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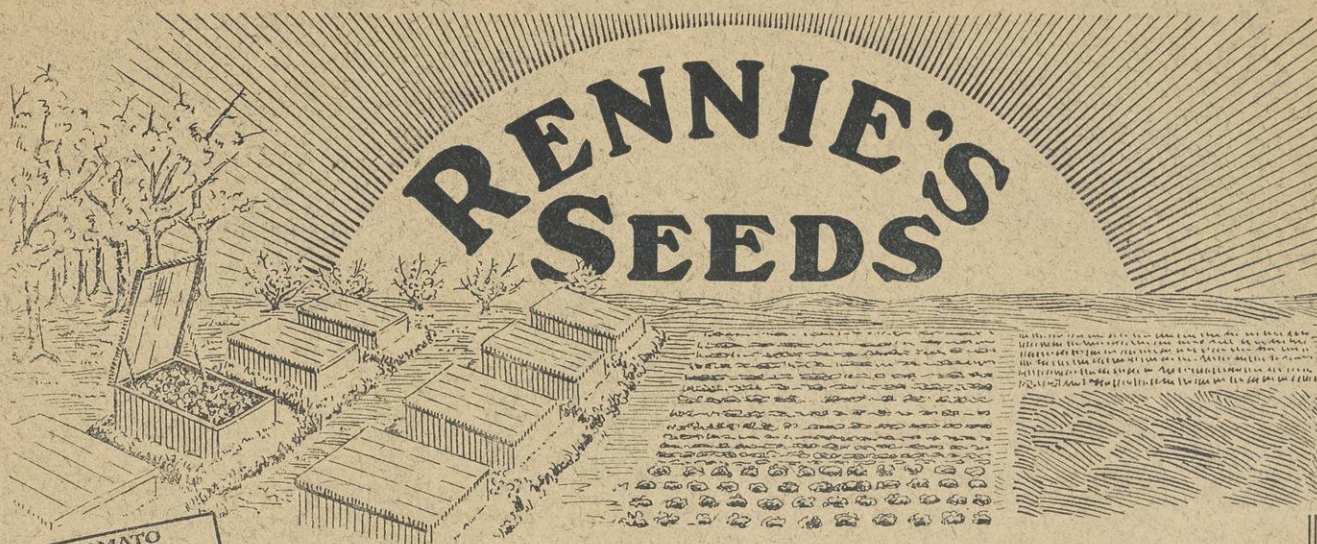
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THE CANADIAN HORTICULTURIST & BEEKEEPER

Vol. 28, No. 1, January, 1920
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The Canadian Horticulturist

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Vol. 28

TORONTO, JANUARY, 1920

No. 1

The Tractor in the Orchard

E. M. Ricker, Lecturer in Horticulture, Macdonald College, Que.

THE present is an age of machinery, more especially where increased production and a minimum of labor go together. It has been brought about largely because of war conditions. In agricultural work, the tractor has been a welcome addition, and since its future is assured in some lines of farming, the question naturally arises, what is the limit of its usefulness in agricultural work? This is the question that confronts the eastern orchardist, and if he is to follow in the footsteps of his western competitor, the adoption of a tractor, in orchards of equal size, seems certain.

The popularity of the tractor is due to the west, where a large acreage gave the machine its greatest opportunity for accomplishing a large amount of work in a short time, and a shortage of men and horse-power made its use necessary. It is estimated that 90 per cent of the North-western orchardists own automobiles and are favorable to the purchase of a tractor, the only question being what kind of a machine to buy.

The present cost of labor on the farm is such as to warrant a consideration of the tractor and the work it does under the best conditions.

Properly operated the tractor is a time-saver during the spring and early summer. The amount of work accomplished in a day is much greater than with any other agent. Ability to work long hours, especially during hot weather, makes the tractor valuable, since its use is not confined to the coolest parts of the day.

Ample Power.

The modern tractor has ample power for the average orchard work, which includes carrying on more than one operation at the same time, e.g., discing, harrowing, and seeding. The motive power for spraying purposes is easily supplied in the spring either for the dusting machine or the liquid tank.

Twice as much power on the pulley or belt, with which most tractors are fitted, makes the machine most valuable for filling silos, in fact, useful anywhere on the farm where power is necessary. Many farmers haul manure, wood, coal, etc., during the winter months, and the ability to keep the tractor in use at various periods during the year adds to its usefulness and popularity.

Tractors are made in various sizes, and rated according to horse-power, hence there are machines for nearly all kinds of farm work. The smaller types of tractors are more suitable for orchard work, and besides being low and performing operations close to the trees without damage, are more easily handled, especially in making short turns in closely planted orchards.

The average orchard does not demand a large tractor because the implements that are necessary for its upkeep are not large or heavy enough to warrant it. Economy is an important question, and the selection of too large a tractor is poor economy in both fuel and investment, while too small a trac-

tor is false economy of labor. The character of the soil and its operative condition should be the guide in determining the horse-power necessary, remembering that too small a machine and heavy work leads to immediate trouble, and too large a machine on light work to waste.

The operator must be a man trained and familiar with machinery. Lack of lubrication and adjustment of parts leads to renewal of parts which are expensive of time and money, and carelessness on the part of the operator in handling the equipment will cause more damage to orchard trees than can be repaired in years. This last point is largely dependent upon the steering device, and machines that respond to change of direction with a slight movement of the steering-wheel are much to be preferred. Many tractors are hard to start and the changing from gasoline to kerosene oil as fuel often leads to trouble which only the trained man can remedy.

The success of the tractor depends upon four things, namely: Operator, make, work it performs, and ability to



Six different makes of tractors have been tested in the orchard at Macdonald College, Que., one of which is here shown. Another illustration secured in this orchard is shown on the front cover of this issue.



Part of the 150 acres of Mr. P. Delsole, Montreal, reputed to be the largest market gardener in Canada. Twenty years ago Mr. Delsole landed in Canada with \$1,000. To-day, his turn-over runs into scores of thousands of dollars a year.

perform more than one kind of work. In the purchase of a tractor select a dealer of reputation who will allow you to test the machine and guarantee it, besides making repairs for a year, for with competition at its height to-day, the reputation of any make must come through time and use, and the responsibility of the dealer does not end immediately upon purchase payment.

Many eastern orchardists are considering the advisability of purchasing a tractor, and it would be well to make inquiries before doing so to insure getting not only the proper machine, but the one that comes nearest meeting your requirements for it.

Here, at Macdonald College, we have operated the Fordson, Case, Avery, Massey-Harris, Sawyer-Massey, and International, and while we recognize the value in saving time and labor at critical seasons of the year, unless there are other uses for the tractor outside the orchard, during the fall and winter, it does not seem advisable for the small orchardist to attempt its use.

Winter Care of Machinery

W. L. Graham, Asst. Dominion Field Husbandman, Ottawa.

"Let him use more machinery then," is the stock phrase and cure-all prescribed by the "Know-it-all" of the food producers' labor problem. This is just what fruit growers have been doing for a generation, or ever since city wages were distinctly higher than those in the country. To-day machinery has doubled in cost because it does not grow upon the land by the free agency of sunlight like crops, but is made in cities and by labor that exacts far more than the fruit growers' wage. Thus there is a limit to the machinery the orchardist can afford to buy and to the extent to which he can substitute machinery for expensive labor. In other words machinery is now expensive labor.

See to it that each implement wears out and does not rust out. Every one knows that it should be housed, but housing under any condition and not properly caring for it otherwise, constitutes very poor care. Machinery may be just as well cared for if it is allowed to stand in the shade of a tree as if stored in some of the leaky sheds, open sheds, poorly drained sheds or combined implement sheds and hen roosts which are found.

Do not merely go through the motion, but shelter considerably and before doing so, (1) list the repairs needed for next season and secure them along with an assortment of bolts, rivets, springs, etc., in time to have each implement repaired and ready for use on time. An implement in repair at all times will have a longer life and will give more satisfactory service during its life than one receiving irregular attention; (2) clean and oil each machine and give all polished surfaces an application of some anti-rust preparation. Axle grease or other lubricant will answer the purpose.

Tractor Care.

Another "critter" occupies space in the implement shed, the twenty-four-hour-day-iron horse or tractor has arrived in the orchard. To insure more efficient use of this implement next season there are two things that should be given special attention. First, take steps to put it in the best possible condition now, and, secondly, learn as much as possible about the fundamentals of tractor operation. Read carefully the instruction book; newspapers, books and magazine articles also furnish a wealth of information. If possible attend one of the tractor schools which will be conducted during the winter. Leave nothing undone that will fit you to become a more proficient tractor operator.

An attic room where there is no frost will be found a good place to store onions.—W. T. Macoun, Ottawa.

The Tractor is Coming

This past summer has seen hundreds of tractors go on to our fruit farms. Why? Simply because under the conditions we met with, many orchardists found it, not a question of whether or not a tractor could do their work cheaper than horses but rather, can a tractor do our work? For horses couldn't.

There was the shortage of labor to be considered. There was the tremendous amount of work to be done, and it was necessary to keep the orchard cultivated. There was the hot spell in June that put the horses on the shelf and there was the drought that made it impossible for horses to get through at all. So it wasn't a case of the cheapest method, but of taking the only method of getting all the work done and getting it done fast, and with the increasing difficulty of securing orchard help, this factor will come more and more to the fore.

But, although many bought tractors this summer owing to the peculiar weather conditions and not because it was cheaper than horses, it has been ably demonstrated that a tractor in many orchards, is cheaper than horse, labor. Many growers who bought these machines, not because they were satisfied with them, but because they needed them, have become enthusiastic over their prowess, and it is probably safe to say that eighty per cent. of these buyers will use their tractors constantly, hereafter.

For the foregoing reasons, and because he can always get his work done with a tractor when wanted, it is safe to presume that in the not very distant future, tractors will be considered a necessity and not a luxury on Canadian fruit farms.

Apple Trees to an Acre

How many trees will plant an acre? I intend to put an acre of my land in orchard this spring.—J.K.

You do not mention how far apart you intend to plant. However, the following rule will give you the number of trees to an acre when planted at various distances. To determine the number of trees per acre for any given distance multiply the distance between the trees in the row by the width of the row. Take that number and divide 43,560 by it. The resulting figures will give the number of trees per acre.

The number of trees to set per acre: 16x16 feet, 170 trees; 18x18 feet, 134 trees; 20x20 feet, 108 trees; 20x30 feet, 72 trees; 24x24 feet, 75 trees; 25x25 feet, 69 trees; 30x30 feet, 49 trees; 32x32 feet, 42 trees; 36x36 feet, 33 trees; 40x40 feet, 27 trees.

Pear Blight

Prof. L. Caesar, O. A. C., Guelph, Ont.

THE disease known as pear blight or sometimes, twig, blossom, or fire blight, is the greatest obstacle to the successful growing of pear trees, not only in Ontario, but also in most parts of North America. It has caused the death of millions of trees in Canada and the United States and has so discouraged the growers in many districts that they have given up the raising of pears. The disease, however, is not equally severe in all localities; for instance, it does not do nearly so much damage around Burlington as in the Niagara District.

Fruit Trees That Are Attacked.

Pears, crab-apples, apples and quince are all subject to attack. Pears and crabs, however, are usually worse injured than apples. No variety of any of these fruits is completely immune, but some are much more susceptible than others. Clapp's Favorite is the most susceptible pear and for this reason as a rule should not be planted. Bartlett and Flemish Beauty though not nearly so susceptible as Clapp's Favorite are often quite severely attacked, while Kieffer is least affected, being seldom much injured. Of apples, Tolman, King, Alexander, Gravenstein, Yellow Transparent, and Spitzenburg are among the worst attacked; while Spy, Baldwin, Duchess and Ben Davis are among the least susceptible.

Symptoms.

The disease exhibits itself in several



A water sucker killed by pear blight. The blight has run down the sucker into the trunk, and would, if not cut out, soon kill the tree. Note the drooping, wilted leaves on the twig.

forms—(1) Soon after the blossoms fall numerous twigs of pears and apples, especially in favorable years for the disease, may be seen to wilt and die. On examination it will be found that almost every twig thus affected has borne one or more blossoms and that trees which had no blossoms have no affected twigs or almost none, thus showing that the disease must have entered the twig through the blossoms. This form of the disease is called twig or blossom blight.

(2) Later in the season dead or dying branches and twigs may be found on trees here and there throughout the orchard. Usually the disease in this case starts at the top of the branch and then gradually works down the branch into the main part and trunk of the tree. Whole trees have often been killed in this way. Diseased bark usually dies soon and especially in winter sinks below the level of the other bark, thus giving an opportunity to recognize how far the disease has gone on the branch. Very often the leaves remain on the diseased branches when all the other foliage has fallen.

Cause.

The blight is caused by a very minute organism, a bacterium known as *Bacillus amylovorus*. This organism or germ is so small that 10,000 of them find a resting place on the head of a pin. The bacteria work chiefly in the tender tissues of the bark, or sometimes between the bark and the wood, and soon cause a reddish or brownish staining of the affected parts. They multiply by dividing, and millions may be produced from one in a single day. They feed upon the food substances found in the diseased sections and soon kill the tissues where they work.

Conditions that Favor the Disease.

The more succulent the bark and tissues of the tree, the better the disease thrives, hence we regularly find it most troublesome in moist warm weather, and in rich well cultivated soil. For the same reason, it is least troublesome in orchards that are in sod or in poor light soil and at times when the weather is very dry, depriving the plants of food.

How the Disease Spreads.

With the return of activity in the tissues of the plants in spring, the bacteria that remained dormant around the margins of the diseased areas in trunks and larger branches on affected trees begin to grow and multiply and in many cases force out a sweetened exudate which may appear as drops or



The same tree after the blighted area has been cut out. Note the large area that had to be removed from the trunk, to make sure that the disease was all removed. The tree was saved.

little streams, at first almost colorless and later brownish. Ants are fond of this exudate and by feeding upon it become contaminated and then, after the blossoms have opened, they carry it on their mouths, legs and body to the blossoms, which they are also fond of feeding upon. Once these blossoms become affected they give an opportunity for contamination to bees, wasps, flies and beetles and other insects that visit them. These then can carry the disease throughout the orchard to other blossoms and produce the so-called twig or blossom blight. Often the disease dies out after killing the twigs, but in very susceptible varieties, especially in good growing weather it lives on and runs down the branches and later down into the trunk killing the other branches or the whole tree. Later on, many sucking insects, such as leaf-hoppers, plant bugs and aphids feed upon the diseased twigs and then upon healthy twigs, thus spreading the disease from one tree to another. As such insects prefer the tender new growth, they will commonly cause the disease to start on water sprouts or suckers or on tips of branches and from these it runs down into the older parts of the tree.

More careful attention is necessary for the control of pear blight than of any other orchard disease. I have had charge of the control of blight in from 15 to 30 acres of pears for a period of five years, and from my own experience and from observations of the



A young pear tree with several branches, as indicated by the arrows, affected by pear blight. This tree, if left untreated, would soon have been killed by the blight running down the trunk.

work done by others, I am convinced that very few growers have ever made a really intelligent effort to combat this disease.

The first step in control is to put the work in charge of the most careful man on the place. He must then learn the symptoms of the disease, not on one tree only, but on many trees. Where men have had no chance for training I shall be glad, if notified, to give them personal direction. After learning the symptoms the next step is to cut out the disease in winter so that there will be as little opportunity as possible for insects to become contaminated in the spring and spread it to the blossoms. I always go over the orchard at least twice during the winter. When work is done before growth begins there is no need of a disinfectant. Moreover, by cutting out in winter it is not necessary to cut more than about four inches below the darkened diseased area whereas if growth has begun the cuts should always be made a foot or more below the diseased part.

The next step is to watch the trees very carefully after blossoming for the first sign of wilting twigs. As soon as any of these are seen every exertion should be made to have them removed promptly, for upon the promptness of their removal depends the prevention of the disease running down from the twigs into the main branches and doing great damage. It is better and quicker to break off the diseased twigs than to

cut them off. This also saves the need of disinfecting. The work can often be done quickly from a lorry or wagon driven alongside the trees. The broken twigs should be thrown on this wagon and hauled away. All the twigs do not wilt on the same day, therefore the trees must be visited several times during the first week, after the blight begins to show, until every twig has been removed.

Once the blossom blight has thus been brought under control the rest is easy and all that is necessary now is to go over the orchard at first once a week and then once in about three weeks and remove any blighted branches that may appear from time to time. These as a rule should be cut out, and the cutting should be about 18 inches below where the disease shows itself on the bark. Every cut area should be disinfected with corrosive sublimate in the proportion of one part by weight to 1,000 parts of water. This substance can be carried in a bottle in a hip pocket with a little piece of sponge in the end instead of a cork. The saw, draw-knife or other tools used should also be disinfected after each cut. If the blight has run down a sucker into the trunk the bark must be carefully removed around all sides of it and the cut disinfected.

As a very succulent condition of the bark favors the blight, it is as a rule, not desirable to prune trees heavily or to cultivate more than is necessary to give fair sized fruit. Often good pears can be grown in sod and in such cases are much less subject to attack from the disease. Kieffers, though quite subject to the blossom blight are commonly immune to blight on the larger branches and trunk, so that one is safe in planting them. It is also a good plan to grow pears at a considerable distance from apple or quince orchards or from other pear plantations.

VEGETABLE PESTS

W. A. ROSS, Vineland

Onion Thrips.

This past season my onion crop was almost a complete failure. The leaves became whitened and crinkled and the bulbs made very little growth. A neighbor called my attention to a very tiny insect or thrip which was present in large numbers on the leaves and informed me that this thrip was responsible for the injury. Is there a remedy for the thrip?—J. L. McD.

Your onions were attacked by the onion thrips, incorrectly called "thrip." This insect was unusually abundant this past season in most onion growing sections of Ontario, and cut down the onion crop very considerably. The injury to the leaves is caused by the tiny yellowish insects rasping the leaf tissue and sucking up the juices.

Control: As soon as the thrips are

in evidence or as soon as the characteristic whitening of the leaves appears spray the plants with Black Leaf 40, 3-8 pint; soap, 4 lbs.; water, 40 gallons. Repeat this application at intervals of from 7 to 10 days up to within four weeks of harvest time. It is of prime importance to use good pressure (at least 100 lbs.) and to thoroughly drench the onions.

Cabbage Aphis.

Last summer my cabbage became covered with a disgusting mass of graying-green lice. Some of the plants were killed outright and in the case of others the heads did not develop. How can these lice be controlled?—C. R. L.

The insect which clustered on your cabbage plants is called the cabbage aphis. It may be controlled by spraying with Black Leaf 40 (3-8 to 1-2 pint to 40 gallons of water) plus 2 lbs. soap or 2 to 3 lbs. hydrated lime. The spray should be applied with good pressure and all parts of the plants should be thoroughly drenched.

Cherry Slugs.

Many of the cherry and pear trees in this section were heavily infested with a blackish slug which ate out the green parts of the leaves. Before my Early Richmond cherries ripened the foliage was ruined and looked as if it had been scorched by fire. This affected the fruit to such an extent that it was not worth picking. Is this slug a new pest? How can it be successfully combatted?—J. O. O.

The pear and cherry slug is an old, well-known pest. Like other insects it has its "ups and downs." Some years, such as 1918-19, it may be exceedingly abundant and devastate thousands of cherry and pear trees, but in other years its numbers may be so insignificant that the growers will not notice the insect or the injury. The slug is easily destroyed by spraying the trees with arsenate of lead, 2½ lbs. to 40 gallons of water. It is worthy of note that the slug caused no injury this season in the orchards which were sprayed according to the directions in the Ontario Spray Calendar.

Profitableness of Tractors

THE greater the number of jobs adapted to tractor work, the more profitable will be the tractor investment. Canadian fruit growers have used tractors for only a few years, very few more than two years, but already we have learned to hitch the tractor to so many implements and power machines that some orchardists have their tractors in almost continuous use.

There is yet one other factor that bears on the effect of the tractor on fruit growing. That is one that is at present considered a drawback in a tractor. The tendency of a rolling wheel type of tractor to bog itself in soft ground in the spring. Is this really a drawback? Many tractor owners are

beginning to think not. "Land that my tractor won't go over should not be worked," says one orchardist from a Quebec district, "and I can do so much more work in a day with my tractor than I could with horses that I can afford to wait a day or so longer and

let it get into good shape." This is very suggestive—the fact that the speed of the tractor gives one a chance to do a thing at the proper time. And orcharding is made up of jobs that are limited severely by the factor of "best time."

was the belief expressed by Mr. Arthur Smith, of Vineland, about his "iron horse," when asked what he thought of his tractor. "You know yourself how it was this summer," said Mr. Smith. "Horses died of the heat all around here, and I couldn't make my men push the horses in the peach orchard for fear of killing the animals. However, with our caterpillar tractor, we set right into the work and got her done."

"That is the strong point of the tractor," continued Mr. Smith. "You get your work done when you want it. You see yourself how I finished up my work in the hot spell, when if I had been unable to get it done I would have lost a crop of peaches worth over \$15,000. But that isn't the only thing. I can go on with some work, say spraying in the orchard in the spring, and then, even if it does take me longer than I expect, I can go to my spring ploughing afterwards, and by using the tractor make up for my lost time."

Knowing that readers of *The Canadian Horticulturist* would be interested in knowing how much it costs to operate a tractor, we asked Mr. Smith, but he himself said that he didn't have any figures. Speaking off hand, however, he said that working nine hours a day the tractor takes 10 lbs. of the best grade of grease, at 20 cents a pound, \$2.00; one quart of the very best cylinder oil, at 30 cents a quart, 30 cents; 10 gallons of gasoline, at 37 cents a gallon, \$3.70; one operator, at \$3.00 a day, without board; total cost of the day, \$9.00.

"But on the other hand," observed Mr. Smith, "I figure that a tractor displaces four teams. Let us figure this up. A horse's feed costs in the neighbourhood of \$250 a year, therefore the cost of four teams for a day is around \$5.45. Four teamsters, at \$3.00 a day, without board, \$12.00; total cost per day, \$17.45; saving made by using tractor: \$17.45—\$9.00 = \$8.45.

You will notice, however, that Mr. Smith does not take in depreciation on the tractor, interest on investment, daily care, etc., but neither does he in the case of the horse. Besides this, although the horse's feed costs in the neighborhood of \$250 a year (an experiment carried on at the Dominion Experimental Farm, at Cap Rouge, Que., in the feed of four horses, whose average weight was 1,330 pounds, for a year found out that it cost \$248.91), that doesn't allow for bedding, doctoring, shoeing, harness, blanketing, stable room—which is much greater than tractor room—harness and blanket room, etc.

This indicates, as Mr. Smith has found out, that it is much cheaper to

What Fruit Growers Say About Tractors

THE light tractor is making good in our Ontario orchards. That is the fact that was impressed upon me most forcibly during a recent visit to a number of fruit farms in the Niagara Peninsula, where tractors were used for the heavy work last summer. It is only a couple of years since the light tractor was first introduced into Ontario as an experiment, but the past year has seen a tremendous increase in the number of these machines used on Ontario fruit farms. Shortage of help with its attendant necessity for greater accomplishments by the man power available has paved the way for the tractor and the low-down fast-working orchard implement.

The peculiar weather conditions of the past summer were another deciding factor leading to the purchase of a machine for use in many orchards, and many tractor owners who, like Mr. Arthur Smith, of Vineland, Ontario, were able to save their tender fruit crops, as Mr. Smith was able to save a \$15,000 peach crop, certainly agree that the use they made of their machines during the hot spell last June paid the initial cost of the machine many times over. While horses in every district

were being overcome with the heat, and while scores of these animals died, the tractor went right ahead with its work, stirring up the soil for its owners, and not infrequently neighbors who saw this went straightway and in turn bought their tractors.

The important feature, however, is not the number of tractors that have come into use in Ontario, but the satisfaction that these tractors are giving day after day to the men who are using them. I found in my little trip through Wentworth and Lincoln a bunch of enthusiastic tractor owners.

So far, of course, the tractor has not been in use long enough to enable one to apportion the proper depreciation in value of the tractor against each year's work, for we do not know how long the life of a tractor will be. One thing certain, they do good work, a lot of work and speedy work, and if they will last long enough they are going to take a tremendous place in the fruit industry of the future.

The following notes are the expressions of several tractor owners and every one is a tractor enthusiast from this day forward.

"My tractor saved me \$15,000," such



A Pattens Greening apple tree in bloom at Macdonald College, Que. It is a seedling of Oldenburg but a stronger grower. It is a hardy productive variety. The fruit is green in color and has a sprightly, sub-acid taste. It is very good for culinary use.

use a tractor instead of four teams.

"But," commented Mr. Smith, "a tractor does as much in 9 hours as the eight horses in 10 hours, if I want it to, but generally it does the work of a little more than three teams daily. Yes," concludes Mr. Smith, "if that tractor is as good for the next six months as it has been for the past half-year it will have earned its place on my fruit farm."

Buy If He Couldn't Hire.

"If I couldn't hire a tractor I would buy one," said Mr. S. H. Rittenhouse, Jordan Harbour, when he was asked if he was thinking of giving up power farming. Mr. Rittenhouse doesn't own a tractor himself, but in the spring he hires one, and says that it is the boy to get the work done when you want it. Mr. Rittenhouse has no comparative figures as to the cost of horse and tractor labor, but in his judgment the tractor is far cheaper and does just as suitable work as horses.

"You know," said Mr. Rittenhouse, "I am not as young as I used to be, but if I were younger I believe I would buy a tractor, because I think we have enough work to keep them busy all the year round."

Other Views.

Besides the two foregoing Niagara growers, The Canadian Horticulturist was able to get a few expressions of opinion in regard to tractors from several of those who attended the recent Ontario Horticultural Exhibition. Mr. J. J. Gilbertson, Simcoe, who although he doesn't own a tractor, has observed their work carefully, is not looking for the day when the tractor will plough without a driver, but, speaking humorously, he said he would like to have a tractor that would prune trees. However that may be, Mr. Gilbertson's observations have led him to the conclusion that the Case tractors are a little too high for orchard work, while the caterpillar types, which he thinks are the ideal orchard machines, are rather slow on the road, if we should want to take several loads of produce to market at once.

Mr. Jos. Tweedle, Stoney Creek, also has a criticism of the caterpillar machines, and that is that they have too many wearing points, while Mr. Dempsey, Trenton, states that besides having so many wearing points, many of the ball-bearings cannot be oiled, and one has to let them grind out. "Besides," says Mr. Dempsey, "they are so low that they go very close to the ground, and their mechanical parts quickly get filled and clogged up with dirt, thus causing them to wear out fast. In my opinion a caterpillar tractor destroys itself twice as fast as a Fordson tractor, which will be in good

condition after two of the caterpillar type have worn themselves out".

Mr. Elmer Lick, a prominent apple grower, of Oshawa, who speaks from experience, since he owns a Fordson himself, thinks that they are one of the

best orchard machines on the market. He states that his outfit will go anywhere a horse can, and as for cultivation in the orchard, he would as soon take a tractor to cultivate close to the trees as a horse.

YOUR QUESTIONS ANSWERED

THE Niagara Peninsula Fruit Growers' Association, in co-operation with The Canadian Horticulturist, has arranged with leading and experienced, practical fruit growers of the Niagara district to answer questions relating to standard varieties of fruit, that may be asked from time to time. Questions should be sent to The Canadian Horticulturist.

Peach Orchard's Life.

S. H. Rittenhouse, Jordan Harbor, Ont.

Will you please let me know the life of a peach orchard when given ordinary care?—R. L. R.

This is a question to which there are a great variety of answers. It depends largely on the variety of peach grown. Yellow St. Johns will last at least 10 or 15 years, while Crawfords or Elbertas live 20 or 25 years. On suitable land with deep surface drainage, thus giving an unretentive soil, peach orchards should be profitable for many years more than I have mentioned.

Spring Planted Cherry Trees.

Geo. A. Robertson, St. Catharines, Ont.

How do you account for approximately 90 per cent. of the sweet cherry trees, planted last spring now being dead?—J. A. L.

Sweet cherries are very hard to get to grow when planted in the spring. Of late years I have fall planted altogether when possible, as they seem to get established better as the ground settles around them and the roots heal over. As the sweet cherries start to swell the buds and form rootlets very early in the spring, if they are established in suitable soil they have a much better chance to grow. The nurseries often winter the fall dug sweet cherries in houses, not giving the roots proper protection, and the prolonged exposure of the roots to the air has a drying effect, so that the trees are sometimes dead when received. If they still have a little moisture left in the roots and branches, the buds will swell and then wilt and die as the weather gets dry and hot, without making any signs of growth. Again the ground may become too wet, as was the case last year, especially if planted in an unsuitable soil where the ground becomes saturated with water, excluding the air which is essential to growth.

In too many cases last year the trees started out and made wood growth. Later, when the spring work com-

menced, the cultivation to conserve the moisture in the soil was neglected. Then dry weather set in and the trees were attacked by the pear slug at a most critical stage, and defoliated wholly or in part. Many did not have a sufficient amount of root growth to start afresh before death resulted.

Side Worm Holes in Apples.

H. T. Foster, Burlington, Ont.

Side worm holes in apples seem to have been unusually prevalent in Ontario this year. What caused the damage and what is the best way to overcome it?—A. L. W., Sheridan, Ont.

Yes, this is true. In many districts apples of good size, and well colored, were damaged by side worm holes, and orchards that were given good average care and spraying, did not escape. I do not know why, unless the weather conditions were specially favorable to this sort of pest.

The early spring was very good weather. This was followed by wet and cold in May and early June. This would tend to delay the hatching of the first brood of the codling moth worm, and then it would seem that the later summer weather, which was hot and dry, was very favorable to the propagation of the second brood, even right up to within three weeks of apple picking time in many cases.

With weather conditions of this sort a thorough spraying three weeks after the "Blossom Spray" would no doubt have destroyed the pests and prevented the damage.

Grapes at Burlington.

F. G. Stewart, St. Catharines, Ont.

What varieties of grapes are the most profitable for the Niagara-Burlington district? What soil would be the most suitable for their culture, were it obtainable?—Burlington.

I would advise nothing but the Concord grapes for the Burlington district. In the Niagara district Concord and Niagara are the two best paying varieties. There are more Concord grapes grown in America than all other varieties put together. The Concord is hardy in root, hardy in cane and when it buds out in the spring it has a rough

The Disappearing Disease

H. W. Sanders, Sturgeon Creek, Man.

EVERY summer there are letters received by the bee papers from different parts of the country telling of a disease which is variously described as the Disappearing Disease, May Disease, Bee Paralysis and perhaps other names. In the December number of *Gleanings* there are no less than three accounts of it in different parts of the magazine. One from Pennsylvania and one from New York State, both report intermittent attacks of the trouble, and the *Gleanings'* editor states in reply to a question as to the cause of loss of queens that they have received a good many similar reports from beekeepers, "some of whom think that the trouble is the disappearing disease." In Manitoba two cases have been brought to the writer's attention, one last year and one this year, both of which agree both in symptoms and in outcome with the published accounts of the disease.

The disease seems to show itself at any time during the season. The bees affected by it have a peculiar black, almost greasy, appearance and seem unable to fly. They crawl out of the hive in considerable numbers and run about as if in pain, often climbing aimlessly up grass stems and other things. The abdomen is swollen, much the same as in cases of dysentery in the spring, and there is often a shaking or trembling movement as if the bee were suffering from ague. The healthy bees of the hive appear at the entrance pulling and tugging at the legs and wings of the victims, evidently in accordance with their instinct to drive away those bees that are no longer serviceable to the colony.

Although this trouble may appear at any time during the season, there seems to be more of it in the early summer, and during wet weather, although one beekeeper, who was troubled with it, noticed it in hot weather. There seems to be just a possibility that the germs of the disease succeed only in overcoming the resis-

tance of the bee-organism under conditions where its vitality has been weakened by a hard winter, and by the conditions of warm and moist weather, which occurring together are hard on bees, for the bees are crowded into the hive by rain, and the warmth causes an unhealthy condition for want of ventilation. Whatever the immediate cause, the chief feature of the trouble is, undoubtedly, a form of constipation, and the fact that it spreads only amongst adult bees and does not affect the brood explains the rapid recovery of the colony when the trouble is over.

A Remarkable Point.

The most remarkable thing about this disease is that it disappears as quickly as it comes. This is probably

cases were so slight and confined to so few colonies, that not much loss was occasioned, but in warmer climates reports indicate that whole apiaries have been badly demoralized and even lost from this cause. This is another consideration that indicates that hot weather may be one of the causes.

In Australia, Mr. F. R. Beuhne, of Tooberac, who is one of the most extensive beekeepers in the country, has had great losses by it, but as we shall relate, he has successfully combated it by developing a strain of immune bees. In the Province of Ancona, Italy, during the years 1901-5 there were losses all over the country right at the opening of the seasons. In Florida, the veteran, O. O. Poppleton (since deceased), fought the trouble for years, so we see that it is by no means confined to a few localities, but is spread over the world.

Immune Strains.

Treatment of the affected colonies has been largely a matter of guess. We do not know for certain how the trouble is spread, and the only form of preventive treatment seems to be to breed immune strains as has been done in Australia. Mr. Beuhne has developed a strain of leather-colored Italians that seems to be quite immune, for in one instance he

tells of 50 colonies that were shipped into his district and all became affected by the disease. He re-queened with queens of this strain and the trouble did not recur. Some report that re-queening effected a cure and others again that they did nothing, at the disease disappeared so that we are not sure whether the new queen really "did the trick" or not.

Remedies.

Apart from changing the queen there are many remedies offered. Mr. Poppleton used to remove unsealed brood and eggs and then sprinkle powdered sulphur over the affected bees and combs. The reason for taking



An 8-frame Jumbo hive beside a Standard 10-frame Langstroth. Apiary of Mr. H. Sanders, Sturgeon Creek, Manitoba.

the reason why it is often called "The Disappearing Disease," not on account of the bees vanishing, but rather because the trouble itself comes to an end as mysteriously as it commenced. Some have attributed the recovery of the colonies to the weather, and there seems enough unanimity on this point to justify the conclusion that dry weather is favorable to the colony affected.

The disease is a cause of considerable loss, because it often occurs just at the time when our bees are getting strong enough to tackle the harvest, and by the time they have got over their losses the opportunity of the season has gone. In our own locality the

away the brood is that the sulphur would kill it, and he found that when placed in a healthy colony it hatched out all right, so that infection does not appear to be carried by the combs and honey as in foul brood. Another method of treatment is to remove the hive and put in its place a strong healthy colony. One writer says that this effected a complete cure, but does not state what he did with the diseased colony. If this were broken up, the bees shaken into the grass away from apiary, and the brood distributed among other colonies, then the treatment seems to be about the best we have seen. Our reason for saying this is that in both of the foregoing plans for cure the affected bees are got rid of, in the one case by sulphur, and in the other case by being lost in the grass, for only healthy ones return to the hive, and if any of these get sick through previous infection they are promptly driven out of the hive by the healthy bees of the new stock. As it appears to be unquestioned that the diseased bees are the carriers of infection after the trouble starts then any plan that eliminates them is satisfactory.

Another Method.

Still another variation of treatment is the forming of nuclei from the healthy colonies and each week transferring sealed brood from the diseased one till the youngsters have been built up into fair colonies. Then when the diseased ones have become weakened by the loss of their brood to a point where they are no longer of much service they are sulphured and killed.

Unless the trouble is very severe this amount of labor is not worth while, for as already stated, the disease often disappears with the coming of warmer weather and even though colonies affected are weakened, still they will recover rapidly once their normal health is regained.

The Isle of Wight disease that has wrought such havoc in England begins with the same symptoms as "The Disappearing Disease," and this has caused scares from time to time on this side of the water that the dreaded malady might have got across. However, we are still unaffected and it is to be hoped that we shall not have to cope with trouble on such a scale as the beekeepers in England. Whole districts there have been swept and not a bee left. The government departments have been conducting elaborate researches into the matter, but so far without any very conspicuous success. It may be that an immune strain of bees can be bred, and as in foul-brood, this seems to be the most promising possibility. In taking brood from colonies affected by The Disappearing

Disease care should be taken that there are no dead bees in the cells, as these

may carry infection to the healthy colony.

Selecting a Site for an Apiary*

R. L. Byer, Markham

THIS subject of the selection of a location for beekeeping seems to be a very serious question to many, as in looking over correspondence I have received during this past year I don't know how many letters I have had from prospective beekeepers asking advice along this line. I sometimes wish I was infallible so that I could give good advice to everyone and advice that would be worth while, but not being so I must go slow in answering a positive yes or no for fear that I would give advice that would be the means of hindering some one that is going into beekeeping as a business.

If I were starting out to-day to look for a location I would try and get one where there is an abundance of buckwheat and clover. It is the best combination you can get. Of course, New Ontario is something of an experiment yet, but twelve years ago if I hadn't been tied up with a family I believe I would have gone up in that north country. There is something that appeals to a man with red blood in his veins to get back into the wilderness and try to overcome difficulties. I was married and circumstances were such that I couldn't go. Lack of money was the chief obstacle. Perhaps I am just as well off that I didn't.

Avoid Nearby Apiaries.

Next I would say, don't go within two or three miles of a well established apiary. I had a question sent me by the secretary of the New Zealand Beekeepers' Association, which was, "do you consider you have a moral right to place your bees within three miles of another well established apiary." My answer was that I did not. In the first place it would be a poor business policy and I feel I would lose out, and another reason is because I feel I would lose my self respect. I want in beekeeping, or anything else to be able to look my neighbor in the face and not be ashamed. Therefore, don't go and crowd another man if for no other reason than to save your pocket book. It is fallacy to go and place your bees close alongside another beekeeper. There are lots of localities in Ontario where there are no bees at all.

Spring Feeds Important.

In your selection there enters in the

question of your spring feed and numerous other problems which will occur to you in regard to location. I personally put a lot of stress on the value of lots of early spring feed being near at hand for the bees. That was proven to me when I didn't want to admit it. At our York yard we have very little clover, but it is located in a place used years ago for basket making and there are a lot of willows set out there which make a natural wind break. The bees have to go only eighty yards for this while to get clover it is necessary for them to go one to two miles. In Simcoe the nearest spring feed is at least a mile in a direct line from the yard. This has been the means of our losing a great number of bees for in the spring the weather is uncertain. The sun comes out for a little while and the bees are tempted to go out; the clouds come and perhaps the sun does not come out again that day. Consequently the bees are caught by the cold weather and perish by the hundreds. I have seen them on the road, hundreds of them. I believe, therefore, in having spring feed right near the bees. There is also a natural spring in our York yard which makes it possible for the bees to have a good supply of water close at hand.

In conclusion I would like to state that personally I have no objection whatever to anyone starting in the beekeeping business, but I would say for the beginners' own good, don't go and plant yourself down close to a well established beekeeper for it means that you are going to lose out.

Mr. Smith: Is there a map of the location of the apiaries in the different districts so that a beginner may know where they are.

Mr. Byer: No such provision has been made so far. That is one advantage that I see in the British Columbia Act which requires every beekeeper to register.

When I was a boy about forty years ago everyone used the old box hive. I think Mr. Alphonse was the first to use movable frames. My father used the old box hives and shook the bees off the combs with puff ball and brimstone. Then the honey was placed in different kinds of receptacles and the brightest combs kept for our own use. When not bright and when filled with pollen, the honey was placed near the stove and strained through cheese-cloth. — Wm. Couse, Streetsville.

*Notes of a paper read at the recent Annual Convention of the Ontario Beekeepers' Association.

Beekkeeping in New Ontario*

Wm. Agar, Thornloe, Ont.

AS New Ontario is rather a big place, I had better state my exact location, it is 352 miles north of Toronto, and about 30 miles north of Cobalt.

In the spring of 1915 I went north with 25 one pound packages of bees. They managed to build up well for winter and yielded a little surplus honey besides. In conversation with Mr. Pettit he suggested that I should not try to winter bees up north, but buy packages every spring. His theory was to remove the queen in August, or at whatever date I thought best, and let the bees work away until the season was over, and then let the bees die and take the honey. The stores they would consume during winter, turned into money, would restock me with bees. In 1915 this idea looked good, so I told him that if he would supply the bees I would do the rest. The outcome of our talk was that I received two one pound packages of bees in May, 1916. About the 20th I started them with two draw combs to each hive. The season was good and the bees built up well. I must say in passing that the bees arrived in good condition. I extracted 200 lbs. of honey from them and sold it at 16 cents per pound. I also increased to four and wintered all four. The total cost of the two pounds was less than five dollars, not counting boxes. I had \$32.00 returns before six months. Needless to say I did not follow out the plan of not wintering.

*A paper read at the recent Annual Convention of the Ontario Beekeepers' Association.

After removing the 200 lbs. of honey I fed 15 lbs. sugar to all.

I wintered 16 colonies out of the 25 of my old ones. They averaged me 233 lbs. per colony, a big crop, but not enough bees. Of course, that was easily remedied. During the winter of 1916-17 I got supplies ready for a big drive. I made no secret of my success the past season, and when my order went out for bees, there were 12 others ready to start a new business. We got 126 one lb. packages altogether. About May 20th, 1917, they began to arrive, all the way from Mr. Achord's, Alabama. The weather up north was cold, cloudy and disagreeable. I treated the little fellows as well as possible, gave them a nice warm drink of syrup. It was not fit weather to unpack bees out side. I rigged up my work shop, got a fire going, got boxes and comb ready, made a syrup, took a whisk and sprinkled syrup into the comb, I put three combs into each box, closed the entrance, and after feeding the bees all they would take in the cage, I took the wire off one side of the cage. I then slipped the loosened wire under the comb, exposing the open side of the cage next the comb. Whenever possible I put the queen on the comb. When I finished one I placed it to one side and started another. In this way I got everything ready for the yard.

Many Were Dead.

At least 30 packages were dead when they arrived. Mr. Achord, with-

out a question refunded the full amount. Some queens seemed injured, they did very poor work. By the end of the season of 1917 those packages had not gathered enough to winter on. Most of them only had three drawn (Continued on page 10.)

QUESTION BOX

Buckwheat Hulls in Manitoba.

I am much interested in beekeeping, especially in outdoor wintering. Can you tell me where or how I can procure buckwheat hulls, packed in bags in ton lots on line of C.N.R., nearest Winnipeg?—E.M.B., Inwood, Man.

Your provincial apiarist, Mr. R. M. Muckle, Clandeboye, Man., advises us that buckwheat hulls cannot be procured in Manitoba. You might be able to get these hulls at buckwheat mills in Ontario, so would advise writing to any of the following mills: Castleton, Ont., (largest buckwheat mill in Ontario); Fenwick & Son, Enterprise, Ont.; Geo. Hammett, Mount Albert, Ont.; E. N. Hendricks, Stockdale, Ont.

Procuring Cork-Chop.

(R. M. Muckle, Provincial Apiarist, Clandeboye, Man.)

Where can cork-chop or ground cork be procured?—E.M.B., Manitoba.

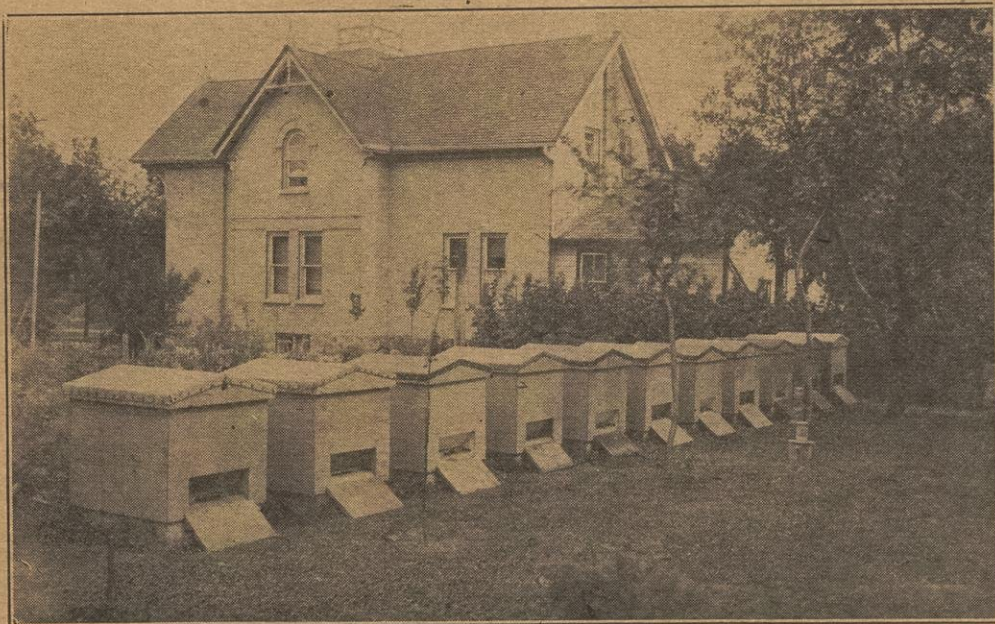
You might be able to get ground cork from some of our fruit dealers or restaurants, as grapes often come packed in cork.

Dividing Colonies.

I have ten hives of bees. I had two weak ones and placed them on two stronger ones, killed one queen. Could I divide these and if so when would be the best time to do it?—J. H.

Adding weak colonies to stronger ones early in Spring does not make much difference in the resulting colony, as the colony which is weak then has not reared much brood and what bees it has have mostly wintered over and are of slight value beyond the small quantity of animal heat they are able to add to that of the larger colony. Also there is great risk of their being killed off by the bees with which they have been compelled by you to associate. Queen-right colonies at that season might better be allowed to weather it through, with as much protection as the beekeeper is able to give them. Just when the main flow starts is the time to unite up colonies which are not strong enough to store properly.

After what you have done your problem of dividing is simply one of making increase. This may be done easily at swarming time, either by natural swarming or by nuclei formed from colonies which insist on rearing queen-cells for swarming.—M. P.



The permanent winter cases, set on concrete basis, of Mr. A. C. Moyer, of Waterloo, Ont., are shown. Langstroth 10-frame hives are used. The cases are made of half-inch lumber, size 24"x28" by 24" high. A space of about 3½" is left for packing all around. With the winter door off the bees can fly direct to the entrance which can be opened the full width of the hive.

Beekeeping in New Ontario

(Concluded from page 9.)

comb for a start and had to work on foundation. About the middle of September they got a lot of Aster honey. It came in freely. The hive on the scale got 25 lbs. in 5 days. They got more during that five days than they did all summer. We had a wet season that was very unsuitable for the bees. After the fine weather in September the weather turned cold again and I was up against leaving the Aster honey with them as I could not remove it.

My old colonies yielded about 30 lbs. surplus. I had now about 90 colonies going into winter quarters in poor shape, after yielding very little. This gives another view of the pound package business. I lost heavily during the winter, more than 50 per cent. The packages nearly all went under.

This brings us to the season of 1918. Remember the cold, severe winter of 1917-18. During that long, cold winter, I often thought of the bees and the different methods of handling them. When they came through so poorly, I was a little discouraged, but at the same time was prepared to try out a little experiment. I was not satisfied with applying southern methods to northern locations. This is the plan I followed with one average colony. They did not need any super room until July 4th. It was a cold, backward spring. On July 4th I gave them five supers without any queen excluder and one entrance at the bottom. I said to myself, "good-by to you until September 1st." In the meantime, Mr. F. W. L. Sladen came and rather discouraged me. He thought the bees would be discouraged with so much room. He said the queen would likely fill the bottom box, go up to the next one, fill it and keep on going up, the bees shifting honey up and out of her way. At the end of one month, I got anxious to see what was in those six boxes. One fine day I removed the top box, found it full of honey, the next and third was also nicely capped over. The next had two small patches of capped brood, the rest capped honey. The next box was all capped brood and the old brood chamber at the bottom was filled with eggs and open brood. The queen did go back down. They had a few queen cells started with eggs in, and all in one month in a poor season. I gave them four more boxes of drawn comb, ten, ten framed Langstroth boxes. I extracted 300 lbs. of honey and left them lots for winter. My next best one yielded me 150 lbs. But as I said, it was a poor season and the yard only averaged about 50 lbs. per colony. The bees went into winter quarters in good shape. I left the bees to themselves. About a year ago now, I left the north and spent the winter in old Ontario.

About April 7th I went back and found the bees in good condition. I sold all but nine. On May 20th this year I left them to take care of themselves. Some were strong, some weak. I made no attempt to equalize. I had lots of drawn comb and used it freely. I left those nine 70 boxes of drawn comb to work on. That is, I left an entrance at the bottom and piled up nine boxes of drawn comb, with bees in the bottom box. I knew you would laugh. So did I. You will have another laugh later on. So had I. I left them on May 20th. It turned cold for a week after that and the bees had all that space to keep warm. I thought of them often all summer. No one was there to catch swarms, or meddle with

them, at least I hoped not. They were on my own farm with no one living there.

I arrived back about the middle of September, very anxious to have a look around. I lifted the lid of the first one I came to in the yard and found empty combs down nearly all the way and could see no bees, but a kick on the hive brought results. Then I took a look around. One had a good big pail full of dead bees in front, robbing I concluded. I looked in with the same result as before. I looked in another and this time saw some honey. At the end of two weeks work I had 1,725 lbs. of good honey. Seven colonies gathered that. The two I spoke of had only enough to winter on. At least three colonies yielded seven supers of good capped honey. In nearly every case the queen was in the bottom box. The method has only been tried twice, so do not make the mistake of rushing into it headlong.

The Buffalo Convention—A Visit to New York Beekeepers

D. Anguish.

IT was my pleasure to take in the Buffalo convention and to spend a week among some of the prominent beekeepers of New York State. The programme at the convention was excellent. Every number was carried out according to schedule. Mr. Miller and Mr. Holterman, from Ontario, gave creditable addresses. Foul brood discussions occupied a great deal of the time. To the beekeeper this is one of the greatest obstacles, and sufficient funds have not been appropriated to combat the disease. A committee was formed to seek an appropriation of \$30,000 to cope with the disease.

The convention was well attended by both lady and gentleman beekeepers. Nearly all the old officers resigned and new nominations were made. In New York State they believe in giving all beekeepers an equal chance, and in keeping new blood at the head of the association.

The Visit.

Messrs. Adams and Myers took me out, after the convention, to their fruit and bee ranch—about 30 miles from Buffalo. It was a great ride. There was a paved road all the way. They have a fine home with eighty acres of orchard, which is nearly all peaches, but there are a few apples and prunes as well.

There were also over 100 colonies of bees. These were nearly all in 13 frame Langstroth hives, all of which were painted white. In six different yards they have nearly 500 colonies. They winter part in cellars and have several different systems of packing outside. They were making cases when I left, similar to our quadruple cases or what they call "government cases."

I assisted a little in placing bees in the cellars and also helped to pack several yards outside. They had a rather poor crop of honey last season, but their bees were going into winter quarters in very good shape. The roads being so good over there, all paved with either brick or cement, it is a pleasure to run from 30 to 60 miles to an outyard. If we only had similar roads in Ontario, we could run more outyards with our present financial outlay. Our country is quite as suitable as theirs, but for our poor roads.

They drove me around to see quite a few other beekeepers, and there are quite a few in that part of the State, all of whom seem to be enthusiastic beekeepers. The only fault I found with a lot of them, as with many of our own beekeepers was the lack

of uniformity in the size of frames in certain yards.

I certainly enjoyed every day while with Mr. Adams and Mr. Myers, as they spared no pains to show me some of the wonders of their locality, such as the old French forts built over 200 years ago, and the sights at Niagara Falls and other places. If any of you beekeepers who happen to read this, have the pleasure of calling on Mr. Adams and Mr. Myers, you will not regret it as they certainly know how to make a beekeeper at home. Mr. Adams is like Mr. Hurshise. He thinks a lot of us Canadians, as they both got the best queen they ever had yet from Ontario.

A Quebec Beekeeper Writes

Editor The Beekeeper:

Enclosed is a dollar covering another year's subscription for The Beekeeper, as I do not wish to be deprived of the monthly visits of the only bee magazine we have in Canada. A very creditable one it is too. I wish all who keep bees had sense enough to become subscribers not only to our own publication, but to other bee papers published on this continent as well and that they would read and assimilate the excellent advice given in the many articles contained within their pages by men of from fifteen to fifty years experience.

More than 35 years ago I first began keeping bees in what was then known as the D. A. Jones hive. I continued a few years as a side line with but little success owing mostly to ignorance as to the proper care and management they should have received. Then I got discouraged and sold out, but I never entirely lost interest in them. About 15 years ago I started again with a run-away swarm and at once obtained books and bee journals on the subject of beekeeping which I studied and commenced to put what I learned from them into practice. From that day to this my interest has continued to increase until keeping bees with me will no longer be a side line, but will occupy my entire attention in the future. I am fully convinced that for myself at least, the business is not only more congenial and pleasant, but more remunerative than market gardening and the growing of plants, in which business I have been engaged for the past 30 years. For some 8 or 10 years I have had from 20 to 80 colonies and never yet have I failed to have a honey crop, obtaining from 35 to 80 lbs. per colony each year and in a locality not the best by any means.

It is marvelous how easy a trade in honey can be built up when you secure the confidence of the public and furnish only strictly first quality goods, put up in a clean and attractive package. The demand too is wonderfully on the increase, especially for extracted honey. Half of my customers are those who four or five years ago could not be persuaded to buy as much as a fifteen cent package. Now they call for 5 and 10 lb. pails. Now what is the cause of this change? Of course the price of sugar had something to do with it as well as the scarcity of the article, but I believe too that the people as a whole are just finding out that honey is not only the most delicious sweet in the world, but is a perfect pre-digested food, containing more energy-giving properties than any other food that goes into the human stomach and besides it contains mineral properties, very beneficial to the health of those who eat it. —J. Laymond Ball, Knowlton, Que.

Benefits of Combination System Explained

G. A. Deadman, Brussels

IN a recent issue of The Beekeeper Mr. Anguish asks the question, referring to the combination system we have been recommending. "Why use so many sized frames when one would fill the bill equally well with bodies and frames all alike?" Then he goes on to say, "This is an age of standardization, and it would seem that the maximum of efficiency of any system or machine can only be reached when the component parts are standardized and can be produced on short notice. I am glad to have the privilege of replying to this from Mr. Anguish, and if there are others who wish to enquire further or criticize this system, I will be pleased rather than otherwise. We want to get at the truth of things and asking questions seems to be one of the best ways of doing it. It would seem the legal talent think so anyway.

Rather Misleading.

I am a little afraid that Mr. Anguish has not followed what I have written on this combination system, or else I have not

shallow and the deep, have something to recommend them. They surely have because we cannot conceive each would have their advocates up to the present time if it were not so. There is, I suppose, not a little satisfaction in each thinking he has got something better than the other "feller." There is no doubt that both are best under certain conditions, and so we come to the shallow frame advocate and say "why do you confine yourself to this shallow frame exclusively for you are missing something that is better in the deep?" And then we go to the deep frame advocate and say, "you too, would be the gainer by using the shallow as well as the deep." You both will find that nine times out of ten, and more, that by combining the two is better than either alone.

A Standard Frame.

When Mr. Anguish asks for a standard frame I think he is asking the impossible. I know that if any one can consistently ask for a standard frame with the hope that it

handicapped for room and you should either scrap or make over into something larger, or adopt a standard frame. But, rather, I say to him, "If you will combine your hive with an eight frame Langstroth shallow you will have a larger hive than now, and in a more manageable form. I say likewise to the ten-frame Langstroth beekeeper, but, of course, he combines his with the ten-frame Langstroth shallow, and then instead of having just one choice as the large frame, or large hive man has, you have a choice of three ways, each of which is better sometimes.

The Combination System in Practice.

I have already told you when we like these two systems combined. We hope to tell you when dealing with the spring and summer management, why, and when, each of these, the shallow and the deep, are preferable alone and why, therefore, it is advantageous to use both systems.

Morley Pettit's Recommendation.

I see Mr. Pettit is coming our way, for he says, "For men who do occasionally feel a limit to their strength, and especially for women, I would strongly recommend the ten frame Langstroth, but with it, I would have a shallow super as a food chamber for each colony to remain with it winter and summer." That is the combination system in fact. We believe, however, and will explain later, when that food chamber is better away and used as a hive by itself, or as a super, combining it again when the time is "ripe" for it. This will be explained in spring and summer management with the combination system.

A Western Success

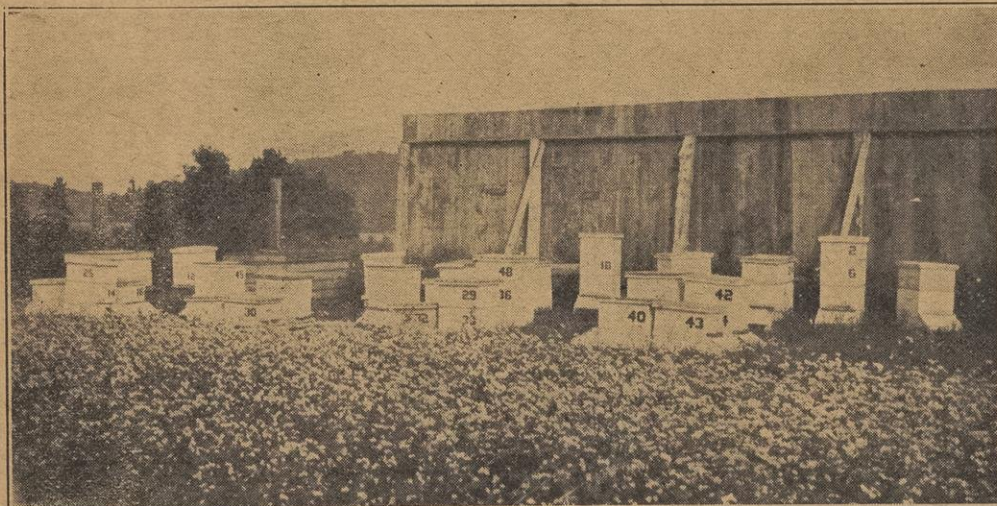
A yield of 7,050 lbs. of honey from 77 hives was obtained last season on his farm at Clandeboye, Manitoba, by Mr. R. M. Muckle, the provincial apiarist. This honey was sold retail at 30 cts. a lb. Mr. Muckle has great faith in the future of honey production in Manitoba, and has increased the number of his hives to 116. Some hives were bought for \$12 last spring and produced \$75 worth of honey.

Beekeeping is being followed with much success and profit by an increasing number of farmers in the prairie provinces every year. Many farmers in the irrigation districts have been very successful, their alfalfa and clover fields furnishing an abundant supply of nectar.

Bring Bees to Canada by Plane

The Aero Club of Canada has been asked to assist in a very special stroke of business. Mr. D. Brunne, of the Brunne Apiaries near New Liskeard, is seeking to arrange through the Aero Club for aeroplanes to bring him an importation of bees from the Southern States.

It is expected that a large number of bees will be imported into Canada for next year, and the Canadian breeders do not want to take chances of getting a strain which might weaken during the winter months. So the desire is that the bees should be imported at the right moment next spring, and without an hour loss of time. This is where the speed of the aeroplane is to be turned to account. It is probable that the first cargo of bees to be carried by aeroplane will be carried by Canadian airmen for Canadian bee-men. It is supposed, also, that these flights will be used to test the practicability of delivering bee breeders' supply by air.



The apiary of E. G. Campin, Port Hope, Ont., taken during the buckwheat flow. If these bees weren't in clover they were at least in buckwheat.

made myself clear. "Why use so many sized frames?" he asks. In reply, I would say we only use what many others are using today, viz., two sizes, same number as friend Pettit in same journal folio 270 recommends. I have said and still maintain that it is an advantage rather than otherwise to use both systems, the shallow and the deep, selecting that which is best from each. In doing this, however, it must be distinctly understood that these are interchangeable, and not as Mr. Anguish implies, as being different, but that the covers, the bottom boards, bee escapes, honey boards and queen excluders are all alike. We could not tolerate any system that would be otherwise. An eight frame shallow goes with an eight frame deep and likewise the ten frames. Those who use a shallow super on a deep frame below (and there are many that do), have two sizes of frames, the same as myself, only they use the shallow probably exclusively as a super, while our shallow is used both as a super and for a brood chamber, only using it as a super when occasion requires, and more particularly for brood chamber purposes.

Good in Each System.

As we have said before, both systems, the

will be the one they are using, it is Mr. Anguish, for his frame is about midway between the shallow and the deep. The difficulty would be to agree on the size for a standard frame. Within a stone's throw of Mr. Anguish is the well known Mr. Brainard, who is a follower of Jas. Heddon. I can quite understand that Mr. Brainard would agree on a standard frame, if that frame would be a Heddon, but would Mr. Anguish agree to this? There is the rub.

The Combination System.

The beauty of this combination system is that no changes are required in your equipment or a mixing of either, as would happen if we were to adopt a standard frame. More than this, there is really no extra expense for you simply add to the equipment you have now, for when you use a shallow hive in combination with the deep it simply takes the place of something else, and it may save you scrapping that which you have.

For example, we all know there is a growing discontent with the eight frame Langstroth hive. Now I do not go to the user of this hive and say that, "too frequently your hive will not contain sufficient stores for the winter supply and your queens are

Keeping Bees in a City

A LIVELY discussion on the possibility of keeping bees in a town or city, was held at the recent annual convention of the Ontario Beekeepers' Association. "I have," said Mr. Hoshel, "kept bees in the centre of a town since 1887 and I have yet to have my first trouble. I have had from one to 400 colonies there. We drive in with heated horses close to the colonies and never have trouble. I had some trouble with my neighbor who was about an eighth of a mile away, on account of his being afraid of them. He went to the Town Council but he didn't get any satisfaction. I think that if your bees are a nuisance it is due to lack of knowledge of how to handle them. My opinion is you can train bees to be cross just as well as you can train them to be quiet."

Mr. Holmes: "We have kept bees in the little town of Athens, near the centre of it, for a good many years and up to this date no complaint of our bees has been made. We of course, in common with other beekeepers, endeavor to handle our bees so that they will be good natured and I would express the opinion that there could not be any objection raised and maintained in court against beekeeping in a town unless it can be shown to the court that the person is actually maintaining a nuisance. Judging from what I have seen throughout the Province, I believe it would be an extremely difficult thing to do."

Mr. Armstrong: "There is one danger in connection with keeping bees in a town and that is if there is a canning factory situated there also the bees will travel there by the thousands."

Mr. Lowey: "I have kept bees where neighbors are close and never had any difficulty. In fact they take as much interest in my bees as I do. If they see any swarming they will come running to tell me, and they will drive inside the yard and stand talking. I think it is something in the management of the bees and in the man."

Mr. Hoshel: "I might say that I have found difficulty in this way, where a man is turning over fresh earth, or even hoeing, for some unaccountable reason you will have difficulty there. If I rent ground off a man to keep bees I try to get as near the centre as possible."

Mr. Baynard: "I live in the City of London. About two years ago there were some people who went before the city council and tried to stop some people from keeping bees in the city and the council refused to do anything."

System in Apiary Work

F. W. Sladen, Dominion Apiarist, Ottawa.

Successful beekeeping depends so much upon giving the bees the right attention when they need it, that following a definite system of management is a great advantage. The system should take into account the local conditions, and the beekeeper should work out the details for himself. Latitude, climate, and the dates of the beginning and ending of the honey flows are the chief factors. Of course every good system is based on the general principles of beekeeping and includes such things as providing sufficient wholesome stores for the winter, breeding in the spring, the control of swarming, making increase (if desired), and requeening—all to be accomplished with a minimum of manipulation.

In the home yard where the bees can be watched all day, hiving the swarm on the old stand, and removing the parent colony to a new one may be a good plan, but, for the out apiary, it may be necessary to make a visit every week during the swarming season to destroy all the queen-cells.

At Ottawa, good results have followed the employment of a two-queen system of management devised to meet the special conditions found there, which are a long and very favourable breeding period before the clover honey-flow, a strong impulse to swarm lasting about ten weeks, and a considerable loss of bees some winters due to granulated stores.

During the clover flow, as soon as a colony is found to have active queen-cells, the queen is removed from the brood chamber or caged. Eight days later the queen is removed from the hive and all the queen-cells are destroyed except two, one on each side of a division then inserted. Two queens are thus raised, and by the use of a special portico they usually get safely mated. The colonies are fed heavily with sugar syrup at the end of September, are wintered in the cellar and placed in separate hives in May.

It is a good plan to keep under the cover of each hive a card giving particulars of the queen and the date and result of each examination made.

Some Double Walled Hives and Single Walled Wintering

W. H. Kirby, Oshawa, Ont.

IN 1907 I concluded to try a double-walled hive, and sent an order to the late Geo. E. Wilton, of Freemont, Mich., whose ad. I had seen in "Gleanings," for a nine frame hive, which cost me about four dollars at Oshawa, freight and duty paid. This hive had a two and a half inch space between the walls, which were made of three-eighths matched pine. The bottom was double with one and a half inches between, the lower one being seven-eighths stuff. The sides and ends were built up of six inch boards matched, four in height. The deck was of one-half inch stuff and nailed in between the outside and inside body.

Before I put a swarm into it I removed the deck and lined it next the outside and inside with tar paper, then packed it all around with maple leaves good and solid, and replaced the deck boards. The outside projected nearly the width of two boards above the deck, this proved to be a nuisance, putting on the honeyboard, or surplus cases, as I had to wait too long to smoke the bees down out of the way, or kill a lot of them. So after a couple of seasons I sawed all the above deck both sides and ends off. So I can get bees out of the way with the sweep in a jiffy. This hive also had corner casings on it of one-half inch basswood and about two and one half inches each way. The cover had six inch sides with one and one-half inch projection all around of the same light stuff. The ridge board is of wood and eight inches wide and the sloping sides are covered with metal. The cover was hinged to the back end of hive, and would turn down over a full depth Langstroth surplus case. I did not think much of this feature and removed the hinges. The entrance is 12 inches by a half inch. The alighting board was hinged and turned up against the end for wintering, thus reducing it to a little less than three-eighths. This hive is in a good state of preservation to-day, notwithstanding its light material. I like it very much. With

a five inch box with burlap bottom full of wheat chaff over the frames, I have never lost a colony in winter in it yet.

Another Double Walled Hive.

My next double walled hive was obtained from F. W. Jones, of Bedford, Que. This was a hive known as the Bristol Manum hive. It was made of seven-eighths stuff. It had no deck on it. The inside was simply a nine frame Langstroth body, which rested on the bottom and which had six inch sides, and a sloping alighting board. The lighting board was set into the sides, and sloped up to the entrance, which was cut across the bottom board, about two inches back from the front end. Under the bottom board, to the front of the entrance was a slide, to regulate the size of the entrance. I did not like the entrance in that position, so closed it up and opened one in the end above the bottom in the regular way. The former entrance being cased on both ends by the sides of the bottom frame, seemed to me to catch the wind and force it right up into the cluster. This feature, I think, was responsible for the loss of two winter colonies in it. I afterwards put a deck on and stuffed the one and a half inches of space with maple leaves. It also has an extension and a gable cover. Somehow or other I do not get as good results from this hive, and I think I will reduce it to an eight frame.

My next double walled hive was a Woodman ten frame, air spaced hive, which I got from Grand Rapids, Mich., about eight years ago. I won't describe it here as any person wanting a description of it can send to the Woodman firm for their catalogue. I like the mechanical construction of it, with a three inch space between the walls for packing, but with the seven-eighth air space I should have no use for it. I tried it a couple of winters, and each spring the bees came through the winter in such a low state that they could not build up in time to store any surplus before the third winter. I had the air space packed with maple leaves, and they have done better since. I have never been able to get more than two six inch surplus cases full in a season from it, with the best of Italian bees in it. I attribute this to being a ten frame hive, which is not suited to my locality as the bees cannot get strong enough in it in time to store the nectar from fruit bloom.

Air Spaced Hives.

There are two great unseen elements in nature which we can feel in a greater or lesser intensity, they are temperature and electricity. Some tell us that an air space is a non-conductor in a double walled hive. I have never been convinced that this is so, and to disprove it, simply refer to the rise and fall of temperature, in the great all out of doors. If it were so, there would be no changes in temperature. I have no use for an air-spaced hive.

My next double-walled hives were built with seven-eighths pine. Both walls had one and one-half inches between, and packed firmly with maple leaves. They contain eight frames, $17\frac{3}{8} \times 10\frac{1}{4}$ inches. I had fifteen made about four years ago, and are a model of my own. The water table sets over both walls, and has a three-eighths rabbet on the outer edge, in which the rabbet of the six inch flat roofed cover sets. The flat roof is made of two boards, tongued and grooved, and is covered with two ply ruberoid roofing material. These hives give the best of satisfaction in wintering. When there is a five inch burlap bottom box of wheat chaff on the frames, with a couple of three-eighths strips about an inch apart under it, across the frames.



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AMERICAN BEE JOURNAL
HAMILTON, ILLINOIS

British Columbia

The Horticultural Branch of the Provincial Department of Agriculture will again conduct pruning schools in the fruit districts during the winter and spring months. These schools are held wherever local organizations, such as branches of the farmers' Institutes, Fruit Growers' Associations or Boards of Trade will agree to give the required assistance. This includes a guarantee of a class of not less than eight and not more than twelve pupils at a fee of \$1.00 each, who will take ten lessons for two and a half hours each. The lessons include lectures on the theory of pruning, budding and grafting as well as practical work in the orchard under the supervision of the instructors. The government provides the speakers and the local committee arranges for the use of the orchards.

An important conference was held some time ago between Mr. F. C. Brown, head of the Federal Land Settlement Scheme, Mr. R. G. L. Clark, Chief Fruit Inspector of British Columbia, and others in reference to settlement work conducted by Soldier-Settlements. It was decided that in the future only experienced orchardists, who hold certificates A and B from the Qualification Board, will be considered for the purchase of orchards. Fruit trees are now considered as a part of the stock and equipment, entitling the soldier-settler to the loan and are to be repaid on a seven years' basis as part of the land value. It is found that the risk of turning a valuable orchard over to inexperienced men is too great to be justifiable. It was decided that when setting the value on fruit trees of various ages it should be taken as \$1.00 per tree per year of age, with variations to cover certain varieties.

Early in December at a conference held in Vernon between District Superintendent Macnab and other officials of the C.P.R. and local shipping concerns, the C.P.R. agreed to grant what is known as "Option No. 2," which guarantees the arrival in perfect condition at points in the United States of fruit shipments from the Vernon district. Heated cars are provided and are placed in charge of competent men. The increased cost is based on the distance the consignment is shipped.

Some idea of the rapidity with which the fruit industry in the Okanagan has developed is furnished by the experience of the Vernon Fruit Union. When this firm built their warehouse, which is 400 ft. by 80 ft. in size, it was believed that the building would be far too large for their requirements. This fall it has been crowded to full capacity. As many as 100 employees were kept busy in it during the fall rush. It is now suggested that another building quite as large will have to be erected. This condition is all the more interesting when it is borne in mind that it is only one of several large firms doing business in Vernon, including Stirling, Pitcairn, the Mutual Fruit Company, Wm. McNair, and the Co-operative Farmers of British Columbia. This year has been a most prosperous year for the fruit growers.

With a total of 940 points out of 1000, Pen-ticton fruit swept the boards at the Provincial Exhibition held at New Westminster. This was in the district fruit exhibit which is an entirely distinct department. Burnaby was the closest competitor.

One prominent British Columbia fruit handler says that prohibition caused the demand for fruit juices and enabled the fruit grower to secure the good prices that have been ruling. He adds: "Soda fountains have increased the use of fruit juices 100 per cent. Since the commencement of the war. Be it strawberries or loganberries, the small fruit man is reaping the

benefit and he need not be downhearted over future prospects; the demand will last and prices hold up. Soda fountains are multiplying and jam and juice making plants are increasing, along with the demand. During the last four years, strawberry syrup has increased in price from 60c. per gallon to \$3.50, according to the New York quotations, and is still on the up grade."

New packing rules, similar to those required for freight movement on the railroads, went into effect on December 10, in the United States, and express shippers have been requested to prepare themselves for the new standards. The new packing requirements, which were recently approved by the United States Railroad Administration, were formulated to provide additional safeguards for merchandise sent by express. Heretofore, shippers have been using all sorts of containers for express packages, but the new rules are expected to make the regulations uniform and thus provide business concerns with an even more reliable and speedy service. Among the chief features of the new requirements is the rule which will make it necessary for shippers to use containers of wood or of fibre-board, pulpboard or corrugated strawboard of a specified test strength, for all shipments over 25 pounds. This means that hereafter paper-wrapping will only be permitted for packages up to the 25 pound limit. The containers must bear the stamp of the manufacturers certifying that the material used is of strength required for the weight of the shipment carried in it, as called for in the rules.

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F. ERIC MILLEN.

Nova Scotia News

Mr. S. B. Chute, who expected to harvest about 14,000 bbls. of apples in 1919, gathered over 15,000 bbls., although in one night he lost about 200 bbls. from frost during the picking season.

The apple warehouses at Berwick are jammed to capacity and handling is difficult.

In a recent issue of the Berwick Register appears the following, under the caption, "Hard to Beat :"—"On the eighteenth day of October, at Somerset, Kings County, Harvey Redden, a lad of fourteen years, weighing eighty-two pounds, picked from a ladder, cleaning the trees as he went, twenty-nine barrels of Mann apples in seven and one-half hours. They were not pulled off, taking the leaves and fruit buds with them, but were in good condition; and not bruised either. Beat it if you can?"

The heavy purchases of the lower grades of apples for evaporating and cider making purposes were of the greatest help in raising the standard of packed fruit, and also did much to relieve the threatened scarcity of barrels.

There was a heavy movement of Nova Scotia apples to New York State points for cider purposes.

During one week the United Fruit Companies Limited loaded the steamers Comeno and Manchester Brigade with apples for England, and the steamer Portganis with potatoes for Havana.

The tomato crop in the Annapolis Valley this year was one of the largest on record. Shipments from Berwick station were amazingly large, and one day there were about 3,000 baskets of tomatoes in the Berwick Nurseries' warehouse, ready for shipment.

The Nova Scotia Shipping Co., Ltd., a Berwick concern, in December reached over the \$100,000 mark in their shipments for the season.

Roses require a good supply of fertilizers—Wm. Hunt, O. A. C., Guelph, Ont.



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YOU CAN get two or three
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POULTRY YARD

Hens With Cold Feet

WITH eggs bringing exceptional prices the object of the poultryman is to get his hens to lay the largest number of eggs at a minimum expense, and one way to gain this end is to keep the feet of hens warm, says A. C. Smith, a poultry man. "Hens with cold feet do not lay," adds Mr. Smith. "Frozen ground, snow and mud make cold feet. A dry floor in the hen house with from four to eight inches of straw in which the hens may constantly scratch will not only keep the hen's feet warm but will help to insure good health, which is absolutely essential to egg production.

Perches in the Henhouse

If your henhouse does not contain dropping boards with the perches a foot or eighteen inches above them, the perches should at least be level. Perches should not be arranged in stepladder fashion, that is one above the other. The objection to step-ladder perches is that hens will fight for the higher places and eventually become injured. No perches should be over thirty inches from the floor because heavy hens are likely to become injured in flying on them when too high.

We use poles for perches, but are careful that they are not over two inches in diameter, nor much less. Poles used should be thick enough for the hen to hold herself securely, but without cramping the toes to hold on. This is the point to watch in choosing poles for perches. Place straw under the perches. The droppings are mixed with the straw and when hauled to the field they are scattered over a greater area.—W. F.

What to Do in January

As the poultryman starts the new year, it is advisable that he start operations on a well-planned system. System saves both time and money, and makes the work more pleasant and much easier. At this time of the year it is not always the most pleasant task to go out to do the chores among the poultry, but the man who takes a deep interest in the work goes about it cheerfully, just the same.

On days that are intensely cold, or when there are high winds or cold rains, or if there is snow on the ground, it is best to keep the fowls indoors. If they have plenty of house room, and a good supply of litter to encourage scratching, the hens will not only busy themselves, but will warm up

their bodies and feel a great deal more comfortable than if allowed to be outdoors. It is the comfortable, contented hen that does good winter laying.

Keep up the good work of culling. Get rid of every undesirable fowl, so as to cut down the expense and encourage the workers. Follow good business principles.

Gather the eggs several times each day and especially when the days are very cold. Eggs that are intended for incubation should be held in a temperature of 50 degrees.

There is something wrong with pullets that do not start laying this month. Either they have been hatched very late, or they have not been properly fed and cared for.

Do not ship dressed poultry to market before the middle of this month, unless by special order. Many people have not yet fully recovered from the holiday feasts, and chickens do not yet appeal to them.

Said a poultryman some years ago—and we have learned the same fact by experience—and it is worth repeating here: A good deal has been said about the value of scalded mash, and I am one of those who have used them during the winter. I have fondly imagined that they are better than those which are simply mixed warm. I asked a chemist about this the other day. He is a man who has given much attention to a closely-allied subject, and he nearly knocked me off my pins when he informed me that, unless the mash be thoroughly cooked, its feeding value is identical whether scalded, or mixed cold.—Michael K. Boyer.

Feather Eating

"Feather pulling is usually caused by a fowl getting a scratch from which blood gets on the feathers. The others discover this, and in the craving for meat, one of their natural foods, they attempt to eat it and the feather comes out. They quickly find that the root of the feather is soft and meaty, and go back for more, till the habit gets established. It is generally a well (grain) fed flock that gets its feed where it is quickly picked up, and has nothing to do till next feeding time, that develops this bad habit. When first noticed remove the fowl that is being plucked and see that its wound is healed and washed clean before it is put back. Give fresh cut bone, if possible, or meat in some form. Feed in deep litter where the hens must work busily most of the time to get their feed.

Get More Eggs; Save Feed

Sky-high prices for eggs this winter will make big profits for those who know how and what grain mixtures to feed. Improper methods mean big loss. Prof. T. E. Quisenberry made a thousand hens in the American Egg-Laying Contest lay 200 to 304 eggs each in a year. Another big flock cleared for him \$6.15 per hen in nine months. His methods are explained in a new bulletin, "How to Get More Eggs and Save Feed." Get this free bulletin by writing Quisenberry to-day, addressing care American Poultry School, Dept. 672, Kansas City, Mo.—Advertisement.

Boiled Oats for Poultry

"Boiled oats as a poultry food are highly recommended. Soak the oats 10 to 12 hours in cold water. Boil one to two hours and feed when cooled or cold in a clean place. Do not feed while hot, or after they have turned sour. Feed all they will clean up quickly, two or three times a day. The last feed for the day may be corn or cracked corn. With free range and free access to sour milk or beef scraps this is all that is needed to secure maximum results."

But why boil the oats? For three years we have been feeding rolled oats (horse oats) along with a little corn or wheat for scratch feed (corn only this last year), and we have gotten excellent results. In fact, our egg yield is just as great as when we were feeding a wide range of grains and meal. We consider rolled oats the greatest of all egg feeds, and it certainly is easier to feed in the hopper than to soak and boil and then feed two or three times a day, with the risk of losing some by souring. Perhaps the boiling would be advisable if it were necessary to feed whole oats, as the digestive system of the hen is not intended to handle oat hulls in their natural form.—F. E. E.

Mr. Hill, lockmaster at Buckhorn, Ont., experimented with a pine tree to determine the growth which may be secured by proper care. Fifteen years ago, he pruned all the lower branches off a 4-inch white pine sapling, removed other saplings from its vicinity, dug up the earth around it and applied manure to its base. It is now 19 inches in diameter at its base and has a long, clean bole. Thus, during the 15 years, the growth in diameter has averaged one inch annually.

Borrow to Buy Cattle



12

"Mixed Farming" is the big money-maker today. Of course, grain and fruit and vegetables pay well—but beef and bacon, butter and cheese, are piling up the profits for the farmer.

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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To Fruit Growers and Farmers—

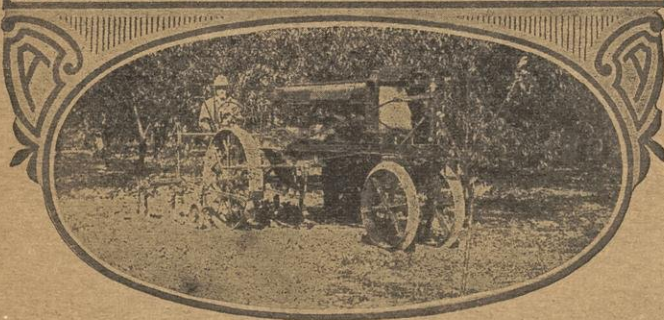
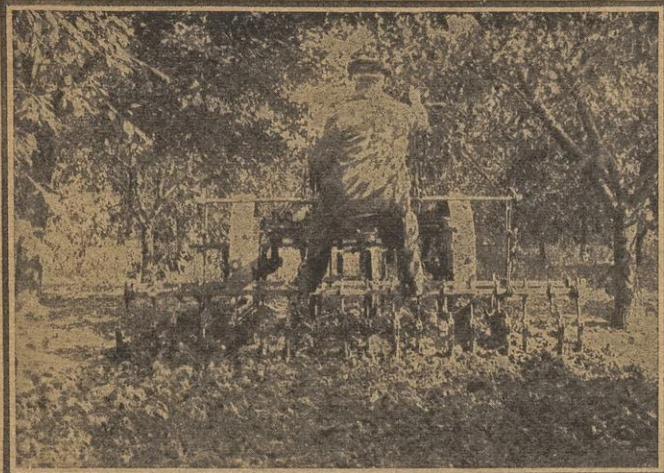
The Dominion Bank is prepared to give special attention to the accounts of fruit growers and farmers.

If you need money to improve your orchard or farm, consult the local manager of any of the following branches:

NIAGARA FALLS	-	-	J. B. A. O'NEILL, Manager
ST. CATHARINES	-	-	B. B. MANNING, Manager
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This tractor is specially designed for gardening and orchard work. Built low to give ample clearance for tree branches. Will pull 2 plows, an 8 foot disc harrow, grain drill, binder, mower and other loads ordinarily pulled by a 3 horse team. Will drive a small silo filler, seed grinder, fanning mill, saw mill, etc. The ideal small tractor.

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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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See advertisement on another page.

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Discussions at the Fruit Growers' Convention

At the recent convention of the Ontario Fruit Growers' Association, Prof. F. C. Sears of the Massachusetts Agricultural College, gave his experience with a block of Wealthies, ten years old. The soil was light. He put on this soil 500 lbs. an acre, of amophos (a combination of phosphoric acid and nitrogen), 300 lbs. of nitrate of soda and 200 lbs. of flue dust for potash. This was applied in three instalments, as soon as tree blossomed, one month later, and towards last of July. On some soils, the first application might be given earlier. The trees bore a tremendous crop of large highly-colored fruit which hung on the trees well. The apples returned at the rate of \$500 an acre and the trees are now in splendid condition for next year. Incidentally the speaker stated that his nitrate of soda cost \$105 a ton; amophos, \$155.

On such light soils, the speaker pointed out, humus is the worst problem. Material for ploughing under must be sown. If the soil is sour, and light soils are as apt to be sour as heavier ones, a fact not realized by all growers, apply lime. The professor uses ground limestone which costs him about \$6 a ton landed on the farm.

Favor Barnyard Manure

Barnyard manure should be used when available. It is particularly advantageous on light soils. To obtain such manure, Professor Sears recommended that fruit growers keep as much live stock as practicable. He suggested four methods of handling stock for this purpose: 1st, Board cows for dealers, the farm to supply the roughage and the dealer the grain; 2nd, buy dry cows,

feed and sell when they freshen; 3rd, get cattle from west or elsewhere and fatten; 4th, keep hogs.

The use of small tractors for orchards was advised. One should be selected that would work around the trees with greatest ease and efficiency. The two best makes for the fruit growers are Fordson and Cleveland. A motor truck also is a valuable addition to the equipment. With a one-ton Reo truck one can make 25 miles an hour to market, and 30 miles an hour on the return. The time, labor and money saved would soon pay for one. A truck this size is too large and heavy for use in the orchard. The professor suggested the purchasing of second-hand Fords and fitting them out for the purpose.

Nursery stock for adding to plantations was dealt with. In Massachusetts, every one was enthusiastic about planting new orchards, but new nursery stock was difficult to obtain. The nurseries are sold out. The trees are costing \$75 a hundred and more.

Orchard land may be ploughed either in fall or spring. Cultivate the early part of the season and in July sow a cover crop for protection and for ploughing under to supply humus. The richer the land the earlier in the season the cultivation should be stopped.

Growers and Cannerys.

The relations between the growers and the cannerys were discussed by Mr. Arthur Craise, of St. Catharines, and others. Mr. Craise did not think the growers always got justice at the hands of the cannerys and advised that growers co-operate with this end in view. He felt that a clause in cannerys'




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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.

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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.

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D-24.



One-Man Cross-Cut.

contracts that made the canners the sole judge of the quality and condition of fruit when taken to the factories was unfair and should be changed.

Mr. Livingston thought that the tomato growers of the province should have an organization of their own to deal with such questions as affect that crop. Mr. W. H. Bunting, of St. Catharines, said that the relations between growers and canners had been carried on in a slipshod manner for several years, that contracts were one-sided and that the time had come when the producers should have something to say in the framing of the contracts. Mr. Hamilton Fleming, of Grimsby, felt that the canners were the best friends the fruit growers had, but agreed with the contention that canners should not be the sole judge of fruit when delivered. Mr. S. H. Rittenhouse, of Jordan Harbor, pointed out that the contracts should be lived up to by the canners, as well as by the growers, that cordial relations between these parties are necessary and should always be maintained, and that the growers certainly had grievances in abundance and legitimate. Mr. Livingston felt that the contracts should protect the grower when he cannot deliver the goods. This was supported by Mr. Bunting, who pointed out that the grower is subject to weather conditions that he cannot control and is penalized by the canners for same with no chance for redress. This situation should not be tolerated much longer. The directors of the association were empowered to appoint a committee to meet the canning association for the purpose of discussing these matters, of rectifying grievances and of making arrangements for their benefit and protection.

"Are Government Grades desirable for our peaches?" was the subject of an important discussion led by Mr. F. A. J. Sheppard, of Queenston, and Mr. Hamilton Fleming. Mr. Sheppard believed that such grades were not desirable at this time. The adoption of such would be a hardship on the

growers who were already doing the best they could to produce good fruit. He thought it wiser to encourage the production of good fruit and to see that it was packed honestly with the tops of the packages no better than the bottoms. Peaches were much harder to form uniform grades for than were apples. Transportation over long distances changed ripeness and condition and size in the same variety varied with different districts.

Mr. Fleming, on the other hand, was in favor of government grades being established and offered as a tentative suggestion the following grade for a No. 1 peach: "No person shall sell or offer for sale any peaches represented to be of No. 1 quality unless such peaches are sound, of one variety and of good color for the variety, free from bruises and other defects; the minimum diameter of the peaches shall be two inches; the grade and minimum weight of the package shall be distinctly marked on the package, also the packer's name and address. Ten per cent. of the peaches contained in the package may be below the requirements of this grade."

Mr. P. J. Carey, Dominion Fruit Instructor, said that the better class of trade and the commission men wanted peaches graded. Mixed packs pleased no one. When all sizes of peaches were placed in the same package, it is sure to be overfaced.

Miscellaneous Discussions.

A resolution was passed requesting the Government to continue the plan of enlisting women and girls for work on the fruit farms of the province. Miss M. C. Straith, of the Dominion Council of the Y. W. C. A., was present and called attention to various difficulties that had occurred in carrying on the camps for these girls in past seasons. Some camps had been overcrowded unexpectedly at times and others did not get the full quota of girls arranged for; this had interfered with proper and adequate accommodation. The camps often had to pay higher prices for fresh vegetables in the fruit districts than the same could be bought for in Toronto. Lack of storage at some camps made it impossible to buy and handle supplies in large quantities. Wages of housekeepers had increased. All these things had resulted in a deficit.

The growers present, and through them, all others interested, were asked by Miss Straith to help relieve these difficulties by assisting the camps to purchase supplies locally at reasonable prices. Miss Straith said that all the camps complained about the exceptionally high prices asked by the growers for produce bought right on the farm. The growers were requested to formulate some scheme to help make the camps pay.

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Larger sizes	50c, 75c and \$1.00
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QUEEN CACTUS—Tree form night bloomer, very large flowers, easily grown	25c
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If you plant seeds of our fall or everbearing strawberries in January or February, you can pick ripe berries in August of same year, or as quickly as tomatoes grow from seeds. Send for packet of strawberry seeds to-day. Price 25c a packet, 5 packets \$1.00.

"Farmer on the Strawberry," the latest and most up-to-date book on strawberry culture, over 100 pages, 1920 edition, price 50c, 5 copies \$2.00. Cloth bound copies \$1.00 each. We are headquarters for Strawberry and all other Small Fruit Plants. Beautifully illustrated catalog free. Address L. J. FARMER Box 96, Pulaski, N.Y.



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Wherever Fruit Excels
Niagara Spray is Used

1920

Start the New Year with a determination to rid your orchard of all its enemies—Scale—Aphis—Curl—Scab—Codling Moth, etc.

Buy Niagara Spray—The Spray that always gives results. First in business—First in quality—First in results. Do not be discouraged because some other Spray disappointed you.

Niagara will do the work—Because it is made right. Niagara costs no more—Is higher in quality—Always reliable.

Everything for Spraying or Dusting—Soluble Sulphur—Lime Sulphur—Arsenate of Lead—Calcium Arsenate—Raw Sulphur—Dusting Sulphur—Spraying and Dusting Machines (Hand or Power).

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DOUGLAS GARDENS**Catalogue for 1920**

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, Argentum, Verbenas, Asters and Stocks.

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HAMILTON, ONT.

Niagara District Notes

F. G. H. Pattison

A prominent grape grower near Winona believes that not in ten years to come will we have as fine a quality as this season. Both in quality and in yield per acre our vineyards far surpass those of Michigan or New York State. The latter especially of late years has been getting much inferior crops. This district must look to it, however, to preserve this superiority, for I feel convinced that the chief reason for the failure of the vineyards on the American side to produce is that the land—in true American fashion—has been to a large extent depleted of its fertility. Signs are not wanting, however, that the same practice is being followed to some extent here, and if it is continued the same results will also infallibly follow. Since the war a good many vineyards have been neglected and allowed to go to sod. When such is the case it is better and cheaper to tear the whole thing out, than to attempt to restore such a vineyard again. I speak not only from my own experience, but also from that of many others who have tried it. Sod is fatal to both grapes and berries of any kind.

Both Grimsby Canning Factories continued to run well up to Christmas. Pears have been good property this season. Bartletts, which were quite a fair crop, brought about \$1.00 per 11-quart basket when sold to the canners, and even more in the open market. Canners paid from 3 to 3½c. per lb. for Keiffers.

A report from Grimsby in regard to the prospects of nursery stock for the coming season of 1920 is as follows: "Many pros-

pective buyers of nursery stock for next spring are backing up on account of the high prices of trees and bushes and will defer planting until stock is easier. Prices in most cases have increased 50 per cent in the last five years, and some nurseries are entirely short of certain varieties of plums and peaches, although nearly all have a good supply of apple, pear, cherry, grape, and bush fruit stocks. There is only a very small surplus stock of peach trees for spring shipment, and these have been nearly all spoken for. The severe winter of 1917-18 was a killer for young peach trees, and nurseries will be another year before a complete assortment is ready. To show the excessive increases nursery stock has risen to, growers have only to compare the prices of three years back with those of to-day.

Plum trees are now quoted at \$75 a 100, peaches \$50 a 100, sweet cherries \$80, pears \$65, sour cherries \$70, apples average \$50 a 100, and grapes 15 cents each. Black currants are quoted at 25 cents each, red at 20 cents, and gooseberries at 26 cents.

Evidently a large proportion of the growers in this part of the county believe in spraying, for, although there were a considerable number of baskets in which the fruit would be graded as "domestic," splendid hand-picked, well-developed apples were to be had at \$6 to \$7 a barrel, \$1.50 to \$2.00 a bushel, and 70 cents a large basket. The most plentiful variety shown was the ruddy, fine-flavored Northern Spy, which appears, this season, to have weathered the vicissitudes of adverse weather much better than the other kinds. Attractive-looking baskets

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

The Vegetable Short Course.—The first week will be for commercial growers and the second for the amateur with a back-yard garden.

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

The College Staff will be assisted by some of the best commercial growers (practical fruit men and gardeners) of the Province.

G. C. CREELMAN,
President.

of choice Greenings could be had, but they were decidedly scarce, while Baldwins were not much more plentiful.

A St. Catharines report says that during November a lot of Keiffer pears were sent to Toronto from St. Catharines, large baskets brought 30c. to 50c. each, while small baskets of a better grade brought fully as much money. Six barrels of pears from Beamsville are reported by a Toronto firm to have contained so much waste stuff that it is doubtful if they paid for the charges.

A report from Beamsville says that while the apple crop throughout that district had been exceedingly light, there is a great demand for cider barrels.

A report from old Niagara says that right up to the end of the season shipments of peaches, grapes, pears, quinces, and tomatoes continued to go forward by train and steamer every day. The quince crop in that section was a good one of excellent quality, the apple crop being uneven, very good in some parts, while in others there was no crop worth mentioning.

Hillborn Farm is Sold

F. A. Williams, Summerland, B. C.

Many Ontario growers, especially in the vicinity of Leamington, will be interested to learn of the sale of Kill Kare Farm, situated at Summerland, B. C., the property of Mr. J. L. Hilborn, which has been consummated, possession having changed some time in November. The purchaser is Mr. Alfred McLachlan, also a former Leamington grower. Years ago they worked together, when Mr. McLachlan, was in the employ of Mr. Hilborn. It is something of a co-incidence that they should be associated again in a deal of this kind.

Coming to Summerland almost together, Messrs. Hilborn and McLachlan bought adjoining places, a road running between, the former getting ten acres and the latter five. At that time the Okanagan Valley was just beginning to hear of early vegetable growing as an adjunct to fruit growing. The whole south Okanagan has since made tremendous strides in this branch of work, and no little credit for this growth is due to these two growers. Always free with advice and instruction, Mr. Hilborn in particular is looked upon as the pioneer of early vegetable growing in this district. He has made egg plant a specialty, and by circulating literature in regard to its use, he has built up a strong demand for it.

The B. C. Government were fully alive to the value of Mr. Hilborn's thorough methods, and his farm was made a demonstration station for the south Okanagan. Details of his working costs were thus made available, and showed that there was a good profit in a ten-acre farm, properly conducted. He also undertook lecture work for the Department of Agriculture, and judging work at various fairs.

It is no secret that Mr. Hilborn, when he bought it, paid in the neighborhood of \$8,000 for Kill Kare. He added a splendid house and buildings, glass houses, sub-irrigation system, and other improvements. A year or so ago he had an offer of about \$14,000 for the place, and is said to have disposed of it now for something like \$15,000. The immediate cause of the sale is the health of Mrs. Hilborn. The elevation of the interior does not agree with her, and they will live in future at Victoria, where Mr. Hilborn has acquired a small piece of property, intending to continue with his vegetable growing.



EVERBEARING STRAWBERRIES

Progressive, Superb and Americus Everbearing Strawberries. Glen Mary, Parsons Beauty, Dr. Burrill, Williams, Senator Dunlap, and over 30 other leading standard varieties. Raspberries, Blackberries, Currants, Gooseberries, Grapes, Asparagus, Rhubarb, Seed Potatoes and Corn.

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H. L. McConnell & Son

Port Burwell, Ontario

Wait for **KELWAY'S** Wholesale SEED CATALOGUE FOR 1920 before placing your order.

The most favorable prices of the year. If not received write or wire.

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Wholesale Seed Growers - LANGPORT, ENG.

EIGHTH Annual Spraying Number

Published February 1st

Our Annual Spraying Number is the first of our three big spring specials to which our fruit grower readers look forward. It deals with all phases of the spraying problem, giving the latest and most timely information obtainable.

It reaches our readers just when they are planning and buying their spring equipment and supplies for home and orchard.

—Advertisers! Hit hard for big business this spring through this special number. Plan special space and striking copy. You'll not regret it.

52 pages in size, special full page cover cut in two colors on heavy stock, strong, well illustrated articles, that's the service we offer.

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The
Canadian Horticulturist
Peterboro - Ontario



"Who Said Spray?"

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.

BEEES

HARDY ITALIAN QUEENS, no bees. W. G. Lauver, Middletown, Pa.

BEEES WANTED—Pure Italian bees for delivery spring 1920. Must be free of disease. Write, stating type of hive and price to Box 10, The Beekeeper, Peterboro, Ontario.

SOUTHERN QUEENS AND PACKAGE BEES—I can supply pure bred Italian Queens from well known reliable breeders, April and early May delivery; also pound packages. Ask for prices. E. V. Tillson, Tillsonburg, Ontario.

HONEY

WANTED—All clover honey. State how much you have and best price. R. Rosebrugh, 427 Ave. D. South, Saskatoon, Sask.

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, 32 Broadway, Room 1014.

**A Complete Line of
BEEKEEPERS' SUPPLIES**

Special discount on Queen excluders and bee escape boards in quantities. Price list on request.

The Ontario Beekeepers' Supply Co.
GUELPH - - - - - ONTARIO.

SITUATION WANTED

A young man, at present in Scotland, desires position on well conducted fruit farm where he can learn Canadian methods. Well educated, two years at Edinburgh Agricultural College. Able and willing to work. Address John Kay, 18 Toronto St., Toronto, Ont.

Items of Interest

At a recent meeting of the executive committee of the Niagara Grape Growers' Association, it was decided to ask the township councils to make an estimate of the grape yield. During last season 58 carloads of grapes were shipped to the United States. Another meeting will be held in February to plan the work for 1920.

According to Yakima despatches there will not be a peach crop from Yakima, Washington state, in 1920. On December 13, Washington was in the grip of temperature ranging from 18 to 31 below zero. After reaching 16 below, the danger point for peach trees, the mercury went down rapidly. Potatoes and other vegetables pitted throughout the valley are said to be a total loss, while fruit and vegetables suffered a like fate. In warehouses where produce was stored, fires saved the supplies.

The Berthierville Nursery, under the supervision of the Quebec Provincial Forestry Service, sent out 1,000,000 seedlings of trees during 1919, as compared with 700,000 during 1918. Since its opening the nursery has furnished 4,000,000 plants.

General Manley Sims, Agent-General for Ontario in London, has sent 3,000 lbs. of tinned peaches as Ontario's Christmas gift to St. Dunstan's Hostel for Blind Soldiers, London, Eng.

The Northumberland and Durham Apple Growers' Association decided at their Directors' meeting recently to hold their convention in Cobourg some time during the latter part of January. Orcharding authorities from Cornell University will be asked to address the meeting, besides noted apple growers from different parts of Ontario. Orchard machinery, tractor and fertilizing men will put on an exhibition. If enough speakers are available the convention will last two days.

The board of directors of the California Fruit Growers' Exchange at a recent meeting unanimously voted to set aside an appropriation of half a million dollars for advertising oranges and lemons during 1920. To this will be added \$75,000 for advertising Sunkist marmalade and \$10,000 for advertising grapefruit.

Some time since the Inspector of Weights and Measures recommended that the Peterboro City Council pass a bylaw requiring that potatoes be sold by weight instead of by measure, to which a correspondent in the evening papers vigorously replied stating that to do so would be to put a premium on wet, soggy potatoes grown on wet or heavy clay soil, because they are always heavier than the good dry mealy potatoes grown on sandy loam.

Efficient Sprays ensure GOOD CROPS

Do not risk loss of time, work and money by using inferior sprays. Use J. C. Co. Sprays because they are:

**Chemically Accurate
Physically Correct**

besides having perfect poisoning efficiency and maximum covering capacity. Guaranteed analysis on every package.



RICHESS-PIVER

CAL-ARSENATE

Efficient — Economical
Paste and Powdered

LEAD ARSENATE

Sticks in all weathers
Paste and Powdered

BORDO-ARSENATE

An Ideal Combination
Paste and Powdered

BORDEAUX MIXTURE

The Standard Fungicide
Paste and Powdered

BORDEAUX DUST

With or without poison for dusting
apple trees, potatoes, etc.

GOVERNMENT FORMULA

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**We Solicit Your
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Fruit and Vegetables Solicited

We Get Best Prices

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 and Timmins. In time of congestion on the Toronto market we have a ready outlet through these branches. We never have to sacrifice your interests.

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

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Cobalt and Timmins.
Sudbury, North Bay,

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References: The
Bank of Nova Scotia,
King and Victoria
Branch, and Com-
mercial Agencies.

Traffic and Provincial Aid

CLASSIFICATION of roads and responsibility according to traffic, has been one of the chief factors of success in every country which has developed a general system of good roads. While township councils were alone responsible for all the roads within their boundaries, very little real progress was made in road improvement in Ontario.

A Step in Advance.

A STEP in advance was made, and better roads resulted, when roads were divided into two classes, and county councils were made responsible for roads carrying the heaviest market traffic. For a similar reason Provincial Highways are a logical development in the road system.

20 Per Cent. of Roads Bear 80 Per Cent. of Traffic.

EVERY municipal councillor, experienced in the management of roads, knows that roads are expensive to maintain largely in proportion to the traffic over them. It is estimated that 20 per cent. of the roads comprise the heavily travelled market roads, and they carry 80 per cent. of all traffic.

ONTARIO has 42,000 miles of graded roads. County and Provincial roads comprise 10,000 miles, or nearly 25 per cent., the development of which, it is evident, will take care of fully 80 per cent. of the traffic, and will therefore require an amount approaching 80 per cent. of the available road expenditure. To this large proportion of the road expenditure, Provincial aid and expenditure is definitely pledged.

Money Spent on Highways Justified.

AN advance programme of highway development is undoubtedly justifiable from a financial point of view. The basis of the Provincial expenditure on roads in Ontario is the revenue from motor vehicle permits. The Government has given the assurance that motor-car revenue will be devoted to this work. In 1916 the fees were substantially increased for that purpose. In 1919 the total revenue from all automobile sources amounted to over \$1,500,000. This in itself is evidence that an advanced programme is necessary.

Expenditure an Annual Charge.

ROAD expenditure should not be considered on the basis of the grand total to be spent in a term of twenty years—any more than should household expenses be estimated on that basis. It is an annual matter to be met by annual income. Township councils of Ontario are now spending over \$2,000,000 a year on their roads—or \$20,000,000 in a term of ten years. The Province can face its obligations to roads annually in the same way.

COUNTY COUNCILS will probably make special expenditures on their market roads during the period of Reconstruction, and will be encouraged by the Highways Department to do so. But it is estimated that on the present basis of Provincial subsidies, the normal demand on the Province for County roads will become about \$1,500,000 annually.

Province Pays 70 Per Cent. of Cost—Federal Government May Help.

THE charge on the Province for Provincial Highways is 70 per cent of the outlay, and it is anticipated that Federal grants will relieve this to some extent. Without materially exceeding the estimated revenue from motor cars, it is apparent that a substantial annual expenditure on Provincial Highways is safely within the resources of the Province.

IT is to be remembered that the Highway Improvement Act, the principle of aid to County Roads, was adopted before revenue from motor cars was a factor in the situation, and for a period at least, until the basis of a system of highways has been established, Provincial expenditure should not necessarily be strictly limited to the income from motor cars.

No New Liability Incurred.

TO establish and assume a system of Provincial Highways does not in itself constitute a new Provincial liability. The highways are here now and must be maintained in any event. The Provincial expenditure will necessarily be limited to the amount which can reasonably be devoted to the work annually.

Dominion Government Will Aid With \$6,000,000.

THE Dominion Government has set aside \$20,000,000 as aid to highway improvement. Of this amount, Ontario's proportion will be nearly \$6,000,000. It will be granted only to work the maintenance of which will be fully guaranteed by the Province. To earn this amount in five years will require an annual Provincial expenditure of only \$1,800,000 by the Province and will result in an asset of \$15,000,000 value, on a well-distributed plan of Provincial Highways.

With Co-operation Success Assured.

THE co-operation of township councils, county councils, urban councils, the Provincial Highway Department, with necessary public co-operation and support, will undoubtedly place Ontario in an enviable position as a country of Good Roads affording the farmers the most economical access to their markets.

Department of Public Highways, Ontario

HON. F. C. BIGGS,

Minister.

W. A. McLEAN,

Deputy Minister.



Nation-Wide Service

Users of Hayes Power Sprayers are within only 24 hours of a serving station at all times. In case of accident at a critical time this quick service may save your fruit crops.

Hayes Hand Sprayers are distributed by Hardware, Implement and Seed Jobbers

Get These Amazing Facts on "Fruit-Fog" Spraying

SEND the coupon to-day. Learn why Fruit-Fog—the vaporous, fog-like super-spray—is the ONLY spray fine enough to reach the millions of tiny, UNSEEN hidden pests that infest microscopic niches in bark, buds and foliage—where no coarse, heavy, low-pressure spray can reach. These hidden pests wipe out millions of dollars worth of fine fruit each year. Yet Fruit-Fog positive thoroughness will exterminate every one of them. Send the coupon and get the complete story to-day.

HAYES FRUIT-FOG SPRAYERS

Fruit-Fog Spray is produced by the Hayes 300-lbs. guaranteed high pressure and the scientific Hayes nozzle. Fruit-Fog, because of its vapory fineness, has wonderful adhering power. No drops fall—no solution wasted—no buds or leaves knocked off—as with a heavy, coarse, low-pressure spray.

Hayes Sprayers are famous for combining speed with utmost thoroughness and lowest consumption of solution. They are skilfully made and every part is positively standardized to the closest limits of accuracy. Thus is obtained enduring service and greatest efficiency under high pressure. The famous Fairbanks-Morse "Z" Engine assures Hayes users the best possible service.

Sprayers for Every Purpose

Hayes Sprayers are made to meet every Orchard, Field, Garden, Park, Disinfecting, White-Washing and Cold Water Painting need. No matter what your sprayer requirement, from our great Triplex Fruit-Fog Power Sprayer to the smallest Garden Atomizer, we make it.

SEND FOR NEW BOOK AND SPRAYING GUIDE FREE

Tell us how many trees you want to spray and how old they are on the average. Also what other uses you have for your sprayer. We'll tell you where and how you can get the style of Hayes Sprayer best suited to your needs and its price. We'll also send our Big New Book of Hayes Sprayers and our Valuable Sprayer Guide FREE. Send the coupon to-day.

Hayes Pump & Planter Co.
Department C, GALVA, ILL.

HAYES Fruit-Fog Gun

THIS is the world's fastest spraying apparatus. A simple twist gives long spray for tall trees, or wide spray for close-up work, or shuts off tight. Prevents waste of solution between trees. The only gun which combines great speed with the thoroughness of Fruit-Fog.

Hayes Hand Barrel Spray Pump



Hayes High Pressure Triplex Power Sprayer

Hayes Pump & Planter Co.
Dept. C, Galva, Ill.

Gentlemen:
Please send FREE and without obligation, your big New Sprayer Book and your Valuable Spraying Guide.

Number of trees.....
Average age

Other uses

Name

P. O.

Province R. F. D.