

Service, Washington, D. C., Circular No. 139, entitled, "A Primer on Wood Preservation."  
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### An Experiment with Alfalfa.

About four acres of alfalfa were seeded May 20th on "The Farmer's Advocate" farm. One bushel of alfalfa seed was treated with a bottle of nitro-culture, and sown twenty pounds per acre, with a bushel of barley per acre, principally behind the spouts of the disk drill, lest it should be covered too deeply. Drill was followed with roller, and afterwards land was harrowed. A few rounds were sown with seed dropping in front of disks. About one acre of land was planted with uninoculated seed, and of this strip one round was sown without nurse crop. The whole four acres were rolled and harrowed after drilling, as all the oats and mixed grain had been. The alfalfa, we might add, would have been sown earlier but for the fact that the field was very weedy, and had received last fall a coat of dirty manure. The remainder of the eleven-acre field across which the alfalfa was sown is to be fallowed till July, tile-drained, if possible, in the meantime, and then seeded to alfalfa alone in mid-summer. But for the weeds and need of tiling, the whole field would have been seeded with barley in good time this spring. Both barley and alfalfa were up in less than a week.

## GARDEN & ORCHARD.

### Commercial Culture of Red Raspberries.

A practical thesis, by L. B. Henry, Second-year Student at the Ontario Agricultural College, Guelph.

Red raspberries have been grown in Ontario, both commercially and for home use, for a great number of years, but it has only been within the last twenty that they have been at all remunerative to the grower.

This has been due largely to the increase in canning and jam factories throughout the Province, which have used up the surplus supply of the market, and the grower has received a very fair price for his berries, where otherwise he would have been forced to take a very low market price, or else go out of business entirely.

The demand for raspberries has been increasing every year, and the writer can see no reason why they should not be as profitable to grow as peaches; but, in order to reach this end, growers will have to improve their methods. They will have to choose, in the first place, the right kind of soil, and must learn the best ideas about planting, cultivating, trimming, picking and marketing, in order to receive the greatest returns from the money which they have invested.

#### SOIL.

Red raspberries will grow on almost any soil, provided it is well drained and retentive of moisture. Although they will grow on fairly poor soils, a clay loam or sandy loam is preferable for a commercial patch, where large crops are looked for.

The soil should not be too rich in nitrogenous fertilizers, as this causes an overgrowth of coarse, woody canes, which do not produce an abundance of healthy buds, as the larger the cane is, the farther apart the buds will be.

As raspberries suffer from too much moisture in the spring, and also from drouth in the fruiting season, we can easily see the object of selecting a well-drained but retentive soil.

The variety grown has something to do with the choice of soils. The more vigorous the variety in growth, the lighter the soil best adapted to it; consequently, the Cuthbert will usually

succeed on a light, upland soil, whereas the Marlboro prefers a heavy, lowland soil.

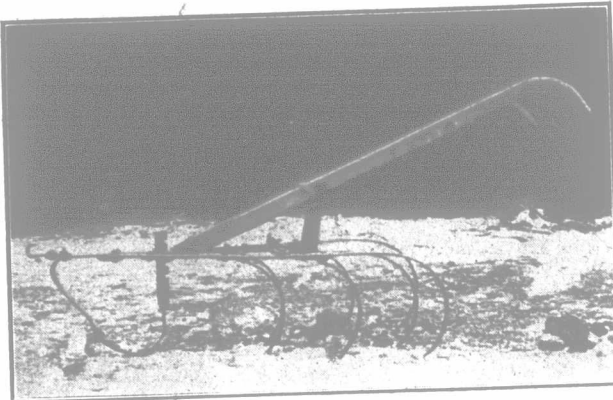
Raspberries suffer very much from excessive heat, and in a dry summer the berries will dry up if in a place where the hot sun can beat down in full force; hence, a north slope is best, especially in districts where long drouths are known in the fruiting season. Never plant in low places, where water stands in spring, but if low ground is well drained, it may be used successfully.

#### VARIETIES.

The three principal varieties are Marlboro, Cuthbert and Herbert, but the first two of the above are the chief commercial berries planted today.

The Marlboro is the chief early commercial variety. It was originated by A. J. Caywood, of Marlboro, N. Y., and is the result of several crosses of both wild and cultivated sorts. It is a hardy, strong grower, but does not grow as tall as the Cuthbert. The fruit is large, somewhat rounded, and a bright crimson color, and has good shipping qualities. It is very productive, and does well on heavy soils on the hill system.

The Cuthbert (or Conover, Queen of the Market, Quinby's Favorite) is probably the best known of all red raspberries, and the most desir-



One-horse Spring Tooth Cultivator.

able market sort, as it comes in just when the Marlboro is through fruiting and supplies the late market. It was a chance seedling, found in the garden of Thos. Cuthbert, of Riverdale, New York, in 1865. It is a strong, vigorous, upright and sometimes branching grower, with short, purplish spines. The fruit is large, conical, and a dark red color, with a very desirable flavor. It is practically free from insect pests and diseases, its chief defect for market use being its dark-red color. It does very well on light soils, and is usually planted in solid rows on account of its vigorous growth.

#### FERTILIZERS.

If the soil lacks humus, it should be applied, if possible, before the plants are started, as difficulty will be experienced in applying it after the plants are set out. Stable manure is the best fertilizer to supply this want, but care must be taken not to apply too much, as it forces too strong a cane growth. Fifteen tons per acre, put on every three years, after the patch is planted, is all that should be applied under ordinary conditions.

In the fall of 1907, the owner of a patch of Cuthberts decided to give it a heavy coat of about twenty-five tons per acre, as he thought the cane-growth was not strong enough. A furrow was plowed away from each side of the canes, and manure put in and covered up. During the year 1908 the cane-growth was normal, but in 1909 the young canes grew so coarse and tall that the buds were badly developed, and consequently



Berry Patch Beginning Growth in Spring.

did not throw out sufficient laterals to bear a good crop in 1910. Judging by the above experience, we see that it is not advisable to apply heavy coats of nitrogenous fertilizers.

After the second or third crop of fruit, the berries sometimes become small, and lack flavor and quality, although the canes may be very vigorous and set a large amount of fruit. This is due to the exhaustion of mineral fertilizers in the soil, and in such cases the following fertilizer is a good one to apply: 50 pounds nitrate of soda, 150 pounds acid phosphate, 50 pounds muriate of potash. Apply the above at the rate of 250 pounds per acre, every year in spring, until the patch requires it no longer.

The fertilizers which I have discussed, together with good cultivation, should be all an average patch requires in the way of artificial fertilization.

#### PLANTING.

This may be done in spring or fall, and, if care is exercised, success will attend both methods. If the soil holds sufficient moisture in the fall to start the young plants, and not allow them to dry out, it is, in my experience, the best time to plant. If the patch is set out in the fall, the plants are ready to grow as soon as spring opens up, and are not set back, as plants set in the spring are.

Suckers are generally used, and they may be dug up between the rows of an old patch. In digging these, never pull them out, as this injures the fine rootlets, but thrust a spade under the roots, then loosen the earth above them, and force the sucker out of the ground. In this way, the small rootlets are not injured to any extent.

The two chief systems of planting are the solid row and the hill system, each method having its own distinct advantages and applications. The advantage of the solid-row system is that it is possible to set more plants per acre, and, under favorable conditions, harvest more crates of berries.

It has several important disadvantages which every prospective grower should consider before planting. These are:

1. Cultivation is possible in only one direction.
2. A large part of the plant is shaded for a greater part of the day.
3. It is impossible for pickers to gather all the ripe fruit, and, consequently, at the next picking, many overripe berries find their way into the box or are entirely lost.
4. Air drainage cannot be as good.
5. Diseases affecting the roots and canes are more abundant, and spread more rapidly.
6. The quality of fruit is not as good.

The solid-row system is used almost exclusively in commercial patches of late raspberries, such as Cuthberts, as this variety is hard to keep in hills on account of its rapid spreading power and rank growth.

The rows are usually planted 6 or 8 feet apart, or in many patches they are 7 feet apart, and the plants are set 1½ feet apart in the rows. However, if the plants are set a little closer, it will do no harm, and the rows will thicken and fill intervening spaces sooner.

Having decided the distance between the rows, the field should be marked out and stakes set up where each row is to be. Then, with these stakes as a guide, a careful man can run out a furrow straight enough for a row. The plants should then be set in this furrow, at a slant against the perpendicular side. The best way to cover the roots is to rake fine soil back on to them as soon as possible, and always tramp it down firmly. Never allow the roots to dry out, either before setting or while in the furrow.

The chief disadvantage of the hill system is that it reduces the number of plants per acre, and thereby reduces the output.

It has many advantages, however, and the following ones have been noted:

1. It gives room for cultivation both ways, and makes it possible to conserve more moisture.
2. Sunlight can reach a greater part of the plant, and thus this system is adapted to early varieties, such as Marlboro.
3. Pickers can gather all the berries, and thus it eliminates overripe berries or entire loss.
4. Disease cannot spread so readily, and can be controlled better, as a diseased hill can be entirely removed.

The usual distance of planting on the hill system is 3 x 6 feet. Furrows 6 feet apart are run out in the same manner as described under the solid-row system. At every 3 feet in these furrows set two or three plants, so as to insure a good hill, and then cover the roots as soon as possible, by raking or plowing in the furrow.

#### CULTIVATION.

Nothing can take the place of thorough cultivation. Bad and careless tillage does more damage and cause more loss than all the insects and plant diseases combined.

It is the best and most economical way of destroying weeds and suckers, conserving moisture, making food in the soil available to the plant, and keeping the soil in an aerated and porous condition.