

GARDEN AND ORCHARD.

Orchard Culture.

BY G. C. CASTON.

IMPORTANCE OF PROPER TILLAGE.

One of the most common causes of failure and of unfruitfulness in our orchards is lack of proper tillage. And people are slow to understand the importance of it. We often see a young orchard set out with well-grown and healthy-looking young trees, the soil in fairly good condition, and everything promising well; but in a few years many of these trees are dead, others are badly stunted and will never do any good. Only a few of the hardy and most persistent growers have survived, because the owner has tried to take two crops off the same land and at the same time. The grower does not consider the needs of the tree. While the different farm crops may be varied, and grown in a good system of rotation, the tree is always getting its food on the same spot of ground. If robbed of its supply by other crops, it cannot go in search of more or be changed to another spot where the soil is richer. Then there is a crop of foliage and an annual growth of wood to be provided for. So it is easy to see that where grain, timothy and other crops are grown right up to the stems of the trees, as is too often done, by the time the tree reaches bearing age there is not enough fertility left in the soil to produce a crop of fruit. But lack of tillage works another great evil, which is mostly overlooked; and that is the drying of the soil and lack of moisture during the summer. Perhaps there is no one thing that has more to do with stunted trees and unproductive orchards than this lack of moisture during the hot months of summer, just at the time when it is most needed. It is very important that the roots of the tree should be supplied with sufficient moisture. Moisture, or, in other words, water, is the medium by which the elements of growth are carried up into the tree, and a lack of it must always cause injury. Then there is the manufacture of plant food in the soil. The fertility or fertilizing elements we apply, as well as that already in the soil, must all go through a process of manufacture by nature before it can be used by the plant or tree. One of the conditions under which this process goes on is the presence of moisture in the soil. The lack of moisture hinders this process, and so the plant or tree fails to get the benefit of whatever fertility there may be in the soil.

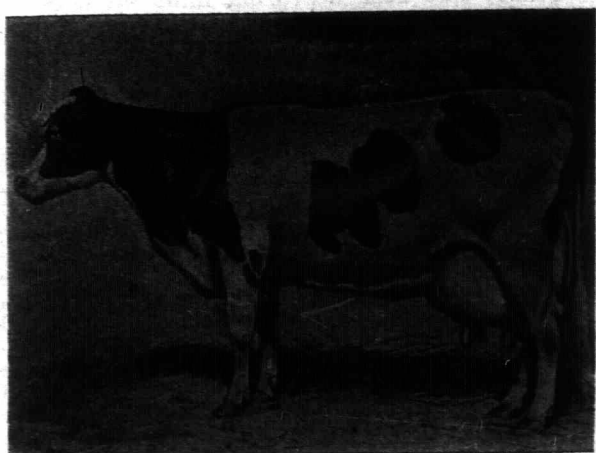
These objects should never be forgotten or underestimated: That by tillage we can control to a great extent the moisture in the soil. By preventing the escape of capillary moisture and by having the surface in a good friable condition we gain a great amount of moisture from the air. But the objection is often raised that in the case of a man planting quite a large area of fruit trees, he cannot always have this all in hood crop, and he does not want to lose the use of all this land while the trees are growing. The young trees are, or ought to be, in the case of apples, 30 to 35 or even 40 feet apart. Well, sow or plant any crop you like on space between, providing you don't put it too near the tree. Always leave a strip at every row of trees to be worked with the scuffer during summer, and wide enough to extend beyond the roots of the trees. This strip should be gradually widened as the trees get older, until they are in full bearing, when they will require the ground all to themselves. It will be very little trouble to cultivate this strip with the horse hoe or cultivator along each row of trees. A couple of rows of early potatoes may be grown on each strip, providing the fertility is kept up. These may be varied by other hoed crops, or occasionally skip a crop altogether. The strip of land between the rows of trees, if cropped with grain, should be cropped with a short rotation, so that a crop of clover should be plowed under every three years at least; that is, it should be plowed under when the after-grass, or second crop, is just at its best. In this way the fertility is maintained, humus is added to the soil, and as the roots of the trees gradually reach out, they will find food and a congenial soil. Some people delude themselves with the idea that as the roots of the tree penetrate deep in the soil, they draw their sustenance mostly from the subsoil and also obtain moisture in the same way. Therefore, it does not matter whether they are robbed of their food at the surface by other crops, and of their moisture by lack of tillage: they will get it from below by means of their deep roots.

A little observation will show the fallacy of this view. Take the case of an orchard that has been for some time on sod, and quite near the surface all about the tree will be found a mass of small fibers. These are the feeders of the tree. Take again an orchard that is regularly and properly cultivated (and an orchard should always be plowed or cultivated shallow, and always at the same depth), and it will be found that just under the cultivated soil, and as close to the surface as the regular cultivation will allow, will be found these small fibers in great profusion, showing clearly that it is from the surface soil that the tree receives by far the greatest part of its nourishment and moisture as well.

Where orchards are planted on old soil that has been cropped with grain without any proper system of rotation until the fertility and humus have been all worked out of it, and then grain and hay are still sown on this land right up to the trees, it is useless to expect any success. It would be just as reasonable to try to fatten a herd of cattle by turning them out to a straw stack. It will well repay anyone who wishes to plant an orchard and wants to make it pay to get the land in the very best shape, by good tillage and a liberal use of fertilizer, before planting the trees. It is very important that the trees get a good start. If they are not supplied with the material to build up good, sound, healthy wood tissue, they need not be expected to produce good crops of fruit, and a stunted tree is like a stunted animal, it will never give its owner a profit.

To have good healthy trees, they must have good cultivation, and it should be given early in the season, just as soon as the sap begins to circulate to the end of the twigs and the buds begin to swell; and it should be regular, never allowing a crust to form on the surface. A well-cultivated surface soil is the best kind of mulch. The season's growth of wood is mostly completed by midsummer, hence the importance of regular cultivation up to that time. From that time the process of ripening and maturing goes on.

In sections where very low temperatures occur in winter, cultivation should cease early, in order to facilitate the ripening and maturing of the new wood growth, and some kind of a cover crop may be sown in the early fall to protect the roots of the trees during winter. Fall rye does very well for this purpose, and it should be sown about the end of August or 1st of September, and it can be plowed under in spring. In some cases orchards have given fairly good results without cultivation after the trees have grown large enough to shade the ground, and the fertility is kept up by top-dressing of the soil. But even in these cases far better results would be secured by cultivation, and it should never be forgotten that cultivation is one of the secrets of success in the growing of orchard fruits.



HOLSTEIN-FRIESIAN COW, BELLE KORNDYKE 13913.

First prize in official test, under rules of American Holstein-Friesian Association, in 1899. Test 509 8-10 lbs. milk, averaging 1 per cent. butter-fat; 25.77 lbs. butter, 139 per cent. butter-fat, in 7 days.

OWNED BY H. STEVENS & SONS, LAONA, N. Y.

Time and Cost of Spraying.

To the Editor FARMER'S ADVOCATE:

SIR,—Regarding the time and cost of spraying an orchard has been overlooked by most of the writers upon the subject of spraying, not but what it is an important item upon the subject, and I here contribute my experience in that regard. I will take one orchard of five acres containing 250 well-grown apple trees twenty years planted. This takes a man and boy three days at each spraying, using eleven barrels at 40 gallons each of Bordeaux mixture and Paris green for the whole, or 40 gallons to every 20 or 25 trees, making a total for three sprayings of 33 barrels of the mixture for the season. In regard to the cost of the materials, last season the copper sulphate cost me 7 cts. per lb., 132 lbs., \$9.24; 2 bushels lime, 40 cts.; 84 lbs. Paris green, 25 cts. per lb., \$2.07; total, \$11.71, not including labor. This is a small outlay compared to the percentage of clean fruit that is to be obtained by spraying, saying nothing about the improved condition of the trees and the satisfaction of knowing that you have done your duty to yourself and country. The cost of an outfit will depend upon the kind of pump. An iron pump will cost less at the first, but will be the most expensive in the end, owing to the action of the copper sulphate upon the iron, to such a degree that in one or two years it will become useless. The pump should be of brass, or at least the parts that come in contact with the liquids, and a pump of this kind will cost \$15 or \$16, but it will be found to be the cheapest in the end, and will last for a number of years.

Bruce Co., Ont.

A. E. SHERRINGTON.

Half hardy plants, such as cabbage, cauliflower, and celery, should be hardened off in a moderately low temperature. The tomato, being a semi-tropical plant, cannot be kept in a low temperature without sustaining injury. It catches cold, becomes sickly and stunted.

ENTOMOLOGY.

Winter Work Against Vineyard Insects.

BY C. J. S. BETHUNE.

About sixty different kinds of insects affecting the grape are mentioned in Dr. Saunders' admirable work, "Insects Injurious to Fruits," each part of the plant, root, stem, branches and fruit having its own special foes. If all these insects were abundant in every vineyard, the grape-grower might as well give up and devote his energies to something else, but happily there are only a few species that are serious enemies and that require to be constantly fought against; other kinds are occasionally troublesome and demand special treatment, but do not return year after year in destructive numbers.

At this season, when we are looking for the speedy break-up of winter with its ice and snow, and the coming of spring, there are only two grape insects to which attention should be especially directed. These are the Flea-beetle (*Haltica chalybea*) and the Leaf-hopper or Thrips (*Erythroneura vitis*). The other destructive species may be dealt with later on when their ravages are apparent and remedies may be effectively applied.

The grapevine Flea-beetle is a tiny creature, less than a quarter of an inch in length, of a shining steel-blue color, sometimes greenish or purplish. In proportion to its size its thighs are enormously thick, enabling the insect to jump vigorously and a considerable distance. Its activity in this respect renders it somewhat difficult to capture, and has given it the name of Flea-beetle. In early spring, as soon as the buds on the grapevine begin to open, this insect may be found upon them, boring into them and devouring the future leaves and fruit in their undeveloped state, and thus doing an immense deal of damage in a very short time. Later on it eats holes in the newly-expanded leaves, and finally provides for a new brood by laying its tiny orange eggs in clusters on the under side of the foliage. From these eggs there soon hatch out small dark brown grubs, which feed in colonies on the leaves, and speedily make their presence known by riddling them with holes till they leave little but the larger veins remaining. For about a month, during parts of May and June, they continue to feed and grow, and when mature they disappear into the earth, where they spend a few weeks in the torpid chrysalis state. The new crop of beetles comes out in midsummer, but is not conspicuously injurious owing to the luxuriant abundance of leaves, which prevents their depredations being noticed. In the autumn they go into winter quarters under fallen leaves, in the earth at the base of the vines, in any convenient crack or crevice, and under any sheltering rubbish.

Remedies.—The first thing to be done, if this insect was noticed last year upon the vines, is to clear up and burn all fallen leaves and rubbish anywhere near the vines, and to rake up the earth about the roots. This should be done as soon as possible after the snow has gone. Later on the buds should be watched until they have well expanded, and if any of the beetles are seen they should be sprayed with Paris green and lime. The same treatment may be employed for the destruction of the grubs when they are found devouring the leaves. This insect also attacks the Virginia creeper, which should be watched and treated in a similar manner.

The Leaf-hoppers, or Thrips, as they are usually called, are very abundant in the dry, hot weather of summer and till late in the autumn. Every vine-grower must have noticed these minute creatures, which fly off in swarms when the leaves are disturbed. They are about one-eighth of an inch in length, of a pale yellowish-green color, ornamented with red or brown bands or rows of spots. They vary very much in pattern and color, and are consequently considered to belong to several distinct species. They feed in clusters on the under side of the leaves, sucking out the juices of the plant and causing the foliage to turn yellow from the exhaustion of the sap. If a single one is watched through



Grapevine Flea-beetle. The grubs are shown on the upper leaves, the beetles on the lower.