberries	6%- 7%
Strawberries	10% upward
English Gooseberries	10%- 30%
Blackberries	20%- 50%
Black Raspberries	50%-100%

Norfolk County.

Raspberries	10%- 15%
Strawberries	20%- 50%

Guelph.

Currants—No apparent injury.
Raspberries—Some bud killing and killing back of canes.
Strawberries—Killed in unprotected sections.

Burlington.

Strawberries—Some plantations were very severely injured; in other places, lightly injured.
Raspberries and Currants—Badly killed back in low areas in the plantation.

Collingwood District.

Red Raspberries—
Cuthberts—Badly killed back.
Herberts—Slightly injured.
Strawberries—Badly killed excepting where mulched.

Vineland Station.

Winter killing of currant varieties, 1918. The data in this table was furnished by Mr. Don Kimball, Pomologist of the Station:

Black Currants.		Red Currants.	
Eclipse	85%	Wilder	30%
Boskoop Giant	40%	Pomona	25%
Kerry	15%	Red Cross	15%
Baldwin	10%	Prince Albert	10%
B. Naples	5%	London Market	8%
Victoria	5%	Diploma	5%

White Currants.

White Imperial	50%
White Grape	5%

The following varieties were not winter injured:

Black Currants.	Red Currants.
Magnus	North Star
Buddenbourg	Victoria
Clipper	Versailles
Topsy	Fay's Prolific
Eagle	Raby Castle
Climax	Perfection
Collins' Prolific	France German
Saunders	Everybody's
Black Champion	
Lee's Prolific	

Causes of Injury.

Factors which predispose small fruits to winter injury include the following:

First—Wet soils—In almost every instance it was found that the injury was greater in low or poorly drained areas. This applies especially to raspberries and to a lesser extent to currants, gooseberries and strawberries. The plants on the well-drained soils came through in much better condition. Wet soils may cause growth to continue late in the fall, and thus prevent the proper ripening of the wood. In the case of currants and gooseberries, it has been found that fungus diseases are more prevalent on the wet soils and these predispose the plants to injury, as will be pointed out later.

Two—Plant diseases, such as leaf spot and anthracnose of the currant, downy mildew of the gooseberry, and leaf spot and powdery mildew of the strawberry, are fruitful causes of injury to the foliage of their respective host plants. They often greatly weaken these plants and lessen their power to withstand severe cold. Careful observation has established the fact that winter injury is greater on plants which have been severely attacked by disease than on those plants which are free from disease.

Three—Sucking insects, such as aphids, frequently injure currants and gooseberries by sucking the juice from the leaves, and the currant saw fly and other leaf eaters often completely defoliate the bushes early in the season, thus interfering with their normal growth and rendering them more susceptible to injury by low temperatures.

Four—Occasionally during very hot periods in the summer the leaves of currants and gooseberries fall off, and this in turn weakens the plants to such an extent that the fruit buds are killed during severe winters or the canes may be partly killed.

Five—Several years ago the writer's attention was drawn to a small plantation of raspberries that had been injured by heavily cutting back the new canes after the fruiting season was over. The canes afterwards produced several strong shoots from lateral buds, and these were in turn cut back. The bushes which had been cut back were badly injured during the winter which followed, whereas those which had not been headed back came through the winter in good condition. The effect of this treatment could be seen for several years afterwards.

Small fruits growing in sections exposed to strong cold winds were invariably more injured than those growing in better protected areas.

In sections where the snowfall was deep, as in the Ottawa district, small fruits did not suffer as severely as where the snowfall was light, or where no mulch was used. This statement refers especially to strawberries. A very good example of the effect of a mulch on strawberries was seen near Craighurst in June last. All the plants on a fairly large plantation were killed excepting in one section where the snow had accumulated on the face of a slope. No mulch was applied to this plantation. In Norfolk County the loss in strawberry plantations was very heavy, especially where no mulch was applied, but where a mulch was used the loss was very much reduced.

Preventive Measures.

Grow those varieties of good quality which are known to be hardy in your district.

Plant small fruits on well drained soils.

Avoid cutting back raspberries in the late summer or autumn. Cutting back can be done just as effectively and with more safety in the spring. Do not cultivate raspberry or blackberry plantations late in the summer, as this causes a late growth, which is more susceptible to winter killing than well ripened canes.

Protect strawberry plantations by a suitable covering, such as straw or marsh hay. This should be applied in the late fall after the ground becomes frozen and raked off the plants into the space between the rows.

Watch closely for the appearance of insect pests, and when these are found apply the remedies recommended in the Ontario Agricultural College spray calendar.

When fungus diseases are known to be present on bush fruits spray thoroughly with those fungicides recommended for the control of these diseases. If leaf spot of the strawberry is prevalent, mow the plants after the fruiting season is over and burn the foliage when dry. As can be readily seen, the treatments suggested are only those which are fully in accord with good horticultural practice, and which can be easily applied.

Orchard Improvement

Henry G. Bell, Soil Improvement Bureau, Toronto

CANADIAN orchardists are watching movements across the water with great interest. The partial removement of the embargo against Canadian apples by a licensing system recently inaugurated, re-opens the British and foreign market to Canadian fruit. This is great news to the owners of the 300,000 acres of orchard in Ontario, as well as to their contemporaries in other provinces. It means the re-opening of a highly profitable market for first grade Canadian fruit. The amount of advantage that the Canadian orchardist will derive from this trade depends upon the quantity and quality of the product which he has to export.

The 1919 fruit crop is now in the making. Fruit branches are now dormant, but the quantity of fruiting buds as well as their earliness in opening depends to a considerable extent upon actions during the winter and early spring months. For instance, too much wood growth diminishes quantity and prevents high quality of fruit. Too much wood growth is a direct result of an unbalanced condition of plantfood in the soil. When the wood growth is excessive there is being provided an excess of nitrogen in comparison with the supply of phosphoric acid and potash. It may be that a heavy leguminous cover crop is now on the ground, and plans are laid to plow this crop under when spring opens. Such a practice will increase the nitrogen content of the soil and still further cause wood growth at the expense of fruit. Unbalanced nitrogen supply can be corrected by the addition of a carrier of phosphoric acid and potash. If the "set" of fruiting buds is scarce and relatively weak, it is a clear indication that there is a lack of phosphoric acid—the plant ripener. Phosphorus is closely related to the germ of life. In fact it is found in the tiniest germinal cell. A sufficient supply of phosphorus causes a maximum setting of fruiting cells in all plants. Beside phosphoric acid, it has been pretty clearly established for most soils that a supply of potash in the orchard soil has a definite relation to the filling of the fruit, in that potash regulates the formation of starch. It is also claimed to have some bearing on the color of the fruit.

Feeding the orchard then, is of immediate interest to Canadian fruit growers. It has been the custom on thousands of acres to apply a heavy dressing of manure either in the fall or in the early spring. This when worked into the soil, adds a considerable amount of humus and if the manure is fresh it also adds from 10 to 15 lbs. of nitrogen and a small amount of potash for every ton of manure applied. Manure is weak in the plant ripener or phosphoric acid, carrying only from five to eight lbs. of phosphoric acid to the ton of manure. Orchardists, therefore, who have been manuring their orchard heavily with live stock manure, will do well to add plantfood high in phosphoric acid, either acid phosphate or acid phosphate and potash.

Fertility tests in Ohio orchards have shown interesting results. The trees on the left were unfertilized. Those on the right received a complete fertilizer and lime. The treatment in all other respects was the same. (Illustration from Ohio State Bulletin 153).

Some orchardists are inclined to look upon the use of fertilizers in the orchard as a practice still in its experimental stage. Fertilizing the orchard is far from being a new practice. Over eight years ago Mr. G. C. Miller, of Middletown, N.S., in reporting his orchard practices to the Nova Scotia Department of Agriculture gave a record of the handling of four acres of orchard in full bearing as follows:

Pruning	$10.00
Fertilizer, 4 acres at $9.	36.00
Sowing fertilizer	2.00
Discing and harrowing	8.00
Seed for cover crop	5.70
Sowing cover crop	1.50
Spraying three times	22.40
Barrels, 451 at 25c.	113.00
Picking, packing and truckage at 25c.	113.00
Sundry expenses	8.40
	$320.00
451 barrels apples, net proceeds	1,017.74
Net returns	$697.74

Mr. Miller's tabulation shows that maximum results are not altogether the result of plantfood management, but that due emphasis must be laid upon pruning and spraying as well as on soil tillage, and proper marketing. Necessarily the figures involved would be changed somewhat under present conditions, but even so, the advantages of proper plantfood management, would be even more emphasized.

Canadian farmers who are going to take greatest advantage of the renewed fruit trade with the Mother Country will do well to make a closer study of the relationship of proper fertility to fruit production. Feeding the orchard is exactly like feeding the dairy herd, in that the result in both cases depends upon the abundance of the food and the wisdom with which the ration is balanced.

If lime sulphur is applied when the buds are not out too far the trees can scarcely be injured if you use one gallon to five of water.—Prof. L. Caesar, O. A. C., Guelph, Ont.

Making Strawberries Produce Results

F. L. Gabel, Dundas

SOME strawberry growers wonder why they do not get good results from their beds. In a majority of cases if they would look back over the season and say, "What time and how much care did I give to my ground and plants?" the question would be answered.

The strawberry plant will thrive in a severe climate but will not stand rough usage. To insure good results I would advise selecting a well-drained, dark, sandy loam soil. Such a soil retains the moisture. Prepare it one year previous to planting by growing, say, a crop of potatoes. Apply fully 35 tons per acre of good manure. Thus all weed seeds will be eliminated. Plough in the fall, draining well to allow early planting, but not before the ground is free from all soggyness. If you do the roots of the plant will not spread, thereby ruining all possible chance for the materializing and development of your plant.

Plough as early as possible in spring, and work the ground as thoroughly as if you intended planting small vegetables. Then use a heavy roller. In planting be careful to secure the crown of the plant just clear of the ground in rows four feet wide and fifteen to twenty inches apart, all depending upon the running qualities of your varieties. I consider the Glenmary one of the best producers. It is large but inclined to be soft when long shipments are necessary. The Parson's Beauty and Pocomoko have given splendid results, and are considered good shippers. Stevens late Champion is very much like the old Williams, without the green tip. It ripens later, and is a splendid shipper, but must have a rich moist soil. All are perfect flowering plants.

In selecting plants take up the entire row. Always plant strong and vigorous specimens, or those near the parent plant. It is very essential that you use the weeder just as soon as the roots have set, then give a light hoeing and continue to keep the ground well cultivated, always going the same way in the rows so as not to disturb the runners any more than necessary. By continuous working do not allow the soil to become solid, thereby retaining all the moisture.

For winter treatment I would advise using from 18 to 20 tons of manure per acre; some have used the manure spreader with good results, or from two to three tons of straw, applied either in the latter part of November or early in December. If your bed is clean it pays to leave it for a second crop, as the fruit ripens early and is of high color. Following the foregoing treatment should give you not less than 10,000 boxes an acre.

Control of Apple Aphids in B.C.

Charles L. Shaw, Victoria, B.C.

FOUR species of aphids are known to apple growers in British Columbia. These are the green apple-aphis, the European grain-aphis, the rosy-aphis and the woolly aphis. The first three are in many ways similar, and may be dealt with collectively. The woolly aphis requires separate attention.

About the time the apple buds are showing green the eggs of these three species begin to hatch within a few days of each other. The hatching period lasts about two weeks. The appearance of all three species is so much the same that they are at this period distinguished from one another with difficulty. Their life histories, however, are different. The European grain-aphis is the first to become abundant in the spring, and it remains on the apple until the end of June, the principal effect being to curl the foliage. The aphids then migrate to the common grains and grasses, returning in the fall to the apple to complete their life cycle.

The rosy-aphis appears about the same time as the grain-aphis, but develops more slowly. Its preference for the leaves of the fruit clusters renders it a particularly dangerous pest. The fruit is not often attacked directly, but it is often stunted as a result of the effect on the adjoining leaves, which are often so tightly curled and badly injured that the clusters may fail to develop. In June the rosy-aphis migrates to its summer host-plants, and by the end of July it has abandoned the apple. In the autumn winged fall migrants return to the apple and deposit eggs.

The green apple-aphis is also slower than the grain-aphis in its growth, and it begins to hatch a few days later. The species stays on the apple throughout the life-cycle, the migrants going from apple to apple in the summer and autumn. Hawthorn, quince and the pear are also attacked by the species occasionally.

In general, apple-aphids pass through four distinct stages in their life history, as follows:

(a) The egg stage: The winter is passed in this stage, the eggs being attached to twigs or placed under bud scales and flakes of bark of apple trees.

(b) Stem-mothers: Forms known as stem-mothers hatch in spring from the over-wintering eggs. These are all functional females, which, without direct fertilization, produce living young. These, in turn, reproduce in a similar manner, so that if climate and food conditions are favorable there will be a constant succession of new generations produced throughout the growing season.

(c) Spring migrants: Winged forms may be produced in the early summer. These are also females which migrate to other host-plants, where new colonies are produced.

(d) Fall migrants: In late fall winged forms may again appear. These migrate to new host-plants, where they give birth to young which develop into true male and egg-laying females. The eggs laid by these sexual aphids form the over-wintering stage.

Thorough and well-directed sprays, the first when the buds have just begun to form and the second during the "pink" stage, just before the blossoms open, are effective in controlling the aphids. Here are two formulae that have proved satisfactory for all species:

Formula No. 1: Nicotine sulphate, 40 per cent, one and a half pints; whale oil soap, ten to twelve pounds; water, 200 U. S. gallons.

Formula No. 2: Nicotine sulphate, 40 per cent, one pint; lime, fresh slaked, six to eight pounds; water, 200 U. S. gallons.

Another formula, good for fungous diseases and many insects, is made up from one and a half pints of nicotine sulphate, four to six pounds of arsenate of lead, and 200 gallons of lime-sulphur dilution. Soap must not be used in combination with lime-sulphur owing to the resulting adverse chemical action.

Ground Limestone

Prof. R. Harcourt, O.A.C., Guelph,

Will ground limestone in the soil be injurious to the growth and production of strawberries.—C. A. M.

I do not think ground limestone rock would injure in any way the production and growth of strawberries. In fact, I think that it would be beneficial.

Two Years of Success With Dusting

Prof. J. R. Cossette, B.S.A., Oka Agricultural Institute, at La Trappe, Que.

DUSTING has been carried on for two years in the orchard of the Oka Agricultural Institute at La Trappe, Que., and it may be called a success. But will dusting ever go so far as to take the place of spraying with lime-sulphur wash, which has given such beneficial results? It has not been possible to make a co-operative record of experiments carried so far in the various parts of the province, and it is only by comparing results that a decision may be reached as to the merits of the two methods: liquid spraying and dusting.

Both methods have their advantages which cannot be denied, and both have also their weak points. They are more or less easy of application when the temperature is favorable, and there are other well-known objections, and especially that of being somewhat expensive. This will always be a serious objection for a great many people, who do not hold the same views on orchard economy. To spend as little as possible on the care of the orchard and make as large a profit as possible, such is the ideal of the greater number, and it will be difficult to change the mentality of those people, at least in a general way.

To be admitted by all, results should be quite obvious, and it is with a view to help in this demonstration that dusting was used again last year for the protection of the orchard at the Oka Institute.

The results of the experiments were as follows:—

The number of apple trees sprayed was 1,407, 1,300 of which were trees in full bearing, and 107 younger trees. The quantity of mixed powder used was 8,020 lbs., and four dustings were given.

The first from May 20 to 23 inclusive, required 2,360 lbs. (944 lbs. of sulphur and 1,416 of talcum).

The second, from May 29 to June 4 inclusive, required 2,990 lbs. (299 of L.A., 1,196 of sul., 1,495 of talcum).

The third, June 10 (7.30), required 1,240 lbs. (496 of sulphur and 744 of talcum).

The fourth, from June 15 to 19, required 1,430 lbs. (143 of L. A., 572 of sulphur and 715 of talcum).

The purpose of the latter was specially to control the bud worm.

The result was that 99 per cent of the apples from dusted trees were exempt from scab and worm-holes.

This result shows at least that powder might with advantage take the place of the lime-sulphur wash, which gave the same result during the past years, but which is not so easy to apply as the dust and which costs more. This success, is not, however, as conclusive as desired, owing to the fact that the orchard was almost decimated last year by the severe and continued cold which caused tremendous havoc in certain parts of the province. However there does not appear to be any reason why the same satisfactory results should not have been obtained on the trees that were killed by the frost, and it may be said that the dusting was really useful and satisfactory.

The efficiency of dusting showed up specially when the hideous disease called canker appeared towards the end of July and proved irresistible. What would the lime sulphur wash have done? Would it have checked this infection? It is believed that this canker is of German origin, and consequently its control requires an allied combination of the most powerful means.

This opens the way to our new experiments, which will certainly be carried on. The powders used in dusting are: lead arsenate, sulphur and talcum; the proportions in which these various ingredients are mixed have already been given. The application of the mixture required 55 hours; a quantity of 146 lbs. was dusted in one hour.

The following quantities were required for dusting 1,400 apple trees: 4,370 lbs. of talcum, 3,208 lbs. of sulphur, and 442 lbs. of lead arsenate. The talcum is worth $20 per ton; the lead arsenate $45 per 100 lbs., and the sulphur $3.50 per 100 lbs., which makes the cost of dusting 28 cents per tree, in addition to the cost of labor and time. Of course, this method of protection is rather expensive, and this is the greatest and the chief obstacle in the way of its general adoption, especially if the results are not quite conclusive.

Winter Injury.

It has been decided to continue dusting at the Institute. The havoc caused by the frost has made a number of orchardists, who had followed the work of last year, with great interest, lose all their interest in the proceedings. The diseases which dusting as well as spraying were called upon to control have become for them of secondary importance. The great question now is to reconstruct the orchards that have suffered to such a large extent from the hardships of last winter.

And the question is important enough. How many people there are for whom the orchard is the main source of revenue! The losses are incalculable and they will be felt for many years until the winter apple orchards are completely reconstructed, as the winter apples are the ones that have suffered most.

The orchards of the Institute have not been spared. Among the Ben Davis, 144 trees were killed; among the Fameuses, 20 were killed, 15 are seriously ill and 75 have little hope of living. Among the McIntosh, 28 were killed, The Pewaukee and Russet are decimated, and the rest will only slowly and painfully come back to life. Over 70 Wealthy have perished and at least 30 are more than damaged. Many St. Lawrence and Alexander have fallen. About 700 apple trees, all told, show their branches stripped of leaves.

The Hyslop, Scott Winter and Salome are the only ones left in full possession of their strength.

Many of the pear trees have also

In old orchards where the limbs are high the use of elevated platforms when spraying is a necessity.

Successful Orchard Culture Demands

A soil adapted to the fruit grown.

Planting of hardy varieties.

Care in planting.

An adapted and thorough system of soil management.

Pruning which conserves the energies of the tree and lightens the orchard work.

Spraying of a character which will control the pests and make the fruit edible and saleable.

died, as well as some of the cherry trees and prune trees. No fungus disease has as yet caused such tremendous ravage, and it was the same throughout all the district. The losses caused amount to thousands of dollars.

It is evident that the situation last spring was not very favorable for spraying experiments. It is certain that the work of last year cannot be used as a basis to calculate the cost of dusting. With the same quantity of mixture a much larger number of trees might have been dusted.

The dusting had no effect whatsoever on canker. Of course, it was too late then to try the lime sulphur wash, but after the failure of the dust, which contains almost 50 per cent. of sulphur, it is a question if a fungicide of this nature can really be efficient to control canker. The sulphur which forms almost one-half of this mixture has probably no value in this connection. It is evident that another mixture must be found to deal with this parasite that has just invaded the orchards. The varieties which have been specially attacked by the canker are the Duchess, Alexander and the Wealthy.

Pruning Peach and Pear Trees*

Prof. W. H. Chandler, Ithaca, N.Y.

RENEWAL pruning for peaches is uniformly practised. This may be done by clipping back the one-year-old twigs a part of their length, but I am of the opinion that it is much better done by shortening the terminal portion of the main and secondary branches back to good side branches, the cutting on any one branch not necessarily being done every year. This requires much less work in pruning. It also tends to keep the tree more open and to result in good growth better distributed along the branches. With plums, I am strongly of the opinion that exactly the same system is best except that less pruning will be necessary.

Concerning the pruning for pears, we have no information either from experiments or from experience of growers that is uniform and extensive enough to be at all conclusive. I am of the opinion, however, that there is even more reason to expect good results from the open head system than is the case with the apple. It is perhaps more important to have a renewal of spurs with the pear than with apples, but it is of still greater importance to have a uniform twig growth in the pear. Its natural habit is to make too vigorous a growth in the top, such growth being very susceptible to blight. The greatest resistance to blight comes when the new wood ripens well, very close up behind the growing points, so there is never a period when there are long, soft, succulent portions on the twigs. This system would render the renewal pruning possible not only in the top but on the secondary branches throughout the length of these main branches, which would tend to give a more uniform distribution of growth throughout the tree.

In pruning pears, there does not seem to be any justification for the system of lopping off the top. The result of this is to encourage water sprouts in the top and instead of giving a more spreading head it tends rather to encourage more upright growth. With some varieties of pears, it may be necessary to prune rather severely in order to get better size in the fruit. This increased size could be better secured with such well distributed pruning as one could give trees of this form. Whatever system is followed in pruning pears, the upright, vigorous growth in the top should be cut back to outgrowing side branches so that the formation of water sprouts is reduced to the minimum and the growth is distributed throughout the secondary branches below. In our pruning experiments, such pruning has resulted in spreading the tops even of such difficult varieties to prune as Sheldon.

* Extract from a paper read at the recent annual convention of the Ontario Fruit Growers' Association.

The difference in the cost of high quality plants and commonly grown plants for one acre amounts to only a few dollars, while the difference in the net profits is vastly greater.

The Strawberry Weevil

W. A. Ross, Dominion Entomological Laboratory, Vineland Sta., Ont.

OCCASIONALLY the yield of strawberry plantations is very seriously reduced by the strawberry weevil—a small reddish or blackish snout beetle which cuts off the blossom buds. Last year, for example, in several plantations in Halton County and in the Niagara District, from 30 per cent. to 50 per cent. of the crop was destroyed by this pest. Early varieties of strawberries apparently are most subject to serious injury. Varieties with imperfect or pistillate flowers are practically immune.

Habits and Life History.

The winter is passed in the adult stage. The weevils hibernate under rubbish, particularly in woodlots and waste land adjoining the strawberry fields. In spring the insects leave their winter quarters and appear on the strawberry plants about the time the first buds are forming. By means of her slender snout the female weevil punctures the blossom buds and deposits her oval, whitish eggs singly in the interior of the buds among the stamens. After depositing an egg the female then crawls down the blossom stem and girdles it so that the bud either falls immediately or is left hanging for a few days by a mere thread. Within the several buds the whitish larvae or grubs, which hatch out from the eggs, feed at first on the pollen and later on other interior parts. They become mature in about a month, pupate and emerge from the buds as adults during July. The new adults feed for a short time on the pollen of various flowers and then in midsummer they seek their hibernating quarters. There is only one generation a year.

Clean Farming.

In combatting this insect it is very important to secure as clean conditions as possible in and around the strawberry plantations. This involves the destruction of weeds, rubbish and anything which may afford the weevil winter protection. It is also advisable not to plant the strawberries near bush or waste land.

According to extensive experiments conducted in New Jersey, almost complete protection from the weevil may be obtained by coating the plants with a dust composed of one part (by weight) arsenate of lead and five parts finely ground sulphur. Ordinarily two applications are sufficient, the first when weevil-feeding begins and the second about seven days later. It is essential that every bud should be coated with the dust.

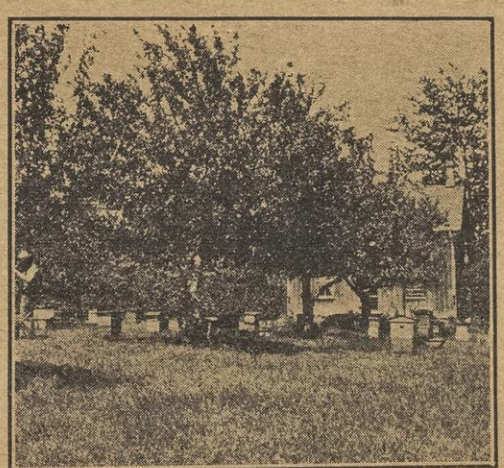
Shall We Practice Early Spring Stimulative Feeding ?

By R. E. L. Harkness, Iroquois

In the following article Mr. Harkness presents the case for the practice of stimulative feeding, a "live" question with beekeepers at this season. Following Mr. Harkness's article is a concise statement against the practice by Mr. Scott of Wooler. If others of our readers have had experience either for or against stimulative feeding and would like to say a word along this line w ewill be glad to hear from them.

THE above topic is one that has been very little discussed either at our beekeepers' conventions or by the press, and I am satisfied the beekeepers have not been giving the attention to stimulative feeding which it deserves. A few of our beekeepers have rather unjustly condemned the practice. This may be the reason why many have fought shy of the practice, as I know the many advantages to be derived from it. I feel any knowledge we have of this fascinating industry should be passed on, as it may help other beekeepers.

What do we mean when we speak of stimulative feeding? We mean feeding in any way to increase activity and action within our colony, that the queens may be stimulated and as a result deposit more eggs within the brood nest, and anything the apiarist does to cause the bees to move stores from one part of the colony to another will have the desired effect. In my early experience as a beekeeper it was my usual practice to feed all light colonies in the spring. These always proved to be my heaviest producers, and on examination shortly after feeding it was found we had a much better filled brood nest than those colonies which were heavy with stores and no feeding done, although the different colonies would be equal size as far as clusters of bees were concerned. We also found the feed was placed right directly and around our brood just where it was needed, the nurse bees were not compelled to leave the cluster as they would be with stores more distant, so rather than feed so large an amount in the fall, that we may have 20 or 25 lbs. left after wintering, I would feed 10 lbs. less in the fall and give this 10 lbs. in the spring, so we would cause activity and also have it directly around the brood rather than in the outside combs farthest away from brood nest. In colonies where we have surplus stores in spring it is a very good practice to take the uncapping knife, remove the cappings from the combs and place these combs towards the centre and the bees will place it around the brood at once. If the honey has crystalized sprinkle a little water over honey after uncapping and there will be no waste, the bees will work it over very nicely, and then feed more syrup. I may say I do not care how heavy a colony may be, we will feed more. Prepare the syrup by taking equal parts sugar and water by weight, pouring the sugar in boiling water and stiring well until clear. If we have any honey unfit for market, heat honey (do not boil) and add boiling water one to one by weight. Remember this is for spring only. This practice is one of the best preventatives for spring dwindling I know; we have added both feed and water—two absolute essentials. As all stimulative feeding is done before natural stores



Part of the apiary of R. J. Fuller, Pickering, Ont.

are coming in there will scarcely be a bee moving, because there is no need for it as all their needs are supplied. Without a doubt, one of the main causes of dwindling is through the bees being compelled of necessity to leave the hives in inclement weather for supplies.

I may say I practice this feeding in the evening after the day the bees are removed from cellar. After the bees have their flight the colony is placed over the feeder, as I believe the only proper feeder to use is one which can be placed under colony. In a surprisingly short time the bees will take up 10 to 15 lbs., with no loss of heat, which will surely escape if feeding is done over top of cluster, as we all know heated air rises.

The Weakness of Stimulative Feeding

By Warrington Scott, Wooler.

As to practising early stimulative feeding, I would say it should be avoided if possible, the greatest objection being it has a tendency to wear out the old bees too soon. The excitement caused by feeding daily soon reduces the cluster, which means only a small brood nest, and all beekeepers know what it means to have a small cluster of bees through the early spring months, as their bees will be behind in numbers when their honey flow opens. Should it be necessary to feed early I would advise adding sealed frames of honey; the next best would be feeding a thick syrup the same as used for winter, and feed large enough quantity to last for a week or ten days. Honey that is free of disease is better for spring feeding, especially early, and it should have from 10 to 20 per cent. water added to it according to its density. I have practised feeding later between fruit bloom and the opening of the main honey flow with good results. Usually the old bees are pretty nearly all gone by this time, and the young bees stand the excitement much better than the old ones do, and the weather at this time is usually a great deal warmer. When bees are fed the excitement causes them to go out in search of honey in any kind of weather, so stimulative feeding, especially early, and with old bees partly worn out, combined with bad weather is bad practice. When feeding at our yards between fruit bloom and clover, I have practised giving enough in one feed to carry them through to the opening of the honey flow, and I like it much better than a daily feed; and feeding at this time I would mix the feed half sugar and half water.

Big Year Ahead for the Beekeeper

According to predictions made by the Department of Agriculture at Washington, which have been received by the bee division at University Farm, St. Paul, the beekeeper may look forward confidently to a prosperous season during the coming summer and fall. The department at Washington reports that the increase in the cost of honey, owing to the big export demand created by the war, makes it safe to predict that the coming year will see the greatest effort ever made to further beekeeping.

During the last half of 1918, honey to the value of perhaps $2,000,000 was exported. This was about 10 times the valuation for any year before the beginning of the war, which indicates that honey has ceased to be a luxury in the minds of the allied peoples.

The Importation of Bees — Is It Necessary?

By W. A. Chrysler

AT one of the sessions of the Ontario Beekeepers' Association, a statement was made by some one present, that bees were imported into Ontario in pound packages by the carload, or that there were carloads imported each year. I made the remark that there must be something wrong or something amiss with the beekeepers of Ontario that they find it necessary to continue importing bees each year when increase is so easy and rapid. This remark was somewhat resented, and it may have stunned a few. I think the facts are a stunner to all of us, when we put our "think tanks" to working.

Twenty-five years ago it was not necessary to import bees, nor was there any considerable amount imported.

With all the importations since that time up to the present, I question if there are as many bees in Ontario to-day as there were a quarter of a century ago.

I believe the beekeepers of Ontario compare favorably with those of any other country, and also that a good beekeeper can become as successful in Ontario as in any country on the earth's surface, but it seems we are getting reckless on this importing fad.

We all have our shortcomings and don't like to mention them in public, so we all sink together in a sort of defence fellowship which staves off the self-condemnation that we should impose upon ourselves.

Many years ago we imported some bees, and some foul brood with them, the foul brood has stayed with us and increased to a greater extent than did bees, in fact, until foul brood is eliminated from the localities infected, increase will seldom be possible.

When bees are so cheap, easily bought and imported, we are not careful enough to save what we have, and if necessary make some increase. Some few years ago some persons raised the question whether it would be more advisable to smother our bees in the fall, extract the honey, and buy some bees in the spring in pound packages, but has any one had nerve enough to try it?

If bees cost twenty-five dollars per colony to buy, beekeepers would be more successful and would soon attain all the bees they required without importing, and some to sell perhaps.

We can raise bees and queens of our own that will be superior to the Southern bred, which will be more suitable for our climate, and prevent much of the loss that occurs annually, in wintering, and other conditions necessary to the greatest success.

NOTES and COMMENTS

J. L. Byer

For the next few months, the matter contained in this corner of The Beekeeper is supposed to be furnished by "J. L. Byer." This announcement is all that is required to convince all interested, that if it is left alone to the individual mentioned, the department will be a flat failure. Will you, my beekeeping friends, lend a hand in the good work of getting out a really interesting budget of news each month for this corner of the Journal? Any items of interest relating to the business of our fraternity, will always be welcomed by "yours truly."

A mild winter is just closing and for the last few days the welcome hum of the bees is once more in evidence. How have your bees wintered? Personally we have to report wintering below the average although we have had a mild season that should have been very favorable for the bees. The cause? It looks as though the trouble is attributable to poor stores, as what honey is left in the hives where bees are in poor shape, is all granulated. Excessive consumption of stores caused uneasiness and heavy brood rearing followed during all the mild weather, with the inevitable result. Our colonies in Langstroth hives that were fed in the fall are all right, while the large hives that were heavy with natural stores, have used up their food and reared much brood, and many are in poor shape at this date (March 20th). To-day a report reached me that one of our well-known beekeeping friends recently visited an outyard and found 45 strong colonies starved to death. A veritable calamity indeed! He uses a very deep hive and in view of how some of our colonies consumed their stores, I can easily imagine how it happened.

Our personal report only concerns the York Co. apiaries as we have heard nothing from the Simcoe Co. yards since last fall. As only raw sugar was fed up there, naturally we are not any too sanguine as to the bees' condition, for I notice that the few colonies around home here that we fed sugar, have shown signs of dysentery for some time. Our apiary in cellar near Fenelon Falls was, according to a good friend of mine who lives near there and who visited the cellar on March 5th, wintering well—that is all we know about them.

Are the aluminum honey combs going to make good or are they destined to be forgotten in the near future, in common with "long-tongued bees," non-swarming hives, and other things too numerous to mention but which we still remember quite well? Dr. Bonny of Iowa, writing in The American Bee Journal, says that they are showing up some decided weaknesses in actual trial. He purchased a set of ten combs and tested them out both in brood nest and extracting super if I remember correctly. He finds that the edges of the cells bent when they came in contact with hard propolis or other substances—this presumably happening during manipulations of the combs. They are made in California, and retail at something over $6 for a set of ten combs. While the price is quite high and would be much higher for Canadian purchasers, yet there is something alluring in the novelty of the invention and many will feel like trying them out in a small way. Just how an uncapping knife would work over these combs I have not seen explained, but perhaps wide spacing of the combs would solve that problem.

It is surprising that quite a lot of honey was left in hands of beekeepers when the slump came. In some cases sickness and other causes prevented marketing, while in others it looks as though higher prices were expected. In the latter case, we can hardly be

Beekeeping demonstration at the apiary of Mrs. S. G. Fowler, Carlisle, N.B.

expected to waste much sympathy, for prices were higher, I verily believe, than we will ever see them again in our generation.

Will carbon bisulphide kill the eggs of the bee moth as well as the moths? I have answered that in the affirmative more than once and thought I was right. But Texas bulletin No. 158 says this is not so. Some years ago at an apiary where we had no late flow, we always stored the super combs after taking off the clover honey, in a large box made of tightly matched lumber. We always gave the combs a good dose of the drug and then closed the lid of box for the season, never opening till following spring. As we never had any damage done by the moths in such cases, naturally we supposed the eggs had been killed as combs were stored in hot days of August.

Some of our best botanists, including Lovell of Maine, who writes much about bees as well as flowers, claim that corn never, under any circumstances, yields nectar. In March issue of The American Bee Journal, a number of beekeepers positively affirm that corn does yield honey. Personally we know nothin for sure about the matter but the bees certainly work hard on the corn bloom, getting abundance of pollen eve if there is no honey.

Although clover has been bare all winter, here in our locality at least, it is now looking well. Although the testing time is yet to come, it has the same chance as in other years, for fields are usually bare by March 20th even if snow has been plentiful during the winter.

I have had many favorable comments regarding the practical talk on queen-rearing given at our last Convention by friend Bisbee of Canfield. No questions but that more of us **could** and that more of us **ought** to raise our own queens, and when the matter of rearing queens is placed before one in the plain practical way as it was, great benefit is bound to follow. It is noteworthy that many of our best breeders are getting away from a lot of the intricacies formerly used and simpler methods just as good are being followed. Many do not transfer larvae any more and personally I cannot see why the other methods of getting cells started are not just as good, and many who are afraid to graft the cells can easily follow the simpler plans.

Bee Diseases

THERE are three brood diseases that are of importance to the beekeeper and two of them are responsible for very heavy losses every year.

Sacbrood is an infectious disease but transient in character. It may be serious enough at times to weaken a colony considerably, but seldom destroys it completely. It appears in the apiary mostly during the spring and early part of the summer, but cases may be found at any time during the season. The symptoms are irregular brood and punctured cappings; the affected larvae are usually dark grey to almost black in color and are found lying stretched out on the lower wall of the cell with the head turned up pointing to the upper wall of the cell at the entrance. The body wall of the diseased larvae becomes toughened while the contents of the body are somewhat watery and granular; the whole can be lifted from the cell intact. There is no definite treatment for this disease, but the beekeeper who keeps his colonies at the maximum strength and uses only young vigorous queens need not fear it.

European foul-brood is a highly infectious disease and spreads very rapidly through an apiary, causing very heavy losses especially among black bees and hybrids. The larvae usually die before being capped over, while still curled in the cell. The color of the affected larva changes from a glistening white to a light yellowish or greyish tint, later turning darker, and the larva settles to the base of the cell in a shapeless mass, finally drying to a dark detachable scale, which is removed by the bees. This disease may appear at any time during the season, but is mostly prevalent during the spring and early summer. European foul-brood is essentially a "weak colony" disease and the beekeeper who uses only young vigorous Italian queens and keeps his colonies strong need not fear it.

American foul-brood does not spread through an apiary as quickly as does European foul-brood, but it is harder to combat. The larvae usually die after being capped over and the first sign the beekeeper usually has of its presence is a number of dark, sunken cappings scattered about among the healthy brood. Sometimes these cappings may be perforated. If the capping is removed, a dark chocolate-colored mass will be found lying on the lower side of the cell. If a wooden toothpick or something similar is inserted into the diseased larva and given one or two turns and then withdrawn, the mass will be found to "rope out" to one or more inches before breaking. This is the chief characteristic of this disease. The only treatment advocated for American foul-brood is to shake the bees on to starters in a clean hive and three days later to remove the starters and give full sheets of foundation. The old hives should be disinfected, the combs rendered to wax for foundation and the frames destroyed. The honey is safe for human consumption but must not be placed where bees have access to it. This treatment should be given during a honey flow, if not the bees will need daily feeding. Further details of these diseases and their treatment will be found in Bulletin No. 26, Second Series, which can be obtained free by applying to the Central Experimental Farm, Ottawa.—Experimental Farms Note.

QUESTION BOX

Conducted by H. G. Sibbald

Preventing Robbing.

How can I prevent my bees from robbing after setting them out from the cellar in April, and how can I stop it if they get started?—T. L.

Contract all entrances down to an inch and weak colonies down to one bee space and do not handle them too much in the day time. If any need honey or syrup give it to them in the evening. If they get started robbing pile grass or straw over the entrance and sprinkle it well with water. Do not open the hive that is being robbed until evening.

Saving the Colony.

One of my colonies is queenless. It is a good stock of bees. What can I do to save it?

First give them a comb of brood from another colony and send to a southern breeder for a queen. Be careful to destroy the cells that will be raised on the brood given or a virgin will hatch and destroy your queen when introducing.

Full Colonies or Combless Packages?

Would you buy full colonies or bees in combless packages?

Would prefer full colonies. If you have drawn combs bees in packages might do very well.

Feeding Syrup.

Could I build up my colonies better by feeding syrup in April and May?

If they have plenty of stores I would prefer to just let them alone. They should build up very well.

To Find Queenless Colonies.

How can I tell if my colonies each have a queen?

Take out a comb in the centre of the brood nest and examine it. If it contains eggs or brood they will be o.k. If they have no brood give them a comb of brood from another colony and examine a few days after and if queen cells are started on the brood they are queenless.

Setting Out Bees.

Should I set my bees out of the cellar in the morning or evening?

Evening after the time for flying is past. They will come out next day and fly more naturally and quickly than if set out in the morning. If the next day is cold and they cannot fly that will not matter.

What Hive and Frame Shall I Use?

The Beginner's Problem, G. A. Deadman, Brussels

ARTICLE THREE.

NOT long ago I read an article in our leading Toronto daily, "The Globe," regarding an English industrial capitalist who makes the claim that larger profits will accrue in factories by having men work six hours instead of eight each day,—of course the men to receive the same pay each day. As he was one of the first to advocate and adopt an eight hour a day instead of a ten, what he says should be worthy of notice. His plan is to have two six-hour shifts instead of one of eight. To be brief the idea is that the men will do more per hour for a six-hour day than one of eight. Then by keeping the factory running for twelve hours instead of eight so much more work is turned out with no more expense as regards some overhead expenses, as interest on investment, insurance, taxes, etc. The part that impressed me was that no record should be taken of the extra wear of machinery because it would be scrapped anyway before it was worn out. I think I read of Dr. Miller giving as a reason for not painting his hives this same idea. I suppose there would hardly be a hive to-day that was in existence twenty years ago if the owner was a close observer and was willing to give the time and money necessary to make the desired change. The Langstroth frame is the one most in use to-day, and who is he that does not know it could be improved upon, i.e., one who is capable of judging upon this matter ? Well, to get back to that long idea hive with the Jones' frame. I wanted to get away from extracting from the brood nest, which had so many things to condemn it, and so, as I said before, I tried to combine the two systems, the long idea and the tiering up, by producing comb honey over the brood nest, and extracted honey at the ends by confining the queen to about eight or nine frames at the centre. To make any kind of a success at this we had to reduce the depth of the Jones' frame for reasons already given. Now by taking about three inches off the depth of our long idea hive and a corresponding one off the bottom of the frame, we had what is practically known as the Gallup frame.

Now about that time no less a personage than the late G. M. Doolittle advocated and used (I presume) the Gallup hive. For wintering his argument was that being nearly square, and the size it was, the bees when clustered would be about the same distance from all parts of the hive. The Jones' frame went one better, inasmuch as it had more honey above the cluster. I understood his objection to it later was that there was not as much super room as he would like above, and I believe adopted the Langstroth. My two objections to it were : The frames are too small for rapid work, because of course there being more to handle to accomplish same results, and in a full strength colony the bees were annoyingly in the way when taking hold of the frames. My hives being all double, having then one-inch chaff-filled space, it gave me ample super room above, and as good fortune would have it, by using the side of the Jones' frame as a top, I disposed of many in that way. In reducing the depth of the Jones frame I made it the same as the width, so that I had uniformity as far as depth of frames went. This Jones frame turned on its side was called, I think, the Jones combination hive. This frame has much to recommend it. It is not listed any more as far as I know. The carpenter whom I referred to expressed his surprise that the Jones frame was not given in the text books same as others. I expect we both understand why now. The long idea hive, whether alone or in combination with super over centre, was not satisfactory. The side storing I found against the natural instinct of the bees unless I gave the queen full swing. It is a wasteful hive, inasmuch as it takes double or more cover material and the same of bottom board, just for the same reason a one-storey dwelling is wasteful from the cost of material view. Those heavy covers, too, so different from just half size used to-day. Fortunately for me the scrapping of this apiary of some 200 colonies was not so serious for by cutting them the next time the perpendicular way I made just two out of one, and so you see them as they are to-day in apiary No. 3, with this exception, however, I use flat covers now, and a half hive in combination, as I will explain later on. I might say, though, to accommodate a longer frame than the Gallup, I had to reduce the thickness of the front wall, doing away with the chaff packing. Apart from all the problems I had in getting down to a frame with the least objections, there was what is known as the shallow frame hive. As I said before, the frame adopted by the beginner is more one of circumstance than choice. Indeed, he is not in a position yet to choose. If he were to ask the Dadants, or the Roots, or Holterman or Anguish or Bramaul, or Chrysler, or a dozen or so more big guns mostly using something different, he would be more muddled than ever, and then on top of it all there are the two distinctly different hives and frames One is known as the deep frame and the other the shallow. Just where the shallow begins and the deep ends I have not been able to discover. A hive six inches deep or less would be no doubt classed as shallow and the Langstroth or anything deeper would be called deep. Mr. Anguish, of Lambeth, uses, I believe, one between these two extremes. Well, just about the time I was about settled on this scrapping business, came along the shallow frame advocates. Handling hives instead of frames was their slogan. It looked so good that I thought I might have to cut my hives in two again, horizontal this time, giving me a hive six and one-sixteenth deep. Instead of doing this though, the new ones I made were this depth. I reasoned in this way : If I find the six-inch shallow hive the best, I can cut the old then, and if I find the deep hive better I can put two of the shallow ones together and make one. The same extractor does both frames. After using both, side by side for years, I think I should be in a position to say which is best, and which is it, do you ask ? Well, there are times when either of them are best, and again there are times when a combination of the two is best. To say the deep frame and its system of management is best is wrong, and to say the shallow frame is best is wrong also ; but that both are best under certain conditions is strictly correct. The deep frame has its disadvantages under certain conditions, and so likewise has the shallow. We have a choice, and more than this, we have the combination of the two systems, which gives us something better than either system alone.

This apiary of G. A. Deadman of Brussels was made partly of scraps from the Long Idea hive apiary with which Mr. Deadman first began beekeeping as described in the March issue of The Beekeeper. This apiary is now one of the largest in Canada.

Keep Bees and Grow Fruit

A new commission to investigate into the promise of small holdings for returned soldiers in the Province of Ontario has been appointed by the Federal Soldiers' Settlement Board with Mr. C. F. Bailey, of the Ontario Department of Agriculture, as chairman. If the committee's work materializes in actual practice, disabled soldiers will be able to obtain small holdings of from 5 to 10 or 15 to 20 acres, and set up beekeeping, fruit growing, or market gardening in a small way, assisted by the government.

The committee consists of the chairman, C. F. Bailey, also Mr. F. F. Reeves, a successful market gardener, of Humber Bay; Mr. J. C. Clarke, who has a 25-acre poultry and beekeeping farm at Cainsville; Mr. Walter Cook, of Cataraqui, graduate of Queen's, and an experienced market gardener; J. E. Johnson, a fruit grower of Kingston, who has been instrumental in forming a co-operative gardening organization in Ontario; Mr. Henry Broughton, of Sarnia, and Mr. A. H. McLennan, a vegetable specialist, who is giving instruction to the soldiers at the Agricultural College, in Guelph.

Send Us Photos

Have you a good photo of your apiary or of any scene that you think might interest beekeepers? If so, send it to us. We are always glad to receive good photos and to publish such as are suitable.—The Canadian Horticulturist and Beekeeper, Peterboro, Ont.

Henry The Great, one of the trucks used in the Pettit apiaries. Note article on the use of the car on this page.

How to Treat Weak Colonies in the Spring

John Moore, Strathroy

EVEN the best beekeepers will have a few weak colonies, and how are we going to save them so that when the honey flow comes on in June they will be strong and ready for surplus boxes.

By a weak colony we mean one that has a laying queen, but has only a handful of bees up to one that may cover three racks. If these were left to themselves during the chilly months of spring it is difficult for them to build up and even some of them would dwindle and die. They want heat and a few more bees.

In setting your bees out it is well to put one of these weak colonies beside a strong colony and by a strong colony we mean one that will cover at least eight Langstroth racks with bees, and if the box is full of bees so much the better, and that on an evening when the thermometer is at freezing. Let the bees have a fly after setting them out, and the first cool evening or day put the weak colony on top of the strong one. I like to cut a hole in a sugar bag about six inches square, lay it on top of lower strong colony, and on top of this a queen excluder, and then set your weak colony on top. The sugar bag closes any cracks between the two hives and helps to conserve the heat ; it also prevents the rush of bees into the upper colony that might endanger the life of the queen. If there is just a handful of bees in weak colony I just leave four racks ; if they cover three racks, then you may leave six or seven racks. See that they have feed and there should be bee bread in some of these racks. Put the racks in the centre of upper box with a division board on each side and pack the intervening space on each side. This will keep them warm, and in a few days the bees will mingle and the upper box will be full of bees from the lower box, and the queen in the upper colony will soon have these racks full of brood. Cover well with cushion and telescope cover so as to keep them dry and warm. Keep them well supplied with feed, for one colony on top of another will consume much more feed than if separate, or in other words more brood will be raised. If they require to be fed and they often do, I cut a small hole in upper cushion (a three cornered piece cut and turned back will do), and upset a ten lb. honey pail with perforated holes in cover. In a few days the pail will be empty, and may be removed. I put on a third box during the feeding process and pack round the pail of warm syrup. Two parts of sugar to one of water this time of year and later on in the spring half sugar and half water is better. When racks in upper colony gets full of brood and warmer weather sets in, remove only side of packing and give more racks for queen to lay. By dandelion time give full racks in upper box, and if both colonies are strong by that time, as they should be, remove lower cushion and just leave queen excluder on. About two weeks before clover honey flow, when weather is warm, separate them, setting the lower colony to one side and the upper colony almost in the place of the lower one. The idea is to have an equal number of bees fly into each colony and to have each colony of about the same strength. If no flow is coming in when you separate them, it is well to place an Alexander feeder under each colony and feed half a pint of thin syrup every evening. By following these directions you will have two rousing colonies ready for the honey flow.

I took out of my bee house forty-three colonies second week of March, and forty-three colonies on Tuesday of this week, the 25th of March. A little pollen the first for this season was taken in on the 25th. Wednesday, the 26th, was a beautiful warm day, and the bees from all colonies were lugging in the pollen fast from pussy willow and soft maple. I never saw so much pollen going in on a March day. Then it turned cold that night, and on Thursday, 27th, it was blowing and freezing with snow flurries falling—such is our changeable climate. My bees have wintered well. All are living, and I have just six weak colonies to be treated. All the rest are strong. Two of these weak colonies are already on top of strong colonies, and the other four will be treated next Monday—March 31st.

The Car in the Apiary Indispensable, Says Morley Petitt

In reference to the use of motor cars in apiary work, where out-apiaries are kept, it would seem about as wise for the farmer to attempt to dispense with horses as for the beekeeper to use them.

We started in 1913 with a Ford touring car and worried along until the end of 1915 carrying things in the back seat and hiring teams for real loads. In the spring of 1916 a Roadster with a box for the back capable of carrying a thousand pounds was a great improvement. An extra leaf in the back spring gave strength, but the overload was hard on tires. During 1917 we were able to do quite rapid work and to dispense with teams entirely by using two light Ford trucks.

Then in 1918 Henry the Great came on the scene in time to bring home the crop, and we wonder how we ever managed without him. On the chassis of the ton truck the body from a roadster was first placed. This gives a comfortable cab and occupies very little more space than the uncomfortable ones provided with commercial bodies generally. To the sides of the sills of the Roadster body oak sills for the box were bolted, and the box made of hardwood was securely bolted to that. This box will hold ten 10-frame supers on the bottom, with extra space at sides and end. Full supers may be piled five high when they come about even with the top of the cab. Such a load weighing about 3,000 pounds makes the springs ride nice and easy and on good roads will never shift, though we usually rope them. The shelving which is put on or off without difficulty by two men may be used with or without the rack sides. The complete rack holds one hundred supers or combs without stacking them higher than the top.

When a load of full supers comes home from an outyard it is driven straight into the garage and the doors closed so that robbers are shut out immediately. The load is then stacked in the extracting room at the left. Upstairs is storage room for supers, also the carpenter's shop, and there is a trapdoor right over the truck as it stands in the garage. This combination of garage, apiary building, carpenter shop and storage greatly simplifies transportation and makes us entirely independent of teams. We also have a roadster for driving or light trucking, as it is easily convertible. With fewer hills we would attach a trailer to the truck.

Norfolk Co. Beekeepers Meet

On March 21 the beekeepers of Norfolk County met in the Town Hall of Simcoe, Ont., where an excellent convention was held. Mr. J. A. Armstrong, President of the Ontario Beekeepers' Association, spoke on "Bees Can be Made to Pay," and also conducted a question box. A discussion of current problems was followed with interest by all present.

New Brunswick Beekeepers Condemn the Use of Honey Substitute

THE Beekeepers' Association of N.B. held their annual meeting at Fredericton on March 14, 1919.

The secretary-treasurer's report showed a membership of 114 at the close of the year, also that the Association had handled supply orders to the amount of $1,222.22.

The following officers were then elected for the ensuing year:

President—George L. Pugh, Nashwaaksis, N.B. First Vice-President—H. B. Williams, Tracey Station, N.B. Second Vice-President—T. H. Manzer, Aroostook Junction. Secretary-Treasurer—L. T. Floyd, Fredericton. County Directors—Albert, Cecil Steeves, Forest Hill; Carleton, Harry G. Miller, Tracey's Mills; Charlotte, A. T. Reed, Rolling Dam; Gloucester, Maynard Smith, West Bathurst; Kent, J. B. Vanton, St. Louis; Kings, Franklyn Wetmore, Clifton; Madawaska, Wm. J. Moran, Edmundston; Northumberland, J. W. Vanderbeck, Millerton; Queens, W. T. Inch, Hampstead; Restigouche, Rev. J. H. McLean, Dalhousie; St. John, Hary Armstrong, 40, Summer St.eet, St. John; Sunbury, J. B. Young,

Oromocto; Victoria, A. L. Green, Plaster Rock; York, David Hiscoe, Fredericton; Westmorland, Prof. W. G. Watson, Sackville.

Resolution Passed.

After the election of officers the meeting discussed different phases of the work terminated in the passing of the following resolution:—

"Resolved, that this association request the Department of Agriculture to finance the purchase of its requirements in glass jars until such time as they can be delivered to the individual beekeepers and the accounts collected from them."

That the following resolution be forwarded to the Minister of Agriculture at Ottawa:—

"Resolved that whereas every endeavor is being made by the New Brunswick Beekeepers' Association to develop and increase the production of honey in our province;

"And whereas a profitable market for pure honey is essential to the maintenance and increase of the present production;

"And whereas, we believe that the sale of a honey substitute termed Hono-mo-leen is detrimental to the market for pure honey;

"We therefore protest against its sale in Canada and urgently request that legislation be enacted to prohibit the sale of it and other substitutes which are offered to the public either as honey or as being equal to pure honey, or to provide that such substitutes must have printed on the labels of their containers the words 'Not bees' honey' and a statement of the materials used in the manufacture of the product."

The association also decided to request the Department of Agriculture to grant one delegate from each county the same privileges accorded to members of the F. and D. Association, namely, to pay part of the expenses of these delegates to the annual meeting of the Beekeepers' Association meeting.

It was unanmously agreed that the following resolution of thanks be sent to the Department of Agriculture:—

"The beekeepers now in session appreciate the efforts and assistance of the department in aiding and encouraging the work and hope it may be continued. We fully approve of the work done by Mr. Floyd in the past year and find him interested, qualified and willing to establish the industry."

Dr. Gates Resigns

To the Beekeepers of Ontario:

"That will be a news item for the 'Beekeeper,'" someone remarked this morning. Just so! It has not been generally announced that the Provincial Apiarist has resigned. There is no dissatisfaction: it is trusted that there is no dissatisfaction on the part of the beekeepers. In resigning as Provincial Apiarist, the writer has also resigned as Secretary-Treasurer of the Ontario Beekeepers' Association. To the vacancy caused, Mr. James Armstrong, President, has appointed Mr. Wm. A. Weir, Ontario Agricultural College, Guelph, as Secretary-Treasurer, pro tempore. Communications should be addressed accordingly.

The writer has enjoyed your Convention at Toronto, has enjoyed the courtesies of the beekeepers, their business and letters. The possibilities of large beekeeping for the Province are promising, the enthusiasm in beekeeping at the College is assured, but a complex of other circumstances have caused the writer's decision. However, the writer wishes to continue the pleasant relationships, official and private, with the beekeepers of Ontario. Be assured that any assistance which can be given will be cheerfully accorded. In retiring, the Provincial Apiarist wishes the best of luck to Ontario beekeepers; — but remember, luck is spelled in a number of ways— with suppression of brood diseases of bees; with improved beekeeping practices—as the control of swarming; with business principles of beekeeping, and with stick-to-itiveness.

BURTON N. GATES.

Guelph, Ont., April 18th, 1919.

"Mary had a little bee,
'Twas worth a lot of money,
For when the sugar bowl was cleaned
She substituted honey."

HERE AND THERE WITH THE BEEKEEPERS

Short Reports of Ontario Conditions

Belleville

April 2nd, 1919.

Having had such an extremely mild winter, bees in our locality have wintered well. Several have their bees out, while a few of us still have them in their winter quarters. At the present time prospects are not quite so good owing to the changes in weather, which no doubt will have a tendency to affect the clover.

J. N. CHISHOLM.

Bradford

Apr. 8, 1919.

In Simcoe County bees have wintered well, and appear to have plenty of stores to supply immediate needs, of course, the worst is yet to come, but it is almost a certainty that an early spring would insure Beekeepers of plenty of bees.

Clover conditions are very poor. A small acreage, and what there is is badly heaved, even sweet clover is greatly damaged; our only hope in our locality is basswood and buckwheat.—R. G. Houghton.

Burrill

April 1st, 1919.

Reports of wintering of bees in this section are good, hardly any losses except some from faulty Queens. Cellar bees become a little too early restless, set them out on 25th and 26th of March, fine flight, almost no dysentery. Some pollen came in, therm. 63! But now the cold N. wind is blowing daily, ther. 24—40. Clover does not look too well, spotted and some heaved up. JACOB HABERER.

Chatham

April 2nd, 1919.

Bees have wintered well in this section. The mild winter has induced some colonies to breed too much in mid-winter and consequently some may be found short of stores. Last summer's late white honey has granulated badly and may cause some trouble. The past week has been quite cold with high wind.

C. E. CHRYSLER.

Iroquois

March 28, 1919.

Beekeeping in this locality is in rather a backward condition, although we are in a good honey locality, as there are hundreds of acres of heavy clay lands which will grow heavy crops of alsike clover from year to year without the farmers sowing any, and it seems almost a pity more of the nectar is not gathered which would be if we had the amount of bees in the locality we should have. R. E. L. HARKNESS.

Little Britain

April 7, 1919.

From consultations with other beekeepers I would suppose fully 90% of the bees have wintered in this section. In my own case I can report 100% wintered, but how they may stand the spring I cannot say. Just one showed signs of dysentery about the middle of March. This I placed above a strong colony with queen excluder between, which I think is a good plan. They build up well, though I must admit queens are occasionally lost in this way.

WESLEY W. WEBSTER.

Apiary of W. A. Rowland, Weston, Ont. Bees are kept in permanently packed double cases. This yard is mainly used for queen rearing.

Bird House Competition

The Guelph Horticultural Society recently prepared the following rules and general information governing its third annual Bird House Competition, to be held at the City Hall, early in April.

The competition will be open to all boys and girls in the county of Wellington.

All bird houses must be the sole work of the exhibitor and have been made since January 1, 1919.

All entries must have a card attached with the name, age, and address of the exhibitor written plainly.

Exhibitors may sell their houses marking the price on the card.

All houses should be made so as to permit of cleaning out. They should have tight roofs to shed rain, and a few smaller openings near the top for ventilation. A couple of small holes can also be bored in the bottom.

Houses should be so constructed that they can be firmly atached in their proper positions.

The entrance hole should be near the top with the exception of the martin houses, and robin and phoebe shelters.

All houses with the exception of martin, robin and phoebes should be rough finished inside to allow foot hold for birds. This is especially important for woodpeckers.

There Will be no Entry Fee Charged.

Prizes will be offered annually for the best prepared note book of bird observation. This note book might record the dates of arrival of birds from the south, how many were seen, when did they become common, dates of nest building, dates of egg laying, when the young leave the nest, description of songs, etc., or any interesting observations in connection with bird life. Keep your eye on the family cat, as they are very destructive to bird life.

The following are the dimensions for the different kinds of houses.

Blue bird, nut hatch and tree swallow houses:—For tree swallow and blue birds inside dimensions 6 inches square or round, inside diameter for nut hatch 4 inches; in both cases 8 inches to 10 inches deep, opening 2 inches, not less than 6 inches from the bottom. These houses can be placed 5 feet to 10 feet from the ground.

Martin houses:—Several compartments, 8 or more, each 7 inches square, entrance hole 2½ inches square or round, near or at the bottom of each compartment.

Wren and chickadee houses:— Inside diameter 4 inches, square or round, 6 to 8 inches deep, opening 1⅛ inches near the top. Houses to be placed 6 to 10 feet from the ground.

Flickers:—Diameter inside 8 inches square or round, 14 to 16 inches deep, opening 3 inches near the top, sawdust in the bottom is important; to be placed 12 feet to 20 feet from the ground.

Robin shelters:—8 inches by 8 inches by 6 inches high.

Phoebe shelters:—6 inches by 6 inches by 6 inches high.

In both cases one or more sides open, to be placed 8 to 12 feet from the ground.

Prize List.

	1st	2nd	3rd
For martin houses	$3.00	$2.00	$1.00
For wren and chickadee nesting boxes	2.00	1.50	1.00
For blue bird, Nuthatches or tree swallows	2.00	1.50	1.00
Flicker nest boxes	2.00	1.50	1.00
Robin and phoebe shelters	2.00	1.50	1.00
For best design of bird baths	2.00	1.50	1.00
For best feeding shelves	2.00	1.50	1.00
Best note book of bird observation	3.00	2.00	1.00

For further information apply to any member of The Bird House Committee.

Committee—R. S. Cull, Prof. J. W. Crow, R. E. Barber, R. K. Readwin, J. T. Power, Angus McKenzie.

For making future observations of any kind, particularly of nests, do not under any circumstances disturb the nest in any way. Do not handle the eggs, or young, or disturb the surroundings, as many birds will immediately abandon their homes upon intrusions of this sort. Protect the birds, and do all you can to further their welfare. Birds are the greatest destroyers of insect pests we have. Protect them and assist in the welfare of our crops.

Items of Interest

The United Fruit Companies of Nova Scotia handled 140,000 barrels of apples or about a quarter of the Annapolis Valley crop. The headquarters of the company are to be moved from Berwick to Kentville.

In an address to Norfolk County fruit growers recently, Mr. W. F. Kydd, of the Ontario Department of Agriculture, said that winter injury had caused thousands of apple trees to die in Ontario and Quebec during the past year. Around Montreal the Snows are dying, around Kingston the trees are practically gone. From Toronto to Trenton certain varieties were badly hurt. In Western Ontario many of the Baldwin trees are dying, and as the Baldwin trees were a heavy-bearing variety, the winter injury will cut down a lot of production.

# of Soda

NOW AVAILABLE

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Nitrate of Soda the Basic Fertilizer

The average yield of wheat in Europe was 33 bushels to the acre, while that in America has been only 14 bushels. The use of fertilizers explains the difference.

And Nitrate of Soda is the basis of practically all Fertilizer mixtures.

It will be used more and more as the years develop and as agriculture advances.

A comprehensive report on "Nitrate of Soda, Its Nature and Use in Agriculture," has been prepared by the Dominion Department and is printed on another page of this paper. It has been prepared by Frank T. Shutt, M.A.D.Sc., Dominion Chemist, and B. Leslie Emslie, F.C.S., Supervisor of Investigational Work With Fertilizers.

Because Nitrate of Soda is readily soluble in water it is most economically employed as a top dressing to the growing crop. Some may be used at the time of seeding and the remainder in a few weeks after the young plants are a few inches high. For garden crops, smaller and repeated applications are recommended. Application should be made on a dry day. In the garden it may be sprinkled between the rows. For the lawn it may be dissolved in a barrel of water and sprinkled on with a watering can.

Nitrate of Soda Greatly Increases Yields

The Ontario Experimental Union reports an increase of about 6 tons of mangels an acre from the use of 160 lbs. of Nitrate alone, this based on experiments in different parts covering several years. With the use of 80 lbs. of Nitrate to the acre, the yield of rape was increased over 2 tons. Such increases are profitable to all farmers.

Price and Instructions for Ordering

The Nitrate of Soda is stored in Ontario at Brighton, Cobourg, Trenton, Nobel and Sulphide. The price is $82.00 per net ton in carload lots, f.o.b. cars at shipping point. The Board reserves the option of selecting the shipping point.

In less than car lots the price will be $9.00 per bag, weighing approximately 200 lbs. each, f.o.b. shipping point. Minimum shipment five bags.

All orders must be sent to Imperial Munitions Board, 56 Church St., Toronto, and each order must be accompanied by a marked cheque or money order for full amount of the purchase. Cheques and money orders should be made out in favor of Imperial Munitions Board, and must be payable at par in Toronto. In ordering please give full shipping directions including your Post Office address, name of railway and of your nearest railway station. All shipments will be made promptly. Freight charges will be collected on delivery.

Church St., Toronto, Ontario

Marketing Tender Fruits*

C. W. Baxter, Dominion Fruit Commissioner

IT is doubtful if there is any manufactured article or product of the soil over which the producer or manufacturer exercises as little control as in the marketing of tender fruits. This may at first thought appear to be a strong statement, but let us try to enumerate the various commodities we purchase where the price is not definitely stated by the merchant, and we will find they are few, if any. In fact, the price asked by the retailer for many commo ties is fixed by the producer or manufacturer.

To make a direct comparison between staple products and tender fruits, would be unfair, because of the very perishable nature of the latter. Nevertheless, there are certain fundamental business principles lacking in our present marketing methods, which if applied, would eliminate much of the "gambling" element now obtaining and would put the fruit industry on a much more solid basis than it is to-day.

In seasons of short crops it does not require any great salesmanship ability to market the fruit, the demand being equal to the supply, or greater. In seasons of big crops the usual method is to sell all that is possible on an f.o.b. basis and consign the balance to the various market centres without control. In many instances the fruit is consigned to the same market as that which is sold f.o.b. and is offered at lower prices, which naturally creates dissatisfaction. In seasons of big crops it is quite common to find a few large centres greatly overstocked and fruit selling at prices which do not return to the grower the cost of production, while numerous cities, towns and villages are receiving small shipments which sell at such high prices that consumption is greatly limited. One of the greatest needs of our fruit industry is a more even and a wider distribution. Our past efforts towards developing our markets have not kept pace with our efforts towards production, and unless some steps are taken in this regard there can be only one result—an unevenly balanced industry. If we are going to increase production we cannot afford to neglect our markets. We must be prepared to take the necessary steps to increase consumption. In years of big crops this cannot be successfully accomplished except through organized effort. During seasons of short crops the necessity for organization is not so keenly felt, and when left to marketing time is not possible.

INCREASING CONSUMPTION.

We have had some excellent examples of what can be accomplished in the way of increasing consumption of perishable commodities. Harvest time in 1914 found Canada with a big crop of apples, the empire at war and our export markets practically inaccessible on account of ocean steamer space. Buyers were inactive and the situation seemed almost hopeless. The Dominion Government took advantage of the opportunity to not only help the growers and shippers, but also to demonstrate what could be done by the application of present day methods to the marketing of apples. To this end an advertising campaign was carried on, which greatly increased consumption. Small towns that had in previous seasons bought only a carload, bought several in 1914. In the cities the increase in consumption was estimated at from 100 to 250 per cent., and the spring months found our dealers importing barreled and boxed apples from theUnited States in large quantities.

Another excellent instance of what can be done in the way of increasing consumption, was exemplified by the results of the campaign which was carried on in 1918 to increase the consumption of vegetables, of which there was a surplus, and which was likely to be a great loss to the producers. An inexpensive advertising campaign was carried on and the results were much more satisfactory than were anticipated.

The campaigns, of course, were put on during war time, and one may argue that the excellent results obtained were due to the patriotic spirit which prevailed at the time, and that the same results could not be obtained during normal times. This may be true to a small extent, but we must admit that it should be much more difficult to increase the consumption of onions than the luscious Ontario grown fruit.

We are not unmindful of the many successes attained by individual effort in marketing, or of the satisfactory prices obtained during the past year, due to abnormal conditions, but if our fruit industry is to occupy the position it rightly deserves and is to develop to the extent it should, it is my opinion that our only hope is through organized effort. Very little can be done through individual effort ; the cost would be out of all proportion to the value of the crop, but if organized along sound, tried business lines, the marketing possibilities in the Niagara Peninsula should be limited only to its maximum production

*Extract from an address delivered recently before the Niagara Peninsula Fruit Growers' Association.

Guelph

The annual meeting of the Guelph Horticultural Society held recently showed the past year to have been a most successful one for the society. The aster was adopted as the floral emblem of the society and its cultivation throughout the city will be encouraged. The lawn and garden competitions that have been a feature of this society's work for some years were a distinct success last year.

The New Standard Fruit Package*

C. W. Baxter, Dominion Fruit Commissioner, Ottawa, Ont.

MANY changes have been made in our fruit packages as a result of the last amendments to the Inspection and Sales Act. Some of these will interest fruit growers in Ontario very little inasmuch as they are seldom used here, but are the popular packages on the Pacific Coast. The changes of greatest interest to Ontario growers are in the apple barrel, apple box and crate. When the barrel was first defined, a minimum capacity of 96 quarts only was required. Ontario at that time was using a barrel of larger capacity. We therefore had practically only two sizes in use in Canada, the 96 quart barrel in Nova Scotia and a larger one in Ontario. Nova Scotia has, up to the present, held to the 96 quart barrels with very little variation, but in Ontario during the past few years, there has been a number of varying sizes due largely to the lessening of the bilge.

The question of the adoption of the standard barrel for Canada, has been a matter for frequent discussion at the various fruit conferences, but Nova Scotia was reluctant to agree to any change until the United States adopted a standard barrel, and because some of the States do not permit apples to be sold in any other size. Another reason why Nova Scotia did not desire a change was that growers and shippers had established a reputation in the London, Eng. market, and they considered that exclusiveness of package was of some advantage. If such ever existed, it disappeared during the past few years as the returns have shown, and Nova Scotia fruit growers were the first to recommend the adoption and standardization of the so-called American barrel of about 100 qts. capacity.

The use of the standard barrel becomes effective on June 1st, next. A number of barrels of the old style are still in the hands of the growers, and we hope before the packing season opens to provide for the use of these, as it is the wish of the Department that we shall adopt the standard barrel without loss. This may result in the identity of the source of the fruit becoming unknown owing to the fact that all apples hereafter packed in barrels, whether grown in Canada or the United States, will be in the same sized package. In order that we shall preserve our standing in the markets of the United Kingdom, I would recommend that in addition to the marks required by the Inspection and Sale Act, the words "Canadian apples" should appear very prominently on our barrels and boxes.

Boxes.

In Ontario, a comparatively small portion of the crop has been packed in boxes, although the number is on the increase. Heretofore our apple box, like our barrel, was of minimum dimensions and applied to export shipments only, although it was generally recognized to be a standard box for both home and export markets.

The question of the standardization of the apple box has been a very live question in British Columbia for a number of years, due to the fact that our box was larger and came into competition with fruit packed in what is known as the Oregon box, which is slightly smaller. So contentious a point has this been in British Columbia, that at the Dominion Fruit Conference held at Grimsby, Ont., in 1914, the British Columbia delegates agreed among themselves that they would not introduce the subject. However, all objections to the change from the Canadian box to that of the Oregon box, were apparently overcome, as the delegates to the conference at Ottawa in March, 1918, were unanimous for its adoption. As this box is the accepted standard in all the States of the Union, we now have in addition to a standard barrel, a standard box. Here again we realize the necessity for maintaining the identity of Canadian grown fruit on the export market, by having our boxes plainly marked with the words "Canadian Apples".

Uniform Sizes.

In describing the dimensions of the various fruit packages, there was one thought kept in mind, namely, to have all of equal length to facilitate loading of cars. Therefore, as the standard apple box was 18 inches in length it was necessary that the apple crate be the same. Although the apple crate may have its place, yet with the new domestic grade, we no doubt will not find so much use for it as formerly, as it cannot be considered a very sanitary package because of the width between the slats.

The Pear Box.

Another package which has been standardized, is the pear box, which is also to be used for the shipment of crab apples. The Ontario fruit grower is not so much concerned in the use of this as are the growers in British Columbia, but it is just a question as to whether the growers in Ontario should not give a little more attention to the possibilities of shipping crab-apples in boxes to the Prairie markets. This has proven to be remunerative to the fruit growers there.

Peach and plum boxes have also been standardized, and while varying in depth are the same length as apple boxes. The cherry box described in the Act is commonly known as the lug box in the west. I do not think it has ever been used in the east. Another package used in the west is the four basket crate, but this is seldom used here.

*Extract from an address delivered at the last annual convention of the Ontario Fruit Growers' Association held in Toronto in February.

Fruit, Bees and Poultry for Soldiers

The committee on small holdings for soldiers, under the Soldier Settlement Act, has issued a report.

The report provides for seven options which may be taken advantage of by men who are not physically able to cope with the strenuous duties of a large farm, but who wish to make their living from the land. The committee recommends that small holdings be taken up only by men partially disabled, who have some assured income by way of pension.

The outlays necessary on the part of the soldier for the securing of a small holding vary from $1,500 to $5,000, all of which may be borrowed from the Government, to be repaid with 5 per cent. interest in 25 years. In the case of the $1,500 investment the largest yearly repayment comes in the third year, when $268 will have to be returned by the soldier farmer to the Government. Where the investment amounts to $3,635, the greatest annual payment is $350, and the committee estimates that in the third year of his venture he should realize a profit of $1,375. This would be on a chicken and bee farm on five acres of land.

Chickens and Bees.

The options include the opportunity of a chicken farm, a bee farm, mixed farming on a small scale with a specialty such as truck farming or dairying, with high revenue possibilities, and truck farming with a chicken raising specialty.

The first option provides for the acquisition of 3 to 5 acres of land at a cost of $800, and other equipment bringing the investment up to $1,500. This would include the purchase of a horse at $150 and a cow at the same figure, with 25 chickens at $2.00 apiece as a beginning for a very much larger activity in this. The second option is that of chicken and bee farm, with small fruits, including currants, raspberries and cherries. The suggestion is to commence with 100 to 500 chickens, which will utimately be increased to 2,000, and with 15 hives of bees, which can be developed into 50 or 75 colonies. For those who have had two to five years experience of this sort of work a market garden specialty is provided where 5 acres of land, at a maximum price of $300 an acre, will be allowed.

Colonies of Soldiers' Families.

The scheme provides for colonies of 5 or 6 soldiers' families to take up small farming in the same neighborhood. It has been devised in response to more than 1,000 applications from returned men in Ontario who want to be placed on small farms under the Soldier Settlement Act, but whose requests could only be treated in a vague way up until the finding of the committee which has been now announced, formulating the small holding programme.

Potato Growers Organize

The potato growers of Manitoba formed a provincial potato growers' association, April 2, with the following officers:—

President, C. H. Whellams, East Kilonan; vice-president, R. P. Andrews, Bird's Hill; secretary, Professor F. W. Brodrick, M.A.C., Winnipeg; executive, J. L. Elders, West Kildonan; J. D. Halliday, West St. Paul.

The association decided to ask the Dominion Department of Agriculture to establish a standard of varieties and fixed grades of potatoes for the Dominion. The types recommended for cultivation in Manitoba were: Early Ohio, the Beauty of Hebron, Irish Cobbler, and Green Mountain.

Protecting Orchards in Quebec

Rev. Father Leopold, O.C.R., Professor of Horticulture, Oka Agricultural Institute

ANYBODY who gives the subject of orchard protection consideration will find that it is a relatively important one, which is closely related to the subject of the location of a site for fruit-growing.

High and strong winds are always to be avoided, if possible, for many reasons: they blow off the fruit either in a mature or immature stage; they injure the trees, especially if thinning has not been thoroughly practised.

On the other hand, high and rolling lands are best suited to most fruits, as winds there find free course, the atmospheric drainage being good, still air is avoided in frosty weather and there is good natural water drainage. These winds on rolling land are beneficial because they bring in warmer air, and they keep the air in motion in frosty weather. But if these high lands need protection somewhere from strong winds, a wind-break will be benficial, if it is placed so as not to endanger atmospheric drainage or if it does not expose the trees to injury from frost.

There is another point that will favor the planting and maintenance of a wind-break, that is, winds, in arid regions especially, abstract a large quantity of moisture from the soil and the plants. This can be diminished to a certain extent by wind-breaks. In arid or semi-arid countries, and in districts where the soil is light and leachy, but especially where there are large tracts of land whose incoherent soils suffer from the drifting action of the winds, it is important that the velocity of the winds near the ground should be reduced to the minimum.

Here are briefly the reasons which favor a wind-break that does not prevent atmospheric drainage, but breaks the violence of the severe winds:

1. The obvious advantage is in keeping fruit from blowing off.

2. It protects from cold winds, especially in blossoming time. In certain unprotected orchards, a north-west wind will destroy half or more of the crop.

3. It retains snow, and thus greatly protects the trees, which come out much more fresh than those exposed.

4. In summer it prevents winds from drying up the fruit, keeping more moisture in the soil and in the leaves of the trees.

5. Protected trees are kept in better shape than the others. The trees become more firmly rooted, are more upright.

6. Trees are less injured during a wind storm, less branches are broken.

Against these advantages which as a whole render the orchard more productive, there are a few reasons that under certain circumstances may prove that wind-breaks are detrimental. But on the whole, one finds that those complaining of losses from cold weather, have gone too far in establishing the wind-break. Either it is a very thick hedge of Norway Spruce or a natural forest that adjoins the orchard.

Fruit immediately adjoining the wind-break is apt to be much injured by insects and diseases, and to be small and inferior in color. The trees are less thrifty and there may be greater damage from late frosts in sheltered plantations. But if one follows the following principles, there is no reason to fear loss from a wind-break.

1. If a wind-break stops or deflects a warm wind, it may prove injurious. If there must be a protection, for instance, on the lakeward sides of plantations, let it be simply a wind-break and not a wind-stop.

2. Thorough spraying with modern devices will overcome insects and fungi on trees immediately adjoining a wind-break.

3. If good cultivation is practiced, wind-breaks will not lessen the vigor of one or two adjoining rows, if the wind-break is established only at the planting of the orchard. The older the wind-break, the farther should the fruit trees be from it.

4. In interior localities, far from the water front, establish a denser protection than otherwise. Winds, coming off the land, make a plantation colder. Coarser evergreens planted close together are advisable for interior places, while deciduous trees, or evergreens more scattered are better for water fronts.

5. Choose for a wind-break trees that are most thrifty and healthy and which are least infested by fungi and insect pests.

6. Norway spruce, Austrian and Scotch pines are the best trees to use among evergreens. Among deciduous trees, I would plant a double, Lombardy poplar on the outside and Norway maple inside, the first planted 20 feet in the rows and the others between each poplar but in a separate row, 10 feet from the row of poplar.

7. Plant the first row of fruit trees at 40 feet from the wind-break.

British Columbia

Chas. L. Shaw.

The British Columbia Fruit Growers' Association is asking the provincial government to establish weather bureaux in each horticultural division so that warning can be given of approaching cold weather and preparations can be made for "smudging".

Interest in small fruits is growing, especially on Vancouver and on the Lower Mainland. On Lulu Island a concern proposes to put 320 acres in loganberries. The project will necessitate the employment of 100 laborers the year round and about 1,400 pickers. It is planned to make this section the centre of the loganberry juice business in British Columbia, remarkable success having attended this industry in Oregon. Small fruits constituted more than one-fourth of the total fruit production in British Columbia last year.

POULTRY YARD

Feeding Suggestions

Many poultry keepers do not give oats the place in the ration they should have. This is probably due to the fact that much of the oats that are placed on the market are not properly filled, and when offered to fowl, are not eagerly eaten. Oats have a fibrous hull, and it is probably largely on that account that fowl take more readily to wheat or corn, but, where oats are of good quality, they are an excellent feed, and as soon as the flock becomes accustomed to them they will eat them readily.

Oatmeal was formerly used to a considerable extent in the feeding of chicks, and at the present time pinhead oatmeal is used in nearly all chick-grain mixtures, but rolled oats are now used much more freely. It is a very valuable feed and, where it can be obtained at a reasonable price, should be used. Many high-class breeders use it freely for the feeding of chickens even when they have to purchase the superior product intended for human food, and claim that even at that cost, the results justify its use.

There is very little difference in the analysis of barley and wheat, the barley being a little higher in protein. The hull makes it less palatable, but fowl soon become accustomed to it, and consume it readily. It might well be used to a far greater extent than it is, as it apparently gives almost as good results as wheat, and is usually much cheaper. Barley meal is used to a considerable extent, especially in crate feeding. It gives satisfactory results both in quantity and quality of flesh produced.

Sunflower seeds are not fed extensively, but many town poultry keepers grow a patch of sunflowers for their fowls, bending the heads down as soon as the seeds fill, and allowing the hens to help themselves. They are of especial value to "fanciers," who use them at moulting time and also for getting coloured birds ready for the show, as they give the coveted gloss to the plumage.

Cabbage, lettuce, onion tops, or practically any waste garden truck may be utilized in the poultry yard. Unmarketable carrots, parsnips, onions, small potatoes, or similar roots may be stored and fed in the winter. These latter are more satisfactory when boiled and mixed in a mash.

Rape is one of the best crops to grow for green feed for summer use where fowls are more or less confined. It is easily grown, gives a large yield, and fowls eat it with avidity. It is an excellent crop to freshen the runs after the breeding season.

April Hatched Pullets

Experiments conducted at the Ohio Experiment Station to determine the influence of time of hatching upon the egg production of pullets indicates that about April 20 is a satisfactory time to hatch the lighter breeds of fowls raised particularly for egg production.

Pullets hatched February 22 were found to lay well from August 10 to November 1, but during late fall and early winter went through a molt similar to year-old hens. The results secured with pullets did not justify the expense and labor involved in brooding the chicks during cold weather.

A profitable egg production was secured with pullets hatched June 13 but it was found more difficult to rear a satisfactory percentage of the chicks at this time than if they were hatched during the latter part of April.

Feeding the Chicks

Chicks should not be fed until they show positive signs of hunger, which will be between two and three days after hatching. They should then be fed a little at a time and often—say five times daily, depending on light, easily digested feeds such as bread crumbs slightly moistened with milk, or bread crumbs and curds, just enough scratch grains being fed to get them used to them. The chicks should have access to a dish of dry mash so as to get them started on this feed as soon as possible. This light feeding should be continued for about a week, when the feed may be gradually increased, at which time it may be about as follows :

First feed, bread crumbs moistened with milk, just what the chicks will clean up, on a little clean sand or chick grit ; second, finely cracked mixed grain ; third, rolled oats ; fourth, moistened bread crumbs ; fifth, finely cracked mixed grains. If too early to get the chicks on grass, green food is supplied in the form of young lettuce, sprouted grains, or any other tender, succulent food that is acceptable After the chicks are ten days to two weeks old, coarser feeds are allowed and the bread and milk discontinued. All changes are made gradually. When on range, hoppers, in whigh are placed grains and dry mash or rolled oats should be put where the chicks can have free access to them. As soon as they become accustomed to the hoppers, the hand-feeding is reduced to the mash feeds and, if the chicks are on good range, it will be found that after a time they will get careless about coming when called. The mash may then be dropped and dependence placed entirely on the hopper feeding. Place grit, water and a dish of sour milk where the chicks will have free access to them.

The mash may consist of equal parts bran, middlings, cornmeal, and one half-part fine beef scrap, but the composition is more or less dependent on the feeds that are most available.

Poultry Feeds

Jerusalem artichokes are of much greater value as a crop for poultry feeding than is generally realized. The tops may be used as green fodder in summer or the tubers as roots for winter feeding. Both are readily eaten. The plant resembles the sunflower, but it is finer in growth, having smaller leaves, stalks and flowers. Growing as it does to a good height, it also makes an excellent shade during the hot weather.

BEETS.—For winter feeding, mangles and beets are the best form in which succulence can be provided for poultry. They are easily grown, yield a large amount of feed per acre, keep well, are handy to feed, and fowl are exceedingly fond of them. Care should be taken in planting them to see that the most suitable varieties are used. Some of the varieties of beets are not so readily eaten as others. Avoid planting those that are very hard in the flesh, as fowl prefer those that are tender.

Corn, oats, rye, barley, and wheat all make good green fodder for poultry, if cut at the right time and chopped into short lengths so that the fowl can readily eat them. They are especially useful in the feeding of waterfowl.

Mites on Poultry

Mites and lice feed on poultry. If numerous enough the birds will be kept poor and few eggs can be expected. The mites live on the roosts and in the nests. When the birds are on the roost or on the nest the mites crawl onto them and suck themselves full of blood and then crawl back on the roost or into some crack. To get rid of the mites clean the poultry house and nests and wash the roosts and nests with a solution made up of 4½ gallons of water, one quart of sheep or cattle dip and one quart kerosene, be sure to get it into the cracks and corners. Then put fresh straw in the nests.

Lice live on the birds all the time, so to kill them the birds must be treated. Lard can be used. Rub it well into the skin under the vent and under the wings on grown birds and for chicks rub it onto the head and under the wings. Dusting with lice powder is also helpful and a dust box containing ashes or fine road dust is also helpful in keeping down lice. A well cleaned and whitewashed (inside and especially roosts, nests and walls) house also helps keep down both mites and lice. — N.D.A.C.

The Leghorns are the most prolific and precocious of all the varieties of poultry. The utility Leghorns are wonderful layers, and, being particularly hardy, they lay eggs freely both summer and winter.

The Andalusians are very handsome as well as excellent layers of large eggs. They are claimed to be better table fowls than most of the Mediterranean breeds.

Non-sitting fowls are, as a rule, smaller than those that incubate. The larger birds, though they require more food, do not necessarily produce more eggs. In fact, there is no breed of fowls in which the big birds are the best layers. The smaller hens are the most profitable for egg purposes. Amongst the non-sitting fowls most suitable for small runs are the Minorcas, Leghorns and Andalusians.

C. H. Wyckoff says that 100 pullets, hatched at one time, and raised together, were placed in one house, and when one laid she was taken out. This was continued until there were fifty in each house. A critical examination showed that nearly all that were laying were of a certain type —while those that were unproductive, were of another type—a longer legged, ungainly, slim-bodied hen, that spent her time looking for something to get scared at. A record of the two flocks showed a difference of twenty per cent. in the number of eggs laid. No. 1 kept laying until nearly denuded of feathers, and after molting began laying before No. 2 did. A short-legged, deep-bodied, full-breasted, wedge-shaped, large combed hen, with a quiet disposition, has capacity to consume large quantities of food, and return eggs instead of noise and flutter.

The Minorcas are more generally kept for purely egg supply, their eggs being large. They are moderate eaters and stand confinement well.

Fruit Marketing Requirements*

C. W. Baxter, Dominion Fruit Commissioner, Ottawa

THE history of fruit growing in Canada shows that the men who have been continually engaged in this work are what may be called "good sports." This is because they are intelligent ambitious, energetic and willing to tackle big things, conscious of the fact that they will probably meet with disappointments. If we want evidence of this it will be found in the spirit of optimism which is so evident to-day after our years of great uncertainty and the anxiety as to labour supply and markets, as well as the great losses sustained by the killing of fruit trees during the severe winter of 1917-18. I do not remember a time when there was more interest displayed in fruit growing than at present. Many of our soldiers who have returned and are preparing to again take their place in civil life, have expressed their desire to engage in fruit farming. Should we encourage them in this? I think we should, for they have shown by what they have accomplished under most trying circumstances, that they possess some of the qualifications essential to successful fruit growing.

CAUTION REQUIRED

Fruit growing, however, is a branch of agriculture which requires, more than any other, greater consideration before entering upon it, inasmuch as it differs from other branches of agriculture which produce annual crops. The plantings of to-day represent the product of from five to ten years and following years. Therefore, the fruit grower must be able to discern with a degree of confidence what the future markets will be.

We are to-day considering the replacing of our trees which were killed by frost during the winter of 1917-18, and which have died from various other causes. We are also considering increasing our acreage of fruit beyond what it was in pre-war time. We are optimistic, but our optimism is tempered with caution as a result of our past experiences and careful reasoning The one thought always in the mind of fruit grower who is planning to increase his acreage, is the possibility of over production. It is not the fear of being unable to make huge profits, but the fear that when the trees come into bearing the returns will not be sufficient to cover the cost of production and leave a fair remuneration for the money invested and the labor expended.

What means have we to-day which will help fruit growers to determine future possibilities? It is true we may have a fairly accurate knowledge of conditions in our immediate vicinity; but in Canada where the fruit districts are so widely separated and where the fruit from each district competes with the other in various markets, is it not essential that we should have some reliable data which would be of practical value in planning for the future? The census figures obtained every ten years are of value as far as statistics go, but they are of very little use to the grower who is contemplating increasing his acreage. In order for these to be of practical value, it would be necessary to maintain an annual record of all plantings of trees and acreages and the losses which take place from various causes. With this information and a record of the prices obtaining in the different markets from year to year, growers would have something substantial upon which to build.

OVERPRODUCTION.

A few years ago many fruit growers were greatly concerned over the possibility of an overproduction of apples. Reference was made repeatedly to the large plantings which had taken place in British Columbia and the Pacific Coast states. Had normal conditions continued as well as favorable weather conditions, there would probably have been a considerable increase in production which would have necessitated a change in our marketing arrangements and which would have effected a more equitable distribution of the crop

The time was never more opportune for concrete action in the matter of effecting better organization in marketing methods than the present. It would be presumption on my part to suggest specific plans of organization, but I should like to take this opportunity of assuring you of the hearty support and assistance of the Fruit Branch in any effort which is put forth in this regard. I feel, however, that in order to obtain at once the benefits from a more even distribution of the crop pending further action towards a permanent marketing organization, steps should now be taken to create a central marketing information bureau where daily records of the movement of fruit and its destination could be kept and available to all and thus prevent the overstocking of any one centre.

* Extract from an address delivered recently before the Niagara Peninsula Fruit Growers' Association.

Niagara District Notes

F. G. H. Pattison, Winona

THE first two weeks of March were stormy and cold, but now (March 20th) the weather has become milder again. Work is far forward. With the exception of peach trees a great many growers have finished their pruning, and in some cases even the brush has been taken out and disposed of. Spray material has been arriving in large quantities, spray machines have been overhauled, or new ones purchased, and, should the weather prove favorable, it is altogether likely that some spraying will be done before the end of the month. Except for the fact that some fruit trees, vines, bushes, etc., are still suffering from the effects of the 1917-18 winter, there never has been a spring more favorable so far for a good crop of all kinds of fruit. Everything in the fruit line has come through the winter well, and fruit growers are hoping for a good fruit crop, together with good prices. Such a situation is much needed and would go far to set the fruit growers of the Niagara District on their feet again. During the war a few exceptionally favored fruit growers made a little money, but the greater number lost money, or at best only marked time.

The following report from an experienced fruit grower in Niagara Township bears out my own experience to a large extent: "The outlook for this year's fruit crop is a pretty hard matter to decide. The orchards have had a good rest from heavy crops, but it is doubtful whether they have fully recovered from the effects of two severe winters. Nearly all varieties of peaches promise well, except Elberta, which appears to have fewer buds than the other varieties. It will probably be some years before the volume of crop will be normal, as a large percentage of trees have been killed, and a good many have reached the age of unprofitable productiveness. The acreage of small fruits is small, but is likely to be stimulated by the high prices. Plums, pears, and cherries should be normal, as the winter has been ideal and all danger of killing frosts has passed. Grapes are a conundrum, and may be profitable if the habit of imbibing unfermented grape juice should be bonused by the Government. The canning factories appear anxious to get all the good stuff produced. They are to pay $60.00 per ton for beans and 50 cents per bushel for tomatoes. My opinion is that with one or two good seasons, the Niagara District will be back on its feet and going strong. Prices for our materials have not stopped advancing, but labor is a little cheaper and will be more plentiful, and anxious to give satisfaction, a feature which has not been very prominent the past two or three years. Roads are greatly improved, both township and county systems, and in a couple of years the cost of handling the fruit crop will be greatly reduced by the use of motor trucks. Tractors seem to be giving universal satisfaction in the orchards, and are reducing cultivation costs. Finally, I might say that fruit growers have not benefitted by the recent high prices of produce, as their crops have been short."

On the 28th of February last Mr. J. J. Davis, of London, addressed the Clinton and Louth Vegetable Growers on the work of the Ontario Vegetable Growers' Association. Some lantern pictures of growing vegetables and other things pertaining to this branch of horticulture were shown to a fair-sized and appreciative audience.

The village of Grimsby has made a new departure by engaging a reliable firm to do the spraying of fruit trees, bushes, shade trees, and shrubs in the corporation, under contract, subject to the supervision of the village inspector, under the Fruit Inspection Act.

A report from St. Catharines is as follows: "Fruit growers are greatly pleased with the success of the meetings at St. Catharines and Grimsby in connection with the annual convention. The attendance and enthusiasm over the subjects selected for the programme augurs well, they say, for a big impetus during the coming season for the Peninsula's vital industry. Another pleasing factor is the splendid condition of the orchards, vineyards, and bush fruits, with no adverse conditions from now on results should be the best in a decade. The only fly in the ointment at present is the anxiety re the ultimate result of the Railway Board's decision on the contemplated increase of the Express rates.

A recent Grimsby report says that a branch was taken from a peach tree there which had two buds so well developed that they were ready to burst open, while many of the others were in a very advanced stage of development. This appears, however, to be an exceptional case, even although the tree from which the branch was taken stood about thirty feet from any building.

A meeting of the Vegetable Growers of St. Catharines District was held at St.. Catharines on the evening of March 17th. Mr. Atkins, of the O.A.C., Guelph, gave an address on "Tomatoes and Melons." Mr. Robb, of the Vineland 'Experimental Station, gave a lecture on "Vegetable Growing in Different Parts of the Province," illustrated by lantern slides. There was a good attendance. On the evening of March 19th, an organization meeting to form a local vegetable growers' association was held in the town hall, Beamsville. S. H. Rush, of Humber Bay, gave a talk on Tomato and Muskmelon Growing.

An agitation is said to be going forward for a change in the contracts made with the canning industries. The feeling with regard to canned goods is rather stronger. A sale is reported of 5,000 cases of tomatoes for export, as well as considerable lots of gallon apples and other fruits. Most of the enquiries come from Europe, but surplus stocks appear to be short. Evaporated apples appear to be very scarce, and No. 1 are practically impossible to secure.

Asparagus and Onion Culture

That luscious vegetable asparagus, available only in the spring and early summer months, might readily be grown much more extensively than it is. If properly prepared, that is, well drained, a bed may remain for twelve or fifteen years and will improve during most of this period if properly looked after. One has to wait a couple of years for a crop after the bed is set out, but the relief from planting, which is necessary with most crops, during succeeding years, more than offsets this disadvantage. Asparagus culture is dealt with in a practical way in Pamphlet No. 24 of the Central Experimental Farm, which is available at the Publications Branch at the Department of Agriculture, Ottawa. In this pamphlet celery culture is also taken up. The soil, growing the plants, planting, cultivation, blanching and storing are dealt with.

That appetizing vegetable, the onion, also occupies a place in this pamphlet which points out that the seed should be sown about one-half an inch deep in rows from twelve to fourteen inches apart at the rate of from four to six pounds of seed per acre. The Large Red Wethersfield, Yellow Globe Danvers, and Southport Yellow Globe are recommended as suitable for the warmer sections of Canada. Early White Barletta and White Queen are suitable sorts for pickling, while in the Prairie Provinces Extra Early Red or Early Flat Red give best results.

I am very much pleased with The Canadian Horticulturist and am on the look-out for it each month.—Frank B. Lockwood. Long Branch, Ont.

Annapolis Valley Notes

EUNICE BUCHANAN

Apple barrels have already been bought for 65c. each ; at the present price of barrel stock the standard barrel with split birch, round hoops, costs 55c. each to make. Individual farmers, alarmed at these prices, have been getting out stave wood and some of them are making their own barrels, which they have never done before. In Annapolis county a number of farmers have combined to make their own barrels in a factory. Eventually this may tend to lower the price of barrels, especially as other products, such as potatoes, beans, butter and eggs, are dropping in price.

Apples made good returns on both sides of the Atlantic until the end of the season. In March, apples were being retailed at 60c. a dozen in Nova Scotia. Since the embargo was lifted, Nova Scotia has exported, through Halifax, 205,111 bbls to Great Britain ; 2,637 bbls. to the West Indies, and to U.S.A., 4,407 bbls. Several thousands boxes and barrels have also gone via St. John.

The Erie Co-Operative Co.

The Erie Co-operative Company, with headquarters in Leamington, had a very successful season in 1918. It sold $437,921,-31 worth of fruit and vegetables, beating all previous records by $27,291.13.

The company shipped 37 carloads, consisting of 44,000 baskets of tomatoes, in four days. During the 1918 season it shipped 336,000 11-quart baskets of tomatoes, 520 cars of onions, and several thousand bushels of peppers. There are 180 members in the company, which also purchased wholesale fertilizers, bacon, salt, and other articles of food at wholesale prices. The balance sheet shows a profit of $21,000. This year the company expects to extend its operations to the Kingsville district, and possibly to other sections of South Essex.—F. G. H.

O.F.G.A. Notes

The Ontario Fruit Growers' Association has appointed the following committee to watch its interests in the matter of Express rates and the application of the Express Companies for increased rates : T. C. Carpenter, Winona ; J. E. Johnson, Simcoe ; W. H. Bunting, St. Catharines ; W. Dewar, Leamington ; W. F. W. Fisher, Burlington ; W. A. Shook, Clarkson.

The following fruit growers have been appointed to act as representatives on the Exhibition Boards : Central Canada Exhibition, Ottawa : W. T. Macoun, Ottawa ; Canadian National Exhibition, Toronto : W. F. W. Fisher, Burlington ; Western Exhibition, London : J. C. Harris.

Fruit Marketing Prospects*

C. W. Baxter, Dominion Fruit Commissioner, Ottawa

THE question of quality will be a greater factor, in my opinion, in the marketing of apples in future in the markets of the United Kingdom than ever before. We are going to meet with greater competition from the United States, by reason of the fact that we have adopted the same standard barrel and that several states of the Union have passed grading laws similar to our own. In addition to this, I should expect that apples packed in barrels would meet with greater competition with apples packed in boxes, and if we are going to maintain our standing in the British markets and preserve our home markets, we must bend our efforts towards the production of the highest quality of fruit, graded and packed in such a manner as will gain for us a reputation for uniformity and dependability. Fruit of this kind has always brought satisfactory prices even in years of depression and of big crops We have gained an enviable position in the markets of the United Kingdom and our objective should be to retain the premier place, not only as individuals, but as a Dominion. In this I believe our greatest hope lies through organized effort.

It is difficult to predict just what the crops may be for the next few years, but when we consider the great loss in trees due to continue neglect and the very severe winter of 1917-18, it is reasonable to expect that the prices for apples would be satisfactory.

PEACH PROSPECTS.

The history of commercial peach growing in eastern Canada would almost convince us that the area in which these can be grown with any degree of safety is confined to the Niagara Peninsula. There are small areas where peaches can be grown with an equal degree of safety, but the quantity grown in other areas will have very little effect on the markets. Therefore, the future of peach growing in the Niagara Peninsula would seem to offer great inducements, provided that market facilities are increased in proportion to the increased production.

THE GRAPE OUTLOOK.

Grape growers have had reason to feel somewhat anxious as to the future marketing possibilities of this fruit in view of the recent legislation which prohibits the manufacture and sale of wine after April 30th next. How long this will obtain, we do not know, but I do not think there is any real cause for alarm. If care is observed in marketing mature fruit and some organized effort is put forth to widen distribution, I feel confident that the consumption of grapes will increase to such an extent that the prohibitive measure will be very little felt. The prairie markets offer an excellent opportunity to increase consumption. The practice for many years of marketing immature fruit has greatly reduced consumption and our people have turned from the Ontario product to the imported Tokays and Emperors from California which are offered during the same season. However, it has now been made an offence to sell immature fruit unless so marked. This, and the publicity which has been given as to the ill results, we hope will eliminate this practice and create in the Canadian consumer a desire for the home grown grapes. I do not know whether there has been any attempt made to extend the commercial life of such varieties as the Black and Red Rogers, but the success of the California grapes which are packed in red cedar sawdust and held over to meet the needs of the Christmas trade, suggests the advisability of testing the California method.

If our fruit industry is to attain the position in our commerce which it rightly deserves, and if our production is to increase, the marketing of our fruit should be done through organized growers' marketing agencies conducted on sound business principles.

* Extract from an address delivered recently before the Niagara Peninsula Fruit Growers' Association.

Increasing Fruit Consumption

WHEN asked by The Canadian Horticulturist for his views on the best methods of increasing the consumption of fruit, Mr. E. B. Luke, the well known nurseryman of Montreal, replied "advertise."

"Both nurserymen and fruit growers," he said, "have the finest product in the world to advertise, and yet both are the poorest advertisers. To my mind it is not a question of foreign markets, but a question of educating our own people to use more fruit, putting it up attractively and in such a way that more city people especially, can get it at reasonable prices and in 'carrying quantities'. I believe also that there is a big field in educating the people in the country to use more fruit. In fact, my experience has been that it is surprising in travelling through some sections of the country and in talking with people, to find how little fresh fruit is used as compared to what should be from a standpoint of health alone."

The Storage of Cabbage

The superintendent of the pre-cooling and fruit storage warehouse at Grimsby, Ont., has reported on a carload of cabbage received into cold storage on November 15, 1918, and shipped out on Feb. 6th, as follows:

"The cabbages were trimmed in the field, and all broken, decayed, or loosened leaves were removed. A room was fitted with a slatted floor raised about four inches above the main floor. The cabbages were piled on this floor from three to four feet in depth and held at a temperature of 32 to 33 degrees F. Circulation of air was provided for by keeping one of the fans running in the daytime only.

"In preparing the cabbage for shipment the waste was approximately 10 per cent., all leaves which showed decay being removed. The cabbage showed no sign of soft rot, the leaves being dry and discolored only.

"Another carload of cabbage is still in the storage and seems to be keeping well. The superintendent estimates that the shrinkage will be about 10 per cent. for March shipment."

Vegetable Immigrants

Celery originated in Germany.
The onion originated in Egypt.
The citron is a native of Greece.
Oats originated in North Africa
The poppy originated in the East.
Rye came originally from Liberia.
Parsley was first known in Sardinia.
The pear and apple are from Europe.
Spinach came from Arabia.
The sunflower was brought from Peru.
The mulberry tree originated in Persia.
Walnuts and peaches came from Persia.
The horse chestnut is a native of Tibet.
Cucumbers came from the East Indies.
The quince came from Crete.
The radish is a native of China and Japan.
Peas are of Egyptian origin.
Horseradish is from Southern Europe.

—JOHN HANCOCK SATCHWELL.

The Canadian Horticulturist has been advised by the publishers that the new edition of the Garden Guide will cost 75c in paper covers and $1.00 in cloth covers, instead of 50c and 75c as formerly. Copies as usual may be purchased through The Canadian Horticulturist.

Pre-Cooling Investigations

C. M. Bonham, Superintendent, Grimsby Pre-cooling and Experimental Fruit Storage Warehouse.

THE work at Grimsby Pre-cooling and Experimental Fruit Storage Warehouse was carried on during 1918 along pretty much the same lines as 1917, very little outside of commercial work being undertaken. Notwithstanding the scarcity of some fruits and the unusually high prices and strong demand in local markets for most lines throughout the season, the plant was extensively patronized, the volume of fruit handled being slightly over that of the two previous seasons.

Raspberries were the first fruits received for storage and a considerable quantity was handled for the canning factories and other purposes. No difficulty was experienced in holding raspberries for a week to twelve days for preserving purposes, provided the fruit was fresh and firm when delivered. Besides the storage for local factories one pre-cooled carload was shipped to Sarnia, Ont.

As usual sour cherries were the first fruits offered for pre-cooling for western carload shipment. The movement of Richmonds and Montmorencies to the western provinces was not heavy, being due to the unusually light crop together with very high prices and a strong demand from Ontario and Quebec markets. Altogether five pre-cooled cars of cherries were shipped. Three of these went to Winnipeg, one to Brandon and the fifth to Oshawa, with satisfactory results in each case. The usual quantity of cherries was stored for the canning factories, etc., but on the whole the volume handled was not large, being about the same as that of 1917.

In neither of these years was there sufficient crop to make it necessary to find an outlet in the western market. Shippers endeavoured however to furnish their western trade with a few cars in each of the past two seasons, since these connections will prove of great value to the growers in a year when cherries are more plentiful.

The season in 1918 was slightly earlier than in 1917. The shipment of plums, pears, tomatoes and other of the fall fruits commenced on August 21st. During the period between this date and October 19th thirty-seven cars were pre-cooled, all but seven of them being handled during the month of September. Twenty-five cars went to the prairie provinces, five to Quebec and the Maritime provinces and seven to Ontario. Of the cars shipped to the prairie provinces a large percentage went to Winnipeg, but shipments were made to Edmonton, Prince Albert, Regina, Moosejaw and other points.

In order to keep advised as to the condition in which cars were arriving the writer arranged with Mr. F. H. Steele, Chief Fruit Inspector for the prairie provinces, for an inspection and either a written or a telegraphed report as might be requested. These reports gave helpful information throughout the season.

As a rule cars for the west were made up very largely of the following: Damson, Reinclaude, Fancy Blue (several varieties), and Burbank plums, tomatoes, Bartlett pears and Elberta peaches. It must be understood however that practically all varieties of plums, pears and peaches respond favourably to pre-cooling, and many varieties besides those mentioned are used for shipment to the western provinces although the heavier production and suitability of those noted places them in a place of prominence in this regard.

With the exception of one or two cases in

which the shrinkage was only on a few tomatoes and Lombard plums, inspection reports indicate that the fruit was received on the western markets in first class condition and gave good satisfaction to the trade.

Next in importance to the extension of markets through pre-cooled carlot shipments is the use made of the plant for storage purposes. Approximately thirty cars were handled in that way last year. Pears were stored extensively with a view to extending the marketing season and a considerable quantity of peaches was also stored with this end in view. Plums however comprised the greater percentage of this class of storage during the season. The shortage of sugar for canning purposes gave rise to a very serious condition as it made it very difficult for growers and dealers to make sales which would take care of the fruit as it was picked. However, the seriousness of the situation was materially relieved through the storage of a considerable number of cars, and as far as the capacity would permit the Grimsby plant helped the producers over a very awkward period and enabled them to hold their plums until they could be disposed of. This applied particularly to Reinclaudes of which there was a heavy crop in the Grimsby district. For some time during the picking season, and after, we carried a balance of from five to six cars of this variety in stock, shipments being made as rapidly as markets could be found and fresh stock being taken in as space became available.

Following is a statement of fruit handled for the season:

Statement of Fruit Handled to November 1 for Season of 1918.

Fruit.	Pounds.
Cherries	140,000
Raspberries	41,700
Red Currants	2,600
Black Currants	8,000
Gooseberries	2,500
Plums	467,300
Tomatoes	262,500
Pears	213,340
Peaches	88,700
Apples (in baskets)	42,000
Canteloupe	3,200
Grapes	50,000
Miscellaneous fruits and vegetables	15,700
Total	1,337,540

Distribution of Pre-cooled Carload Shipments.

	Cars.
Prairie Provinces	29
Quebec and Maritime Provinces	5
Ontario	8
Total	42

Items of Interest

"Some years ago," said Mr. David Allan, of Grimsby, at the recent convention of the Niagara Peninsula Fruit Growers' Association, "growers used to come to me, almost with tears in their eyes, asking what was going to be done with all the fruit when the young orchards came into bearing. There is no reason to be worried on that point today. Growers, therefore, may well have every confidence in the future of the industry and plan their work accordingly."

Poultry droppings collected and kept dry until next year will furnish a good supply of nitrogen for garden crops. If allowed to get wet they lose much of their value.

Plum Growing on the Prairies

Prof. F. W. Brodrick, Winnipeg, Man.

PLUM growing in the Canadian northwest, from the standpoint of hardiness at least, probably gives greater promise than the growing of apples, due to the fact that a hardy native species, which may be utilized as a foundation stock, is found throughout many parts of the west. The species referred to is the Prunus nigra, a hardy variety of the Prunus americana. The tree or bush is of rather small size, or irregular habit of growth, and with dark colored branches. The fruits are of moderate size, red or yellow in color, and of somewhat astringent flavor. The readiness with which the genus Prunus will hybridize with other species of the same group, affords splendid opportunities of combination of hardiness with other valuable characteristics. At present there are few improved varieties belonging to the Prunus nigra group. The Cheney and the Aitken are probably the best. In a paper on plum culture, presented some time ago, Mr. A. P. Stevenson, of Morden, has the following to say of these varieties :

"CHENEY."—Possibly the best all round variety in our orchard. The fruit is large, round, not astringent, flesh deep yellow, clingstone, deep red color, season early September, tree a strong, extra heavy grower, but limbs very liable to split down in the crotches.

"AITKEN."—Fruit large ; deep red ; clingstone ; no astringency ; quality fair : the tree is only fairly productive ; season, early September ; extra hardy and vigorous.

He also has the following to say of some of the leading American varieties :

"WYANT."—Very hardy ; fruit large, oblong ; color, deep red ; skin rather thick ; some astringency ; flesh juicy sweet ; freestone ; season, mid-September ; very prolific, but fruit occasionally injured by fall frosts. This is one of the leading varieties in Iowa.

"ODEGARD."—Very hardy ; medium size ; color, red ; fruit, oblong ; quality, fair ; season, second week in August. The strongest point about this variety is its early ripening, it being the first of all to ripen its fruits on our grounds. The tree is of slow growth and dwarf habit ; specimens on our grounds, eighteen years old, are only now six feet in height.

"SURPRISE."—Fairly hardy. This is one of the newer varieties originated at Sleepy Eye, Minnesota, is of large size, bright red color, good quality ; it will keep longer after being ripe than any of our plums ; season, mid-September.

"BIXBY."—Fairly hardy ; fruit medium size ; color yellow ; flesh juicy, tender, sweet ; no astringency ; quality good ; season, early September.

"DESOTA."—This tree was quite hardy with us, but had to be thrown out on account of the late ripening and qualities of the fruit.

"WEAVER."—Tree is a strong, hardy grower, but discarded long ago on account of fruit ripening too late.

"WOOD."—Very hardy ; fruit medium size, almost round ; a prolific bearer ; season, early September.

"ROCKFORD."—Fruit excellent in quality, but tree lacks vitality and is short lived.

In speaking of plums, one could really include the Compass Cherry, which is a cross between the Sand Cherry and the Miner Plum originated by Mr. Kudson, of Springfield, Minnesota. It is perfectly hardy in the Northwest, and produces fruit of fair size and quality. Of Professor Hansen's cross-bred cherries and plums, a number of which he has tried, he has the following to say as to quality and date of ripening :

"ETOPA."—This is a cross between a sand cherry and Sultan plum ; first fruited 1909 ; color, dark purple ; flesh, dark purple, juicy ; small pit ; a large cherry, over one inch in diameter ; ripe September 7th.

"OPATA."—A cross between the wild Sand Cherry and the Gold Plum ; first fruited 1912 ; fruit is large, being over 1 inch in diameter ; dark purplish red ; with blue bloom ; flesh, green ; flavor, a mingling of the sprightliness of the sand cherry with the rich sweetness of the gold plum ; quality delicious ; pit small ; ripe September 5th.

"EZAPTAN."—A cross between the sand cherry and the Sultan Plum ; first fruited 1912 ; color, dark purple ; size, will average smaller than Opata ; quality delicious ; flesh, black purple from skin to pit ; ripe September 6th.

"SANSOTA."—A cross between the sand cherry and the Desota Plum ; first fruited 1912 ; size, over 1 inch in diameter ; color, black when fully ripe, with blue bloom ; flesh cling, yellowish green, sprightly pleasant ; thin skin ; the fruits are a mingling of the sand cherry and the Desota Plum. So far as tested, this is the most prolific bearer of all the hybrids in our orchard ; fruit ripe September 8th.

"CHEROSOTA."—Of the same parentage as the Sansota, and while the fruit of that variety is round that of the Cherosota is longish with a small prickle at the apex ; the fruit averages smaller than the Sansota and about a week later in ripening.

"TOKEYA."—A cross between the sand cherry and a Chinese Apricot Plum ; first fruited 1909 ; the fruit this year was over one inch in diameter ; color, dark red ; flesh green ; fine quality ; pit very small ; fruit ripe September 7th.

A variety of more recent introductions is the "Mammoth," originated by Mr. A. P. Stevenson, and said by some of our growers to be a plum of very good quality. It is possible that, with the improvement of varieties, the plum will be quite generally planted throughout the Canadian Northwest.

I enjoy The Canadian Horticulturist and wish it was issued every week.—H. Vollock, Paris, Ont.

Nursery Inspection

Three years ago it was found that San Jose Scale was beginning to get very plentiful in an occasional nursery in Ontario. After searching for the cause it was discovered that the men who were doing the budding were unconsciously inserting the scale with the buds into the nursery stock. Instructions were then given to the inspectors to examine all bud stocks and destroy all found with scale on them. The nurserymen were also urged to spray their nurseries.

The result has been that San Jose Scale in the nurseries has been decreasing until last year the inspectors scarcely found scale in the nurseries at all. This has saved thousands of dollars' worth of nursery stock which otherwise would have been destroyed. Some time was also spent by the inspectors under the Fruit Pest Act, in the winter of 1917-18 inspecting in the principal towns and cities for the Tussock Moth, which was found very bad in cities bordering on the lakes. In such cases the mayor and park superintendent were consulted and given instructions how to destroy egg clusters, with the result that the Tussock Moth has practically disappeared for the present.

The Horticultural Exhibition

At a meeting of the directors of the Ontario Fruit Growers' Association, held in Toronto, March 4, a committee was appointed to cooperate with like committees from other organizations in arranging for the resumption next fall of the Ontario Horticultural Exhibition. The committee is comprised of Messrs. J. E. Johnson, F. W. Bishop, Elmer Lick, and F. A. J. Sheppard.

It was recommended that a special potato exhibit be put on at the exhibition and that all kinds of farm and spraying machinery be exhibited. One hundred dollars was voted to the Royal Horticultural Society for relief work among horticulturists in the devastated areas of France and Belgium.

It was decided to send a representative to the hearing of the commission on the increase in express rates in the Maritime Provinces and to send two representatives to the final hearing in Ottawa.

Caging fowls separately for two weeks, while fattening them, will produce tender meat; while, on the other hand, where fowls are yarded they are apt to nag and chase each other so that the muscles harden and the meat toughens.

B.C. Growers Discuss Important Matters

THE annual convention of the British Columbia Fruit Growers' Association are becoming more and more occupied with questions relating to the economics of the industry, such as express rates, legislation, packages, and oriental immigration and less and less attention is being devoted to questions of production which some years ago largely occupied the attention of the growers. This change was noticeable at the recent annual convention held at Penticton.

It was decided to protest strongly against the proposed increase in express rates. A special committee that had been appointed to deal with the matter reported that the new proposals of the express companies were calculated from a mileage basis, replacing the old flat rates. The general increase proposed was 25% west of Sudbury and 37% east of that point, together with abolition of the present special rates of B. C. fruit and vegetables and the substitution of new rates at 60% and 75% of the proposed new merchandise rates. The effect, it was claimed would be an increase in the express cost of hauling fruit and vegetables of about 100%.

The report pointed out that the volume of British Columbia fruit and vegetables shifted through the Dominion Express Company alone rose from approximately 2,000,000 lbs. in 1910 to 17,000,000 lbs. in 1918. Approximately 10% of the provincial fruit crop and 5% of the vegetable crop moves by express, the more valuable varieties, however, going by this means; 10% moves to B. C. points, 30% to Alberta, 45% to Saskatchewan, and 15% to Manitoba.

If the increased rates go into effect, new districts which have not reached the freight shipment stage will be virtually wiped out and shipping of early fruit and vegetables and the movement of the tender crops will cease, claimed the report. A committee was appointed to represent the fruit growers before the Dominion Railway Commission when it met in British Columbia to consider the matter.

Officers Elected.

The following officers were elected: President, C. E. Barnes, Walhachin, re-elected; vice-president, L. E. Taylor, Kelowna; secretary-treasurer, A. M. Clement, Vancouver, re-elected. Executive, Thos. Abriel, Nakusp; W. E. Chapple, Armstrong; R. M. Palmer, Cowichan Bay, and W. F. Laidman, Vernon.

Directors: Victoria, W. F. Somers of Gordon Head; Duncan-Nanaimo-Comox, R. M. Palmer of Cowichan Bay; Gulf Islands, W. E. Scott of Salt Spring Island; North Fraser, James Alexander of Hammond; Mission-North Bend, C. K. Ward of Mission; South Fraser, G. I. Thornton of Sardis; Lytton-Lillooet-Kamloops, C. E. Barnes of Walhachin; Salmon Arm, L. B. Pangman of Salmon Arm; Armstrong-Larkin-Sicamous, W. E. Chapple of Armstrong; Vernon, J. T. Murie of Vernon; Coldstream, W. F. Laidman of Vernon; Oyama-Okanagan Centre, E. Trask of Oyama; North Kelowna, L. E. Taylor of Kelowna; South Kelowna, E. M. Carruthers of Kelowna; Westbank-Peachland, T. Powell of Peachland; Summerland-Naramata, R. V. Agur of Summerland; Penticton-Kaleden, A. H. Huntley of Penticton; Keremeos-Similkameen, J. J. Armstrong of Keremeos; Grand Forks-Rock Creek, H. W. Collins of Grand Forks; Revelstoke-Deer Park, Thos. Abriel of Nakusp; South Kootenay, Mr. Johnston of Nelson; West Arm-Kootenay Lake, J. H. Hoyle of Queens Bay; Creston-East Kootenay, James Compton of Creston; Greater Vancouver-New Westminster-Lulu Island, Mr. Sprott of Burnaby Lake.

The convention passed a resolution to create a new horticultural division for the territory embracing Greater Vancouver, New Westminster, Burnaby and Lulu Island.

Large Attendance.

The attendance at the various sessions averaged over 200 and at times almost 300, constituting a record.

President G. E. Barnes of Walhachin, urged the great need of organization and close co-operation in the reconstruction period in order to keep their needs before the Government, just as organized labor had so successfully done during wartime. He pointed out that the farmer, although representing the greatest industry in the world, was the most poorly organized.

The wheat growers of the prairies formed an exception. The farmers there are, with some sign of success, endeavoring to eliminate the duty on American fruit, a step which would seriously injure British Columbia farmers. President Barnes said only the strongest organized effort could combat the move.

In order to create an organization and an emergency fund over 50 of the delegates subscribed for life memberships and the directors were asked to push the plan by which every grower will contribute a quarter of a cent a box on apples, pears, crabs and berries and one-eighth of a cent per box on stone fruits. Shipping organizations will also give assistance. Some of this fund, it is expected, will be required for fighting the prairie farmers' proposal to lower the tariff wall against American fruit and also in combatting the express companies' application to raise carriage rates.

Oriental Ownership.

A lengthy discussion took place over Oriental ownership of fruit and farm lands.

Delegates from the Fraser Valley told of the inroads of Japanese and Chinese who were literally driving the white farmer out of the districts. Japanese, borrowing money from their consul in Vancouver at 3 per cent., were able to make a profit where a white man could not get a living. Oriental laborers at high wages were soon able to lease land and when they reached that

stage they brought out fellow country men with the result that some districts were almost overrun.

The opinion seemed to prevail that the time had come to take action in the matter or serious results would ensue. For some years the question has been before the people, and many of them are wide awake to the fact that the holding of their present homes is jeopardized by the possibility of Orientals getting possession of adjacent lands. In California very serious trouble arose on this account. When an Oriental got possession of some land, the tendency was for white people to withdraw from that vicinity. This gave other Orientals their chance to secure more land and become a menace to the white race. In British Columbia there is grave danger of the recurrence of a similar state of affairs. The longer the matter is allowed to drift, the graver the danger becomes. A strong resolution was passed demanding government action in the matter.

Expert Needed.

Provincial Plant Pathologist Eastham discussed the Baldwin Spot, declaring that a special expert, giving his entire time to the disease, was needed. Dominion Entomologist Treherne referred briefly to the establishment of a Dominion branch at Vernon and to the fight against Codling Moth and Fire Blight, and Assistant Provincial Horticulturist Ben Hoy announced that the Minister of Agriculture had promised every assistance in combating blight and codling moth. The sum of $5000 would probably be appropriated for the moth campaign alone. In the proposed reorganization of the horticultural work, it was possible, he said, that the province would be divided into two main districts, the coast and the interior.

The chief horticulturist for the interior would have headquarters at Vernon. All necessary field staffs would be kept up.

Resolutions Passed.

A resolution was passed asking Hon. E. D. Barrow to make a definite announcement with regard to his intention in connection with appointing a provincial horticulturist in succession to Mr. M. S. Middleton. If an alteration in the present system was contemplated, the fruit field force, it was held, should be maintained.

Another resolution sought a substantial sum from the department for the work necessary in eradicating the codling moth, particularly in the area of infestion at Okanagan Landing. The codling moth now seriously threatens many fruit districts of the province, and energetic steps are necessary for its elimination.

The convention petitioned the Agricultural Department to enforce compulsory cutting out of fire blight among fruit trees, with all the penalties attached to noncompliance with the terms of the regulations.

Vernon was chosen as the meeting place for 1920.

The abolition of the embargo on the importation into Great Britain of canned, bottled and preserved fruits, has opened a new market to Canadian canning factories, and there has been a marked increase in the demand for such from overseas, which more than compensates for the possibility of a decline in the demand for canned goods owing to the improved conditions prevailing since the armistice. There have been a number of enquiries as to what stocks are available, and some shipments have already gone forward. Very large quantities of Australian jams are being imported into Great Britain, and it is thought probable that Canadian jam and canning companies can obtain a considerable share of that business.

Windbreaks for Orchards

Prof. P. J. Shaw, B.A., Provincial Horticulturist, Truro, N.S.

We have a good wind-break of Scotch pine on the north and west sides of our orchard at the Agricultural College. This wind-break has only been growing in its present position for four or five years. We think it is useful and worth the expense for the benefit it is to the fruit trees. Last winter all the clover in the orchard was winter-killed except that within two rods of the wind-break. As the trees become taller they will protect a larger area.

In the fruit section of this province it may be a debatable question whether a wind-break for an orchard pays. There are occasions, however, when an effective wind-break would prevent much loss of fruit from high winds in the fruit section. Some fruit growers prefer to plant in large areas and allow one fruit tree to protect another, or to plant large growing varieties like Northern Spy, on the outside of their plantation.

In other parts of the province there would be benefits from planting wind-breaks around orchards. Winds not infrequently sweep over some parts of this province near the sea coast with such force as not only to blow off nearly all the fruit but to break down and uproot the fruit trees. In such cases wind-breaks of native evergreen, such as spruce or even of hardy strong growing deciduous trees, such as maple and birch, would be valuable in protecting the trees and fruit. There are a few parts of the Province in which it is difficult to grow some garden crops on account of the extremely high winds at certain times during the growing season. Wind-breaks are needed there for successful gardening.

After Ontario Markets

Methods of increasing the sale of British Columbia fruit in Ontario markets, particularly Toronto, were discussed at the recent annual convention of the British Columbia Fruit Growers' Association. There was, it was said a million-dollar fruit market for British Columbia shippers in Ontario if they take care to send only the right kind of fruit properly graded and packed.

Mr. J. A. Grant, prairie markets commissioner, told the delegates that many of the shippers in British Columbia had not been sufficiently careful in the shipments they forwarded to Toronto and other points, and as a consequence Wenatchee fruit was more favored there. He urged stricter grading and packing, with an eye to the future in Eastern Canada and Old Country markets. The time had also come when more attention should be given to selecting and growing the best varieties of apples. At present the prairie wants about ten varieties of British Columbia apples and gets nearly a thousand. Mr. Grant recommended the following as commercial varieties: Delicious, McIntosh Red, Jonathan, Spitzenburg, Winesap, Northern Spy, Wagner and Wealthy.

Mr. Grant told the growers that the dealers would probably try to bear down next year's market, and shippers would therefore be required to use every possible effort to keep the market up. He went into detail in connection with the sale of all British Columbia fruit on the prairies last year, showing what fruits and vegetables had brought good prices, and what had not, and why British Columbia could send much heavier shipments of strawberries and raspberries to the prairies, where the market for such fruits was good.

Nitrate of Soda: Its Nature and Use in Agriculture

By Frank T. Shutt, M.A., D.Sc., and B. Leslie Emslie, F.C.S.

NITRATE of soda, also known as Chile saltpetre, as found on the fertilizer markets of the world, is the crystallized and purified product from extensive deposits of the crude nitrate (caliche) occurring in Chile, South America, whence it is shipped in 200 pound bags. This product is about 95 per cent. pure and contains between 15 and 16 per cent. of nitrogen, the element to which this material owes its fertilizing value.

Nitrate of soda is the most important and the most widely used of all the nitrogenous fertilizers, chiefly for the reason that its nitrogen is directly and immediately available to growing crops. Since it has not to undergo any preliminary or preparatory changes in the soil, it is in a class by itself as regards efficiency and quickness of action; all other nitrogenous fertilizers, with the exception of nitrate of lime (which is not on the market) must pass through some process of conversion in the soil before they are utilizable by crops.

Nitrogen as plant food is instrumental chiefly in promoting the growth of the vegetative parts (stem and leaf) of crops, and hence is more particularly valuable during the earlier stages of development. The nitrogen so stored in the tissues forms a reserve to be used later in the formation of seed and fruit.

From this property of available nitrogen it will be evident that an excess of nitrate of soda or any similar source of readily assimilable nitrogen would tend to unduly prolong growth and possibly delay the maturing of the crop. Some crops are more particularly susceptible in this regard than others, and the effect is more

marked when there is a lack of phosphoric acid.

Experiments have shown that nitrate of soda exerts an indirect fertilizing influence in causing the liberation for crop use of potash from its inert stores in the soil.

Application.

Time and Method.—From the fact that nitrate of soda is readily soluble and its nitrogen immediately available, this fertilizer, as a rule, is most economically employed as a top dressing to the growing crop during the earlier weeks of growth. A portion of the application may, however, be given at the time of seeding without danger of any appreciable loss through leaching, the remainder being subsequently applied in one or more top dressings to the crop.

In dressing the growing crop, broadcasting the nitrate should be done on a dry day, to avoid scorching the foliage.

Rate.—The application per acre per annum may be from 100 to 400 pounds, the heavier dressing being used in market gardening and other intensive forms of farming, as in potato growing. For the ordinary farm crop on soils of average fertility, 100 to 250 pounds per acre probably represents the limits of profitable application.

If one half of the application, say 75 pounds per acre, is broadcasted and harrowed in at the time of seeding, the remaining half may be given as a top-dressing about two weeks after the crop appears above the soil. Or the first application may be made as soon as growth appears and a second some two or three weeks later. A single application should not exceed 100 pounds per acre. As far as may be practicable, it is well to conform to the practice of small and frequent dressings during the earlier weeks of growth, according to the crop's ability to utilize nitrogen. By this means the loss through leaching will be reduced to a minimum.

Rate Suggested for Various Crops.

	Pounds per acre.
For grain crops	75 to 150
For hay and pastures	100 " 200
For corn (fodder) and turnips	100 " 200
For mangels, sugar beets, etc.	150 " 300
For potatoes	200 " 300
For cabbage and similar leafy crops	200 " 400

Clover, alfalfa, peas and beans, though "nitrogen-gatherers" when well established frequently respond profitably to a small quantity of nitrate of soda applied during the initial stages of growth.

The amount that can profitably be employed will naturally be determined in a large measure by the character of the soil, the smaller dressings sufficing on liberally manured land.

Supplemental Use of Nitrate.

As a supplement to low grade mixed fertilizers, containing only say one per cent. of nitrogen, as well as to purely phosphatic fertilizers, such as superphosphate and basic slag, the use of nitrate of soda will usually be found profitable.

Symptoms of Nitrogen-Hunger.

When soil and weather conditions are unfavorable to the production of nitrogenous crop food (nitrification) early spring sown crops may suffer from a lack of assimilable nitrogen. If the young crop assumes a sickly-looking, yellowish appearance, it stands in need of nitrogen. An application of nitrate to such a stunted, starved crop will, in a few days, with a warm rain, change its color to a deep green, a sure indication that the crop has obtained its required food and is again making healthy, vigorous growth. One of the chief advantages in using nitrate of soda is that it supports a continuous and vigorous early growth and that it will help the young crop to safely tide over a critical

period arising from unfavorable weather conditions.

Storage and Preparation.

Nitrate of soda, as already pointed out, is extremely soluble, and hence, to avoid wastage, should be stored in a dry, rain-proof building.

As received, it will in all probability be caked into hard lumps and masses. These should be broken down, by pounding or to a fairly fine powder, in order that the nitrate may be uniformly applied.

To facilitate distribution, especially when the application is of the order of 50 to 75 pounds per acre, the powdered nitrate may be mixed with any desired quantity of dry loam or sand.

Nitrate of Soda a Source of Plant Food.

Though the principal function of the nitrogen in this material is to promote growth of the vegetable parts and its effects are frequently very quickly observable, nitrate of soda is not to be regarded as a mere stimulant; it offers plant food in the most acceptable form. Used rationally as indicated, it is an excellent and effective fertilizer. It is not a "lasting" fertilizer, but it is one that, other factors being favorable, yields a quick return on the investment.

Ontario Horticultural Exhibition

A most enthusiastic and optimistic gathering was held at the Parliament Buildings on March 28th of representatives of the various horticultural and affiliated organizations of Ontario to consider the question of reviving the Ontario Horticultural Exhibition.

Those present were Mr. William Couse, Streetsville; Messrs. P. W. Hodgetts, Samuel Jay, G. A. Putnam, E. F. Collins, Fountain, Whaley, Jas. Simpson, T. Manton, J. A. Simmers, J. Lockie Wilson, and W. H. Foord, Toronto; Elmer Lick, Oshawa; James E. Johnston, Simcoe; H. G. Sibbald, Claude; W. F. W. Fisher, Burlington.

The matter of holding an exhibition in Toronto in November was thoroughly discussed, and it was the unanimous opinion that the time was now ripe to revive it. Mr. Tom Manton stated that the gardeners and florists wanted the show and would back it up. Mr. P. W. Hodgetts expressed the opinion that the feeling among the fruit growers was to hold it again, and that the backwardness of the last four years was due to a considerable extent to the exhibition being discontinued. This opinion was concurred in by the other fruit growers present. A representative of the poultrymen agreed to join. Mr. Geo. A. Putnam also spoke for the Women's Institute and Mr. Sibbald for the Beekeepers. The Treasurer (Mr. J. A. Simmers) reported a balance on hand of $919.00, in addition to which a Government grant would be available.

It was unanimously decided to hold the Horticultural Exhibition from Nov. 11—15, at Exhibition Park, and the following officers and committee were elected.—

Hon. Pres.: Sir John Eaton.
Pres.: Wm. Couse.
First Vice-Pres.: Tom Manton.
Sec. Vice-Pres.: E. Lick.
Treasurer: J. A. Simmers.
Secretary: P. W. Hodgetts.

Executive Committee: Jas. E. Johnston (representing the Fruit Growers), H. R. Franklin, G. A. Putnam (Women's Institutes), H. G. Sibbald (Beekeepers), E. F. Collins (Florists), Frank T. Reeves (Vege-

FOR SALE AND WANT ADS

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

BEES

WANTED—a yard of 50 to 100 colonies of bees for cash. Send particulars to Dr. C. J. Devins, St. Michael's Hospital, Toronto, Ont.

BEES BY THE POUND OR CAR-LOAD.—I am now able to supply you with bees and queens in any amount that you might want, having made arrangements with two southern breeders, to handle all of their early bees. Five other large breeders also, have promised to fill my surplus orders. So before buying your bees, get my estimate. I may be able to save you money on express rates, if nothing else. Canadian Trade Solicited. George W. Brown, Lynnhurst Apiary, Wilson, Wisconsin.

FOR SALE—65 shallow supers (10 frame) about half with drawn combs, rest with foundation. Box 27, Canadian Horticulturist and Beekeeper, Peterboro.

FOR SALE.—2 1-2 lb. packages of Italian bees and queens. Double and single walled hives. Full colonies R. Rayson, 9 Hillsview Ave., Toronto, Ontario.

BEES WANTED.—State price, location, etc. A. R. Vannatter, R. R. No. 1, Georgetown, Ont.

SWARTS GOLDEN QUEENS produce Golden bees of the highest qualities. Satisfaction guaranteed. Mated, $1.00; 6 for $5.00. Tested, $2.00 . D. L. Swarts, Lancaster, O., Rte 2.

QUEENS.—Golden or three band—Each $1.50; six $7.50. Also nucleus. A. R. Simmons, Claverack, N.Y.

FOR SALE.—A few colonies of Italian bees with tested queens at $15.00 per col. May delivery John A. McKinnon, St. Eugene, Ontario.

BEES FOR SALE.—235 colonies, pure Italians. Will teach buyer how to manage during coming season. My 1916 crop from 185 colonies was 30,169 lbs. R. A. Marrison, Cataraqui, (via Kingston), Ont.

FOR SALE—Hardy Italian queens, the busy kind, no culls, must please. W. G. Lauver, Middletown, Pa., Route 3.

EMPLOYMENT

GARDENER WANTED—To take charge of city parks, London, Canada. Apply to E. V. Buchanan, General Manager, Public Utilities Commission, London, Ontario.

HELP WANTED.—Young man who is fond of work and bees, for this season. Good wages and board. John A. McKinnon, St. Eugene, Ontario.

YOUNG MAN wishing to secure experience in beekeeping, desires position. R. McNish, Dundas, Ont.

BEE SUPPLIES

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

EASTERN LABEL CO., Clintonville, Conn., U.S.A. Catalogue Free. Italian queens, select tested, and breeders $2.00. Bees by lb.

FOR SALE—300 lbs. Weed Process comb foundation, light and medium brood. Address R. F. Holtermann, Brantford, Ontario.

REAL ESTATE

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

FOR SALE.—Market garden, small fruit, apiary, 2 3-4 acres black muck and sandy loam. Frame cottage, greenhouse, barn, 18 colonies bees, equipment. P.O. Box 126, Lucan, Ont.

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

ORDER FALL BULBS NOW and save half. Get Import Bulb Catalogue at once. Morgan Supply House, London, Ontario.

BI-ANNUAL DWARF WHITE BLOOM SWEET CLOVER SEED FOR SALE.—Best variety for hay and excellent for honey. Per bushel, $15.00 F.O.B. Bright. Wm. Beuglass, Bright, Ontario.

FOR SALE.—Large Red Wethersfield Onion seed, fresh and pure, $2.50 a pound. Apply to J. J. Gareau, St. Roch l'Achigan, Que.

50 EARLY CABBAGE PLANTS—40c prepaid, shipped everywhere successfully. Ask for price lists. Agents wanted. Herold's Farms, Fruitland, Ontario, Niagara District.

SPRAYS

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

RAISE ALL THE CHICKS YOU HATCH. It is easy to avoid loss and turn failure into success now. Professor T. E. Quisenberry, Box 6710, Leavenworth, Kansas, has just written a 16-page bulletin telling plainly just how to avoid losses, how to successfully raise your baby chicks and just how to feed them. Everyone of our readers should have one of these bulletins. Write at once and a copy will be mailed to you free. —Advt.

CABBAGE PLANTS

Charlestown Wakefield
Copenhagen Market
Early Spring — 50c per 100
$4.00 per 1000

TOMATO PLANTS

Bonny Best
Chalk's Early Jewel 50c per 100
$4.00 per 1000

Will also have a full line of all kinds of annuals including the grand new Aster — Heart of France, and Silvery Rose. Will have these either in bulk or pots.

ALF. MURDOCK,
Please write for our list
LONDON - - ONTARIO
Established 1874

table Growers), Chas. E. Chambers (Toronto Parks).

The Hall Committee: W. H. Foord, Fountain, Jas. Simpson, W. F. W. Fisher, H. G. Sibbald, T. Delworth, and two ladies to be appointed by the Federated Women's Institutes.

Mr. E. T. Reed was appointed manager.

Fruit Baskets

C. W. Baxter, Fruit Commissioner, Ottawa.

Owing to unavoidable delay in determining specifications for the manufacture of 6 and 11 quart baskets which will ensure to the grower and shipper of packages of uniform size, manufacturers will continue to make baskets of the old style until September 1st next. Growers and shippers, or any person intending to use baskets of the old sizes, need have no hesitation in purchasing them as no restrictions will be placed upon their use until the supply now in stock or which may be manufactured up to September 1st next is completely used up. Should there be any left over after the 1919 crop is marketed, they may be used the following season.

The necessity for arranging at an early date for a reasonable supply of fruit packages will be obvious, as it will permit the manufacturer to meet the increased demand should the crop be above the average of the last few years. In past years when the crop has been large, difficulty has been experienced in obtaining sufficient packages to market it to advantage. It is too early to form an estimate of what the 1919 crop will be, but numerous reports received at this office state that the trees have wintered well and that that there is marketing methods.

Changing Marketing Problems*

J. A. Grant, Provincial Markets' Commissioner, Calgary.

AGRICULTURAL science, the introduction of the refrigerator system, improved transportation facilities, the adoption of a larger measure of commercial fertilizing, the opening up of large fertile areas, and most of all in the west, the application of water on the arid deserts, has fairly revolutionized marketing conditions. With telegraphy and telephones entering into the subject we are now compelled to act differently about our markets. The old district preserve is a preserve no more. We have access to markets far and near, and they have access to us, and our margin of price is regulated only by the cost of bringing in goods from outside to compete against us. Of all the great changes that have taken place in the west during the past twenty-five years, there is none that has stabilized marketing more than irrigation. Under ordinary conditions of nature, the crops fluctuate causing prices to fluctuate with them, but with the application of artificial moisture we practically get a full crop year in and year out. The irrigated areas are now growing the bulk of our feed and our fruit, and the volume is so uniform as to make the result of work an assured thing. Such innovations in the supply of food and its production have created a revolution in market methods.

*Extract from an address delivered at the last annual convention of the Western Canada Irrigation Association, held at Nelson, B.C.