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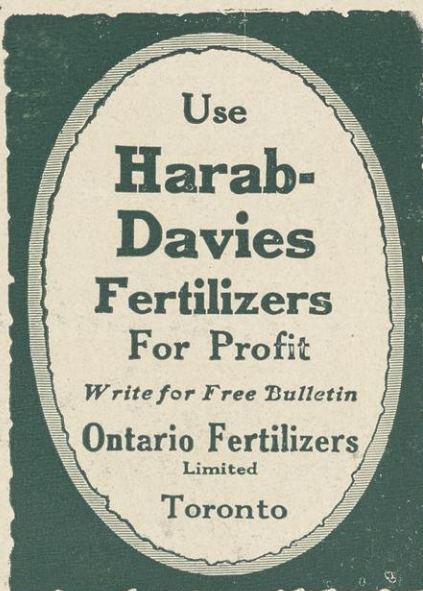
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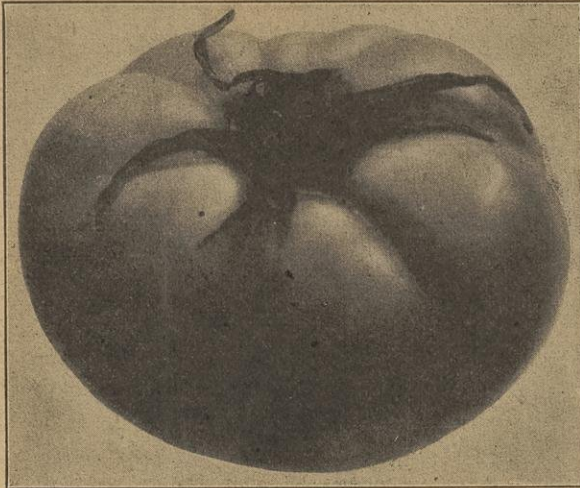
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The Canadian Horticulturist

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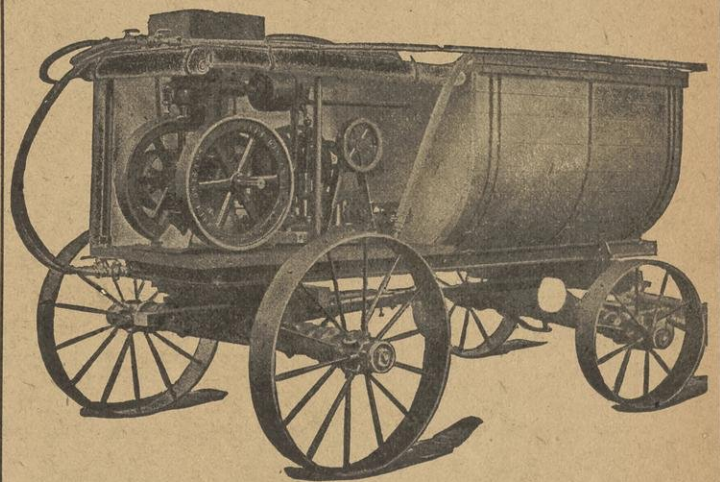
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The Canadian Horticulturist and Beekeeper

(See Pages 67-72)

(See Pages 67-72)

Vol. 27

TORONTO, MARCH, 1919

No. 3

The Relation of Winter Injury to Soil Fertility*

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

ONE does not require to trace the history of fruit growing in Ontario very far back in order to reach the conclusion that our climate is subject to dangerous extremes and that many of our orchard practices require to be carefully examined in the light of the test conditions which are certain to occur. Fruit trees in our climate are subject to serious risk and from time to time losses occur the extent of which is seldom fully appreciated. It is probably safe to say that the extremely severe winter of 1917-18 imposed upon the general fruit growing interests of this province a disability in excess of 25%. Some would rate the damage much higher—up to 30 or 40%, but in any case it is extremely serious. With farm crops a loss of this magnitude would be entirely made up in a year or two by increasing acreage, but in fruit trees the matter is not so easily rectified. The damage inflicted is permanent and is, in effect, repeated annually up to the life time of existing plantations. Add to this the fact that the lifetime of most trees is appreciably shortened by even one such winter and it becomes apparent

that the sum total of the injury could only be offset by the planting of a very large number of trees. It is safe to say that of every 100 trees set in commercial orchards not more than 50 come into bearing, which means that in order to offset as fully as possible the damage done last year it would be necessary to plant two young trees for every mature tree killed. If we estimate the losses at 25% this means that an acreage of orchard would require to be set which would be equal to half the acreage now in existence. We all know that such extensive planting is not likely to occur but the figures given will serve at least to bring out the seriousness of the situation.

In observing the effect of last winter upon trees, it becomes obvious at once that the particular treatment given has an important relation to the amount of injury experienced. We are all familiar with the fact that late growth of trees is dangerous, but it would perhaps do no harm to sum up the several influences which may cause growth to continue to a dangerously late period.

The effect of late tillage is obvious. It stimulates root activity directly, by aeration and indirectly by increasing bacterial action, thereby liberating plant

foods. Late tillage also tends to keep the land warm and in this connection mention should be made also of autumn or fall plowing. If plowing is done too early the effect is to stimulate root action by preventing the natural cooling process which ordinarily checks root activity. It is a well known fact, too, that growth is later on wet land or in seasons of heavy fall rains. The reason in both cases is because the high water content keeps the land warm and the roots correspondingly active. Thorough drainage is essential for fruit trees, as was well demonstrated in this locality during the excessively wet June of 1917. Peach and cherry trees in low ground were killed outright by the wet, which occurrence is most significant in spite of its rarity.

EFFECT OF PRUNING

Too heavy pruning in the dormant season may stimulate growth beyond the point of normal maturity as may also summer pruning or pruning done when the tree is actively growing. Repeated cutting or pinching in the growing season as carried on in European practice may possibly check growth somewhat, as it is said to do, but the customary result of ordinary summer



In British Columbia fruit growers show a greater disposition than is shown by fruit growers in Eastern Canada to use fertilizers in their orchards and gardens and phenomenal yields are sometimes recorded. An orchard scene in the Rutland District near Kelowna, B. C., is here shown.

Time of Application

In making a local test and also in the general fertilization of orchards, it appears that the time of application is important. Our knowledge on this point is not yet as exact and definite as it should be, but it now appears that one of the principal functions of fertility applications in orchards is to furnish available plant food early in the season before the larger natural supply in the soil is ready for use.—Pennsylvania Agricultural Experiment Station, Bulletin 153.

pruning as it has been recommended in this country is simply to defer growth and prolong it later into the summer. This practice has, therefore, an aspect of serious danger and it would certainly be unwise to do any considerable amount of pruning of any kind while the tree is actively growing.

HOW FERTILIZERS ACT.

Stable manure is seldom used in dangerous quantities on fruit trees except in colder climates where winter killing is likely to occur in any year. Where late growth results it seems quite as likely to be due in milder climates to lack of lime as to excess of nitrogen. Fruit trees, particularly plums, cherries, and peaches, appear to require lime in abundance, one of the chief effects of which is to cause earlier ripening of the wood.

OTHER FACTORS

Orchard practice, with certain tender fruits, as peaches, plums and cherries, is very seriously complicated into the case at this point. Too early maturity of wood is not desirable, and is to be avoided as carefully as is too late maturity. The fruit grower, therefore, is faced by the problem of balancing up all the conditions which affect growth or maturity in either direction. Too early maturity is dangerous because thoroughly ripened wood starts into growth more easily in mild weather in winter and is much more likely to be injured by colder weather coming after, especially if the change from warm to cold should be at all sudden. Thoroughly matured fruit buds behave in the same way and are likely to be destroyed by late winter cold snaps or caught by early spring frosts if they go into winter in an advanced condition.

THE USE OF FERTILIZERS

Studies of winter injury throw a particularly interesting light on the question of tree nutrition and particularly the use of fertilizers. Starved or neglected trees suffer severely from winter

killing and there seems no room to doubt that trees showing poor growth and sickly color would be greatly improved in health and in cold resistance by the use of stable manure or nitrogen, the lack of which is so plainly indicated. There is abundant proof, also, that trees which are allowed to exhaust their energies in over-bearing are most susceptible to injuries of the kind under discussion. This fact is important and has several applications to fruit growing practice which are decidedly far-reaching in character.

One of the important means of preventing exhaustion from over-bearing is thinning of the newly-set fruit by hand. It is perhaps not too much to say that thinning cannot be omitted if best results are desired. Some peach growers are able to do a large part of the necessary thinning at the time of the spring pruning, but in any case it would probably pay well in the long run to go over the trees when the fruit is well set and see that the number and distribution of fruits is satisfactory.

EFFECT OF PHOSPHORIC ACID.

With respect to the use of fertilizers it is probably true that phosphoric acid is more often deficient than any other element and since phosphoric acid is known to have a very marked influence on the nutrition of the general plant body it is perhaps not too much to say that a deficiency in the supply of this element is more serious in its consequences to the tree and to the grower's pocket-book than any other fertilizing constituent.

Lack of phosphoric acid is one of the reasons for the common failure to set fruit of trees which blossom very heavily. The application of superphosphate to induce fruit setting is in line with the use made of this material by tomato growers who make special application in liberal quantity at the time of fruit setting.

PHOSPHORIC ACID

Phosphoric acid, with some plants, has a stimulating effect on growth, which is at first glance very similar to that of nitrogen, but which on closer study proves very different. Phosphoric acid imparts a dark color to foliage and a well developed, healthy appearance to the entire tree. It plays a very important part in the building up of firm, well-ripened wood and even if the growth is stimulated and correspondingly late in maturing, the probability is that hardiness is increased instead of diminished.

Reducing Fertilizing Costs

To reduce the cost of handling fertilizing materials, the Ohio Experiment Station officials are calling the attention of farmers to the plan of buying acid phosphate in bulk during the coming

spring. When shipped in bulk it may be purchased for several dollars less per ton and applied to the soil with practically the same amount of labor as when handled in sacks.

Experiments show that acid phosphate may be applied with a fertilizer or lime spreader any time after plowing and before the spring crop is sown with good results. When purchased in bulk the acid phosphate may then be applied to the soil when hauled from the railroad station. In some cases the use of old fertilizer sacks is recommended, the sacking to be done at the car. The sacks alone for a ton of fertilizer cost from \$1.50 to \$3.

Small Fruits Being Planted

During the past three years there has been a great increase in the planting of small fruit and the trend of the times indicates that this tendency will continue indefinitely. One reason for this is that besides the unusual tendency toward a vegetarian diet brought on by war-time garden development, small fruits, such as strawberries, currants, gooseberries and grapes are being substituted in many sections for tree fruits. The smaller fruits are generally cheaper, more easily grown, and frequently more plentiful than the tree fruits.

Cities depending upon a distant section for small fruits nearly always receive fruit of rather low quality, or at least improperly ripened, because the fruit is picked green. This condition has encouraged the development of home gardens and small farms by city people, and has led to the culture of small fruits more than ever. Many land owners are seeking to establish fruit gardens simply to insure a good supply of highest quality fruit for themselves. As a rule the small fruits may be produced much more cheaply than they can be purchased upon city markets.

IMPROVING SOIL FERTILITY.

For the vigorous development of the tree and an abundant crop of fruit, the soil must contain the needed constituents in a more or less immediately available condition. It is for this reason, as well as to replace the exhausted plant food, that fertilizers are necessary to profitable apple growing. . . . Soils differ so much in composition that it is impossible to state definitely the amounts of these fertilizers that should be employed in all cases. . . . It may be said that the best and most profitable crops can be obtained only when the soil contains what might be thought to be a large amount of plant food, the greater part of which is more or less assimilable.

Obtaining Results With Cane and Bush Fruits *

Prof. O. M. Taylor, Geneva, N.Y.

OTHER things being equal, currants and gooseberries are at their best in cool, moist, retentive soil of rather heavy clay-loam type, quickly deteriorating in hot, dry, sandy soils. None of these fruits will thrive in wet soils, a soggy condition being especially favorable to winter injury of cane fruits. All soils should be well drained. There is but little danger of over-feeding bush fruits but heavy applications of nitrogen may at times cause excessive growth of cane fruits which do not fully mature, resulting in winter injury.

The pruning of cane and bush fruits is important. The old canes of raspberries and blackberries should be removed as soon as the crop has been harvested, thus destroying insects and diseases which may have infested the fruiting canes, and giving more room for the new growth. No further summer pruning is required with red raspberries. In the spring, the canes are cut back to a desired fruiting height. Summer pruning of black raspberries and blackberries depends on the method of culture. Usually the new growth is stopped at a desired height by pinching out the succulent tip. In the spring the lateral branches are shortened back, depending on the vigor. The vinelike growth of dewberries must

be supported by stakes or trellis. In the Hudson Valley, where berries are grown intensively, stakes or various forms of trellis are in common use but in western New York the trellis is seldom seen.

Systematic pruning of currants is essential to improve the fruit and to renew old and weak wood. Most of the wood over three years old should be cut out and only enough for the yearling wood left to maintain an annual supply of the younger wood, leaving from five to eight canes per bush. The tops of gooseberries should be thinned and occasionally cut back when necessary to encourage new growth and to maintain an open habit of growth. Varieties that sucker freely may be pruned much like currants.

Few, if any, growers spray the cane-fruits. As a rule, insects do not appear in injurious numbers in New York, although there may be occasional infestations of the snowy tree-cricket, the raspberry cane-borer and the raspberry sawfly, only one of which may be controlled by spraying. Unfortunately, there are several fungus troubles or diseases which are difficult to control, such as anthracnose, orange rust, cane blight, crown gall and raspberry yellows. The most common insect enemy of the bush fruits is the currant worm and San Jose scale, which readily yield to proper spraying.

All efforts come to naught with the

selection of an inferior variety. Some varieties are almost cosmopolitan in adaptability but others are at their best only in restricted areas. The question of what to plant is difficult partly on account of the great number of varieties available but more so because of the fact that under different environments and under unlike surroundings the same variety may change both in plant and fruit-habits. The best varieties in one place may be all but worthless elsewhere. Adaptation should be determined before planting extensively.

The testing of the newer, most promising kinds should be encouraged and every effort made to develop a plantation especially for home use of choice varieties, high in quality, of all the classes of both cane and bush fruits, including the red raspberry, black raspberry, yellow raspberry, purple raspberry, blackberry, dewberry, the red, white and black currant and especially some of the European varieties of gooseberries. When grown for home use, the fruits may be left on the bushes until the highest degree of flavor and quality has been developed—giving the grower a product tempting to the eye, and delighting all by the handsome appearance, delicate aroma and pleasing flavor. With the many varieties at our disposal, and with a better knowledge of their adaptabilities, intelligent effort cannot fail to supply our tables with fruit most acceptable to both sight and taste.

*Extract from a paper read at the meeting of the Niagara Peninsula Fruit Growers' Association held in Grimsby, Ont., Feb. 26.



Celery is a gross feeder and requires a well-prepared, rich soil for best results. This ten-acre crop was grown by Dr. H. A. Clark, at Brockville, Ont. Note the method of bleaching.

Fertility and Other Factors

A. H. MacLennan, Vegetable Specialist, Toronto, Ont.

IN order to be able to study more satisfactorily the relation of temperature to moisture and fertility in plant diseases, we must understand more completely that plants and human beings are identical in their resistance to disease. Given certain conditions each can combat successfully any disease. It is well known that where man follows nature's rules he escapes disease; if he does not he has to pay the penalty. So it would be with plants if we human beings had not chosen to interfere, for our own benefit, with nature's methods. Seeing that we, forcibly, have done this, it is necessary that we try to follow as closely as possible what nature would have done if we are to retain the right balance.

If we will recognize each plant as a child we will get off to a good start in our work. Nature gives each plant a definite type of growth with definite food requirements. Do we study each closely enough so that we know exactly what is best for it? Few of us are really making a close study of plant growth and until we do we will make many and often serious mistakes.

All plants require, largely, four substances in the soil for their growth: lime, nitrogen, potash and phosphorus. Of these lime is not so important as the others, being really a soil sweetener and helping to make soluble the other three for plant use. For this reason we will consider only three. As with the human the plant must have a steady supply of all foods. If some element is lacking it means that the plant will be weakened in growth just so much. Supposing phosphorus were lacking—and it is a well known fact that it is very deficient in most soils—what will happen? The plant structure would tend to make too rapid a growth and, if any adverse condition set in, disease would quickly seize the opportunity and the plant. It is claimed to-day that lack of potash in the soil is causing considerable trouble in potato growing and that the cause of our so-called physiological diseases can be traced to its absence. Our experimental work on tomato streak diseases shows very conclusively that an application of acid phosphate will stay to a large extent, the ravages of this disease. Onion Blight starts when the bulb is about one-third grown. Bordeaux Mixture has little effect on it. Experiments show it is not from lack of potash and phosphorus in the soil. Will nitrate of soda serve? It is well known that it will draw moisture to itself from the surrounding soil. What little work has been done so far seems to prove that it at least will go far toward preventing the disease.

Many diseases get started in crops through too great changes in temperature. This cannot be controlled outside but under glass it is possible, and here we find more diseases developing, especially in the early fall and late spring. The tendency for most of us is to try to save coal at these periods and many of our troubles are directly traceable to this. While it is well to be sparing of cost in production, we should never allow our crops to suffer. The steadier temperature at which plants can be grown means a greater return.

Plants for Cover Crops

Some writers have divided the plants used for cover crops into three groups: Nitrogen gatherers, potash plants, and ordinary plants.

The nitrogen gatherers are so-called because during their development they take some nitrogen from the soil air. Consequently in their decay such plants actually leave the soil richer in this element. The clovers, peas, beans, vetches and alfalfa belong in this class.

One writer, at least, has spoken of turnips and rape as being potash plants, since analyses show them to contain rather large amounts of this element. These plants might be used to advantage in orchards where a vigorous growth of trees indicates that more nitrogen is undesirable.—Ohio State University, Reading Course.

Many also in greenhouse work do not give sufficient air. Especially is this so among the newer growers. They seem afraid to give the plants all the fresh air possible and generally have to make two or three failures before they do so. I was asked the other day why the seedlings in a certain greenhouse died each year; the trouble was that the man did not ventilate and the plants burned. Fresh air will harm no plant as long as it does not strike directly on the plant.

Excess moisture in the greenhouse probably gives rise to more diseases than any other cause. Too many growers seem to think that the plant can stand any amount of moisture and then run the house at either a very high or very low temperature. Most of the mildew on lettuce and tomatoes is attributable to carelessness with either of these factors.

We are only started on this work, but

so far results indicate that a closer study must be made of each of these factors for each crop. While it is not so easy to handle this work outside, especially the temperature factor, still we have control of two out of the three factors and nature will take care of the other much better herself than we could.

Pruning Peaches

W. A. McCubbin, St. Catharines, Ont.

There are two diseases in the peach that can be materially lessened by care in pruning; one of these is the Brown Rot and the other is Peach Canker. In the case of Brown Rot care should be taken when the trees are being gone over to knock off all the old mummified fruits which were rotted last summer, and remain in a dried up condition on the trees. If left till spring the Brown Rot fungus which is still alive in these mummies will start into growth in warm weather, and a new crop of spores will be produced to start infection once more.

Pruning can also be made to help greatly in keeping down Peach Canker. The following recommendations are taken from Bulletin No. 37, of the Central Experimental Farm, which will be sent on request to anyone interested:

“Keep the trees free from all dead and dying wood, because this harbors the canker fungus. Prune out all dead twigs, especially on the main limbs so that they cannot serve as starting points for the canker. Make all pruning wounds clean cut and cut as close to the remaining limb as possible. If a projecting stub is left, part of it will die and the dead tissue thus left serves as a starting point for canker.

It is estimated that Brown Rot in peaches causes a loss of at least 10 per cent. of the crop annually, while peach canker destroys each year from 3 to 5 per cent. of our bearing trees. These figures will indicate the importance of taking every method that will tend to keep these diseases in check.

Will Use Nitrate of Soda

John Buchanan, Berwick, N.S.

This year I purpose using one-half pound of nitrate of soda per tree in my apple orchard for trees six years old and under. Will use two pounds of nitrate on thirty and forty year-old trees. This will be put on as soon as the frost is out of the ground—following the results of the Oregon and Ohio experimental stations.

I will throw the nitrate under the spread of the branches and not broadcast over all the orchard. Mineral fertilizers have shown no returns in increase of apple crop with me, so I will only buy enough to continue my trials.

The Use of Commercial Fertilizers

W. M. Grant, Blenheim, Ont.

HAVING had for a number of seasons, considerable experience in the use of commercial fertilizers in connection with early vegetable and fruit production, I propose outlining herewith the methods I used and the results obtained. The all important fertilizing elements necessary to plant life are nitrogen, phosphate and potash, and if all these are not present in the soil in readily available form and in sufficient quantities, no plant can properly develop. To supply these most economically to insure best plant growth, maintain and insure soil fertility and best mechanical conditions are problems which all tillers of the soil must solve if maximum results are to be attained.

To get the best results from the use of fertilizers it is essential that land be thoroughly drained either naturally or artificially. Then to correct any superabundant soil acidity a generous application of lime should be made, a ton to the acre every five years is none too much. The land should then be in good condition to receive the necessary preparation for crop production.

My practice has been to make provision in the spring to have some leguminous crop coming along. In the fall this is supplemented by an application of five or six spreader loads of manure per acre, when manure is available. This is turned under in the fall and

supplies the necessary humus and in addition small quantities of nitrogen, phosphate and potash. In the spring I cross-plow and apply about 400 lbs. of 16 per cent. acid phosphate per acre. This is thoroughly worked into the soil, which is put in condition to receive my early vegetable plants, cabbage and cauliflower. These are started under glass and are ready for the fields as soon as the soil can be got in condition to receive them.

About a week after they are set out, a hand application of about 250 lbs. per acre of a 4-0-7 fertilizer is made. This is thoroughly worked into the soil and about two weeks later a similar application is made. This gives the necessary boost when it is most needed, and before the soil nitrogen becomes readily available.

Under this treatment I invariably have cauliflower fit to cut by June 1st, and cabbage a week later, and prices that are realized at that season of the year will give gross returns of from \$350 to \$400 per acre.

Tomato Land.

Early tomato land I treat somewhat similarly but give a more generous application of acid phosphate from 600 to 800 lbs. per acre. In the past I have been making only one application of 4-0-7 at the rate of 300 lbs. per acre

shortly after plants are set out, but this coming season I purpose following the advice of one of our most competent vegetable men. I intend making an application of nitrate of soda as the first fruits begin to ripen, when the greatest strain is being made on the vine and before the soil fertility is fully available.

In the season of 1917, under the methods outlined, I realized gross returns of \$982 off 75 square rods of ground in which I grew 3,000 tomato plants, staking some and training to a single stem.

In the growing of early vegetable crops, we must remember we expect to get our returns in a comparatively short time and early in the season before soil fertility is readily available, and to aid nature in giving us good returns, we must supply the necessary fertilizing elements in the most available form and at the right time.

Results With Fruits.

In the growing of fruit my experience is largely confined to apples. My orchard is principally Baldwins, covering four and a half acres. In the past I have plowed as early in the spring as possible and have practiced close cultivation until about July 1st when a cover crop of either alfalfa, red clover or hairy vetch was sown. In the fall of the year I have applied about 500 lbs. of a 16 per cent acid phosphate per acre, depending on the leguminous crops to supply the necessary nitrogen. Under this treatment my trees have made splendid growth and yielded fairly well, my average yearly returns being over \$1,000 gross per year. I think the orchard should do better if properly fertilized and this coming season I propose applying 5 lbs. nitrate of soda and 5 lbs. 16 per cent. acid phosphate around each tree, making the application about April 15th, when the tree requires this quick acting fertilizer to enable it to properly develop both leaf and fruit buds.

In the past my application of commercial fertilizer has been fairly generous, as experience has taught me that it is better to be on the safe side and apply perhaps a little more than is necessary rather than take a chance of robbing the soil and starving the plant by applying too little.

No plant food is so slow in its action and so difficult of access to the plant as the natural phosphates in the soil. To a very large extent the roots only obtain the supply they need by direct contact with and the actual corrosion of solid particles of phosphate in the soil.



The early maturity of the tomatoes grown by Mr. W. M. Grant, of Blenheim, Ont., is shown in this illustration obtained on June 26, 1918. He attributes this and the large yield to the proper balancing of the plant food with fertilizers.



In the production of this crop of cabbage Mr. W. M. Grant, of Blenheim, used 300 lbs. of bone meal in the spring and 500 lbs. of 4-0-7 fertilizer after the crop was established. Note article on page 6.

A Balanced Ration in the Orchard and Garden

F. J. A. Sheppard, St. Catharines, Ont.

FROM a number of years experience I am convinced that the average fruit and vegetable grower does not pay sufficient attention to the balancing of his fertilizer materials. Often times large quantities of stable manure and mixed fertilizer fail to give their best results, simply because the different plant foods contained in them are not properly apportioned or balanced. We know that there are three essential plant foods which all our trees and plants require, namely, nitrogen, phosphoric acid, and potash, and we are also taught to believe that a surplus of one of these three in the fertilizer ration will not make up for a deficiency of another. Therefore, to obtain the maximum results from one fertilizer we must have the proper proportion of each of the three essentials to supply the need of the crop we are growing. The majority of our farmers are alive to the great benefit to be derived from feeding a "Balanced Ration" to their live stock, but when it comes to feeding our trees, vines and plants, I fear very little attention is given to the balancing of the fertilizer ration. Stable manure is the best single fertilizer we can get, and most of us are unable to get too much; but I claim that our stable manure might be made to go a lot further and to give us greater returns if it was supplemented with some mineral fertilizer to balance it up.

Stable manure is rich in nitrogen and nitrogen plays the principal part in promoting growth, but without phosphoric acid and potash to balance it up, the growth is so soft that the plant or tree will break down before it has matured its crop. Most of our grain crops and fruit trees require a larger

percentage of phosphoric acid than is contained in manure. My experience has been that a combination of stable manure and commercial fertilizer is better than either alone, and that where stable manure is used an extra dressing of phosphoric acid in the shape of acid phosphate or bone meal, added at the rate of from 300 to 500 lbs. per acre, will show marked results. As phosphoric acid is an important factor in the early maturing of a crop, growers handling crops, the early ripening of which is an object, will be benefited by using a fertilizer high in phosphoric acid or by applying an extra dressing of 16 per cent acid phosphate to the growing crop.

Two Crops that Paid

Grant S. Peart, Burlington, Ont.

In 1918 I planted 2,000 tomato plants of the Bonny Best variety. At the time of planting, a large handful of acid phosphate (16% available) was scattered directly around the roots, 400 lbs. being applied to the 2,000 plants. The soil was gravelly loam and on the previous season had been an old strawberry bed, heavily manured, and plowed down in the fall of 1917. From these 2,000 plants I harvested a total crop of 2,130 baskets and 52 bushels of ripe tomatoes, which were marketed. The quality of the product was excellent.

One quarter of an acre of sweet corn, variety Cook Special, was fertilized with acid phosphate. The corn was planted May 28th. On August 18th I had harvested the crop of green corn and marketed 510 dozen. There were just 82 days, including the date of seeding and the final date of harvesting. I believe that the yield obtained with the toma-

toes and the early maturity of the corn was due to the acid phosphate application.

Lime as a Fertilizer*

Prof. R. Harcourt, Guelph, Ont.

IN the discussion of this subject the first consideration is the plant itself. What we need is something to feed the plant. In the consideration of plant food there are only four constituents we need pay attention to, namely, nitrogen, phosphoric acid, potash, and lime. A very large quantity of nitrogen is present in the air and one of our problems is getting that nitrogen from the air to the plant.

There is a great deal of difference in plants. They differ in the range of their roots, some plants obtaining this sustenance from the surface, and others from lower down. Plants also differ in the time when they make their growth and in getting their supplies from what is in the soil. You must understand your plant.

Then there is the question of soil. In the analysis of soils it has been found that most soils contain a large amount of plant food, such as nitrogen, potash, and phosphoric acid. But the real problem we have to solve is how much of that food can we get available for the plant. Plants take their food in the form of a solution. So there may be plenty of food in the soil, but if it is not available for the plant it is of no value to the plant. What is it, then, which makes the food available? The great agency is decaying organic matter. If we allow that to be depleted we prevent being made available what is there.

Hastening decay looses organic matter, and in the process acids are formed which bring potash, phosphoric acid, etc., into available forms. Lime assists in these processes, but the tendency of lime in soils that have been cultivated for any length of time is to go down below the surface and when we test the lower soil we find it contains plenty of lime for the plants, but the soil on the surface does not.

Hardly any soil in the Niagara Peninsula has enough lime on the surface to produce all crops; it has been carried down by carbon-dioxide. The first and most important substance to obtain for our soil is barnyard manure, but of that we cannot procure enough, and in buying fertilizer we must know what our plants particularly need. Of the three chief substances, nitrogen, phosphoric acid, and potash, nitrogen is what gives a strong stem and leaf growth; phosphoric acid gives early maturity, and potash enables starch-growing plants to get their proper growth.

*A report of an address given by Prof. R. Harcourt at the recent annual meeting of the Niagara Peninsula Fruit Growers' Association, held in Grimsby, Ont.

Commercial Strawberry Growing*

Manning Ells, Port Williams, N.S.

STRAWBERRIES seem to fit in well with orcharding. They can be grown in the young orchard until the trees have been out some fifteen to twenty years and there is no way in which a young orchard can be grown so cheaply as in conjunction with strawberries. With good cultivation the strawberry is practically a sure crop, and under all conditions of weather we have not had a failure in ten years, the crop not varying more than a thousand boxes to the acre one year with another. Some objection is raised that when growing berries one has to wait two years before any returns come in. This is true when starting a plantation, but where planting is carried on every spring you have a crop maturing every summer. Strawberries are the first crop to be harvested on the farm and bring in some money at a time when other sources of revenue are at a low ebb. Right here let me state that the man with an acre of berries to harvest this summer has a small bonanza in his hands.

Growing strawberries presents no greater difficulties and does not require any greater knowledge than is needed in any other hoed farm or garden crop. In starting a plantation select a piece of ground that has been under cultivation for at least three years. The June bug lays its eggs in old sod and pasture land and the white grub or young June bug is very fond of strawberry roots and will soon fin-

ish a new set plantation if there are any in the soil. It takes three years before they are all out of an old piece of sod. In this valley I think a loam or light loam is the most satisfactory kind of land for berries, it being the easiest to work and giving the highest returns because the berries will be earlier than in heavier land. We want to keep in mind that the early berry is the one that pays. By raising early berries the crop is out of the way before the haying season is on, quite an important consideration if we are to grow berries in a general way.

Preparing The Soil.

Prepare the land as for potatoes or corn. We like to get the stable manure on the fall or summer before and plow it in, plowing again in the spring as soon as the land is fit to work. In growing Dunlaps—and this is the only variety we would grow on a commercial plantation in the Annapolis Valley—it is not necessary to set them before the first of June to get maximum returns. If the Dunlap has one fault it is that it makes too many runners, too rank a growth when set early in the spring on very good land. Later in the season these runners pile over one another and take root so thickly that the producing plants are almost smothered out. For the same reason, strong nitrogenous fertilizers should be sparingly used on the Dunlaps when set early in the season. The best crops I have ever seen were grown on strong, well-manured land when the plants were set the last week in May.

On our own farm we begin to plant

as soon as the land is ready and continue as opportunity offers right into June. We have a large plant business to take care of, however, and have to plant as soon as we get the time available. After planting it is most important that cultivation should take place at once. Plants that are cultivated within a week of planting will seem to come right along and get a much better start than those left until the weeds are showing above ground. If cultivation is started early and kept up once every week or ten days until the runners cover the ground the heaviest part of the work is over. This constant cultivation gets the weed seeds all started to the surface and sprouted so when the fall rains come and the rows are nicely matted there will be few weeds left to come up through the young plants.

To get the best returns it pays to mulch the first winter. Use marsh hay, meadow hay, rushes or straw. The most of us will have to depend on oat straw and even at twelve dollars a ton we covered the whole of our ten acres with straw this winter. Many make the mistake of putting the mulch on too heavy. All that is required is enough to shade the plants; shake the loose straw along the rows as thinly as it can be spread, and from one to two tons of dry oat straw will mulch an acre. This mulch, when drawn between the rows as soon as the growth starts in the spring, will help to keep down weeds, will keep the berries clean and conserve moisture.

Up to picking time any ordinary farmer can grow several acres of plants with no more trouble than with the same acreage of turnips or potatoes, but the harvest is the limit.



How would you like to produce a crop of onions running 30 tons to the acre, like this one grown on the Casorso Ranch, Kelowna, B.C.? Only land rich in readily available plant food can give such yields.

Now, just a word about varieties. For our market we want an early berry, one of good quality and also a large cropper. Fortunately we have in the Senator Dunlap a variety that fills all these conditions to a greater extent than any other. In our experience in growing plants for the public we have had under test all the usual varieties and most of the new ones, and have yet to try any that will make for us the amount of cold, hard cash that we can get from the Dunlap. For our conditions in the Annapolis Valley it is in a class by itself.

The cost of growing berries one year with another is fairly constant, and with man labor at 20c an hour,

horse labor at 15c an hour, boxes at four dollars a thousand, and after paying pickers one and a half cents a box, our costs have worked out at a little under six cents a box on the five year average. During these five years the price averaged about twelve cents for the whole season. Since 1917 the cost has gone up about two cents a box and the price about six, so the grower is still a little ahead of the game. For the next few years berry growing should be very profitable for those in a position to produce them. Last season one farmer in New Brunswick received over eight thousand dollars for the berries grown on less than ten acres of land.

Nitrate of Soda Beneficial in Peach Orchard

THE experience of a practical fruit grower in the use of nitrate of soda in the peach orchard was related to the members of the Niagara Peninsula Fruit Growers' Association at their recent meetings held at Grimsby and St. Catharines, Ont., when Mr. C. E. Nichol, of Model City, New York State, in the course of an address on peach growing described his method of applying nitrate of soda to his trees and the results he has obtained from its use. "Peach trees," he said, "must have plenty of foliage to do their best. To promote the growth of foliage we have been using nitrate of soda to excellent effect.

"In our locality the nitrate is applied about May 15 to 20, or about the time blossoms begin to fall and when we know what our prospects are for obtaining a crop of peaches. We try to get it on the ground and to harrow it in just before a storm, if possible. Within 18 days we can usually see marked results from its use. It creates a healthy growth and puts the trees in good bearing condition. We do not use it late in the season nor do we advocate a second application the same season. We grow Elberta peaches almost exclusively. The nitrate of soda prolongs their ripening period by three to four days or from about seven to eleven days, which means a good deal to us in the harvest season.

Stimulates Root Growth.

"One effect of the use of nitrate is that it stimulates root growth by leading the root system to reach out after the nitrate. In order that we might test the results obtained from its use we have compared the yield of trees so treated with that of untreated trees in adjoining check rows. The trees given nitrate produced on an average two

bushels more fruit than the untreated trees.

"Since using nitrate we have not been troubled with shot hole fungus. This is because the nitrate increases the vitality of the trees. The fungus thrives on enfeebled trees. On a tree seven or eight years old we apply two pounds as a standard application.

Be careful when using nitrate of soda on light soils. Never use more than two or three pounds on extra large trees and keep it two to three feet from the trunk of the trees and out to as far as the limbs extend. With a couple of men I can sow thirty acres a day.

"We use all the stable manure we can but it is difficult for us to get enough for our 40-acre orchard. The only fertilizer that has given us results has been nitrate of soda. It gives quicker action than barnyard manure and therefore does not promote growth so late in the season. That is why we prefer to use nitrate early in the season as it gives quick action at the period when it gives the best results. If you will use a check row the trees on which you use nitrate should show results within 15 to 20 days after the first rain. Too large an application may do injury on light soils.

"Early cultivation is very important. We have never seen the cover crop that we could use that would not interfere with early cultivation."

Bush fruits of all kinds should be staked, thoroughly worked and then should receive a heavy mulch of coarse barnyard manure, which serves the double purpose of keeping them from drying out and keeping up the necessary fertility. A light dressing of wood ashes before applying the mulch is quite beneficial on most soils. Keep a sharp lookout for mice in the litter.

Spraying Preparations

Prof. John Evans, O.A.C., Guelph, Ont.

NOW is the time to get the spraying outfit in order. Spraying is conceded to be one of the most important operations of progressive farming, be it done in the orchard, in the field, or in the stable. The manner in which it is done often determines the quality of the crop and the health of the stock.

The air and soil are full of all kinds of insects and fruit disease germs. The only way the grower can combat them is by the use of the spray pump. Efficient and economic spraying is hard to attain with the use of poor machinery. The power sprayer is an expensive piece of machinery, but it is effective when properly handled. Its usefulness can be greatly impaired by improper care. To secure the highest degree of efficiency in spraying the maintenance of high pressure is necessary. Probably high pressure is not needed in all cases. It is, however, true that by means of it more thorough and consequently more effective work can be done in a much shorter time and with much less effort.

The agitation of the liquid in the tank is another important matter. In the case of most sprays the individual particles that make up the insecticide are suspended in the water. Unless the sprayer is equipped with a good agitator these particles will settle to the bottom, rendering the mixture in the top of the tank weaker than it should be and that in the bottom stronger, and possibly in some cases too strong for safe application.

It is needless to say that the care of spraying machinery should never be neglected. Indeed the spraying outfit should never be put away after using until the mixture is thoroughly cleaned out from all parts of the pump, rod, piping, hose and nozzles by running clear water through them. The water should be drained from the engine, and all parts cleaned and oiled. Test the pump for pressure, nozzles for fineness of spray, uniformity and distribution of spray, size and penetration of spray. Examine the pump valves, piston, packing glands, connections; compression and solution tanks for leakage. Overhaul the engine for broken gaskets, clogged oil holes and grease cups; test for compression and timing; see that ignitor mechanism—spark plug—are clean, and the batteries and connections intact and in good condition. All defective parts noticed during the previous season's operations should have been ordered and now on hand ready for fixing so that the complete outfit may be tested for efficiency.

The Core of the Fruit Industry

EVERY apple grower knows that the core has five sections, each bearing a well-matured plump seed when the fruit is ripe. This core is the centre of reproduction. The surrounding fruit that we value so highly is but a camouflage, some say, to assist animals in distributing the innermost seeds when the ripened fruit has fallen. Now the orcharding industry has a core essentially like that of the fruit which it markets. This core has to do with the essentials to the production of best crops. It, like the apple core, consists of five distinct parts—to wit, first, proper variety of fruit; second, proper mechanical condition of orchard soils; third, the effective control of insects and diseases; fourth, proper supply of orchard plant food; fifth, proper marketing of the produce.

Granted that each of these essentials is given its merited attention, the growth, blossoming and fruition of a satisfactory fruit industry is assured. Space will not permit our discussing each of these essentially important factors, but we shall confine our remarks to that factor which has to do with the early feeding of the crop, which function latest orchard investigation has shown absolutely determines the strength of "set" of fruit and the development of the fruit itself.

The long-time orchardist will possibly be inclined to ask why the orchard should need feeding. Its trees send out their extensive root systems far and deep into well prepared soils. Proper pruning prevents excessive

drafts upon the root system of the tree, while care to other essential factors, with the exception of plantfood, keeps the tree in a comparatively healthy condition. But this is the very point. A man may be healthy and may not overtax his strength, but if he does not have a better balanced supply of plantfood than he can get from hunting and fishing under normal conditions, he is unable to keep up his maximum energies. Just so with the orchard. The growing tree, although it seems a much stronger plant than the flowering plant of the home or the tomato of the garden, is built up of cells just the same as are the tender plants. These cells are equipped essentially the same as the cells of other crops, and require like nourishment if they are to thrive and reproduce both in foliage and fruit.

Starved Orchards

A notable instance of orchard starvation is reported by the Ohio Experiment Station. This station some years ago inaugurated a study of the extensive orchards of the Ohio Valley, which orchards had ceased to produce a satisfactory return. The fruit trees blossomed in profusion. Their foliage was beautiful to behold, but when it came to the setting of fruit there was not sufficient strength to maintain the draft upon the soil. The result was disappointment and loss instead of a thriving orcharding industry. The Ohio Experiment Station found that the shortcoming of this section was lack of plantfood. In view of this fact

it inaugurated an extensive fertilizer demonstration, which, in the course of a little over seven years, brought back many of the orchards, reviving them, and in fact developing them far beyond the former important orcharding industry of that territory. Two systems of orchard practice were investigated, the sod and the cultivated orchard. In both instances, what were considered suitable fertilizers were applied in sufficient quantity to materially nourish the apple trees. In fact in 1914 the rows of Ben Davis apple trees shown on the front cover of this issue of *The Canadian Horticulturist*, containing 12 trees each, produced 49 barrels of large marketable apples, where fertilizer was applied, but only 20 barrels of inferior fruit where nothing was added. In 1915 these same rows yielded as follows: Fertilized, 46 barrels; unfertilized, 9 barrels.

Maintaining Humus.

There were two things to which the orchardists paid special attention. One was the upkeep of humus, which was accomplished by the addition of one bale of straw around each tree annually and a proper supply of plantfood, which the station supplied in 12½ lbs. of a mixture of fertilizer made up of 5 lbs. of nitrate of soda, 5 lbs. acid phosphate, 2½ lbs. of potash. This same quantity of plantfood is supplied by 12½ lbs. per tree of a fertilizer analysing 6 per cent ammonia, 6.4 per cent phosphoric acid and 10 per cent potash. Quickly available ammonia caused rapid tree growth, along with vigorous twig and bud production. Phosphoric acid hastened ripening and helped the setting of fruit, while potash assisted in laying down starch and gave general vigor to the tree. The Ohio Station, in speaking of the effects of fertilizing this orchard, says: "The first noticeable effects of fertilization in these starving orchards were discovered within two weeks from the date of application where the quickly soluble, promptly available nitrate of soda had been applied around the trees, either alone or in mixture with other forms of plantfood. Dark green circles or "belts" around the trees caused by the thin mixed growth of weeds and grasses, taking on a much deeper, richer shade of color were distinctly outlined. . . . These changes were remarkably noticeable within a month, as the fertilized rows or plants were compared with those left unfertilized."

Orchard fertilization has also been extensively examined by Pennsylvania



This orchard shows the results obtained from the use of a well balanced fertilizer. Each row contains 12 Ben Davis apple trees. The row at the left received complete fertilizer and yielded 49 bbls. of large marketable apples. The row at the right, unfertilized, produced 20 bbls. Note article on this page.

Agricultural Experiment Station, who have reported on their tests in bulletin No. 153 of that station. The Pennsylvania orchardists made tests of the application of ammonia and phosphoric acid and of complete fertilizers. When applied to old orchards they found that in one orchard the increase per acre per annum from the addition of nitrogen and acid phosphate was 265 bushels per acre, while that on another orchard was approximately 309 bushels per acre. When plantfood was applied to young growing orchards, the following results were obtained:

Gain Over Normal Yields.

Name of Orchard	Nit. & Phos. Acid	Complete Fertilizer
Strode ...	45.9 bus. per acre	46.4 bus. per acre
Tyson ...	55.1 " " "	89.9 " " "
Wertz ...	15.9 " " "	59.0 " " "
Mynard ..	17.1 " " "	69.7 " " "

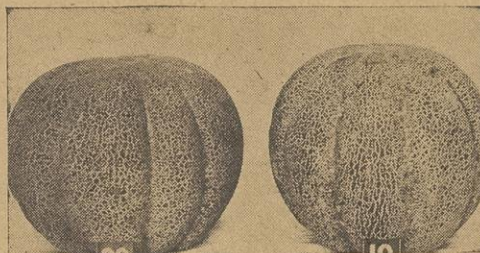
This station, too, has been able to demonstrate that trees can be profitably fed like tender plants and growing animals. The station says: "The crops on these plots (Brown orchard) in 1917 were 25.3 bus. per acre on the unfertilized trees, and 762.6 bus. on those receiving fertilizers."

The Value of Tests.

Tests and findings in near-by or distant locations are of precious little use unless applied to our local conditions. A great deal is being said about soil characteristics and their influence on crop production, and we do not for a minute wish to minimize the importance of the soil type; nevertheless, the soil side of the question is but half of the problem. Apple trees use the same essential plantfoods whether they are grown in the eastern counties of this province, the Niagara Peninsula, Ohio, Pennsylvania, or elsewhere. This is a point which should constantly be kept in mind by business orchardists. Moreover, it should be kept in mind that the soil analysis of the sections where the Ohio and Pennsylvania experiments were carried on, do not differ materially from the analyses of the soil in many of the orcharding sections of this province. The only material difference is that in Ohio and Pennsylvania the apple crops have a much longer growing season in which to mature, which fact in itself only emphasizes the greater need of paying attention to the fertility side of orchard management in Canada.

Some men are disposed to dismiss the question of fertilizers by saying: "My orchard does not need fertilizers." We quite agree with him; in fact, we never knew an orchard or a field that did "need" fertilizers. In fact, the field does not "need" tillage, nor does the orchard "need" care, but the farmer and orchardist find it pro-

fitable to apply proper tillage and proper care. This is the crux of the matter. The use of fertilizers on crops of any sort, including orchards, is not a matter of sentiment or prejudice, but is a cold dollars-and-cents proposition. It should be placed on just the same basis as improved machinery for spraying or tillage. If fertilizers will pay on the orchard, the orchardist should study them carefully and apply them abundantly so that his trees may produce the largest quantity of best quality fruit.



These two fine samples of Montreal Musk Melons were grown at Macdonald College, Que. They are well netted and perfect in form. Melons like these sell for \$12 to \$13 a dozen on the Montreal market.

Ontario orcharding is extensive; in fact, the figures reported by the Bureau of Statistics show that in 1916 over 313,000 acres were given up to the growing of orchards, small fruits and vineyards. Now, the yield of apples per tree in Ontario is not by any means as large as it should be. In fact, if an increase in Ontario orchard production equivalent to that obtained on commercial orchards in Ohio Valley could be obtained it would increase the returns in orchard crops in Ontario five-fold, not saying what it would do in the improvement of the quality of the fruit gathered.

Methods of Application.

What to apply, when and how to apply it, are interesting points for the Canadian horticulturist. As to the time of application of fertilizers the Pennsylvania Agricultural Experiment Station says: "To increase the crop of the current season the right time to apply fertilizers appears to be about the time the buds are beginning to open in the spring or slightly later. Applications made much later, however, are often useful in steadying the yield from year to year, and hence should not be neglected."

In general practice best results are obtained from fertilizers on orchard trees from applying the fertilizer around the tree, covering an area out from the trunk of the trees about equal to the spread of the overhead branches. This application should be made about the time that the grass is

becoming green and taking on a vigorous growth.

What to Apply.

As to what to apply, it is generally conceded that a fairly available nitrogen gives quickest results. This should be accompanied by a good supply of phosphoric acid and potash. In Nova Scotia practical orchardists report the use of 500 to 1,000 lbs. per acre of a high-grade fertilizer. This available plantfood assists in early branch growth and bud formation and feeds the developing fruit at a time when the ordinary supply of soil plantfood falls short of the great draft which a heavy crop of fruit makes upon the soil.

Many an acre of unprofitable home or commercial orchard can be brought into profitable yielding by closer care to the five factors at the core of the orcharding industry. None of these factors can be omitted, but not all of them are receiving the attention that they merit from Canadian fruit growers. Indications are that considerable opportunity will develop in the near future for export fruit trade from Canada. Whether or not we shall be able to hold this trade when the opportunity offers will depend upon the magnitude of the supply of A1 stock. This is why intensive orcharding is of such vital importance to the Dominion.

Urge Use of Acid Phosphate

Due to the high prices of fertilizing materials, the Ohio Experimental Station urges Ohio farmers to make the most economical use of animal manure and acid phosphate for spring crops. Manure contains relatively high amounts of nitrogen and potash and when reinforced with acid phosphate at the rate of from 200 to 300 pounds to the acre produces the most economical gains in farm crops.

The shipment of European potash salts has not begun and the latest United States quotations are around \$350 a ton for muriate of potash; nitrate of soda has been offered at \$81 a ton at eastern ports. Acid phosphate, it is said, should be secured in Ohio at around \$27 a ton.

Station officials also point out the economic lessons in a 14-year experiment in which acid phosphate, at the rate of 240 pounds to the acre and costing on the average of \$3.12 per acre for application, has produced a net gain of approximately \$20 per acre in a five-year rotation, whereas other combinations of acid phosphate, nitrate of soda and muriate of potash costing from \$10 to \$18 per acre have produced a net gain of but a little more than the acid phosphate alone for the same period.

More About the Double-Walled Hive

J. F. Dunn, Ridgeway

SINCE writing my article on the double-walled insulated hive in the November number of the BEEKEEPER, I have been kept pretty busy since November replying to numerous enquiries, and they are still coming.

It occurred to me that a mechanical drawing would assist interested bee-keeping friends, and be helpful to any contemplating the construction of a hive. Fig. 1 illustrates an unpacked removeable bottom board, and while it is just possible that a packed bottom may result in the warm air generated by the cluster being held in suspension a little lower down in the hive, I am not at all certain that there is relatively much difference between a packed and an unpacked bottom, in practical results. I am, however, just a little inclined to favor one inch of cork packing below the floor of the hive.

CONSTRUCTION OF A PACKED BOTTOM

I consider it of great importance that a piece of heavy waterproof paper be placed between the packing and the boards enclosing it. This keeps any moisture from the insulating material.

CONSTRUCTION OF THE WATERTABLE

The watertable can be mitred at the corners, like a picture frame, but we prefer to tenon and mortise it, placing the tenon enough off the centre to miss the outer edge of slant of watertable. After the four sections are driven together, the saw table is set on a bevel and the slant cut; also the drip rebate on the under and outer edge. A strip of waterproof paper should also be placed under the watertable and over the insulation before the watertable is nailed down.

CEMENT COATED NAILS.

It is better to use thin gauge cement coated nails when putting hives together. If you cannot obtain them from your hardware dealer, coat them yourself. Throw a few pounds of nails into an old dish, then add a teaspoonful of shellac, shake them up well and when coated take them out. If any shellac is left, add more nails until all the shellac is used. You will find that nails so treated will cling to the wood and "stay put." I got this hint from Mr. W. A. Chrysler, and it is passed on for the general benefit.

LOOSE BOTTOM-BOARDS.

There are some advantages in a removeable bottom board. We have quite a number of them, but are making all our new hives with the bottom built in, the outer shell reaching far enough below the inner shell to admit of one inch bottom packing. The front of the

hive body is made one inch shallower than the back and sides, giving you an entrance one inch high clear across the hive. In other words the entrance is the full width of the brood chamber. The same rule holds good if you prefer the removeable bottom board. We very seldom remove the bottom board from those hives so constructed, for if it is

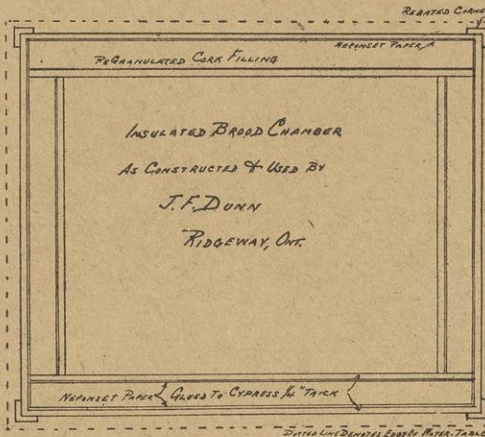
over twenty years, and they are still going strong. In 1916 our out apiary averaged 265 lbs. to the colony, and as we use "sky scraper" methods, tiering up and not turning a wheel until fall, I hardly dare tell you how much honey some of our best colonies piled on those hives. The writer stands 5'8 1/2", and he had to stand on two hive bodies to reach the top super, even after taking some off (bees and all) to even things up.

This apiary is on stony land and we could not get holes deep enough for posts for an eight-foot fence. We built an eight-foot slatted fence and braced it up at an angle of 45 degrees to take the thrust of our southwest gales. Last winter the snow flew to the top of this fence and dropped a ten-foot bank on top of the hives, and it stayed there all winter.

I would like to ask some of those good fellows up north, what sort of crops they get, that would lead them to say this hive will not stand weight. If you will tell us all about it we will promise not to move up there. We wouldn't like to have to build a hive too heavy to hold out with one hand at arm's length, and we might have to if we ever found a locality giving a crop that would crumple up our hives.

Laying all joking aside, we welcome criticism; "A reasonable number of fleas are good for a dog; keeps him from broodin' over being a dog."

The remark we hear most often is: "We have been through all that, we have tried double walled hives and don't like them." Oh, yes, we know all about those hives, too; we have been



SCALE 1/4" TO 1"
Fig. 2

desired to remove all bees from an empty hive, a bang on the ground with the hive inclined toward the front will scoot them all out in either case.

Fig. 2 shows the construction of the inner and outer shell. This is so simple that no explanation is necessary. Although made of quarter inch lumber, it is very strong.

Some of the veterans at the Toronto Convention thought this hive would not stand up under weight, because of its light construction. We have used them

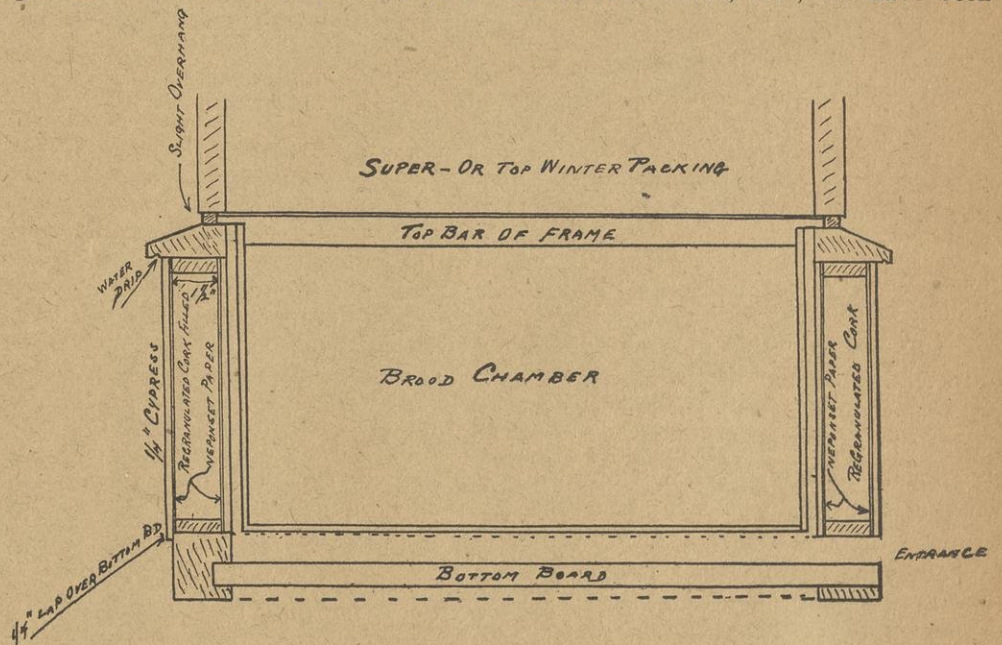


Fig. 1

through it, and we didn't like them either. A seven-eighth outer shell, three inches of sawdust, then another seven-eighth wall, all of which are good conductors of heat or cold, besides making a heavy, cumbersome and otherwise undesirable hive to handle. After a spell of severe cold, a thermometer placed near the inner wall of this hive as high up as the cluster, would register nearly as low as the temperature outside. With a thin walled, properly insulated hive, such as above described, a thermometer placed two inches above the floor would register but slightly higher than that outside the hive. Place the thermometer at the side of hive and as high as the cluster, and it will register during a zero freeze, from 40 to 47 degrees, if hive is contracted to suit size of colony. The warmth generated by the colony will not radiate through the sides of the hive.

For the benefit of those who prefer metal rests and also have the bee space above the top bars of the brood chamber instead of at the bottom of the super, Fig. 3 is a good illustration of this and will be helpful to anyone who may be contemplating the construction of a hive of this nature.

In reducing size of Mr. Dunn's drawing (Fig. 3) the end and side bars of bottom board should be shown wide enough to reach the inner wall as in Fig. 1. So placed they take the full thrust of the weight of honey in the supers.

In the February issue of THE BEEKEEPER, Mr. Deadman in his article on his hives says: "As I understand Mr. Dunn, the neponset paper is placed next the cork-packed space on the outside wall and on the side next to the frames on the outside wall, and on the side next to the frames on the inside wall. If this is correct why not put the paper on the side next the packing on the inner wall, the same as he does on the outer wall?" By consulting the drawings accompanying this article Mr. Deadman will see that I place the insulating paper on the inner shell where he recommends it should be—next the cork packing. In preparing the glue used in securing the paper to the boards, to every 1½ pints of glue add one teaspoonful of boiled linseed oil. Moisture will not affect glue so prepared.

In closing permit me to repeat, I do not make hives for sale; I know of no dealer who makes such a hive as I have described. My object in submitting working plans is to help the beekeeper to make them himself. Here they are for everyone. A multitude of other questions, not relating to hive making, I shall endeavor to answer in a later article.

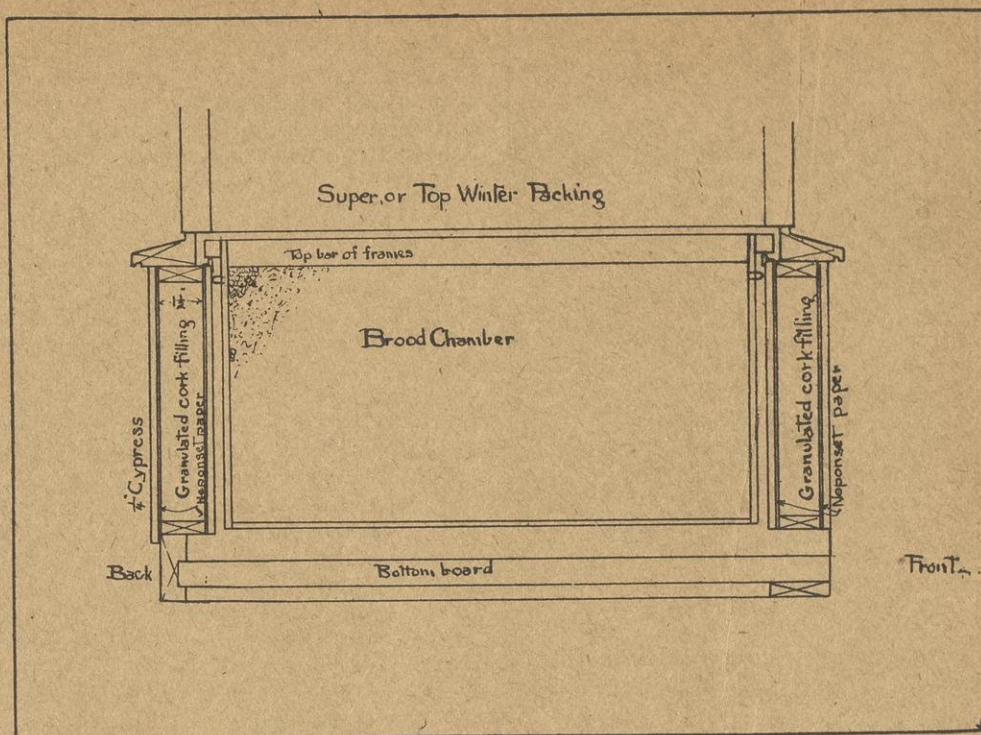


Fig. 3

Some Experiences With the Long Idea Hive*

By G. A. Deadman, Brussels

ARTICLE TWO.

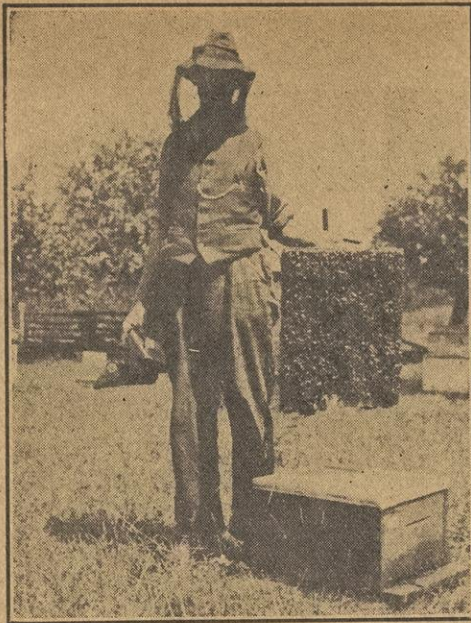
SOMETIMES we can accomplish as much, and more, by showing a child the pitfalls to avoid rather than the narrow way he should tread, and so I am going to write of a hive I have no further use for, viz., The Long Idea Hive. As this hive may be new to some of you, I may describe it in brief as a one-storey hive varying in the number of frames it contains according to idea of the user. It is the opposite of that most generally in use, which is adapted for tiering up, hive upon hive, or super upon super. It appeals to the beginner, inasmuch as at no time are there heavy supers of honey to remove, to examine the brood or find the queen, which by him is considered so necessary to be done frequently.

In a former article I said that the hive or frame adopted by the beginner will depend largely on circumstances, although I suppose more so forty years ago than now.

It was not from any love for bees or any desire to know how intelligent they were, that made me the possessor when a boy of a colony of bees in a box hive. Nor was it from lack of fear, because I would rather have faced a lion in those days, than an angry bee bent on stinging somebody. The fact of having no remembrance of what became of that hive of bees after I left home would indicate that my temperature was normal; there was no "bee fever" such as I contracted later on. It was not until I

*This article is the second in the series that Mr. Deadman has written for The Beekeeper entitled, "What Hive and Frame Shall I Use? The Beginner's Problem."

had started in business for myself and was building a house that my attention was again drawn to them. We thought then, as we do now, that when building a house it is very important to have a good cellar, one under every part of the building, and it so happened that the carpenter who had the work of finishing, remarked one day regarding the cellar, "What a fine place this would be to winter bees in." More than this, he was receiving through the mails little cages of bees, each containing a queen. I thought if that cellar was such a good place to winter bees I would get a hive and put them there. And so I got him to make me a hive in which to put a swarm of bees. It was a one-storey hive holding twelve frames and a division board, and the surplus honey was to be taken from the three back frames especially, and as many of the others that contained enough honey to make it worth while extracting. It might be called the long idea hive on a small scale. With such a hive, and such a method, it was no uncommon sight to see larvæ in different stages floating on the honey in the extractor, something never to be tolerated. This was the Jones' hive and frame. Worse luck it was, too. D. A. Jones had a name in those days, and so I did not attempt to improve on the frame, but only in extending the principle by making a hive to accommodate more frames. And so I made a hive twenty-eight inches long inside, having the entrance at the side, so I could



Can you count them? A hot summer's day in the apiary of R. J. Fuller, Pickering, Ont.

extract more particularly from each end. I had two chaff division boards, one each end, and during the honey season, queen excluding division boards to confine the queen to the centre frames. I worked both comb and extracted honey. This was mostly done by having a comb honey super over the centre, and I was free to extract from the frames at the ends. For a time I gave the queen access to all the frames, but I found for this locality it did not work. If there was one thing that the late G. M. Doolittle emphasized more than another, it was the importance of having a large force of bees just in time for the honey flow, not too early nor yet too late. I could never agree with him about the early part, but we can all understand why not too late, for as a rule those that were too late for the honey were too soon to be of value for the winter, and so although these large hives gave us bees in abundance, they were too frequently not worth the good clover honey it took to mature them. Sixteen to eighteen frames, all containing some brood, meant as many good frames of honey we are told to prepare them for the work of honey gathering. One could avoid that by confining the queen by the queen excluding division boards I have already referred to, but the principle is all wrong. Bees will store honey at the sides of the brood, but never much by choice, whereas they delight to store it above. Notice for yourself the first honey they draw upon as the cold weather approaches is by preference from the sides, and if you are ever in doubt as to the position of the outside frame in the hive you may know that the side next the outside or end of the hive is that which has the least honey in it, so we conclude if given their choice they put it there last.

The Long Idea Hive was advocated long ago by the late O. O. Poppolton, and every now and then has its advocates. It appeals to those also who want to keep bees on the "let alone" plan. I cannot see, however, that by the tiering up system, provided you allow the queen to go where she pleases, that you cannot accomplish the same results with less frames containing brood, as, before she may go above, the first super may be well started, if not well filled with honey.

So much for the long idea hive system as it pertained to the Jones' hive. The Jones' hive had nothing to recommend it, and I was going to say that his frame has lure yet. It was recognized, however, as a good wintering frame, but the very thing that made it good for this made it bad for the tiering up plan. It was a good wintering frame for the reason it was deep in proportion to its width. The hive was twelve inches wide and fifteen inches deep, inside measure. The comb measure of the frame was about ten and a half inches wide and about thirteen and three-quarter inches deep. The tendency of the bees with this depth of frame was to store considerable honey above the brood. The bees when clustered for

winter would probably cover or extend to eight frames. Now with a hive only twelve inches wide, and the bees occupying the lower part of these deep frames, and plenty of honey above and around them, made it an ideal place for the cluster. With such a winter nest there was no danger of the bees (unless weak in numbers) of getting so far away from the honey at one end as to lose sight of it entirely, as is frequently done with the long Langstroth frame. But we want more in a frame than this to recommend it. With a frame so deep there is a tendency for the bees to store honey above the brood. Now this is the very thing we want to avoid, whether working for comb or extracted honey, but especially when producing section honey. I have known strong colonies to hang out in clusters in front of the hive with oceans of super room above, simply because of their aversion to travelling far over capped honey above the brood in the brood nest. We can control this to a certain extent as I will explain later on, but the deeper the frame the more difficult it is to do, but apart from this give me as deep a frame as is compatible with good wintering and little danger of a honey-clogged brood nest.

Practical Advice on Queen Rearing

S. B. Bisbee, Canfield

WHEN talking of Queens, at the recent Convention of Ontario Beekeepers, held in Toronto, a member asked, "Have you ever noticed that the largest and best looking Queen cells do not hatch, and why?"

From the discussion following I was led to believe that several others present have been having the same trouble. This has not been my experience, and at the moment I was unable to think of any reason. However, after taking my seat, it occurred to me that there was some little thing that was being done that was the cause of the trouble, and I took the opportunity of having a talk with the party who had asked the question.

Our conversation revealed the fact that the cells were sometimes carried around the yard with the small end upwards. Also that in turning the combs when looking for cells the combs were swung over, instead of being carefully turned on end, thereby again turning the cells upside down and the quick motion dislodging the larvæ and causing it to die. The largest and best cells were more easily destroyed than the smaller ones because more room had been left by the bees in the larger cells, for the growth of the larvæ, and the larvæ being heavier was more easily separated from the royal jelly.

It cannot be too strongly impressed upon all who attempt to rear queens

that "after the cells are sealed over, they must not be turned upside down and they must not receive a jar."

It would be better not to attempt to handle them or give them to the colonies to be re-queened until they are just about to hatch.

A correspondent writes: "How do you control swarming?"

It is as natural for bees to swarm as it is for the birds to lay and incubate their eggs. It is nature's provision for the survival of the race.

Before we look for the cure let us first find the cause. Bees swarm for a number of reasons. The queen may be getting old and the colony reluctant to trust their very existence to the ability of the queen to carry them through another winter. These are supersedure conditions, queen cells are drawn out, and the young queens when they emerge may lead out a swarm. Re-queen often.

A young and very prolific queen will lay eggs so fast that very soon the colony has a large quantity of young bees hatching daily, with the result that the hive soon becomes over populated, and unless care is taken overcrowded. They are forced to seek new quarters, as otherwise they have no place to store the honey that usually starts to come in about this time. In this event cells are started and about the time they are sealed the old queen leads out a swarm, which is called the prime swarm. About

a week later young queens commence to hatch, and a large amount of brood having hatched since the old queen swarmed, another swarm comes off with a young or virgin queen—that is a queen that has not been fertilized or mated and this is called an “after-swarm.” The following day another swarm may appear, and for two or three days following swarms may come off until the strength of the old colony has been greatly reduced.

It is no disgrace for this queen to have swarmed. She is like the enterprising and successful manufacturer who is forced to leave one town and move to another, so that he may have sufficient room to carry on his business. Careful and judicious handling would likely have kept both where they were, had the beekeeper given more room at the proper time. If honey were coming in, give plenty of drawn combs for storing, and if this does not appear to satisfy them, remove some brood from the brood nest, replacing them with frames of foundation or drawn combs, preferably the latter.

It would seem that the tendency to swarm occurs just a little before, or at the commencement of the honeyflow. If the queen can be kept satisfied until honey is coming in freely the danger of swarming daily becomes less. My theory is that during the week or ten days immediately preceding the honeyflow, with very little or nothing to gather, the colony rapidly becomes stronger and overcrowded. But a few days later, with the honey-flow in full swing, the strain on the bees of the colony is very great. The situation has changed, and combined with the fact that the queen shows a disposition to slow up on egg laying, possibly in order that as many bees as possible may be released for honey gathering, causes the strength of the colony to be diminished and the danger of swarming is past, providing enough room is given to store the honey.

To sum up: Give the queen ALL the combs she can fill with brood, up to the commencement of the honey-flow, taking care not to add supers too fast. Then when honey is about to start to come in, confine her to one brood chamber (ten or twelve Langstroth frames) raising up a part of the brood from the bottom brood chamber, and replacing with empty combs, at the same time giving plenty of room for storing the honey.

In looking over the price lists of a number of Southern Queen breeders, I have noticed that the prices of queens are considerably higher this year.

At the Convention there seemed to be a growing antipathy to Southern queens, apparently on the ground that they did not winter well here. Coupling these two facts it would seem that Ontario breeders will have their hands full this season, and possibly more orders than they can take care of.

Removing Bees From the Cellar

By Wm. A. Weir, Toronto

THE operation of removing colonies from the cellar is one requiring considerable judgment on the part of the beekeeper, for at this time of the year colony conditions are at a low ebb. Cellar conditions, weather conditions and the general state of the colonies must all be taken into consideration in forming decisions. Colonies which are housed in a cellar which does not permit of uniform temperature between 40 degs to 45 degs. Fahr. and is not dark or easily ventilated will need to be moved out earlier than when they are in a proper cellar. Unless all of the cellar conditions are well regulated the colony will become restless, consuming more stores and rearing an excess of brood in cellar quarters.

As a general rule Ontario beekeepers remove their colonies from cellar quarters about the time willows begin to yield pollen. This is usually between the 5th and the 15th of April. In the actual removing and placing of the colonies on their summer stands there are two particular considerations to bear in mind, viz., the prevention of robbing and the prevention of chilled brood. It always pays to provide some light packing for colonies which are just set out of the cellar. The temperature of April nights is often quite low, and unless something is done to counteract the lowering temperature, the clustering bees will draw somewhat closer together in their cluster and leave a portion of valuable brood exposed. Even a wrapping of tar paper placed around the single walled hive is better than none at all, and it is an easy matter to arrange a four-inch tray of chaff or other good packing over the top of the brood nest by taking a half depth super and tacking a

piece of burlap to the lower edges forming a tray with a canvas bottom.

In choosing a day on which to set out the colonies a dull or slightly rainy day will give the best results. It will be all the better if a light rain follows the putting out of the colonies. When carrying the colonies out, carry them so as to prevent the frames swinging from side to side in the hive body, and note all colonies which are light when placing them on the hive stands. Always contract the entrance considerably. An entrance $\frac{1}{2}$ -inch x $\frac{7}{8}$ -inch is big enough for any colony at this time. Carrying the colonies out on a bright sunny day is to be avoided, as the strong light will attract the bees out for flight and “drifting” is caused; the bees not taking the precaution to carefully mark their new location readily drift to nearby stands, from which a goodly number of bees have play-flights. The weak colonies are thus made weaker and the strong colonies made excessively strong. Always move all of the colonies out of the cellar into the yard at the same time or day. Moving part of the colonies out to their summer stands and then a lapse of two or three days before the balance of the colonies are moved out to complete is a strong predisposing cause of robbing; the established colonies (those moved out first) are likely to attack the newcomers.

Many of the best authorities in apiary culture recommend an eight-foot board fence as the best protection from cold winds but should there happen to be good natural protection, such as evergreens, in the vicinity, this may be taken advantage of, and prove quite as efficient as a board fence.—Morley Pettit.

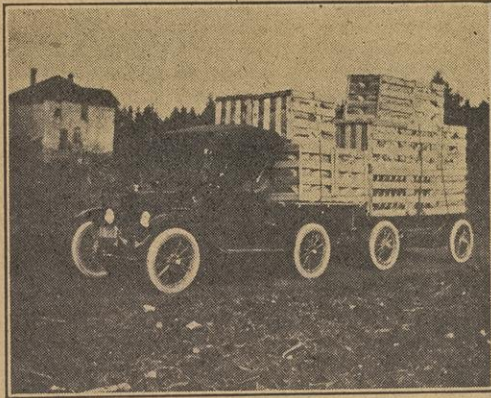


The backyard apiary of Mr. Sidney Pickett, of Owen Sound, Ont. Starting 4 years ago with one swarm Mr. Pickett now has 15 colonies and extracted 700 lbs. of honey from 9 colonies last season, which he rightly considers very good for that locality.

My Experience With Pound Packages

John A. McKinnon, St. Eugene, Ont.

DURING the last few seasons I have often been asked about buying bees by the pound from the South, and I cannot do better than relate my own experience. In the spring of 1917, as an experiment, I ordered fifty 2-lb. packages of bees from a southern breeder, to be delivered May 1st. Owing to unfavorable conditions in the South that spring, the bees did not reach me till the latter part of May. Most of the packages arrived in good condition, but in some from one-half to one-third of the bees were dead. Six days after transferring the combs, I made an examination for queens, and after uniting one or two and giving queens from my own yard to some that were queenless, I had thirty-four small swarms out of the fifty bought, which cost me about \$6.00 a swarm, as the



An auto that does splendid service in the apiary. Mr. Eric Hutchinson's car with a four-wheeled trailer attached with a load of 2,000 ten-lb. pails.

shipper did not make good the loss. In 1917 these bees did not produce enough of honey for winter stores, although the surplus taken from their supers would about pay for the sugar fed for winter. The 1st of September I increased the number by dividing into fifty-three colonies of good strength. In the season of 1918, two of these colonies developed paralysis, not the disappearing disease. After re-queening and giving some sealed brood to each, the disease disappeared. This yard's location I consider my best for honey, but last year I was sadly disappointed as to the yield there; so much so that I re-queened every colony with queens of my own rearing, as these southern bees were not hardy enough to stand up against our cold spring weather; and one bad trait that I noticed, they kept breeding or rearing brood long after the first severe frosts in the fall, consuming the honey they should have kept for winter. Judging from my own experience with southern bees in packages, I have come to this conclusion: I can raise bees a good deal cheaper than I can buy them, and have bees that have already proven hardy enough for our climate. I believe that, take it on the average, it is easier, handier and more profitable to make increase by dividing our colonies.

This is one plan that I have used successfully, by good management and using sheltered locations. I build up the colonies in the spring, and as soon as they are strong enough I give to those that are ready a full super of selected worker combs containing pollen, and about 15 lbs. of honey. Then I might say that I find it more profitable to keep over odds and ends of fall honey and use it in this way in the spring. I leave this honey at the out-yards, frequently from 500 to 1,000 lbs at some yards. When taking off the supers in the fall, the best combs are exchanged for light ones in the brood nest; the rest are sorted over. All combs containing honey are placed in supers and piled seven or

eight high. The dry comb supers are piled one at each end of the row, and the whole securely stapled and braced. Then I go over the piles very carefully to see that all cracks are plugged, so that no robbing bees will find an entrance. Honey stored in this way outdoors will keep in fine condition for early spring feeding, as it will not granulate, ferment, or sour, and it saves the trouble of transporting feed over almost impassable roads in the spring. It is also one of the easiest and most profitable ways to stimulate and care for bees that are short of stores at this season, and it also enables a man to care for colonies by the hundred.

As soon as these supers of honey and pollen are given to strong colonies they take possession at once, re-arranging the honey and form their extended brood nest, and I frequently have colonies with twelve to fifteen frames of brood a month before clover starts to yield in this locality. I then give them another super of drawn combs and honey, if I have any on hand; and if I want increase I prepare it in this way: I fill a super less one comb in the centre, and give the queen two brood chambers, placing the super of brood over an excluder. I then have the colony in this way: The queen occupies two brood chambers; over the excluder are eight frames of brood in all stages of development in a nine-frame hive, which leaves one comb space for a bar or two of grafted cells. These cell bars are placed in a frame, and given to the bees for a day to work over. It also gives them time to realize that they are queenless in the super. The next day I do the grafting in the usual way, except that at this time of the year I nearly always graft the first bars without the use of royal jelly, as about the only place it can be found is in a superceding colony, and besides it is not absolutely necessary, as the bees are sure to accept a good part of the cells, and in four days' time I have all the jelly I require for further grafting. In eleven days after grafting the young queens will be fully developed in the cells. The brood in the super will all be sealed over and ready for making increase. One comb of brood with adhering bees and a comb of honey will make a good start. The increase should have their hives located in pairs for uniting later. Should some of the young queens fail to develop into good layers, or are lost, the queen cells should be handled carefully and placed where the bees are most apt to cluster near the brood, without any cell protector or wire cloth of any kind. I have raised thousands of queens and for several seasons I have dispensed with most of the paraphernalia advertised in the supply catalogues, as they only add to the labor and expense. If two frames of brood are given each division and the bees are Italian, all that will be necessary is to fill out the hive with drawn combs or full sheets of foundation. In an ordinary season they will fill their hive with honey and will need no extra feed for wintering. In a good season I have had a division so made, give a surplus of two hundred pounds of clover and basswood honey, and the parent colony will be stronger and in better shape for the honey flow than if it had its brood nest crowded with the early dandelion and spring honey; but I would caution beginners not to divide their colonies till they are strong enough to cover the combs well. In a three-storey hive use only brood that is sealed for making increase, and never weaken the parent colony lower than eight frames of brood. Always leave the best pollen combs with the old queen; see that they have plenty of honey in their hives, and I am sure you will find it more profitable to raise your own bees. Another good plan is briefly as follows: The latter part of July, when you are extracting your white honey, as the combs are taken from the extractor, sort out all combs that are heavy with pollen, and place them in separate hive bodies. Colonies at this time that you wish to make increase from

should have all supers taken off. Go into the brood nest for a frame of brood and place it in the centre of your hive containing the pollen combs, place an excluder over this colony, then your super with comb of brood and empty or pollen combs over excluder. Allow it to stand till next morning, when the bottom hive can be given a new location and the top box placed on the old stand, and a young queen given. In a buckwheat locality both colonies should fill their hives for winter, otherwise they will need to be fed.

The Motor Car in the Apiary

At the annual convention of the Ontario Beekeepers in Toronto last month, Mr. Bainard, of Lambeth spoke on the use of the motor car in the apiary, and said that nothing could take the place of the car in the apiary for quick service. The following remarks by Mr. Eric Hutchinson, of Lambeth, on the use of his car for moving bees will be of interest to our readers. The pictures referred to are shown on this page.

"The Ford car and a four-wheeled trailer with pneumatic tires is about as good a way of moving bees as one could wish for. This spring with the two trailers shown in the pictures, and two Ford roadsters, we moved 56 colonies of bees in single packing cases from Arkell to Mount Forest, a distance of 45 miles, without loss. It took two all-night trips, though, that were no fun. Later we moved about 60 colonies in single hives a distance of 40 miles without loss. This fall Mr. Krouse and I, with our cars and trailers, moved a yard of about 50 colonies in heavy packing cases from Kitchener to a place near Guelph, a distance of about 20 miles, in daylight, without loss. The weather, of course, was cool. It is a treat moving bees by motor compared to horse and wagon."



The car can be made to do useful service in the apiary. Here is a photo of Mr. Hutchinson's and Mr. Krouse's car with trailer attached loaded with honey.

Beekeeping in New Brunswick

By W. R. Reek.

In January, 1918, L. T. Floyd was appointed Provincial Apiarist. Previously it had been generally conceded that beekeeping in New Brunswick was a minor sideline to agriculture and was scarcely worthy of much attention. A Beekeepers' Association had been organized but was allowed to drift until it became useless.

Last spring Mr. Floyd set out to visit every beekeeper that time would permit, for instruction purposes and to incidentally build up the association. No record of the number of beekeepers was available, consequently they had to be discovered. Up to the end of September over four hundred men had been visited and, in many cases, much assistance and instruction were given in the simpler work of caring for bees.

The Beekeepers' Association now stands with a membership of over one hundred. A short course for beekeepers was arranged during the winter.

A Beekeeper in Manitoba

By Wm. C. McKinnell

Does it pay to keep bees in Manitoba, is a question often asked and on which opinions seem to differ:

In some districts it has been found to be very profitable and the reverse in others. The reader then asks if it is profitable in one part and why not in another, and we have to inform him that Manitoba is a very large country and that we have a great difference in the soils, flora and other conditions.

These conditions may occur in other provinces, but not to the great extent they do in the three Prairie Provinces. We have not the beautiful fruit orchards of the East, neither have we got the fields of clover, alfalfa or buckwheat that abound in certain of the provinces, and which we hear so much about. We have to depend almost entirely on what the country has provided in wild flowers and weeds, and in some parts, especially the Red River Valley, the country abounds with lots of both. Another thing, in some seasons there is such a short period between frosts that the bees have to work overtime if they are going to store any honey at all.

Manitoba is divided into several distinct districts, the Prairie, the Bluffy, and the Scrub Country. On the Prairie they have a number of flowers especially along any creek or river bottoms, but they have not many that are valuable for bees.

There is considerable sweet clover being grown now, and most years this is a valuable food; but it takes the Scrub Country to produce the best conditions and this can best be said of the Red River Valley, because, either owing to the soil conditions or on account of it having been the first settled.

We have several valuable plants in abundance for the beekeeper. After the bees are put out in the spring, generally during the first two weeks in April, it is only a very short time until the poplars bloom, and they abound in the Scrub districts and then the bees get busy and you will see them working hard and carrying in large quantities, a greenish-grey pollen on their legs every fine day they can be out. Soon after this, the bloom comes on the balm of gilead and a few dandelions show up, and the pussy willows bloom, and the bloom comes on the maple (box elder). I have never been able to ascertain even by close observation that the bees ever got any honey from these; but, as pollen producers they are certainly very important and valuable, as it keeps them busy and the pollen they secrete helps out the brood and you notice the queen speeding up also. Next we get the strawberry and other wild fruit blossoms, and you notice a little honey coming in, and these carry you on through May and into June, when you get the wild raspberry and wild white clover. There are lots of other flowers, some of them the bees work on and others they do not, but the ones I have already mentioned stand out by themselves. These two abound all through the valley, especially north of the city of Winnipeg., the clover forming a perfect mat alongside of the roads, and in any place through the bush where there has been a clearing at any time, and the raspberries are in every bluff.

I have extracted honey at the end of June that was as white and clear as water. July and the first two weeks of August are when we get our best flowers and when we depend on our honey. We then get the clover at its best, the fire weed (Great Willow Herb), the sow thistle, Canada thistle and sweet clover if there is any in the district. These, are all first-class honey plants and the bees are certainly kept busy, and I have seen a strong colony fill up an extracting super in five days.

After the above plants are over we get the different wild asters, and of these we have a number of varieties, and they nearly all good

honey producers, and if the frost keeps off, as it does some years, we get a lot of honey. We have had bees fill up supers in September, although this is exceptional.

We do not care for the quality of the honey from the asters, as it seems very strong, but the bees winter well on it, and it is light in color. As keeping bees depends entirely on the flowers growing in your neighborhood, you can easily determine if it pays to keep them. What a lot of people, however, do not understand is, that bees do not work on every flower that grows, and some they do work on do not produce honey and some do not produce pollen and that bees cannot get on without both. Do not keep bees unless conditions are satisfactory. Do not keep them unless you like them, but if you have once kept them you will find it hard to be without.

The Returned Soldier and Beekeeping

By R. A. RUTLEDGE, MANITOBA

IN offering these few remarks to the readers of THE BEEKEEPER, I do it with the idea of merely offering a suggestion that may be of use to some of our returned soldiers. Many of



No veil needed here. In the apiary of R. J. Fuller, Pickering, Ont.

our men, we know, are unable to return to their former occupations, if they wished, and must seek some other line of light employment. It is for such that these remarks are penned with the idea that to some disabled soldier who is puzzled regarding his future, they may suggest the possibilities of Beekeeping.

I have thought that a number of our returned soldiers might be able to go into beekeeping, joining it up with some other light employment, such as poultry raising or keeping sheep. I would not advise depending on beekeeping for a full living in either Manitoba or Saskatchewan. A living, however, might be supplemented to the extent of a few hundred dollars in the majority of districts by the keeping of bees.

I do not say for the healthy and strong to take up this line of employment. Take for example a soldier who has lost a leg, or even both legs or an arm, shell-shocked or gassed, might be able to help himself and be able to realize that life is still worth living. He may still be useful a man in a community and develop resources that are now being wasted.

One of the chief reasons why many might not feel inclined to handle bees is that they are afraid of being stung. This will happen, but need not happen often. The writer has passed through a

season receiving but few stings, and the few that were received happened by the accidental crushing of a bee in the manipulating of the frames. In time, a beekeeper usually becomes inoculated so that the sting of a bee bothers him no more than the bite of a mosquito.

As to having a market for the goods produced, there may be no fear for years to come. The writer has been handling bees in Manitoba for the past fifteen years, and has never had to sell extracted honey for less than fifteen cents per pound retail, and this year the price has been nearer thirty-five cents.

As to an estimate of the amount of honey produced per hive, it would be conservative to say fifty pounds. The writer some years has averaged about ninety with individual cases of hives giving nearly two hundred pounds. Other beekeepers have had much higher averages than the writer, but this district has not proved itself to be the best in quantity, but can hold its own in quality.

An Experimental Apiary in Toronto—A Suggestion

EDITOR THE BEEKEEPER:

DEAR SIR,—The Ontario Beekeepers' Convention held in Toronto this month was an eye-opener to some of us. The numbers present showed that there are many people interested in the collection of Ontario's wonderful honey crop.

And after being told by the Washington experts that only 3% of the honey which the flowers of our continent secrete is collected, one realizes the need for getting together to look into the possibilities of a more thorough collection of this valuable and delicious crop.

Of the many things that impressed me at the Convention, there are three that remain in my mind. The first is the number of people at the evening meetings who came from Toronto district, and who were looking for information, some hoping one day to go more deeply into the honey business. The second is Dr. Gates' suggestion that we establish a museum for beekeepers' appliances;—what a lot of time such a museum would have saved some of us. The third is the necessity of a wax melting plant available to all beekeepers; such a plant would save messing up our home kitchens, and help us to keep out of mother's bad books.

Now I would like to combine these three thoughts with another, and it is this:—That our Agricultural Department build or rent a building for a museum and wax rendering plant somewhere in Toronto, close to a park, and that in connection with this a small experimental apiary be kept. If the Government will not allow this to be done in Queen's Park, I feel sure that the Toronto Parks' Department would allow us to use a small area for this purpose. It might be put close to the Zoo, for there a few hives would have ample area for collecting a good crop of honey. The Toronto Beekeepers' Association might be willing to manage the rendering plant and museum, and probably a member would do the work in the apiary in exchange for the honey collected.

Such a scheme would have the following advantages: The apiary and plant would be within about an hour's journey of one-fourth of the total population of the province. The rendering plant would be centrally placed from a shipping standpoint. There are more beekeepers visiting Toronto than any other place in Ontario. The apiary would be wonderfully instructive to the children and others in the city. Evening short-courses could be given there for those who could not go to Guelph.

Toronto Exhibition management might be willing to let such an apiary and museum form part of their permanent exhibition.

I would like to have the opinion of more experienced beekeepers on this scheme and see if something cannot be done.

Toronto.

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Ontario Fruit Matters Discussed

A full day meeting of the directors of the Ontario Fruit Growers' Association was held in Toronto, March 4, to plan for the year's work. Mr. P. E. Hynd, of Forest, who was appointed a director at the recent annual meeting, wrote that he would not be able to act. The vacancy thus created was filled by the appointment of Mr. W. Dewar, of Leamington. Mr. P. W. Hodgetts was re-elected to represent the association on the board of directors of the Horticultural Publishing Company, Ltd., publishers of The Canadian Horticulturist, the official organ of the association.

Refunds on Packages.

At the recent annual meeting of the association Mr. W. Shook, of Clarkson, stated that some of the growers in his section felt that action should be taken to obtain a rebate for the growers on the baskets, boxes and crates in which fruit is shipped to market. The cost of packages had increased so greatly it had become a burden on the producers. One association alone had paid out \$16,000 for packages. Some Toronto dealers resell these packages to growers near the city. A resolution was passed at the convention asking the directors to look into the matter. The directors considered the proposal at considerable length. Mr. Bridgman, of Winona, pointed out that sometimes fruit sells for less than the cost of the package.

It was shown that there were very serious sanitary and other similar objections to re-using packages and that many packages are so frail it would not be practical to return them any considerable distance. It was thought that growers living near cities might be able to arrange for the return of

(Continued on page 76.)

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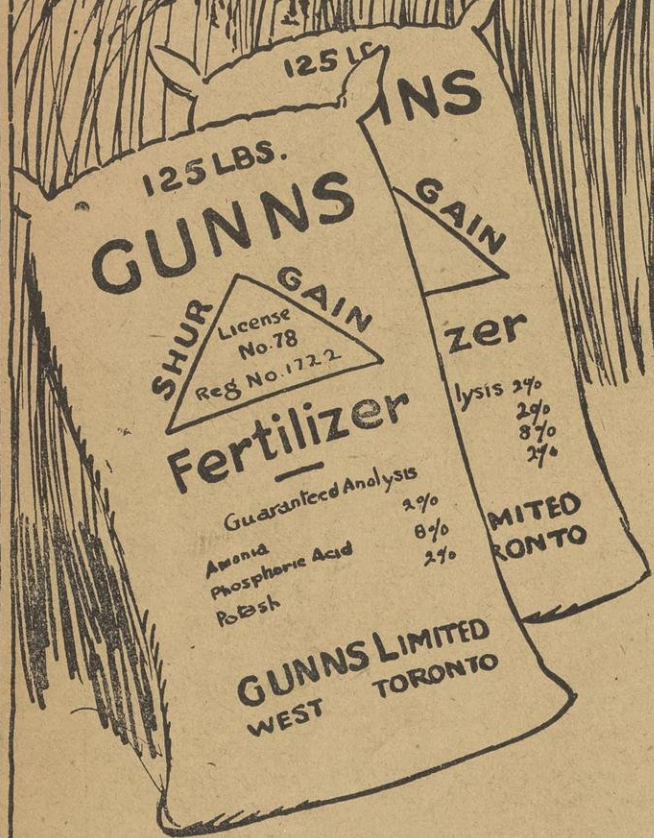
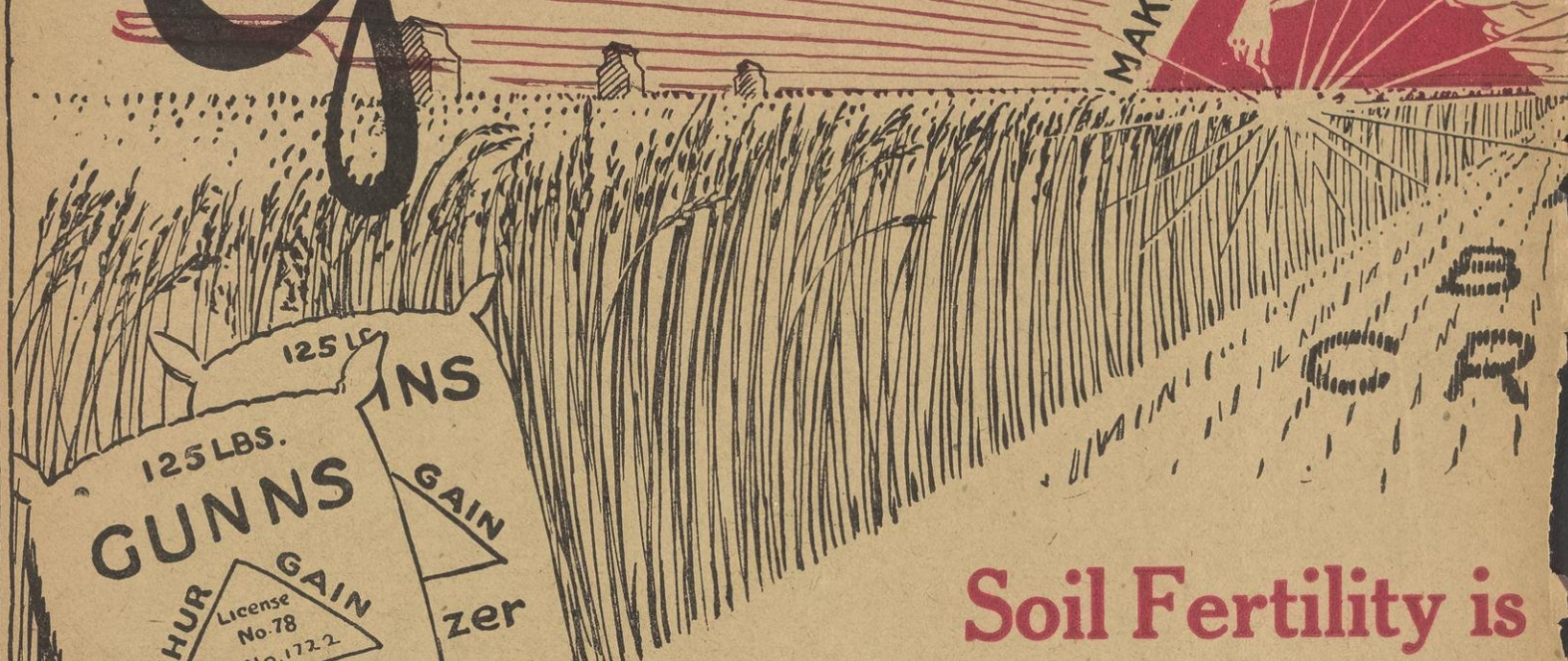
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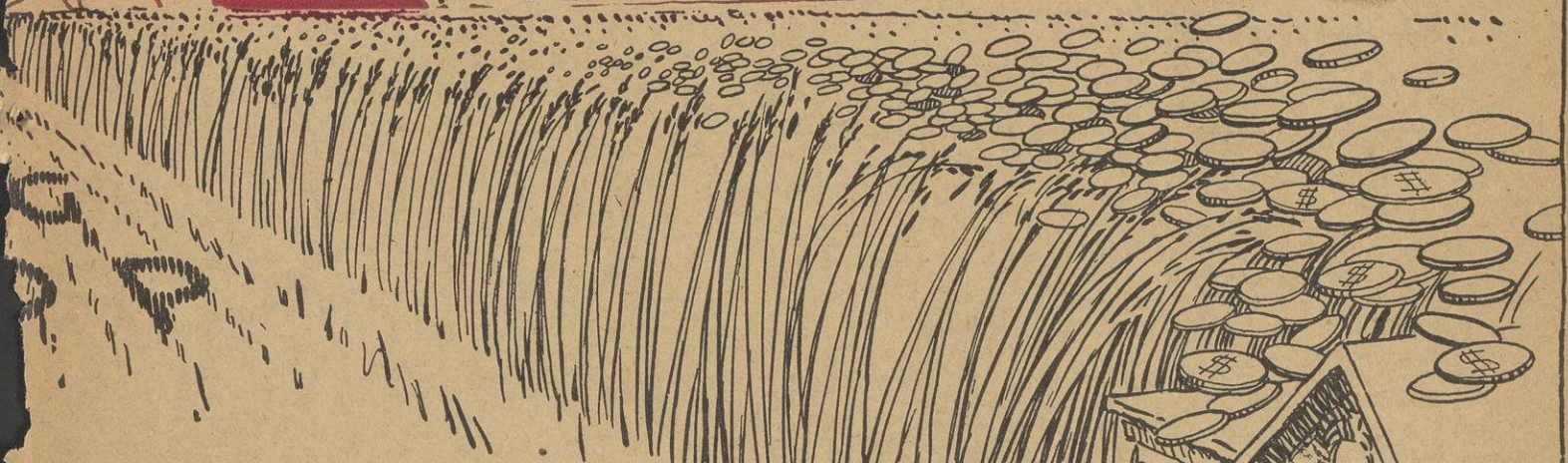
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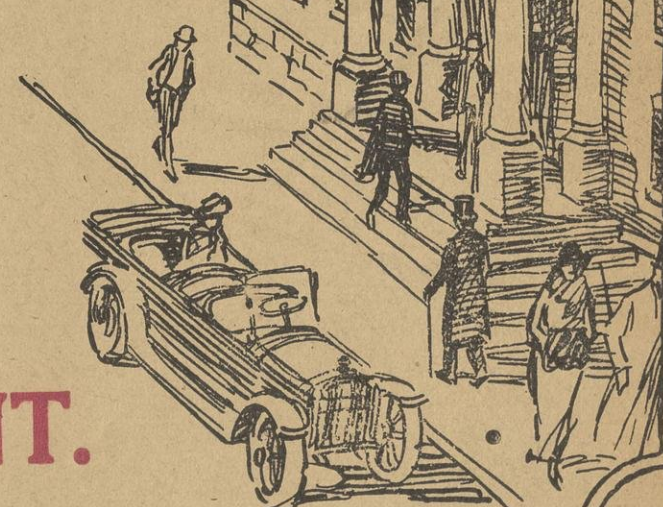
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HAMILTON, ILLINOIS

their packages, but that it would be very difficult in cases where fruit was shipped long distances.

Prof. Crow suggested that a press committee might be appointed to explain to the responsible parties on the daily press the costs involved in the purchase of packages, express, picking, etc., to ensure the facts regarding the cost of producing and marketing fruit being given the public, instead of the misleading information so often given publicity. The need for some such action was recognized. Such a committee would be able to send letters to the papers promptly setting right misconceptions spread by misinformed people by means of letters and interviews in the daily papers.

Mr. Craise, of St. Catharines, said that last year fully 50% of his crates that were returned were seriously damaged. The return charges were so high the practicability of the idea of requiring packages to be returned was very problematical.

Mr. Johnson showed that it frequently happens when markets are glutted that it becomes difficult to find an outlet for the fruit. If growers insisted that the packages must be returned it would mean that the buyers would pass over their fruit and take the fruit with which the package went free of cost. One grower thought that it should be possible for associations near cities to buy up packages from the dealers and haul them home themselves to good advantage.

The president, Prof. Crow and Mr. Hodgetts were appointed to act as a press committee. This committee will send letters to the daily press from time to time setting forth the grower's side of matters affecting the fruit industry.

A lengthy discussion was held over methods of increasing the membership of the association. The advisability of requiring all who attend the annual conven-

tion to become members before being granted admission was considered. It was thought that the resumption of the Ontario Horticultural Exhibition next fall would tend to increase the membership. The advisability of giving special premiums was proposed. The preparation of a statement showing the valuable work the Ontario Fruit Growers' Association is accomplishing for use by the directors while attending meetings of the local association was authorized for the purpose of assisting them in obtaining members.

Those present included President Jas. E. Johnson, Simcoe; Sec'y., P. W. Hodgetts, Toronto; W. T. Macoun, Ottawa; Prof. J. W. Crow, Guelph; R. W. Grierson, Oshawa; Howard Leavens, Bloomfield; G. W. Bridgman, Winona; H. Sirrett, Brighton; W. Mitchell, Clarksburg; E. F. Palmer, Vineland Station; A. Craise, St. Catharines; H. K. Revell, Goderich; C. R. Terry, Clarkson.

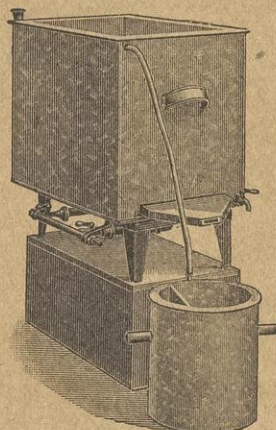
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Niagara District Notes

T. G. Pattison, Winona

DURING the past month the unusually mild weather has continued and we have had little or no snow. In consequence, fears have been expressed by many as to the peach buds being in danger in the case of a cold snap coming suddenly. But although the buds on the lilac and some other shrubs are fully developed, the peach buds are not much further forward than usual and the opinion of experienced growers, both in this section and around St. Catharines, is that there is little likelihood of any serious damage from that source.

An auction sale of the Bell Fruit Farms and Canning Factory took place recently at Grimsby. The factory was sold to the Grimsby Fruit Growers, Limited, for \$38,000 and they also acquired the Durham property close by for \$5,500. The Vineland and Beamsville farms were not sold.

There has been a very large export demand for canned goods lately and during the past three or four months exports have amounted to about 500,000 cases. A fair profit has been made on these, and the business is still keeping up. The large canners are reported to have pretty well cleaned out their stocks and to be purchasing from other sources to meet the demands of this export trade.

Fifty cents per bushel is the price being offered for tomatoes on contract by the canners this winter in the Niagara District.

A well-attended conference of fruit and vegetable growers of Welland County was held at Fonthill from the 10th to the 14th of February. President W. S. Vanevery occupied the chair. The following subjects were discussed: Onions, asparagus, early potatoes, raspberries, strawberries, peaches, cherries, fertilizers, greenhouse crops and construction, irrigation, and celery.

The first annual meeting of the Clinton Farmers and Fruit Growers' Club was held at Beamsville, the first week in February. There was a large turnout and a considerable amount of enthusiasm was shown. Prof. Harcourt, O.A.C., made a test of a large number of samples of soil for lime, but in every case it was found lacking.

The Lincoln County Board of Agriculture have sent in a strong resolution to the

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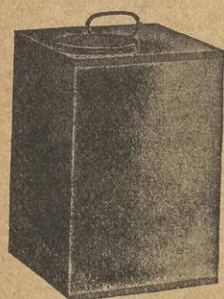
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We are in a position at present to make prompt shipment, and would caution beekeepers not to put off ordering until the last minute to prevent delay and disappointment when extracting.

Our 1919 Circular and Price List has just been issued. It describes our line of Honey Containers that have been giving satisfaction to beekeepers for years.

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UNTESTED.....	\$ 1.00	\$ 5.50	\$10.00	\$37.50
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Send us list of your requirements EARLY so as to insure date of delivery. We are booking orders now.

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State present occupation, weight, height, age and beekeeping experience, if any.

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Bee Supplies

The Krouse winter case and cedar hives a specialty.

A full line of supplies on hand. Write your wants.

F. W. KROUSE

Guelph,

Ontario

Government regarding daylight saving, declaring the measure to be "a detriment to the agricultural and fruit growing interests of the country, in view of the fact that on account of weather conditions about half the time of each forenoon has been wasted and farm labor has been disorganized, some laborers commencing operations on the old time and others on the new time, thus causing dissensions between the farmers and their help."

A recent report from St. Catharines says that Mr. Ernest Servos, of McNab, one of the most successful peach growers of the district, states that he gave a number of his peach trees a thorough examination and did not find any buds injured. On the contrary the showing of buds was splendid and unless the mercury goes down to eight or 10 below zero, the coming peach crop is likely to be a large one.

The fruit growers and farmers of Grantham have recently formed a Farmers' Club, to be called "McNab Farmers' Club." The following officers were elected: President, A. Griffin; Vice-President, A. T. Baker; Sec'y-Treasurer, Chas. Gilleland.

A report from Vinemount says that the weather has been so fine that nearly all the grape growers have their vines pruned and the brush burned. So far fruit trees have wintered well and the mild weather has done no harm in the Vinemount district.

The following is the explanation given by Mr. F. G. Stewart, of St. Catharines, a well-known fruit grower, as to bud conditions. "The peach buds are all right so far, I know that some city people have been quite agitated by the recent spring-like weather; they figured out that the buds would advance rapidly and then be at the mercy of any heavy frost. But a rather unusual set of circumstances have prevented this. While overhead it has been warm, the

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You will find our service extremely prompt and efficient. Reports of sales are sent out to our customers every day and remittances arrive unfailingly every Monday morning. Can you ask for more?

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If you don't know us, come down and pay us a visit.

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ground has been wet and cold, and the buds have not started to grow at all. I have carefully examined many trees, and the buds are no more than formed; there has been practically no growth. So that the peach crop is safe so far."

In the neighborhood of Winona pruning is far advanced, except in the case of peach trees. In many vineyards the grapes are all pruned and the brush has been taken out. Several of the fruit growers in this section have been getting in cars of manure. Indeed more has been got in this winter than for the past three or four winters. This is a good sign of a reviving interest in the fruit industry. Experiments recently conducted show that a ton of manure spread directly from the stable to the field is worth 75 cents more than a ton left in an open barnyard for three winter months and then applied. Other experiments have shown that a ton of fresh manure treated with 40 lbs. of acid phosphate and spread immediately is worth nearly \$2.50 more than a ton of untreated manure left in an open barnyard from January to April.

Quite a number of enquiries are reported lately from Britain for canned goods, more particularly gallon apples and fruits, and some actual shipments are reported of canned peas. In some quarters a slightly easier price is being quoted on tomatoes, but other lines seem to be holding their own fairly well.

Norfolk Growers Meet

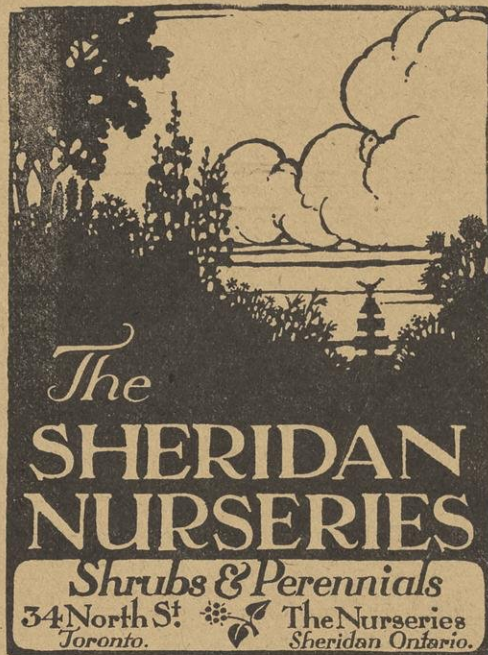
The fruit and vegetable growers of Norfolk county held a series of meetings February 4-6, at Simcoe. Several experts were on hand to give addresses, such as W. F. Kydd of the Fruit Department, A. H. McLennan, Provincial Vegetable Specialist;

Prof. Caesar, O.A.C.; F. F. Reeves, and Mr. Atkinson.

On Feb. 6th the annual meeting of the Norfolk Fruit Growers was held, when a splendid report was given for the past season, the chief item of which was for sale of apples, \$93,309.95. About 20,000 barrels were marketed in 1918, and practically none in 1917.

The following officers were elected: President, Joseph Gilbertson; Vice-President, Geo. Schuyler; Treasurer, Jas. E.

Johnson; Managers, Jas. E. Johnson and Bros.; Directors, Jos. Gilbertson, Geo. Schuyler, Theo. Cunningham, Geo. Potts, and Harry Lawrence.—F. G. H.



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Contracts to inspect and advise, or inspect and treat apiaries, accepted.

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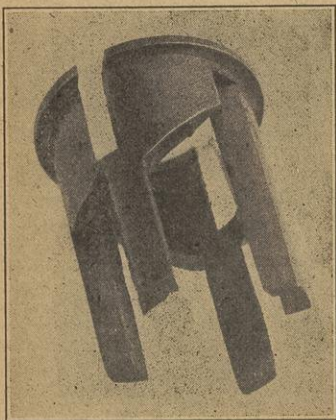
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Send for my list. It is not large, but lists some fine varieties.

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Exclusive Features.

- Ports clean automatically.
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- No back pressure.
- Breaks liquid into finer spray.
- Material goes farther.
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- No drip.

The GIFFORD has all the good features of the other guns, their bad ones left out. The TWIRLER construction here shown is the correct principle, every ounce of engine pressure is used to fullest, no back lash, enabling the Gifford to do the best work with least pressure. Suitable from hand to largest power outfits. Built of highest grade materials, beautifully finished, will last for years and save its price many times over in one season.

**BUILT FOR SERVICE. QUALITY GOES CLEAR THROUGH.
HUNDREDS OF SATISFIED USERS PRONOUNCE IT THE BEST.**

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"After testing out all the makes of Spray Guns in my large apple orchards, I wish to say that I am delighted with work of the Gifford Spray Gun and have selected it for my work as most satisfactory and in preference to all others. Enclosed please find fifteen dollars in payment."

Order yours to-day. Booklet on request. Guaranteed satisfactory or money refunded.

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SPRAGUN
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THE ORIGINAL SPRAY GUN



INCREASES EFFICIENCY
 OF YOUR POWER
 SPRAYER 100%

FRIEND MFG. CO.
 DEALERS WANTED GASPORTE, N.Y.



Success With Incubators

The main essential in successful hatching is the placing of the machine in a cellar or room that does not undergo great temperature changes, and where moisture can be, in a measure, retained. The cellar or room should have proper ventilation, without drafts. A well-ventilated cellar is the best place, although many good hatches have been made in the rooms above the ground. The second point to consider is in having a uniform temperature for the 21 days. In almost all machines the directions call for 103 degrees for the 21 days, and this will produce a good hatch. Temperature should be maintained very evenly, especially the first 10 days. Very low or very high temperatures, if kept up for a short time, may not kill the hatch but will weaken the chicks to some degree. The strongest hatches result from the machine that has been kept at a uniform temperature the 21 days.

Cooling the Eggs.

Cooling the eggs should commence at the fifth day and gradually increase as the hatch proceeds. In this cooling the length

of time depends on the cellar temperature and the time of the year. But cooling in a safe and sane manner has been found beneficial. The moisture problem also depends largely on the cellar or room conditions, and to a certain degree the make of the machine, although there is no question that moisture in some form is essential during certain times of the year, during dry periods, such as are found at times in March, when the ground is frozen and high, dry winds the rule.

With proper eggs, a good machine and a careful operator, the incubator will turn out as many chicks and as strong as any hen, and more will hatch them when the hens are still shelling out hen fruit. The incubator should no longer be looked upon by the beginner as a mystery unsolvable but as a practical hatcher, that, with ordinary care, can be made to do the work just as well as the hen.

Poultry Diseases

Mr. K. Boyer.

Diphtheria is generally caused by roosting or sleeping in a draft, or being confined in a damp place. The cause of ulcerated sore throat and canker are the same.

Diarrhoea in chicks is often caused by sour food, bad water, damp quarters, filthy coops, exposure to cold or wet, and too much green food. In fowls, too, it is caused by too much green food, lack of sharp grit, and errors in feeding.

Indigestion is caused principally by lack of sharp grit, overfeeding, unwholesome diet, injudicious use of grain, and debilitated system.

Roup is the result of neglect or want of attention to minor diseases of the air passages, produced by colds.

At least three square feet of floor space should be allowed each hen and the poultry house should be kept dry and well ventilated. Only clean grains should be fed and they should be mixed to afford a variety. The mash, which is made up of ground grains, including equal parts of same, also bran and middlings, should contain 20 to 25 per cent. beef scraps.

Lighter types of chickens are generally more profitable than the general purpose breeds when egg production is the sole aim. Especially in times when feeds are exceedingly high in price should a breed of fowls be selected that has been developed primarily for producing eggs.

PERRY'S SEEDS
 Alpine and perennials, unique collection; many new varieties unobtainable from any other source.
 Hardy and adapted for Canadian climate.
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PEERLESS PERFECTION
 The **Fence That's Locked Together**



It's close enough to keep small fowl in and strong enough to keep large animals out. Securely locked together at each intersection of the wires. It's many times heavier and stronger than poultry netting, and being well galvanized, will last many years longer. Top and bottom wires are extra heavy. No top and bottom boards required. PEERLESS Poultry Fence is built so strong and heavy, that but half the ordinary number of posts are required. It gives you real fence service.

MADE IN CANADA

Note the extra close spacing at bottom, no base boards required. Turns the small chicks, keeps small animals in or out.
 The Peerless Lock holds the intersecting wires in a firm grip that is non-slippable. Compare it with any other poultry fence. The Peerless fence is built to stand any test. It is durable.
 Send for our catalog—it's free.

THE BANWELL-HOXIE WIRE FENCE CO., Limited
 Winnipeg, Man. Hamilton, Ont.



WISCONSIN INCUBATOR AND BROODER BOTH FOR \$17.50

130 Egg INCUBATOR
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 BOTH FOR \$17.50 Freight and Duty PAID

If ordered together we send both machines for only \$17.50 and we pay all freight and duty charges to any R. R. station in Canada. We have branch warehouses in Winnipeg, Man. and Toronto, Ont. Orders shipped from nearest warehouse to your R. R. station. Hot water, double walls, dead air space between, double glass doors, copper tanks and boilers, self-regulating. Nursery under egg tray. Especially adapted to Canadian climate. Incubator and Brooder shipped complete with thermometers, lamps, egg testers—ready to use when you get them. Ten year guarantee—30 days trial. Incubators finished in natural colors showing the high grade California Redwood lumber used—not painted to cover inferior material. If you will compare our machines with others, we feel sure of your order. Don't buy until you do this—you'll save money—it pays to investigate before you buy. Remember our price of \$17.50 is for both Incubator and Brooder and covers freight and duty charges. Send for FREE catalog today, or send in your order and save time.

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1/2 lb. Wax or Butter Beans.
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Niagara Peninsula Fruit Growers Enthusiastic

Hold Two Days' Successful Convention at Grimsby and St. Catharines— Prominent Speakers Take Part—Prospects for Fruit Growing Bright

THE two-day convention of the Niagara Peninsula Fruit Growers' Association held February 26th, at Grimsby, Ont., and February 27th, at St. Catharines, Ont., was said by old fruit growers to have been the most successful conducted by the association in its long history, which now extends back about a quarter of a century. All has not been well with the fruit industry in this district during the past four or five years. War conditions, including the fruit embargo, labor shortage, increased freight and express rates, the advancing cost of supplies and other factors, combined with several years of, on the whole, poor crops, have tested the metal of a good many of the growers. Now, however, that the war is over and conditions have been rapidly righting themselves, a new enthusiasm and confidence is evident. This was shown by the large attendance at all the sessions of the convention, both at Grimsby and St. Catharines, and in the interest that was manifested throughout.

The success of the convention was due in a large measure to the unusually strong list of speakers who took part. These included Prof. O. M. Taylor, of Geneva, N.Y.; C. E. Nicholl, a practical peach grower of Model City, N.Y.; Mr. W. T. Macoun, Dominion Horticulturist; Mr. C. W. Baxter, Dominion Fruit Commissioner, of Ottawa; Major H. L. Roberts, Prof. J. W. Crow, Prof. R. Harcourt, Dr. G. C. Creelman, of Guelph; and W. A. Ross, of Vineland. Extracts from several of the addresses given by these speakers are published elsewhere in this issue, including Prof. Crow's remarks on "Winter Injury," Prof. Taylor's on "Cane and Bush Fruits," Prof. Harcourt's on "Fertilizers and the Use of Lime," and Mr. Nicholl's on the use of nitrate of soda. More extended reports of some of these addresses as well as of some of the others will appear in later issues of The Canadian Horticulturist.

Resolutions Adopted.

Important matters relating to the interests of the fruit growers of the district were dealt with in the form of resolutions, all of which were adopted unanimously. These were as follows:

"Resolved, that the Dominion Government be requested, in view of the great loss of nursery stock occasioned by the delay caused by the Fumigation Act, to either discontinue the enforcement of this Act, as it concerns the importation of nursery stock from United States, or if this is considered impracticable to so aid and instruct their authorities in charge that nursery stock may be immediately delivered to fumigation on arrival and reshipped without delay."

"Resolved, that the Niagara Peninsula Fruit Growers' Association appoint a permanent standing committee on experimental and investigational work in horticulture, and that the following constitute the committee: A. Onslow, Niagara-on-the-Lake; G. A. Robertson, St. Catharines; P. H. Wismer, Jordan; Arthur Smith, Vineland; Hamilton Flemming, Grimsby; J. P. Bridgman, Winona; J. A. Railton, Fonthill."

Strong disapproval was expressed of the proposal to re-enact the Daylight Saving Act.

The meeting confirmed the resolution of the Ontario Fruit Growers at Toronto, ask-

ing for a fruit survey of the province, and requested that the Niagara Peninsula be selected as the starting point of the survey, that district being the most important fruit centre in Canada.

A resolution was passed expressing the appreciation of the Niagara Peninsula Fruit Growers' Association of the work that has been accomplished by Mr. W. A. Ross, of the Dominion Entomological Division, who has been stationed at the Vineland Experiment Station in the course of his investigations of insect pests and the best remedies to use in their control. The resolution suggested that the Government would increase Mr. Ross' opportunities for service by placing an automobile at his disposal.

President's Address.

President David Allan, of Grimsby, in his presidential address, pointed out the value the association has been to the fruit growers of the district during the twenty-five years it has been in existence. He urged that an effort should be made to increase the membership from 300 to 1,000 in order to strengthen its position when dealing with public matters relating to the fruit interests. In view of the fact that possibly 50 per cent of the fruit trees in Ontario have been winter killed, the present should be a good time for the planting of orchards of well-selected varieties. He did not, however, entirely agree with advice that had been given by Mr. Macoun that more apples might be grown in the Niagara district. He felt that the Niagara district, being the only place practically in the province where tender fruit could be grown successfully, special attention should be given to the cultivation of such fruit. In its production growers would not have to meet as much competition from outside districts they would were they to grow more apples.

Causes of Light Crops.

At the evening meeting at Grimsby Mr. W. T. Macoun spoke on the subject, "Some Causes of Light Crops." In the case of strawberries, these are due principally to winter killing of the roots, spring frosts, and lack of pollination. The enemies of the raspberry are principally the red spider, anthracnose and the drying up of the fruit from drouth. Currants suffer from spring frosts and the currant worm and gooseberries from the same causes, as well as scalding. Peaches are susceptible to winter injury to fruit buds. They require to be pruned on reaching the bearing age to develop new wood with strong foliage. Pears are affected by lack of pollination and winter killing. A considerable number of varieties are self-sterile. Grapes can generally be depended upon to yield a crop, but some varieties are self-sterile, such as Lindley and Wilder, and need other varieties adjacent to them to fertilize them.

Mr. Macoun stated that temperature at pollination time is very important. The presence of bees in the orchard when pollenization was in progress was decidedly beneficial. As a means of keeping vigorous foliage on trees he recommended thorough spraying and early cultivation. Fertility must be maintained, as without it good foliage is not possible and without good foliage crops need not be expected. Applications of nitrogen applied a few weeks be-



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Only One in Every Hill

Perfect Planting Pays the Profit! Cut out the "perfect" and you cut out the "profit." The first part of the crop goes to pay the cost of production; consequently, the profit depends on that *extra* part of the crop which perfect planting gives you. Perfect planting, together with stabilized prices due to the new dehydration plants and potato flour and starch mills, will enable you to calculate your profits with certainty.

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Go to the nearest dealer and ask him to show you the IRON AGE implement or tool you need. If he can't show you an IRON AGE, write to us at once. We'll send you interesting booklets free

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Milk more cows—fatten more cattle—raise more hogs. If you need money to do it, come to The Merchants Bank. We are glad to assist all up-to-date farmers.

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fore the fruit sets will at times result in a decided increase in the crop.

Peach Growing.

Mr. Nicholl, in the course of his address on "Peach Growing in New York State," said that that State stands seventh in the production of peaches. The crop runs from 700 cars in a light year to 7,800 in a heavy year, such as 1917. The principal peach district borders Lake Ontario for 90 miles and extends back 20 to 25 miles. No success has been obtained growing peaches above the escarpment. Below the escarpment most of the ground is level. The seasons of 1916 and 1917 were extremely wet, and the vigor of the trees was weakened, with the result that they suffered severely from winter killing in the winter of 1917-18. Many orchards have been pulled out and others will be, and there is still much dead-wood in the orchards. A year ago eight co-operative organizations formed a central organization, through which the growers are planning to standardize and advertise their products. Previous to five years ago the growers used to head back their trees. A hard freeze at that time made them loath to continue the practice the following year. Since then it has been difficult to resume the practice.

After the severe winter of 1917-18 it was possible to detect by the appearance of the trees where the frost level had been. In some cases buds were killed on the lower parts of the trees, but not on the top. Old trees on high ground were above the frost level. Smaller trees in some cases were injured. Mr. Nicholl advised the growing of high-headed trees on low ground and low-headed trees on high ground.

Growing Pears.

Major H. L. Roberts gave a most interesting account at the Grimsby meeting of his experience in pear-growing. A full report of this address will be given in a later issue.

Prospect for Apples.

Speaking on the subject of the prospect for an increased production of apples in the Niagara Peninsula, Mr. W. T. Macoun expressed the view that the prospects were good. Owing to the large number of apple trees that have been winter killed, and to the fact that injured trees were possibly more numerous than those that have been killed, he pointed out that should there be another freeze the Niagara district would be likely to suffer less than other districts in the province.

Mr. F. J. A. Sheppard, of St. Catharines,



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Good Prices Always

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OUR facilities enable us to realize top prices at all times for your fruit, vegetables or general produce. Aside from our large connection on the Toronto Market, we have established branch warehouses with competent men in charge at Sudbury, North Bay, Cobalt, Cochrane and Porcupine. In time of congestion on the Toronto market we have a ready outlet through these branches. We never have to sacrifice your interests.

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References: The Canadian Bank of Commerce (Market Branch) and Commercial Agencies.

said that the Niagara Peninsula growers have not given their apple orchards the same care in the past that they have the more tender fruits. Had they done so the returns would have been much greater. If growers are prepared to give their orchards proper attention apples should again prove a profitable crop.

Fruit Pests.

Mr. W. A. Ross gave an interesting address, entitled "Some Fruit Pests of Last Season." Articles by Mr. Ross on some of these pests have appeared in some of the recent issues of The Canadian Horticulturist. A further reference to them will be published in a later issue.

Strawberry Problems.

Professor Taylor introduced a novel feature, which was much appreciated in connection with his address on "Strawberry Problems," at the St. Catharines meeting. Slips were distributed throughout the audience containing some fifty questions on different aspects of strawberry growing. Those present were invited to ask any of the questions contained on the slip in which they were most interested. The result was that questions were showered on him from all parts of the hall. His answers were so condensed and to the point, this discussion proved one of the best features of the convention. A number of these questions and answers will be published in a later issue.

The Fumigation Difficulties.

A lively discussion resulted from a remark by Prof. Crow to the effect that he found it practically impossible to import new varieties of small fruits for testing

purposes owing to the fact that they were almost certain to be destroyed before they got clear of the fumigation station at the port of entry. "There is not one chance in fifty," said Prof. Crow, "that were we to bring in some of these fruits that they would arrive in living condition." Valuable tests have been conducted in California with blight resistant varieties of pears. Their experimenters are willing to send us some of these varieties for joint experimental purposes, but there is no use at present in our attempting to do this owing to the condition in which they would be sure to arrive."

Mr. Sheppard confirmed all that Prof. Crow had said. He had tried to bring plants across the border and to wait while they were fumigated, but was compelled to leave them at the fumigation station. Signs of approval were manifested when Mr. Onslow asked if fumigation is necessary under existing conditions. Mr. W. A. Ross said that he had investigated a considerable number of complaints, and had invariably found that the delays that were the cause of the trouble were due to the express companies. The work of fumigation was attended to promptly, but the express companies frequently left the stock lying for long periods before continuing its delivery to the point of destination. The meeting seemed to feel that a change was needed, as later the resolution already given was passed asking that fumigation either be discontinued or conducted more expeditiously.

Marketing Possibilities.

The Dominion Fruit Commissioner, Mr. C. W. Baxter, gave an excellent address on "Marketing Possibilities." In the past



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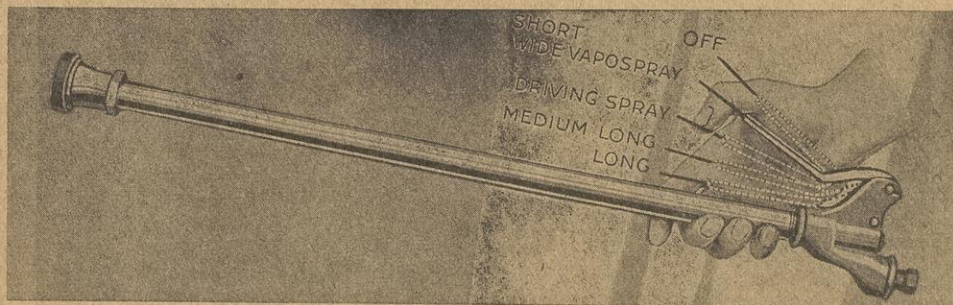
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Shoots Farther and Sprays Finer. No Other Like It. Gives Four Distinct Sprays.



NOTE THE EASY GRIP.

What the Largest Apple Grower in Illinois Says

WARD PUMP CO., Rockford, Illinois.
Gentlemen:—

We have been giving the spray Guns a test, and we are greatly pleased with the results. I regret that we have not more of them. The device of opening the valve, I refer to the hand lever, is the best I have seen so far. The difficulty with a great many guns is not that they will not do the work but with the man behind the gun making a fire engine out of it instead of a spray machine. With your lever for adjusting the spray it is not easy for the operator to do the wrong thing. It is easier to do the right thing than the wrong. If he opens it up too much the regular pressure will tire him out. I congratulate you on what seems to me to be a very successful and easy to operate spray gun, one that is fool proof.

Yours very truly,

H. M. DUNLAP

Savoy, Illinois, May 13, 1918

Built by **WARD PUMP CO., ROCKFORD, ILL.**

Send for complete Catalogue and Prices.

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Safety Efficiency Economy

"KATAKILLA"

The UNIVERSAL INSECTICIDE for use on FRUIT, FLOWERS and VEGETABLES.

A Non-Poisonous Powder, readily soluble in cold water; cheap, efficient and effective.

"KÜR-MANGE"

The approved Insecticide for use on Horses, Cattle, Dogs, etc.

A certain cure for Parasitic Mange, Lice and other parasites.

As supplied to the British Army.

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Improved Farm Root Seeds
Improved Vegetable Seeds
Improved Flower Seeds

Seedsmen please enquire for our SPECIAL PRICES

KELWAY & SON, Wholesale
Seed Growers
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Cable Address: KELWAY, LANGPORT

efforts towards developing markets have not kept pace with efforts towards increased production. In the future the marketing end must receive more attention, which means more organized effort. The question of quality is likely to be a greater factor in the future in the markets of Great Britain than ever before. For some years at least the prices paid for apples are likely to be satisfactory. Peach growing in the Niagara Peninsula, he considered, offered great inducements, provided market facilities are increased according to the increased production. In the case of grapes, he thought that if care is observed in the marketing of matured fruit and an organized effort is put forth to widen distribution the consumption should increase sufficiently to largely offset the recent legislation prohibiting the manufacture and sale of wine after April 30th next. A further reference to this report will be published later.

An interesting address dealing with general subjects, including good roads and farm surveys, was given by Dr. G. C. Creelman. At a meeting of the express committee held after the convention a resolution was passed recommending the Ontario Fruit Growers' Association to send a representative to the session of the Dominion Board of Railway Commissioners to be held in Nova Scotia, to receive evidence in regard to the proposed increase in express rates.

Ste. Anne De Bellevue Society

The annual meeting of the Ste. Anne de Bellevue Horticultural Society was held on the evening of February 7th at Macdonald College, Que. Reports of the work carried on during the year were read and showed the splendid progress this society has made since its inception three years ago. During the year 16 meetings were held, including a general annual exhibition in September, a tulip and pansy exhibition, a sweet pea show and a chrysanthemum show. The programme was arranged with a view to placing chief emphasis on vegetable production, and many papers and demonstrations were given dealing with this subject. In addition, addresses were given on the rose, the gladioli, the peony and ornamental shrubs. Mr. W. T. Macoun, Dominion Horticulturist, and Mr. F. E. Buck, Specialist in Landscape Gardening, both of Ottawa; Mr. T. F. Ritchie, Lennoxville Experimental Station, Que.; Mr. E. H. Stephenson, Montreal West, and Mr. B. H. Farr, Wyomissing, Pa., a peony specialist, assisted in the programme, and in addition a number of the staff of Macdonald College and members of the society.

Auction sales were held at two of the exhibitions, and the proceeds donated to the Local Order of Victorian Nurses, \$81.34, and the Montreal Children's Memorial Hospital, \$56.10.

War gardens were a feature of the society's work, and a large area of vacant land was brought under cultivation and the crops were generally good. Excursions and demonstrations were held at different dates, when the members had an opportunity of comparing notes. A pleasant Saturday afternoon excursion was held in June to the estates of Mr. R. B. Angus, Mr. James Morgan and Mr. F. C. Morgan, of Senneville.

During the year a large number of options of seeds and plants of vegetables, flowers and shrubs were distributed to the members, and through this action of the society in distributing the best seeds and plants of the best varieties much good has

been accomplished. The membership now numbers 160, and the society is in a very thriving and active state. The election of officers for 1919 resulted as follows:— President, T. G. Roe; Vice-President, Miss Kruse; Sec.-Treas., E. M. Ricker.

Mr. G. H. M. Baker, of Lindsay, a director of the Ontario Horticultural Society and past president of the Lindsay Society, has succeeded in forming a Horticultural Society at Fenelon Falls. This society will start off with a membership of ninety. It has arranged to give a year's subscription to The Canadian Horticulturist and other premiums to all its members.



ORCHARD RECONSTRUCTION



75% of Ontario Apple
Orchards are Gone

British and Local Markets Demand Canadian Apples

An Apple Orchard is Now
the Investment of the
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Plan Now for Spring
Planting

Catalogue and Orchard Information sent on application.

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\$4800 A YEAR on a 50-ra-
ise raising
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Rabbits. We furnish high grade stock and pay
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you raise from same. We need 3000 weekly. Get our
FREE BOOK telling how to feed, breed and house.
Get started right. Don't breed common rabbits.
DAVIS & SON, 128 AVE. 31, LOS ANGELES, CAL.

Ontario Fruit Growers Meet

At the recent convention of the Ontario Fruit Growers' Association, Jas. E. Johnson, who founded that society, was asked to give his ideas on co-operation. He did it in few words. He said: "We have tried to build our organization on quality,— quality in apples and quality in men. The membership must be made up of honest men to be successful. We can trace every knocker in the Norfolk Fruit Growers' Association back to a bad barrel of apples. Be honest. In saying this I have said it all."

"It is the character of the men that make a co-operative association and nothing else can or will," stated Mr. Elmer Lick emphatically. He then dealt with the wider aspect of co-operation and urged provincial action in looking for markets, advertising Ontario fruit and controlling distribution. He thought the larger growers should make a start toward provincial co-operation, which has been neglected, although a nominal provincial co-operative has been in existence. Mr. W. H. Gibson told of their association at Newcastle with seven to ten members and a pack last year of 6,000 bbls. apples and 5,000 or 6,000 boxes.

Diversification in Fruit Farming.

Prof. J. W. Crow applied the principles of farm management to the business of fruit growing. He emphasized the value of side lines as means of steadily employing labor, and suggested not only the growing of a variety of fruit crops, but the possible inclusion of feeding beef cattle. Other lines of live stock, he did not think, could be carried to advantage.

Mr. Shearer, of Vittoria, in discussing the possibility of running a small orchard to advantage, gave figures for an orchard of one and a half acres of his own which, in the past twelve years, has produced over 1,700 bbls. of apples and a gross revenue of over \$4,000.

Best Varieties of Apples.

At what looked like the close of the evening session a discussion started, with Prof. Crow as its centre, as to what are the best varieties of apples for Ontario planting. The discussion lasted over one hour. Prof. Crow questioned if it were wise to again recommend Baldwin on account of winter killing. His list for planting was Rhode Island Greening, Ben Davis, Duchess, Alexander, Wealthy, Snow and Spy.

At a later session Prof. Crow summed up the remarks made the previous day by seven growers who had mentioned the varieties of apples they favored. All seven favored the Snow and Wealthy apples. Six favored the Duchess and the McIntosh, five the Greening and Spy, and four the Alexander. Five of the growers also favored the Baldwin, but some other growers said that they would not plant it at all. The foregoing varieties, with the possible exception of the Baldwin, were highly recommended for those districts in the province where they can be grown satisfactorily. The Duchess, Wealthy, Snow and McIntosh were recommended for all districts in the province.

Grape Growing.

On Wednesday, the closing day of the Convention, the interest was maintained until the last address, well on in the afternoon. The address of Mr. D. E. Skinner, of Westfield, N.Y., on "Grape Growing for Factory Purposes," which had been left over from the preceding day, was followed with great interest by the grape growers present. Mr. Skinner spoke from thirty



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For all poultry keepers and stock raisers, a book that tells you what to do, what to use, and where to get it.

Write for it, Hang it in a handy place—Of infinite value as a ready reference.



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PLANTS
BULBS
ROSES
SHRUBS
VINES
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"Best-by-Test" FERTILIZERS

This brand of fertilizer is noted for high plant food value and the analyses are guaranteed by us and by Government regulation to be full strength. We have the right Fertilizer for every soil and every crop. Make your farm a good farm; make your yields big on every acre and for every crop. You can do it by judicious use of Best-by-Test Fertilizers. Get your order in early; don't take a chance on a shortage. Farmers should club together and order in car load lots.



Write particulars of your soil and the crop you will plant, and we will give you the best advice we can, as to the kind, quantity and price.

Write For Booklet—FREE

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22 Market Chambers
CHATHAM, ONT.

DOUGLAS GARDENS

Catalogue for 1919

Contains a complete list of a number of new plants that will interest customers this season.

A fine assortment of Paeonies Perennial plants of all kinds. Shrubs and roses.

BEDDING PLANTS

Standard Fuchsias from 2 to 3 feet. Carnations of the finest varieties. Heliotrope, Cowslips Salvia, Salpiglossis, Snapdragons, Pentstemon, Lobelias, Pansies, Ageratum, Verbenas, Asters and Stocks.

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OAKVILLE - ONTARIO

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A vast new land of promise and freedom now open for settlement at 50c an acre in some districts—in others, Free

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For information as to terms, regulations and railway rates to settlers, write to

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Minister of Lands, Forests and Mines.

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Sarnia Woven Wire Fence

Stop that waste. Rails are worth more for firewood than woven wire fencing costs. Then, too, the ground you gain when you can plow to the straight fence line will yield grain or other crops enough to soon pay for the fence. Looks better—is better. It means clean farming, more crops and larger profits. Be a 100% Canadian farmer.

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Fencing is the kind that is made right. Stands trim and tight, adjusts itself to all weather conditions, requires fewest posts. Made and shipped from our factory in Canada for Canadian farmers. Only two profits—a big one for you and a small one for us. Gives genuine fence satisfaction. Shipped fresh from our loom. You get a new fence when you buy the Sarnia, not one that is second handed because of several times handling or having stood around in dealer's store or out in the open weather. Thousands of satisfied farmer customers. No middle profits. Our "Fence Facts" circular and price list is free to you.

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STRAWBERRY PLANTS

Raspberry Plants and Seed Potatoes—
Muskoka grown. New location.

N. E. MALLORY
Gravenhurst - Ontario

With Spraying You Get Bumper Crops

If you could spray one tree properly, and leave the one next to it unsprayed, you'd be *horrified* at the great loss represented in the unsprayed tree. With a Spramotor you can double and treble the yield from orchard or field. There is an efficient



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5006 King Street

London, Canada

years' experience and answered many questions in a practical, simple way that revealed his wide experience. He gave an interesting account of his methods of planting, pruning and tying grapes. A fuller report of this address will be given later.

Fruit Inspection Act.

Dominion Fruit Commissioner, C. W. Baxter, discussed fully the amendments passed last year to the Inspection and Sales Act. These amendments caused but little discussion as the growers seemed unanimously in favor of the changes that had been made. He said that the new clause in the Act requiring every person who packs fruit in an open package intended for sale to have the package marked with his full surname and address, has resulted in a great decrease in overfacing fruit, a practice which was becoming common before the amendment was passed. Benefit had resulted also from the clause imposing a penalty for shipping immature fruit. This clause had been inserted largely because of the large quantity of grapes and plums that were sent to market in a green condition. Benefit was resulting also from the amendment which stipulated that no person should sell or offer or have in his possession for sale at the original point of shipment unless the package was well filled. Because Canadian and American apples now have to be marketed in barrels of the same size on the European markets there was a possibility that their identity might become confused. He, therefore, urged that Canadian shippers should take pains to see that the words "Canadian Apples" were placed prominently on every barrel of apples sold for export purposes.

Profits in Strawberries.

One of the most successful fruit growers in Canada, James E. Johnson, of Simcoe, spoke on the subject of growing berries for the factories, dealing especially with the growing of strawberries. This paper will be published in full, probably in the April issue of The Canadian Horticulturist.

Three interesting papers were read at the closing session, one by W. H. Gibson, of Newcastle, on "The Large Specialty Farm for the Fruit Grower," one by J. C.

Harris, of Ingersoll, on "Securing Annual Crops of Apples," and one by Wm. Everett, of Simcoe, on "Making the Land Pay while the Orchard is Growing." All will be published later in The Canadian Horticulturist.

Labor Situation.

Miss Harte, of The Ontario Labor Bureau, Toronto, spoke in reference to the services of the National Service Girls. Last year 2,500 girls had been sent out, nearly 2,000 of whom worked on fruit farms at all kinds of work. The aim last year was that these girls should secure at least \$9 a week, but 58% of them earned less than that, due to the fact that many of the growers for one reason and another refused to pay them that amount. This year the girls desire a nine hour day and an hourly rate of 20 cents instead of 15 cents, which prevailed last year and a sliding scale of piece work, which will allow girls more where they have to pick fruit on weedy ground and where the crops are light. A committee of the fruit growers was appointed to meet with the girls. It was expected that they would come to terms with them so that their services will again be assured for the coming season.

The Horticultural Publishing Company, Limited

The annual meeting of the shareholders of The Horticultural Publishing Company, Limited, was held in Toronto on February 20th, 1919. The reports presented reflected the great improvement that has taken place lately in fruit conditions, particularly since the signing of the armistice, indicated that ere long pre-war conditions will prevail. The shareholders approved of the adoption of a policy which should strengthen the company and its publications very materially during the coming year. The following officers were reelected: President, W. H. Bunting, St. Catharines; Vice-Pres., Hermann Simmers, Toronto; Sec. Treas. and Managing Director, H. Bronson Cowan, Peterboro; Directors, P. W. Hodggets and W. G. Rook, Toronto; A. W. Peart, Burlington; Harold Jones, Prescott.

The Fruit & Produce Market

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

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CONSIGNMENTS OF FRUIT & VEGETABLES SOLICITED

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32 West Market St., Toronto, Ont.
Wholesale Fruit and Produce. Consignments Solicited.

Canada Food Board License No. 3-045,
Class II., Div. B., and 3-046, Class II.,
Div. C.

HERBERT PETERS

88 Front St. E., Toronto, Ont

See advertisement on page 84.

Canada Food Board License Nos. 3-007,
3-008 and 3-009.

The Horticultural Convention

At the recent convention of the Ontario Horticultural Association an excellent paper entitled "Potatoes in the Small Garden," was read by Dr. C. A. Zavitz, of Guelph. This appears in this issue of The Canadian Horticulturist. Mr. W. T. Macoun read a paper entitled "Raspberries and Currants for Small Gardens," a portion of which appears in this issue of The Canadian Horticulturist and the balance of which will be published later. "How I grow Dahlias" was the subject of an excellent paper by Mr. J. S. Wallace, of Toronto, which is published in this issue.

Work For Returned Soldiers.

At the Thursday evening session, Rev. A. H. Scott, of Perth, gave an interesting address entitled "Training Returned Soldiers as Horticulturists," and Hon. W. D. McPherson described what the Provincial Government was doing to fit returned soldiers back into society. The feature of this session was an illustrated address by Miss M. E. Blacklock. Starting at the beginning of the season Miss Blacklock showed the first perennials that put in their appearance. She described these and then showed

the various hardy herbaceous perennials in the order of their blooming throughout the season. Some exceptionally fine slides were shown and a number of questions asked and answered.

Peonies.

Keen interest was displayed in an address by Prof. A. P. Saunders, of Clinton, N. Y., one of the most noted authorities on the Continent in the culture of peonies, who spoke on this now widely popular flower. The speaker described the early varieties and the progress that has been made in their development and gave a long list of the best varieties for cultivation. He was asked many questions which he answered in a simple, practical way.

A feature of the convention was two luncheons served after the evening sessions through the courtesy of President Dockray at which it was possible for the delegates to meet and become better acquainted in a sociable way. During the noon hour on Thursday a round table luncheon was held during which three minute addresses were



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Plant permanent flowers in your garden, that improve every year and never fail to give an abundance of bloom.

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| Achillea | Geum |
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Field grown clumps of above and many others at 10c. each. By express—not prepaid.

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25 Plants and Flowers, \$1.00, postpaid. See our advertisement on page 42, in February CANADIAN HORTICULTURIST, for list.

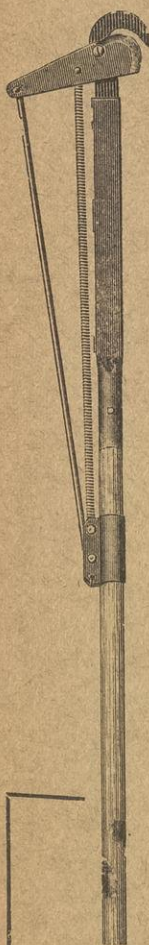
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100 fine mixed Gladioli, by express, \$1.00. If by mail add 40c. for postage. Raspberry Plants, immense berries, 20 for \$1.00.

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The Flower Bargain Man

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There are four styles of Tree Pruners made by the Taylor-Forbes Company:—"Orchard King," "Happy Thought," "Detroit" and "Kansas."

The "Kansas," as here-with illustrated, is a general utility knife for pruning trees, shrubbery and hedges. It may be operated from the ground to cut through a green limb one and three-eighths inches thick, by drawing down on the handle. It makes a clean cut, without bruising or splitting.

For light, swinging branches, and shrubs, the pump gun action is employed.

A five and a half foot handle is regularly supplied with the "Kansas," giving a length of seven feet, but longer handles will be furnished as required.

If your Hardware Dealer cannot supply you, write us direct. Our folder on Tree Pruners will be mailed to your address, postpaid, on request.

Taylor-Forbes Co.
LIMITED
Guelph, Ontario



Bruce's Seeds

Special Garden Collections

School Children's Collection—12 pkts. for \$1.00, postpaid. 1 pkt. each Beans, Beet, Carrot, Corn, Cucumber, Lettuce, Onion, Peas, Parsnip, Radish, Squash and Turnip—our selection of varieties.

Small Garden Collection— $\frac{1}{2}$ lb. each, Beans, Corn and Peas, and 1 pkt. each Beet, Cabbage, Carrot, Cucumber, Lettuce, Onion, Parsley, Parsnip, Radish, Spinach, Squash, Tomato and Turnip— $1\frac{1}{2}$ lbs. and 13 pkts. for \$2.00, postpaid—our selection of varieties.

Suburban Garden Collection—1 lb. each, Beans, Corn, Onion Sets, and Peas; 1 oz. each Beet, Carrot, Onion, Radish, and one pkt. each Cabbage, Cucumber, Parsnip, Lettuce, Melon, Parsley, Spinach, Squash, Tomato and Turnip—4 lbs., 4 oz., and 10 pkts. for \$3.50, postpaid.

Flower Seed Collections—Asters, Dwarf Nasturtium, Tall Nasturtium, Sweet Peas, Various Flower Seeds—50c each.

FREE—Write for our 112-page Catalogue of Seeds, Plants, Bulbs, Garden Implements, Poultry Supplies, etc.

JOHN A. BRUCE & CO., LIMITED

Seed Merchants

ESTABLISHED 1850

Hamilton, Ont.

Spray Potatoes

To avoid Bugs and Blight—It Pays

The O-K Canadian 2-Row Sprayer works like a wheelbarrow and thoroughly sprays two rows at a time; agitator keeps mixture stirred. Nozzles adjustable for both height and width of row; can be used for spraying trees, whitewashing, etc., built for long service.

O-K SPRA



THE O-K-SPRA for hand spraying

Keeps going without cleaning longer than any other compressed air sprayer, owing to the "efficiency" non-clog nozzle with special thimble-shaped strainer; has special curved lance that saves you from backaches—no stooping to reach the under side of leaves; directs spray into otherwise hard to reach corners

Write for full particulars about O-K-Spra, and our 2-row and 4-row sprayers for large acreages. Also special information about spraying materials. Write to-day.

CANADIAN POTATO MACHINERY CO., LIMITED
STREET NO. 30 GALT, ONT.

Makers of the Famous O-K Potato Planters and Diggers



O-K CANADIAN 2-ROW SPRAYER



FLOWER POTS

Hanging Baskets and Fern Pans

We make the "Standard" Pot, the best Pot in the world—uniform, best of clay, well burned, in every respect superior to all others.

All our pots have rim on shoulder, thus allowing them to be placed together perfectly and preventing breakage in shipping and handling.

Place your Spring Order NOW.

A complete line and large stock of all sizes kept on hand to ensure prompt shipment.

Send for NEW CATALOG and PRICE LIST.

The Foster Pottery Co.

HAMILTON ONTARIO
Main Street West.

ALL LOVERS OF ROSES, PEONIES and FLOWERING SHRUBS

should write for my catalogue, best and cheapest in Canada.

A. W. GRAHAM - - St. Thomas, Ontario

given on subjects of interest to the delegates.

Gardening in the North.

The results of ten years' gardening activities in northern Ontario were given by Mr. R. Whorley, of Haileybury. The season in the north is shorter than farther south. Plants cannot be set out before the first week in June, when flowering annuals are planted. All herbaceous plants grow well. Some could not be grown to better advantage any where in Canada. All varieties of small fruits can be grown, as well as practically all varieties of vegetables from a turnip to a mushroom. Potatoes do exceptionally well. From two bags of potatoes last year forty-four bags were produced.

During the afternoon session on Thursday the convention adjourned in order that the delegates might pay a visit to the beautiful greenhouses and residences of Sir Edmund Osler in Rosedale. Here a mass of flowers was found in bloom and much admired. A luncheon was served.

The Canadian Horticulturist is a most useful, attractive, and much esteemed visitor. Enclosed is \$1.00 as my subscription for this excellent publication for another three years.—R. S. Hood, Calgary, Alta.

When It's Nitrate Time for Apples

Use 200 pounds of Nitrate of Soda broadcast per acre in late February or early March, or use at Blossom Time.

Send Post Card Today for Fruit Books—Free

WM. S. MYERS

Chilean Nitrate Committee

25 Madison Ave. New York

BISSELL Double Action Harrows will thoroughly cultivate and pulverize any soil.



One Harrow is Out Throw; the other is In Throw. They are simply constructed, rigid and durable. The Gangs are flexible and the Disk Plates are so designed that they "hang" right into the soil. Bissell Harrows are built in sizes and weights suitable for horse or tractor use. Write Dept. N for free catalogue. 98

T. E. BISSELL CO., LTD., Elora, Ont.

See advertisement on page XIV.

FEED THE LAND

By using the best Manure and get

GOOD CROPS

For Nurseries, Fruit Growers and Gardeners.

Sure Growth Compost

(A Composition of all Natural Manures)

Makes poor land fertile and keeps fertile land most productive.

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133 Victoria St., TORONTO

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OUR ANNUAL Spring Gardening

—AND—

Planting Number

PUBLISHED IN APRIL

Will be the last of our three big special issues this Spring, and promises to be as large and attractive as either of the other two.

It will have a full page cover illustration and will be replete with special articles dealing with the Spring planting problems of both commercial and amateur gardeners and fruit growers.

It will be a "BUSINESS GETTER" so reserve your largest and best copy

Advertisers are asked to send in reservation and copy as early as possible before March 25th.

RATES:

Page..... \$42.00 Half Page.... \$21.00
Quarter Page. 10.50 One Inch.... 1.40

The Canadian Horticulturist
PETERBORO - - ONTARIO

Small Fruits in the West

Prof. F. W. Broderick, Winnipeg, Man.

WITH the bramble and bush fruits, very good results have been obtained in western Canada. The wild red raspberry (*Rubus strigosus*), which has been found by one of my students growing in the native wilderness four hundred miles north of the city of Winnipeg, is indigenous. Raspberries have been extensively planted in Manitoba and the west, and have given very good results. A number of varieties have been under test, and among those which have given best results are: Caroline (yellow), Sunbeam, Ironclad, Herbert, Miller and Turner. The black and purple cane varieties have, as a rule, not given as good results as the red varieties. Blackberries have never been found sufficiently hardy for general planting.

Of all the fruits grown in western Canada none have given better results than the currant. Practically all varieties have come through our winters with perfect success. The red varieties have possibly given the best results from the standpoint of vigor and hardiness. Among those mentioned as most prolific at Brandon are Red Cross, Red Dutch, Ruby Castle and Cumberland Red, with Victoria Red and Cherry growing the largest fruit. White varieties giving good results are Large White Cherry and White Grape. The Magnus, Climax, Eagle, Kerry and Eclipse are vigorous and productive varieties of blacks.

Gooseberries come through satisfactorily, and give good results from the standpoint of productiveness. Houghton is probably the most prolific; Downing produces the largest sized fruit. The Carey, which is of Minnesota origin, has given good results with us.

Strawberries give fairly good results, but, in exposed situations, are more or less subject to winter killing. Of the June-bearing varieties Bederwood, Senator Dunlap and Dakota are among the best. The everbearing varieties are meeting with increasing popularity and are being more extensively planted than the June-bearing sorts. Some of the varieties originated at the Fruit-Breeding Station at Excelsior, Minnesota, are giving good results under Manitoba conditions.

Onion Diseases

Because onion diseases cause an enormous loss in Ohio, growers are urged by specialists in plant pathology at the Ohio Experiment Station to give attention to the treatment of onion seed used in planting the spring crop. Smudge, smut, black mold and neck rot of onions have been controlled in experimental tests at the Ohio station by treating the seed with a solution of formaldehyde, made at the rate of one ounce of formalin to two gallons of water. The seed is soaked in this solution for an hour or more but dried completely before planting.

Where onions are grown on the same soil year after year, however, the diseases are found to exist in the soil; while the treated seed produces more healthy onions in the infected soil, specialists recommend crop rotation to rid infested ground. In some cases a regular farm crop is grown in place of the onions, thus keeping out the disease because its host plant has been removed.

Experiments show that the white onions are susceptible to the smudge or anthracnose disease which in causing a discoloration of the set reduces its market value. The brown and yellow varieties of onions are much more resistant to smudge.

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Marketing Problems

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

WHAT are our marketing problems today? They are precisely the same as those of our competitors. What is the best way to solve them? Follow the lead where they have been successful in other localities under similar conditions. California is a model of agricultural organization. They have organizations for marketing their wares and produce having a membership of 6,000; some organizations 9,000 and one 15,000. Oregon and Washington have like organizations, but not so large in membership. Formerly and not so long ago those places were in the hands and at the mercy of brokers and jobbers, but those agents in their grasping for a little more than was fair put the farmers on their mettle. They organized associations, selected market experts, and then set out to sell their own produce, not, of course, without opposition. The jobbers then also combined and coordinated their combinations, until they have strings of houses in all important towns covering several states. They have made the going hard enough by their strength financially, and their cash buying (where it suited the case) and that is their strongest weapon.

Farmers' organizations after several defeats at the hands of the jobbers, are today more strongly organized than ever. They are divided on the question of handling their own produce and selling it to, or allowing jobbers to handle it. Results have proven, where good management was secured, that handling their own produce was the best way to market, especially if in sufficient volume to control the market. Today the fight is hot. Good sales managers are about as popular as "movie stars," and command big salaries. The farmers through their sales agencies have won in many sections in California, in Oregon, and also in Washington. Wherever they win, they show better financial results than they obtained under the jobbing system. Their success is heartening.

Experimenting.

We are experimenting along their lines in British Columbia with good prospects of success. The prairie provinces have succeeded in their organizations. The United Grain Growers have put the prairies on the map. More power to them. Prices that will pay for the cost of production to the grower is more their aim, than securing fat commissions to the brokers and jobbers. They are getting such prices now.

The art of marketing for economy, lies in good buying, as well as good selling. This is largely an experiment so far as its general application is concerned, but its success will mean the shifting of control of selling produce from trained merchants for their own profit, to trained men engaged by the producers selling their produce for the producers' profit. The battle will be long and keen, between the "diehards" and the "skinned to deaths." It behoves us to give a little more attention to our organizations—feature them, and be loyal to their directors.

Our problems lie largely in securing better distribution on distant localities, to prevent gluts in one town and famine in another, such as we have seen in prairie towns recently; to arrange our distribution so that we will know exactly what is rolling, where it is rolling and why it is rolling; and, to arrange prices so that they will not be prohibitive to the consumer and ample to pay for cost of production.

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Strawberry Plants

All leading varieties, stocky and well rooted. Securely packed in moss. Send for prices.

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How to Fertilize

EVERY farmer knows that plants need Food as much as cattle. He knows, too, that plants cannot get all the Food they need out of the ground alone. He must supply them with certain Foods himself, or they will not thrive and bear their full yield of fruit. Exactly as he supplies hay and oats to his horse, so he must supply Nitrogen and phosphate to his plants. He may buy these in the open market exactly as he does his hay or his oats, or he can buy them in combination. Moreover, there is no secret value in the "complete fertilizer," it is nothing more nor less than the ingredients combined and sold at a higher price. Nitrogen is by far the most expensive as well as the most effective of plant foods, and it will pay the farmer well to stop and think before he buys it in this combination form or waits season after season for legume nitrogen or organic nitrogen to become available.

These compounds generally averaging 8-2-2 do not supply what nature requires, for the crops take out more nearly the equivalent of a 2-4-3; that is why we can in most cases and in most soils use Nitrate alone as a straight top dressing, and the earlier the better.

Translated into Commercial Fertilizer terms, the comparison is as follows:

	What Nature Requires.	What the Average Brand Supplies
Phosphoric Acid...	2.02	8.00
Nitrogen.....	4.33	2.00
Potash.....	3.65	2.00

The Best and Cheapest Nitrogen

The cheapest and most practical form in which to furnish Nitrogen to plants is Nitrate of Soda. In the rainless region of Chile are stored away vast quantities of Nitrogen in what are known as Nitrates—the only form in which Nitrogen can be utilized by plants. The Nitrogen which exists in organic, vegetable or animal matter—that is, roots, stems, dead leaves, weeds, leather, tankage, dried blood—and Nitrogen as well in the form of Ammonia salts, must first be changed to Nitrate before it can be taken up by plants. This change is dependent upon conditions of weather. If the season be backward, or there be a prolonged drought, this change may be so retarded as to deprive the plant altogether of Nitrate Food at the very time it needs it most; moreover, certain mineral forms of commercial Nitrogen leave acid residues in the soil. Nitrate of Soda, on the other hand, is entirely independent of weather and leaves the soil sweet. It is immediately available under all circumstances, for it is readily soluble, and as soon as it comes within reach of the roots of plants it is taken up by them. It can, therefore, readily be seen that the practical value of various forms of Nitrogen ranges from nothing at all, where conditions of temperature or soil prevent Nitration, to 100 per cent. of Nitrate of Soda, where Nitration has already completely taken place. Moreover, the process of transforming the Nitrogen of cotton seed meal, dried fish, dried blood, tankage, and other Nitrogenous constituents into Nitrate is very wasteful, for much valuable nitrogen is lost in the process, as well as by natural oxidation. Official soil experiments have shown that 100 pounds of Nitrogen in these organic forms has only about one-half to three-fourths the manurial value of 100 pounds of Nitrogen in its NITRATED form of Nitrate of Soda.

A Great Saving

In view of these facts it seems extraordinary that farmers should continue to purchase their Nitrogen in compounded form in a ready mixed fertilizer, when they can procure it much cheaper, and ready for the plants' immediate use, in the form of Nitrate of Soda.

Nitrogen is often in a form which is not available as food for the plants, for it must first be converted into Nitrate. The time required to do this varies from a few days to a few years, according to the temperature of the soil and the kind and condition of the materials used.

It must be recognized that the grower should have a chance to derive some profit from the use of a fertilizer, and wise buying is a prerequisite to successful use.

How it Helps Crops

If a young pig or a young calf does not have an abundance of the right kind of feed when it is young, it becomes stunted in growth, and never recovers fully, no matter how judiciously it is afterwards fed. The intelligent cultivator has learned that this holds good in the feeding of plants. Nitrogen is the element which enters most largely into the building up of the plant itself—roots, stems and leaves. Most plants

quently with sulphate of lime, converts any alkali residue into harmless forms of soda.

In most of our experiments where Nitrate was used alone at the rate of only 100 pounds per acre, with no further applications of fertilizers to the plots, a decidedly marked effect was noticed. This speaks very well indeed for Nitrate of Soda not leaching out of the soil. The readily soluble elements of fertility are the readily available elements. The natural capillarity of soils, doubtless, is in most instances a powerful factor in retaining all the readily soluble elements of fertility, otherwise all the fertility of the world would, in a season or two, leach away into the ocean, and be permanently lost. A case is yet to be seen where the after-effects of Nitrate are not distinguishable, and in most cases such effects have been marked. The 2,000 or more

Why Europe Makes Bigger Crops Than America

Average Production of European Crops is as follows:

Wheat.....	33 bushels per acre
Oats.....	45 " "
Potatoes.....	199.84 " "
Cotton in Egypt....	400 pounds "

Europe uses a Home-Mixed Nitrate Fertilizer containing 8 per cent. of Phosphoric Acid and 4½ per cent. of Nitrate Nitrogen.

The difference in yields is largely due to larger amount of Nitrate Nitrogen used in Europe per acre as Nitrate of Soda. Our small American acre yields are due to failure to appreciate this necessity.

Average Production of American Crops is as follows:

Wheat.....	14 bushels per acre
Oats.....	40 " "
Potatoes.....	97.15 " "
Cotton.....	185 pounds "

America uses a Fertilizer containing 8 per cent. of Phosphoric Acid and 2 per cent. of Nitrogen which is mostly not readily available.

larger amount of Nitrate Nitrogen used in Europe per acre as Nitrate of Soda. Our small American acre yields are due to failure to appreciate this necessity.

Write for "What Chilean Nitrate Has Done In the Farmers' Own Hands."

DR. WM. S. MYERS

Chilean Nitrate Committee

25 Madison Avenue, New York, U.S.A.

need to take up the greater part of their Nitrogen during the early stages of their growth, as in oats. It is plain, therefore, that the cultivator cannot afford to overlook Nitrate, and thus endanger the chances of his crops, which must have Nitrogen in a form the growing plants can use. The presence of Nitrate at the outset enables the plant to get its food WHEN it needs it most, and develops a vigorous growth of roots, leaves and stems capable of withstanding the scorching rays of the sun or sudden changes of temperature, disease, or the attacks of parasites. It is then able to mature properly. Without Nitrate present, the young plant will fail to attain stem and leaf growth sufficient to mature its fruit or grain. Why take chances with makeshifts or substitutes when the real thing is 100 per cent. effective?

Nitrate of Soda is of high value for early crops, such as peas, corn, beets, cabbage, where rapid maturity is desirable. It is a special help to hay, grain, rye, wheat, timothy, cereals and orchards, all of which are unable to obtain sufficient Nitrogen from the soil just when they need it. It is a great specific in the production of sugar beets, potatoes, cotton, cane, and apples, or other fruits.

Small fruits, such as blackberries, currants, raspberries and gooseberries, which need a steady, even growth, are greatly benefited by Nitrate of Soda, which can be furnished all ready for digestion when the plants require it.

The Rational and Irrational Use of Nitrate of Soda

Everywhere in the world where there is progressive experiment station work, the unique qualities of Nitrate of Soda are putting it ahead of every other Nitrogenous plant food. Nobody who advocates the rational use of fertilizers ever recommends such large quantities of Nitrate of Soda per acre as would result in any abnormal accumulation of alkali salts. Moreover, the use of acid phosphates, associated as they are fre-

tons of active service soil in an acre of land have a powerful holding capacity for all the useful, available elements of fertility.

How to Use Nitrate

Recent experience suggests that Nitrate may be applied as a Top Dressing to best advantage as soon as growth starts in the Spring, or even better, before seeding or planting.

Nitrate of Soda should be thoroughly cultivated in, as should other fertilizers, so that they may properly nourish the plant roots of the seeded and cultivated crops during the growing season. Most fertilizers should not touch the seed.

Nitrate has no acid residue to leave behind and it will leave nothing deleterious in your soil after using. It will enable you to overcome the effects of droughts and frosts in the shortest possible time and prolong the bearing period of your trees. Nitrate does not have to wait to get busy.

Valuable Books Free

Numerous books have been written on the value of Nitrate of Soda in agriculture. These books deal with questions on which progressive farmers cannot afford to form incorrect opinions.

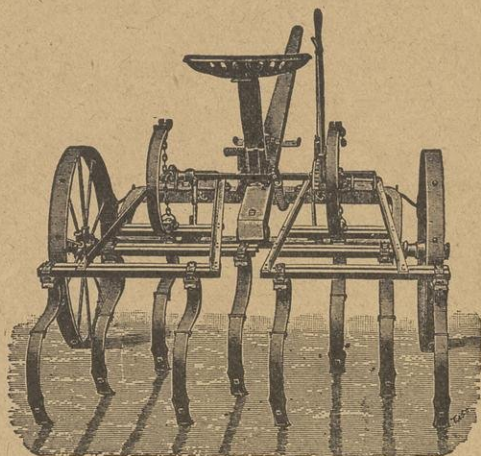
If you are farming to make money you owe it to yourself to send for the free books which pertain to your crop. If you want to know what farmers have done both in America and Europe, who grow the same crops as you do, these books will tell you. If you have any doubt on how valuable Nitrate of Soda would be to your particular crop, you should get all the available information you possibly can on the subject.

These booklets are free—write for them, addressing

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Here is a cultivator which is adaptable to a variety of work—for the preparation of the seed-bed in ordinary field work, or the cultivation of the vineyard. Extensions which enable it to work under overhanging branches of trees can be furnished, making it a first-class cultivator for orchard work. Also, attachments can be supplied which make it suitable for furrowing or ridging.

The Teeth can be so set as to cultivate behind the Wheels. They are made from steel, and have reversible points attached so as to be readily adjustable. Fitted regularly with 9 Spring Teeth.

Frame and Sections are angle steel. Wheels are 29-in. high with 2½ in. face, and are on Extension Axles, permitting of change in the tread from 4 ft. to 4 ft. 10 in.

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Price Setting.

The question of price setting is a contentious one, and is always a difficult problem. The price of produce is, or should be, based on the law of supply and demand. It is here that manipulation enters. Gambling chances are taken in advance sales, which mostly result in the producer getting the worst of the deal. The individual grower, and even the un-co-ordinated association, that is not in close touch with general market conditions, is usually no match for the better informed buyer. A few ill-made bargains not only hurts the farmer's returns directly, but it indirectly hurts the market otherwise. It is the few cheap offerings that lower the prices ruling, especially at the peak of a season when the supply is at its head.

Growers' consigning goods to the retail trade constitute a very destructive factor in price setting. The merchant who has no price named can cut just a little under the market and advertise and feature his goods at the growers' expense. The result is that others have to meet his cut which he often repeats until what should have netted the producer a good return fades away below the expense of production. Happily, this evil is almost removed.

Nova Scotia's Position

A. E. McMahon, Manager, The United Fruit Companies of N. S., Ltd., Berwick, N.S.

OF all parts of Canada and possibly of all parts of America probably the Annapolis Valley has suffered most financially from the great war. The growers of beans, potatoes, wheat, corn and oats have been able to move the prices of the products upwards with the rising cost of supplies. So, to a great extent have the growers of oranges, peaches and strawberries, whose usual markets were near at home. This has not been true of the growers of Nova Scotia apples. The cleared land of the Annapolis Valley is largely planted to, and the capital of the Annapolis Valley is largely invested in, apples.

The most profitable market for Nova Scotia apples yet found is England. Some forty years ago the first Nova Scotian apples were shipped to England and for some years thereafter a barrel of good Nonpareils in the spring of the year was as good as a five dollar bill. Then the various foreign competitors whose apples we all know entered the field. Some of these competitors were in a position to supply a certain quality of apples for certain seasons, others special varieties, and others again to supply apples for ordinary trade varieties profitably on the English markets. Almost without exception however they attempted too much and planted orchards to grow more apples than could profitably be marketed. The result was a hard contest and a survival of the fittest among the various apple sections. When the great war broke out it was beginning to be seen by those who were in a position to judge that Nova Scotia was winning in the contest. Knowing this the officials of the United Companies of N. S. Ltd., and the affiliated subsidiary companies, assisted by Chief Fruit Inspector, G. H. Vroom and his staff of inspectors, Professor W. H. Britain and his staff of assistants, and Dominion Field Officer, G. E. Sanders and his assistants, have unceasingly advised, coaxed, pleaded with, and begged growers to keep their orchards up, not to let them deteriorate.

On September 5th, 1918, the Fruit Commissioner's Branch published Fruit Crop Report No. 4 in which the general review included states: "The embargo on apple ex-



Holding War-Time Markets for the Canadian Farmer

Canada is called upon to help to feed Europe during the period of Reconstruction.

This is good business for the Canadian farmer as it means he may be assured the same markets as he had while the fighting was on BUT— these prospective customers are little better prepared to pay cash for their purchases than they were during the War. To hold these markets for you, and make it possible for you to get the cash, the Dominion of Canada must extend credits.

Must Supply Credits

How is Canada to supply the necessary credits and finance this international trade? From the invested savings of her people.

The plan has been most carefully worked out. If the Canadian people co-operate to the utmost of their ability, the markets are assured, the people profit by their investment, their money is available when needed, and since Canada will, in due course, receive back the money advanced to the buying nations, not a dollar is added to the permanent indebtedness of the country.

\$5.00 for \$4.02

The Dominion of Canada is raising the necessary money by the sale of War-Savings Stamps.

In your own interest, buy War-Savings Stamps. Get every man, woman and child you can talk to, to buy War-Savings Stamps. The price this month is \$4.02.

Each stamp will be redeemed on Jan. 1st, 1924, by the Dominion of Canada, for \$5.00.

As an aid to the purchase of a War-Savings Stamp, you can buy Thrift Stamps at 25 cents each. Sixteen Thrift Stamps on a Thrift Card represent \$4.00 on the purchase of a W-S-S.

W-S-S. and Thrift Stamps may be purchased at Money-Order Post Offices, Banks, and other places displaying the sign at the top of this announcement.

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WONDERFUL EVERBEARING Strawberry

Fruits in Fall of first year and in Spring and Fall of second year. Three crops in two years. 500 plants set in May produced in Aug., Sept., Oct. and Nov. nearly 400 quarts, which sold at 20c to 40c per qt., netting at rate of \$2,000 to the acre. We are headquarters for Everbearing and all other Strawberries, Raspberries, Blackberries, Gooseberries, Elderberries, Currants and Grapes, Fruit Trees, Roses, Ornamentals, Vegetable Plants, Eggs for Hatching, Crates and Baskets. 34 years experience. Catalogue Free.



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when they are handled right, particularly now that everything eatable is so expensive.

Nothing is more important than the selection of seeds, and for this the safest guide is our new Illustrated Catalogue of

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Ewing's Seeds have produced forty-five successive and most successful crops in Canadian gardens and fields, and are ready now for the forty-sixth. Why not have a share in it?

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THE WILLIAM EWING CO., LIMITED
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Ewing's Detroit Dark Red Turnip Beet

Valuable for its remarkable uniformity and smoothness; size medium; flesh rich red, fine-grained, tender and remaining so for a long time; admirable for either summer, fall or winter use. The tops are dark-colored and vigorous. One of the best varieties for the home garden or market and equally good to store for winter. Lb. \$2.50; ¼ lb. 85c; oz. 25c.; Pkt. 10c. Sent postage paid—cash with order.

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ports to Great Britain is discouraging to the Nova Scotia growers. They are, however, being rightly persuaded to give their orchards every possible care. The Annapolis Valley is so situated geographically that she can take immediate advantage of British markets once the embargo is lifted. Other provinces will have a long freight haul and high rates to contend with, but Nova Scotia shippers will have Halifax right at their door. To keep an eye on future possibilities is a good policy under such conditions."

In spite of the embargo the Nova Scotia growers have been wise enough to keep their orchards practically in as good condition as ever, while almost without exception the sections that normally compete with Nova Scotia have allowed their orchards to go back. In this connection one section that normally grows three million dollars worth of Baldwins per year, most of which go to England, lost through the frost last winter two-thirds of their trees. Other things have taken place in other sections which tend to cause one to be more optimistic in regard to Nova Scotia's future.

The Increased Freight Rates.

The 35 per cent increase in freight rates is a big consideration for the grower with the long rail haul, but an increase of four times that amount would not be a serious matter for growers in Nova Scotia with Halifax within shunting distance. Some Nova Scotian growers go so far as to say that they welcome every increase in rail freight rates as it eliminates just so many more western apples.

It is true that Nova Scotia has this last year had the shortest crop of apples in her history, but that is not the result of care or lack of care, as well tended and neglected orchards are relatively suffering equally. Some attribute the short crop to injury inflicted by the gale of August 10th, 1917, others to the cold winter 1917-1918, others again to the lack of sunshine for the elaboration of plant food in the summer of 1917. We have a short crop and know it is not the result of neglect. We are of the opinion that the crop will tax the space allotted for apples to England and we look for good prices for what apples we have, so taking it all in all possibly the short crop is best as a larger crop might cause apples to be marketed at a loss locally as has happened in previous years.

The Local Markets.

In spite of the fact that in certain years the local markets have objected to paying prices that would net the growers cost of production, yet owing to the thorough canvassing of markets and the satisfactory pack delivered by the United Fruit Companies of N. S., Ltd., the consumption of apples in local markets is increasing beyond expectation. During the last season the local markets have consumed a larger proportion of the crop than in any previous year in the history of the United Fruit Companies. Up until the lifting of the British embargo on November 16th, 1918, the United Fruit Companies marketed and shipped out apples at the rate of 1,000 bbls. a day, 17,000 of which were placed in our own province of Nova Scotia. In this connection the increase in the rate of rail freight has practically prohibited the shipment of apples to western Canada, and from that we can draw our most reliable deduction as to the effect of the increase of rail freight on the European trade of our western competitors.

While our local markets, in a sense, have not been highly remunerative, yet they have been our salvation during the last four



SMALL FRUITS

Raspberries, Gooseberries, Red Currants, Black Currants, Strawberries, Rhubarb Roots, Asparagus Roots, etc., etc.

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Gladiolus, Paeonies and Phlox

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Spramotor
It isn't a SPRAMOTOR unless we made it



To get twice and three times the yield from row crops, fruit trees and plants is the common experience with Spramotor users. We hesitate to mention the increases some farmers have secured—they are so great as almost to be incredible. Buy a spray outfit—moreover, buy a Spramotor; because it is the world's best, made right here in Canada, no duty to pay, has met and beaten the pick of all makes in Government contests and at World's Fairs and Expositions. Every machine guaranteed.

FREE We have a valuable illustrated work on "Crop Diseases" to send you postpaid for the asking. Also catalogue showing our complete line of hand, horse, knapsack and power machines. Write to-day for your copy.

SPRAMOTOR WORKS
5005 King Street - - London, Canada

DISSTON
Pruning Saws
A STYLE FOR EVERY REQUIREMENT

No. 19.
Flat steel back, narrow tapered point, Beech handle, varnished edges, three brass screws. Handle has extra large hand-hold for use with gloved hand, swivel stretcher, blued steel blade. Blade 18 inches centre to centre of holes.

D-24.
Narrow point crucible steel blade, copper handle with beechwood grip. 14 to 24 inches.

No. 25.
Flat steel frame, riveted sockets, swivel stretcher. Beech handle, varnished edges, two nickel-plated screws. Blued steel blade. 14 inches.

One-Man Cross-Cut.
Made on the same principles as our Disston handsaws. Designed to withstand maximum "thrust" without buckling, and for easy rapid cutting.

Write for "Pruning Saw Booklet"
HENRY DISSTON & SONS, Limited
2 FRASER AVENUE - TORONTO, ONT.

Growing Two Apples Instead of One

OHIO EXPERIMENT STATION (Monthly Bulletin No. 4, 1918) reports: "The fertilized tillage and cover crop plots have returned a 4-year average annual gain of 47.25 barrels per acre over the unfertilized plots in the same section. The fertilized grass mulch plots have given a 4-year average annual gain of 91.5 barrels per acre over the unfertilized plots in the same section."

Mr. E. E. Archibald, Wolfville, N.S., through proper cultivation, fertilizing and spraying, increased the yield of a half acre degenerated orchard to 108 barrels of *picked* fruit. (Annual Report of Secretary of Agriculture, Nova Scotia, 1910.)

Just what would the above increases in yields from fertilizing your orchard mean

to you? Figure it out. Apply fertilizers this spring.

Pennsylvania Experiment Station, Bulletin 153 (1918) has also found orchard fertilizing profitable. Bulletin 15 says: "When the trees indicate that some fertilization is needed at once we suggest the use of about 500 lbs. to the acre of a 6-8-5 fertilizer." (This means a fertilizer carrying 6% ammonia, 8% phosphoric acid and 5% potash).

Strawberries

Manure supplemented by 1,000 lbs. fertilizer high in ammonia and potash with a medium amount of phosphoric acid per acre is the way Mr. L. D. Robinson, Berwick, N.S., grows highly profitable crops.

Mr. M. K. Ells, Port Williams, N.S., uses 800 lbs., high grade complete fertilizer per acre applied just before the young plants are set.

—Annual Report of Sec. of Agriculture, Nova Scotia, 1910

It Pays to Fertilize

Write for Our Free Bulletins on Crop Production.

The Soil and Crop Improvement Bureau
of the Canadian Fertilizer Association
1110 Temple Building - - Toronto

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 AND QUEENS—Bees in pound packages and queens from the South will be in greater demand this year than ever before. This season spells opportunity for every beekeeper. Book your orders early. Geo. W. Brown, Lynnhurst Apiary, Wilson, Wis.

BEES FOR SALE—Prize Italians of Dr. C. C. Miller's famous honey gathering strain in ten frame Langstroth standard hives. Write for prices and particulars. D. E. McDonald, Rutland, B.C.

"SHE SUITS ME."—Italian queens, untested, \$1.15 each. For 10 or more, \$1.00 each. Allen Latham, Norwichtown, Conn., U.S.A.

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

WANTED—Five to twenty-five colonies of bees; also supers, etc. Box 331, Dundas, Ontario.

FOR SALE—66 colonies of bees, sugar fed in fall, packed in winter cases; 145 supers filled with comb; 4 frame extractor; uncapping can; 4 storing cans, wax press, honey pails. Everything in perfect readiness for spring work. If buyer would like to start beekeeping here, would sell or rent land and could have use of honey house. This is an ideal location for bees, only a few minutes walk to station. Sacrifice on account of death. Mrs. J. F. Orishaw, Hastings, Ontario.

EMPLOYMENT

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

MAN WANTED to take charge of young orchard, Eastern Ontario, by April first. Box 20, Canadian Horticulturist, Peterboro.

BEE SUPPLIES

FOR SALE—One hundred new Langstroth ten-frame supers and hives, metal spaced frames, medium brood foundation, in part or all together, at a bargain. E. L. Patchet, Weston, Ontario.

DRAWN COMBS FOR SALE—What offers in ten frame hives; no disease. Write Box 45, The Canadian Horticulturist and Beekeeper, Peterboro, Ontario.

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

FOR SALE—600 colonies Italian bees, 1,600 supers, drawn combs, 500 lbs. foundation, 500 lbs. wax, covered motor truck, 2 six-comb friction drive extractors, gas engine, 600 excluders, 150 four-colony winter cases, one straining can, holds 1,800 lbs. and will strain 12,000 lbs. without changing the cheesecloth, 1 extracting and storage building, 42 x 47 ft. One large size Sibbald wax press, one ¾ inch honey pump. One of the best locations in Canada goes with the bees. Everything must be sold. Am retiring from business. C. D. McIntyre, Woodbridge, York Co., Ont.

FOR SALE—Comb foundation. Light and medium brood. Address R. F. Holtermann, Brantford, Ontario.

WANTED—Good two-frame Cowan or Reversible extractor. State price. Garfield Stewart, Glasgow Station, Ontario.

REAL ESTATE

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

SEEDS, BULBS, PLANTS, SHRUBS

C. KEUR & SONS, Hillegom, Holland. Bulbs of all descriptions. Write for prices. New York Branch, 8-10 Bridge St.

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

FOR SALE—Cuthbert, Marlboro, Everbearing Red; and Cumberland Raspberries, Currants, Gooseberries, Ornamental Stock, also Spruce, Cedar, Pine, Privet and Barberry for hedges.—JOHN DOWNHAM, Strathroy, Ont.

SPRAYS

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

WOOD

WANTED—Green apple logs, 13" and over in diameter, 3' and up in length. Agents wanted to secure this material. Henry Disston & Sons, Inc., Tacony, Philadelphia, Pa.

MISCELLANEOUS

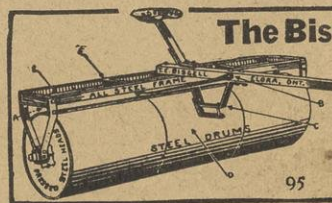
ANYONE KNOWING the whereabouts of Charles W. Cummings, otherwise called Charles W. LaHue, please communicate with the undersigned. A reward of \$5.00 given for such information. Cummings has one arm, is about 50 years old, of stocky build, with black hair and moustache. Former inmate of Rochester State Hospital. Sarah Cummings, 13 Elwood Bldg., Rochester, N.Y.

PRIZE WINNING DAHLIAS

Ten Cactus varieties	\$1.00
Ten Show and Fancy varieties	1.00
Ten Decorative varieties	1.00
Ten Peony Flowered varieties	1.00
Ten Pompon varieties	1.00
Ten of all classes	1.00

Postpaid.
Twenty-five mixed varieties, \$1.00 by express.
Send for catalogue, over 200 varieties.
MRS. C. DOUGLASS, Buctouche, N.B.

I have nothing but praise for The Canadian Horticulturist as I have learned more from the Floral Edition than from any books on the same subject. Enclosed is \$1.00 and the names of two new subscribers.—W. Burden, Kingston, Ont.



The Bissell Steel Roller has a rigid steel frame—no wood whatever.

Large roller bearings and strong 2" axles insure durability and great strength. The Bissell is a 3-drum Roller of good weight, built to stand hard usage and give great service. Write Dept. N for free catalogue.

T. E. BISSELL CO., LTD., Elora, Ont.

See advertisement on page 90.

years in that the returns for apples marketed locally have helped to tide over the period during which the British fruit embargo was enforced. They have taken every year more and more fruit and as a result a close and wholly satisfactory connection has been established in the local markets and we look for them in the future to consume an appreciable quantity of our Gravensteins, Northern Spys, Wolf Rivers, Kings, Bishop Pippins and such varieties at prices as profitable as though they were marketed in England. To say the least the future looks good for the Nova Scotia grower.

Prospects Are Bright.

The conditions arising from the war eliminated the competitors of the Nova Scotia grower more rapidly than they would have been eliminated by competition, and although for four years he has sold his apples for a ruinous price compared with the cost of supplies, yet he is probably in the best position he has yet occupied in regard to the future, and in a few years he will recoup his loss.

In a way the position of Nova Scotia can be compared with the 80's, and early 90's. It is better in that competitors have had their try and are now, to a great extent, dropping from the game.

Rail freights are up and none of us can ever remember when rail freights have generally dropped. We know that the present increase was permitted as a war measure and with the wages following the increase in rates we are skeptical in regard to any decrease in rail freights.

The period of competition has been, in a way, for the ultimate good of the industry in that it has offered growers the best methods of growing, spraying and packing and the best varieties. Our United Fruit Companies have developed under force of circumstances. Competition became so keen and the growers' profits so small that in order to barely exist through the hardest years they had to combine in buying their supplies and selling their products. This combination now includes approximately 1,500 growers, and handles in the neighborhood of 40 per cent of the apples and 60 per cent of the potatoes grown and marketed in the Annapolis Valley, and considerably over one-half of the spraying material, fertilizers, flour, feed, and other supplies purchased. The principle of this organization has been to deal through the ordinary trade channel where possible, and only to cause changes in the regular system of buying and selling where profits of certain groups doing business for the apple growers were too high. In this way amicable relations have been maintained with the manufacturers and wholesalers of supplies at the one end and the fruit trade on the other. The result has been that the consumers of fruit have bought their fruit for at least as low a price as they would had not the United Fruit Companies existed, they have received a better pack than they otherwise would have, and the growers have received more for their fruit and bought their supplies for a less price than they otherwise could.

Plants must be Fed For Best Results!



INVESTIGATION proves that manuring and cultivation are not sufficient to produce the largest crops of best quality. Plant food is essential. Commercial fertilizers contain the elements for proper growth in exactly the right proportions for maximum results.

Swift's "Red Steer" Brand Fertilizers

BLOOD

are the results of many years' experience and careful research, and the ability to secure the best raw materials necessary. Swift's "Red Steer" Brand Fertilizers are made to meet every crop and every soil requirement.

A favorite for horticultural use is Swift's Orchard Fertilizer, a mixture of 3% Ammonia, 8% Phosphoric Acid, and 1-2%

BONE

Potash. For Greenhouse use, Swift's Blood Meal, Swift's Blood and Tankage, and Swift's Pure Bone Meal are known for the exceptional results they secure.

It is poor economy to allow expensive land and valuable equipment to yield low returns when a small investment in a carefully selected fertilizer will accomplish so much more. Don't buy haphazard! Insist on

TANKAGE

Swift's "Red Steer" Brand Fertilizers

and be sure of best results. We can ship in quantities of 100 lbs. or car lots. Swift's Fertilizers will keep indefinitely under proper conditions. Write for prices and literature.

Order NOW to insure Prompt delivery

Swift Canadian Co.

Limited

Toronto

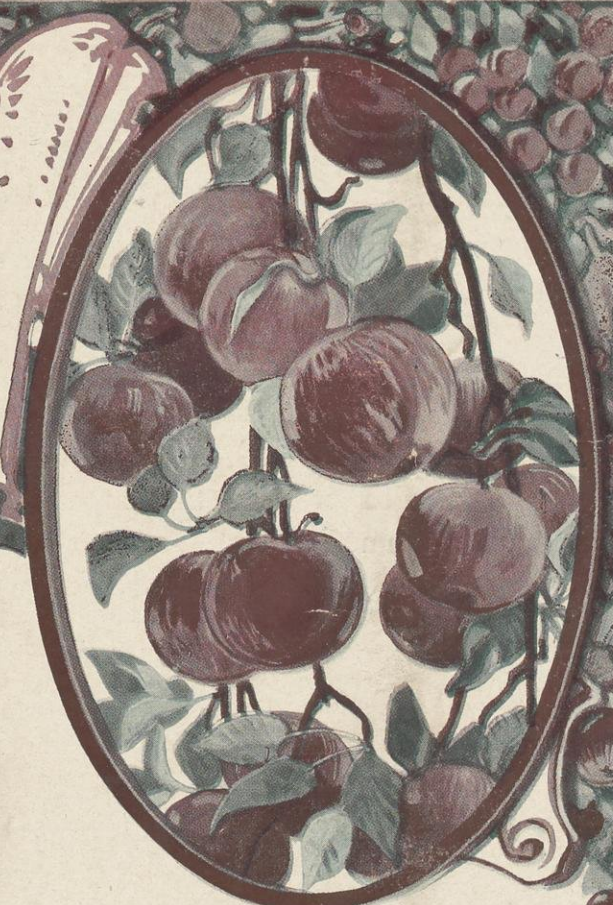
Winnipeg

Edmonton

Agents wanted for unrepresented territories

Consistent Fertilizing

Means Bigger Steadier Yields and Surer Profits



THIS is a truth that fruit specialists have long recognized and a systematic fertilizing plan is invariably carried out. This ensures choicer, heavier yields and more consistent crops — also materially assists in protecting the fruit buds and trees from winter killing.

Many farmers divert all their manure and other fertilizers to the grain fields, however, not realizing that an orchard really takes more plant food from the soil than even wheat as the attached table will show. Then they wonder at poor crops.

Give your orchard a chance to be a consistent money maker for you. Give it a share of the manure pile. You will be richly paid.

With the export markets opening up and the shipping situation steadily improving the demand for fruit crops should materially improve from now on.

For information on any phase of fruit growing — fertilizing, spraying, cultivating; varieties; packing; marketing etc., write to

Amount of Plant Food removed from an acre of ground during 20 years' continuous cropping to wheat and another acre devoted to 20 years of apple orcharding.

Growth	Nitrogen	Phos. Acid	Potash	Value
	Lbs.	Lbs.	Lbs.	
Grain.....	424.80	160.20	109.80	\$ 79.86
Straw.....	234.78	50.40	214.20	48.37
Apples.....	498.60	38.25	728.55	110.26
Leaves.....	456.75	126.00	441.00	97.17

Ontario Department of Agriculture

PARLIAMENT BUILDINGS, TORONTO

P. W. HODGETTS,
Director Fruit Branch

HON. GEO. S. HENRY,
Minister of Agriculture

