

in shape and having a considerably longer stem. Uniformity in size and shape is an important essential of commercial perfection.

Third, the color is materially bettered, more uniform, and comes earlier. The remarkable increase in color which occurs when a first picking is made from heavily bearing trees of even the winter varieties such as Jonathan and Wagener, furnishes a striking confirmation of this point. While color seems largely related to sunshine, it is a well-known fact that on a heavily loaded tree the fruit has less color less evenly distributed, and more slowly acquired.

Fourth, thinning improves the quality. This is especially the case when the soil is deficient in moisture or plant food.

Fifth, the fruit is freer of diseases and insect pests because wormy apples, limb-bruised or diseased fruit of any kind can be removed at thinning time. On plums and peaches in moist regions, fruits thinned so that no two touch when fully grown, are much freer of brown rot.

Sixth, the removal of misshapen fruit lower the percentage of low grade fruit.

Seventh, thinning prevents premature dropping. A familiar instance is that of the McIntosh Red, which is especially liable to drop where two fruits are left on one spur. Premature dropping is quite largely due to the inability of the tree to supply moisture to an excessive crop.

Eighth, the load of fruit is more evenly distributed, and this is a very important feature in preventing the breaking down of trees.

Ninth, the cost of picking is reduced considerably, and the labor of packing is divided more evenly over the season. This is an important advantage where the supply of labor is deficient in picking time. The costs of grading and packing are also much lessened.

Tenth, less fertility is removed from the soil; a ton of apples takes out approximately 1.2 pounds of nitrogen, 1.6 pounds of potash, and .6 pounds of phosphoric acid. A ton of pears removes the same amount of nitrogen and about twice as much of the other elements. The seeds take the great bulk of these amounts, the pulp of the fruit taking but a small portion. As the number of seeds is roughly in proportion to the number of apples, and not to their size, the removal of fruits leaves a much greater supply of plant food for the balance of the crop, for the growth of the tree, and in the soil.

Eleventh, the tree is less liable to winter injury. The extensive injury suffered throughout Ontario by the hard winter of 1903-4 fell mainly on the trees which had borne an overload the previous season. This is a natural result because the ripening of the crop drains the vitality of the tree, so leaving it in poor shape

to withstand the winter. Trees bearing moderate crops for which there is an adequate supply of plant food, and an adequate supply of moisture, have sufficient vitality to ripen the crop, and to ripen the fruit buds and new shoots as well.

Twelfth, one of the most important results of thinning is that the trees will bear a larger and more uniform crop the following year. The tendency towards biennial bearing is materially reduced, much depending in this, however, on the variety.

For various reasons, then, thinning helps materially to secure the maximum duty from the tree.

WHEN TO THIN

As soon as the crop can be determined and the supply of labor permits, thinning should be commenced. Start with those varieties which are most advanced. Generally, apples, pears, and peaches are thinned when about the size of a hickory nut, and the thinning should be completed before they are more than double that size. On the various plums the work should be commenced as soon as possible after the dropping, familiarly known as "the June drop," is over.

Apricots, cherries, and crab apples are not usually thinned by hand, because the crop which they are to bear is a reasonably certain quantity, and can be controlled to a greater extent than in the larger fruits by proper pruning. The Italian prune and the Peach Plum are not usually thinned because normally the set of fruit of these varieties is not great enough to necessitate the expenditure.

HOW TO THIN

To set rules for thinning is even more difficult than to set rules for pruning. The fruit grower must determine for himself just how much crop the tree will be able to carry. Much depends on the variety, the age of the tree, its vitality, the soil, cultivation, climate, and district. Under equal conditions the Winesap may be thinned to say five inches, where the Jonathan would be thinned to six or seven, and the Northern Spy to eight. In climates such as that of Vancouver Island, where no irrigation is available, and the rainfall averages about half an inch per month during the growing season, or one-fifth that of the average Ontario district, all varieties are thinned to a greater distance than in districts of greater rainfall or where irrigation is available. In this district it is advisable to thin many crops, the whole of which could be carried to advantage under other conditions. Unhealthy or diseased trees should not be expected to grow as great a load as those in perfect health, while trees making extensive growth may very well be allowed to carry much more than average trees under the same conditions.

By one rule which is practised to some extent, the grower sizes up all the con-

ditions and determines how many boxes of fruit the tree should carry. It is a small matter then to determine how many fruits there should be left on the tree. The results at first are likely to be considerably off the estimate, but this is very largely a matter of practice and variation of seasons.

Another rule which might be taken in conjunction with the previous one, is to thin plums to about two, two and a half, or three inches, peaches four to eight, depending on the earliness of the variety; pears and apples, five to seven inches apart. In thinning pears and apples, it is only with early varieties that more than one should be left on any fruit spur, and with these early varieties part of the crop may be removed in one picking, and the balance later.

With winter varieties of apples it is a good rule to leave fruit only on each alternative spur, to encourage annual bear-

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Dynamite in the Orchard

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Early in May several tests were made at the Experiment Station with dynamite as a means of loosening the subsoil for the planting of nursery stock and for the purpose of subsoiling in a mature orchard. In our mature apple orchard, we took a row of eight trees and put in twenty-five charges of dynamite. They were put in in quarter pound charges midway between the trees about thirty inches deep and a charge at each side of the trees at about ten feet from it. The subsoil in this orchard is quite hard. The explosion loosened the soil from three to three and a half feet deep and about three feet in diameter. The soil could be easily shovelled without blowing it out of the hole. In shovelling out the loosened soil, cracks could be seen, showing that the explosion had shattered the soil for a considerable distance. We will note the results, if any, in the crops of apples on these trees.

We also used it to loosen the soil for planting trees in eighteen holes, six plum, six pear and six apple trees, using the same amount of dynamite with the same result in the soil. In this test the soil was much heavier and harder than in the apple orchard. In this test we have trees from the same nursery, of the same age, and from the same part of the nursery, planted in the autumn in dug holes, planted in the spring in dug holes, and planted in exploded holes. I am making photographs of these trees as planted, and will make a record of their growth by photographs as well as notes.

The explosion loosens up a large hole in the ground, and it is necessary to see that the loosened ground is settled back again before the tree is planted. It enables one to take out the subsoil and fill