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Pruning Fruit Trees

BY

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PRUNING THE APPLE.

Much has been said and written concerning the pruning of apple trees; in fact too much has been said which has tended to make fruit growers believe that in order to get large production of fine apples one must prune heavily and continually. The results obtained by pruning young trees heavily, in comparison with those obtained by pruning lightly or not at all, have shown that the latter methods give larger trees and earlier production.

Since production is what we are after, the ideal tree should be one with a good framework of well-balanced limbs, in order to hold the fruit, and one with the fruiting branches and fruit spurs distributed thruout the tree.

The fruit grower who prunes heavily every year will produce an undersized tree with leafy branches and few fruit spurs. He will be disappointed also in not having the tree produce fruit at the normal bearing age. In order to develop the ideal tree some general principles must be understood and applied in pruning.

PRINCIPLES OF PRUNING.

Principle 1. There is a relation between the rate of growth of a tree and the leaf area. The roots take up plant food from the soil and this is carried to the leaves. The leaves use this plant food in combination with air in sunlight to manufacture starches and sugars which are stored in various parts of the tree. This stored food is used the following year in developing branches and roots. Therefore, the more leaves there are on a young tree during the growing season, the more food will be

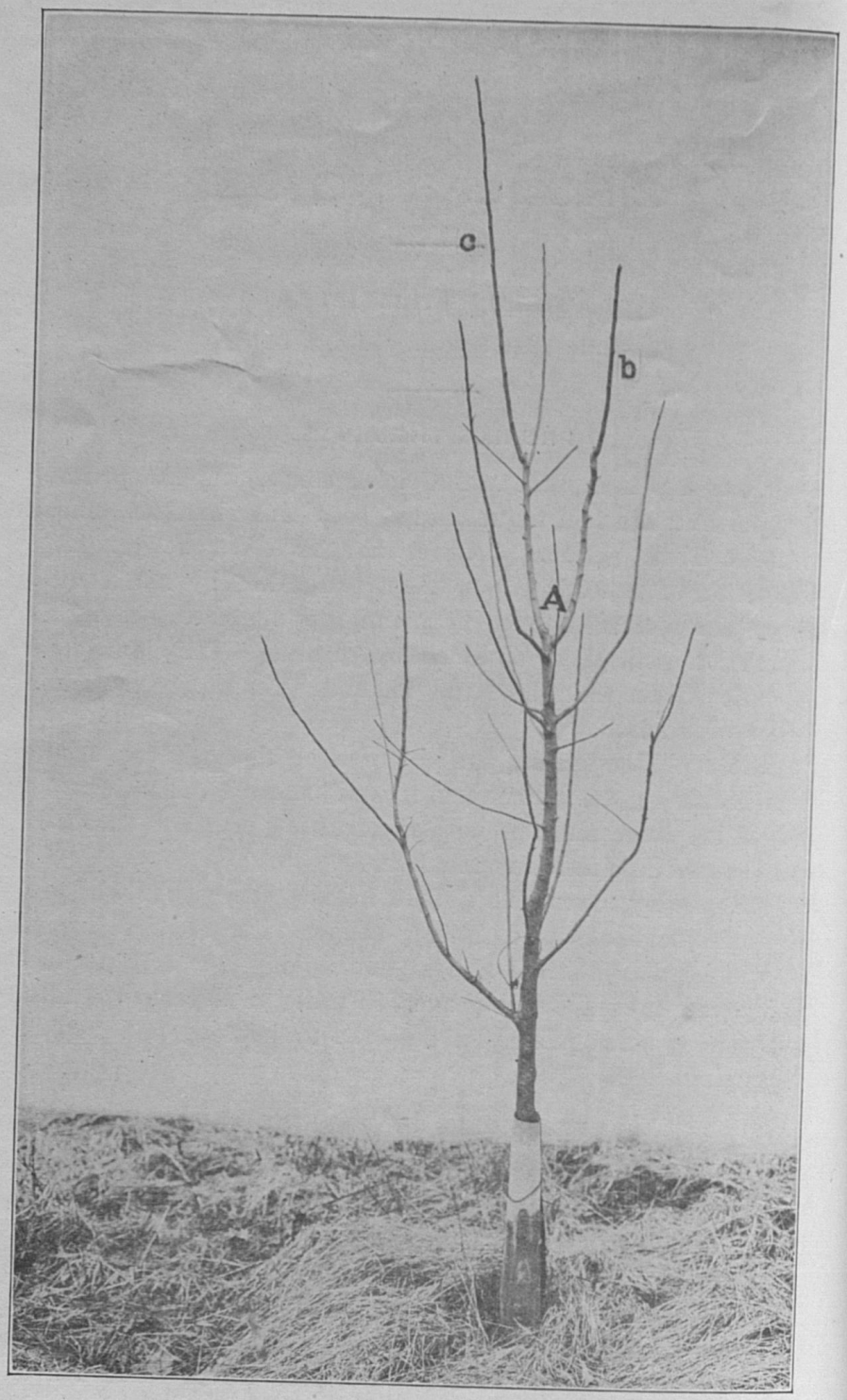


Fig. I. LEADER TYPE TREE.

Crotch A corrected by cutting back branch b more severely than c.

manufactured and stored for future use; consequently, a greater growth of both branches and roots will take place the following year.

Principle 2. Two branches often will be found growing from a common point, making the same rate of growth and forming a sharp, weak crotch. Reducing the number of leaves on one of these branches by cutting it back heavily will result in unequal growth; the one having the most leaves will make the most growth and become the leader or main branch, while the one which is cut back heavily will make the least growth and become a side branch.

Principle 3. Heavy cutting back of laterals or side branches will result in one or more vigorous shoots near the pruned end, and few fruit spurs. Light cutting back will result in the formation of fruit spurs and smaller laterals or side branches.

Principle 4. Whenever a large branch is cut back the growth response takes place near the pruned end, resulting in a renewed wood growth in the form of water sprouts. To get a general renewal of growth the cutting must be distributed thruout the tree.

Principle 5. Pinching back the terminal growth of the branches during the month of June will result in the formation of fruit spurs or small side branches at the axils of the leaves near the pinched end, and also a secondary terminal growth.

Principle 6. The removal of small branches has a marked influence on the renewal of old spurs on old fruiting trees.

Principle 7. A heavy cut made close to small laterals or small fruit spurs will result in a large number of water sprouts, but if it is made near a large lateral branch little growth of water sprouts will result. This is to be considered when heading back old trees.

PRUNING YOUNG TREES.

In taking trees from the nursery, a portion of the root system is left in the nursery row. Whether the tree is one year or two years old, the top should be cut back in proportion to the lost root system in order to maintain the balance between the

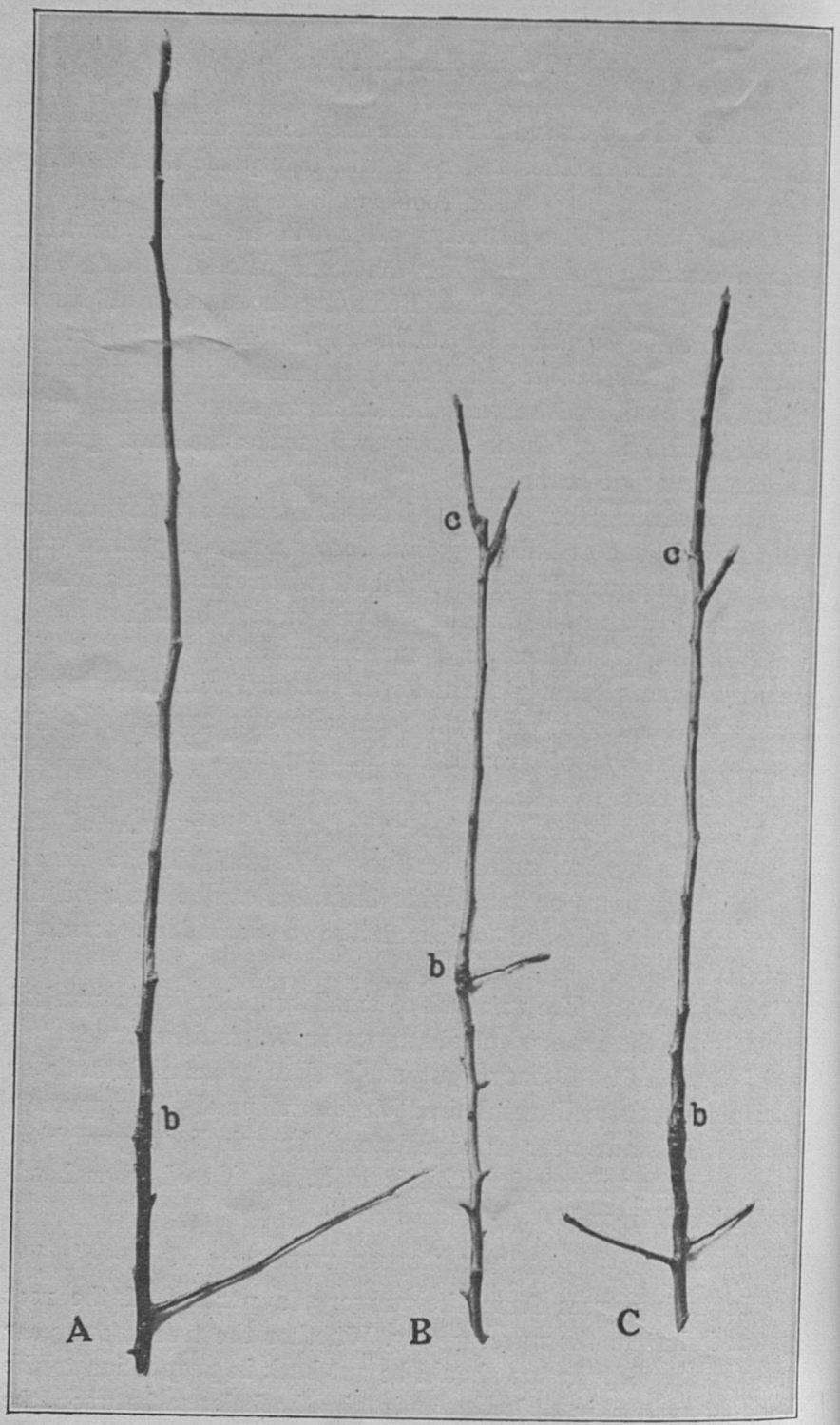


Fig. II. BRANCHES TAKEN FROM THE SAME TREE.
A. Not pinched back; B and C pinched back the last of June; b. beginning of current season's growth; c. pinched area showing spur develop-

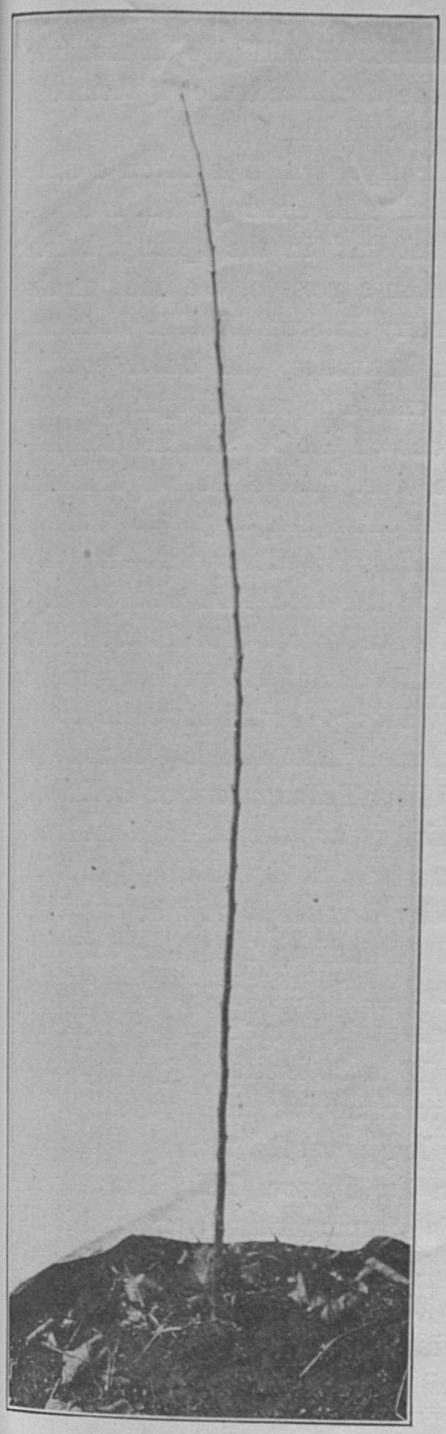


Fig. III. ONE YEAR TREE BEFORE PRUNING.

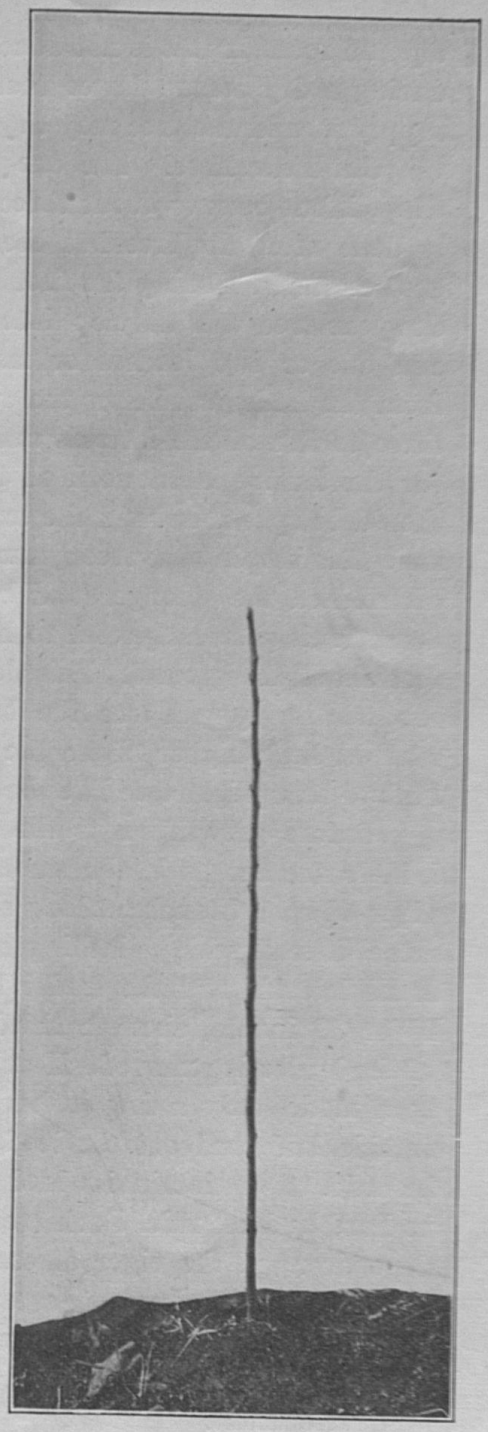


Fig. IV. ONE YEAR TREE AFTER PRUNING.

top and root. If this is not done, the leaves will give off moisture during a dry season faster than the decreased root system can supply it, and the tree may dry out and die.

One-Year Tree. The one-year tree, which is often a mere whip, is cut back to about three feet. This cutting back is usually done after the tree has been set out, in the spring, before growth starts. During the first season's growth, the buds on the one-year tree will develop into many laterals or side branches and one or two leaders or main branches, the latter coming from the buds just below the cut end. The second spring about three to five of the laterals and one of the leaders are selected for the future framework of the tree. These lateral branches should be spaced around the tree as far apart as possible, at the same time keeping the tree symmetrical. The more widely they are distributed the stronger and better the tree that will develop. Some fruit growers prefer to have the lowest branch about two feet above the ground. This depends somewhat on the variety. A spreading type of tree like the Winesap should have the lowest scaffold limb higher above the ground than the lowest scaffold limb of an upright tree like the Yellow Transparent or Delicious.

Before growth starts the third year, the laterals and the leaders are cut back, the amount removed depending upon the vigor of each branch; a long stocky branch should be cut back more than a weak, spindling one (Principle 2). For example, if all laterals and the leader have made a vigorous growth of 25 or 30 inches, about a third of each lateral and one-fourth of the leader is removed. If only 18 or 20 inches of growth have been made, only a few inches are removed. Always cut to an outside bud, and cut the leader less severely than the laterals in order to maintain its lead in the future. This, however, is no hard and set rule. Each tree is a separate problem, and it all depends upon the vigor of each branch and the growth of the tree as a whole. In fact, a tree that is not making a vigorous growth should be pruned very little and more attention should be directed to some system of soil management that will hasten its development.

Many small branches and short, stubby growths will now be developing thruout the center of the tree, some of the longest

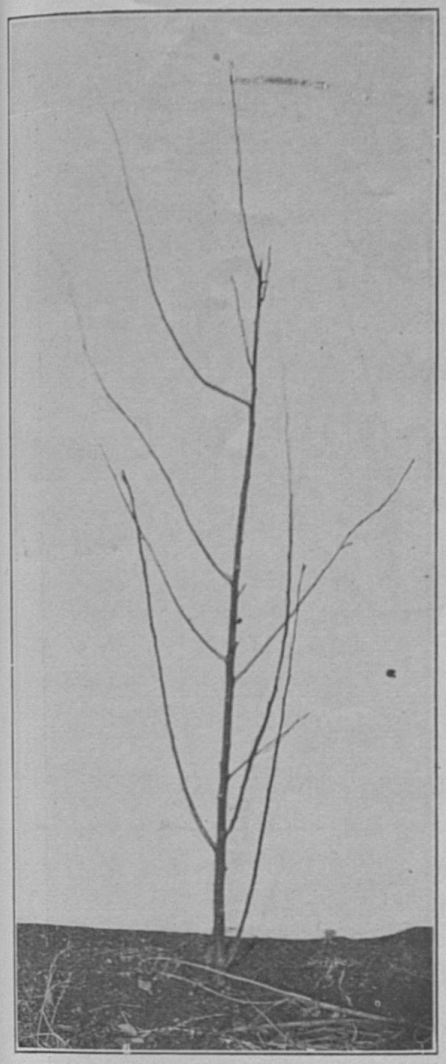


Fig. V. BEFORE PRUNING.

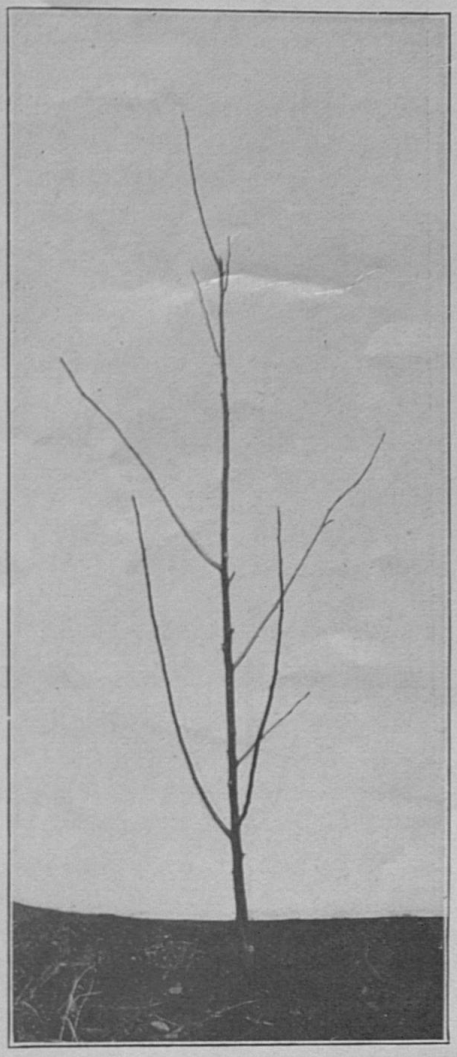


Fig. VI. AFTER PRUNING.

An upright type of apple tree, planted when one year old and pruned the second year.

ones becoming cross branches. These small growths very seldom attain much length and often produce some of the first fruit. Should some of these cross branches grow too fast, they may be cut back during the dormant season or pinched back during the month of June, causing them to become stocky and fruitful. The removal of many of these branches will often encourage wood growth and delay the formation of fruit spurs.

Fig. VII. STAYMAN WINESAP TREE, FOUR YEARS OLD.
Illustrating the development of fruiting branches as a result of light pruning.

During the following years, up to the bearing age, very little pruning is done, except to correct the formation of weak crotches (Principle 2), and to check the end growth of the more vigorous growing branches, with the view of getting a well-balanced tree. This kind of pruning is done by some commercial growers during the month of June by pinching back the new,

green end-growths (Principle 5). This again should be governed by the amount of season's growth already made and the vigor of the branch. This pinching back of the terminal growth in June should not be confused with the summer pruning which has been advocated by some, in which entire branches or large parts of branches are removed. This kind of summer pruning is strongly condemned because too much leaf surface is removed (Principle 1). After the tree has reached its bearing stage a light thinning out of the cross branches growing anywhere thru the center may be made without checking its productiveness.

A tree cannot be brought into fruitfulness by pruning alone. It often needs the assistance of some good system of soil culture.

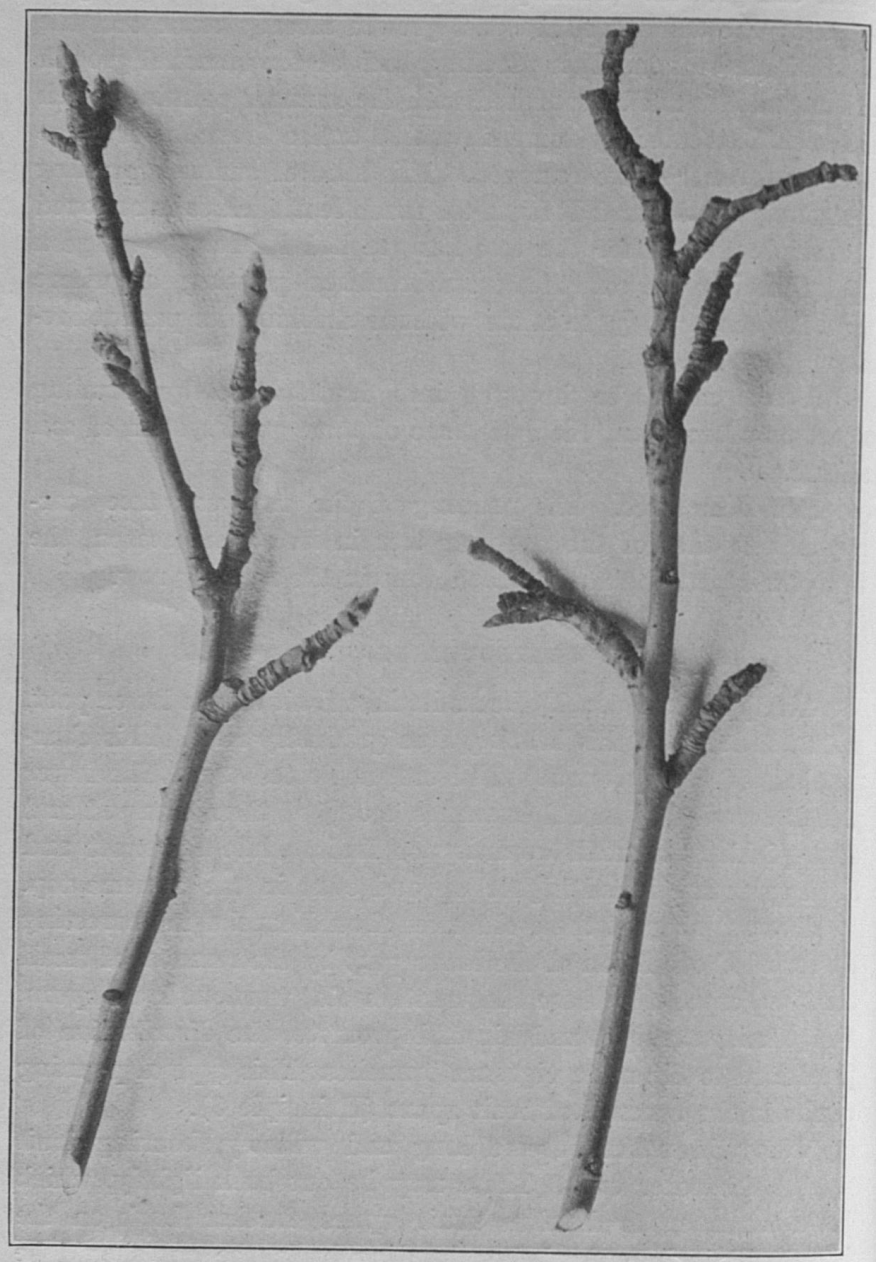
Two-Year Tree. The pruning of the two-year tree corresponds to that of the one-year tree in its second season, the first year's pruning having been done in the nursery row.

PRUNING NEGLECTED BEARING TREES.

An apple tree usually bears its first fruit on the lower part, and as it develops this bearing area gradually rises. This characteristic is very pronounced in old, neglected trees. The lower part is crowded with old branches, many of them diseased and dead, yielding a small quantity of fruit, while the most and best apples are found higher up and even in the extreme top.

The pruning of these old trees should consist in correcting the crowded condition of the lower part by the removal of small branches, especially those that contain old, wornout fruit spurs. This admits sunlight and air and promotes the distribution of plant food to the more vigorous branches. This type of pruning results in the renewal of fruit spurs (Principle 6).

Many branches become long and willowy, bearing fruit only at the outer ends. These may be cut back lightly, which has a tendency to develop fruit spurs farther back on the branch (Principle 3). When heading back, the cut should be made close to a side branch. If the limb from which the branch is removed is drooping and does not clear the ground, the cut



PRODUCTIVE FRUIT SPURS. UNPRODUCTIVE FRUIT SPURS.

Fig. VIII.

should be made close to a side branch that grows from the upper part of the limb.

Along the main limbs, especially on the inside of the tree, there are usually additional short branches containing fruit spurs capable of producing fruit. The tendency of a good many fruit men has been to strip the limbs of these branches, in many cases for one-third the way up the trunk. This sort of pruning results in decreased production.

Heavy pruning by cutting out large limbs encourages wood growth near the cut end the following season and decreases production the second year (Principle 4). Again, the removal of large limbs on the lower part and in the center of the tree opens large holes, admitting too much sunlight, causing sunscald injury on branches exposed to the direct rays of the sun.

Many old trees have grown to such a height that spraying and harvesting the fruit are hindered. Heading back the main limbs by cutting to a side branch which points down and out will tend to lower the tree top and make spraying and harvesting the fruit much easier. Heading back by completely removing large upright branches is to be condemned, because this treatment opens the top of the tree, exposing many limbs to the direct rays of the sun. Again, an excessive growth of water sprouts will follow, making the top more dense, shutting out light from the fruit spurs. It is better to head back a little each year, leaving some branches to shade the central and uppermost parts of the tree, until the desired reduction in height is reached. With this method of heading back, there will be less tendency to water-sprout growth and more development of fruit spurs in that part of the tree which has been pruned (Principles 3 and 7).

When an old tree needs thinning and heading back, it is advisable to thin one year and head back the next. All dead and diseased branches should be removed and burned the first year. In removing laterals, cut close to the main branch so as to leave no stubs. It is good practis to cover all large cuts with grafting wax to prevent the entrance of disease. Pruning may be done during any part of the dormant season, except freezing weather, giving preference to later winter and early spring.

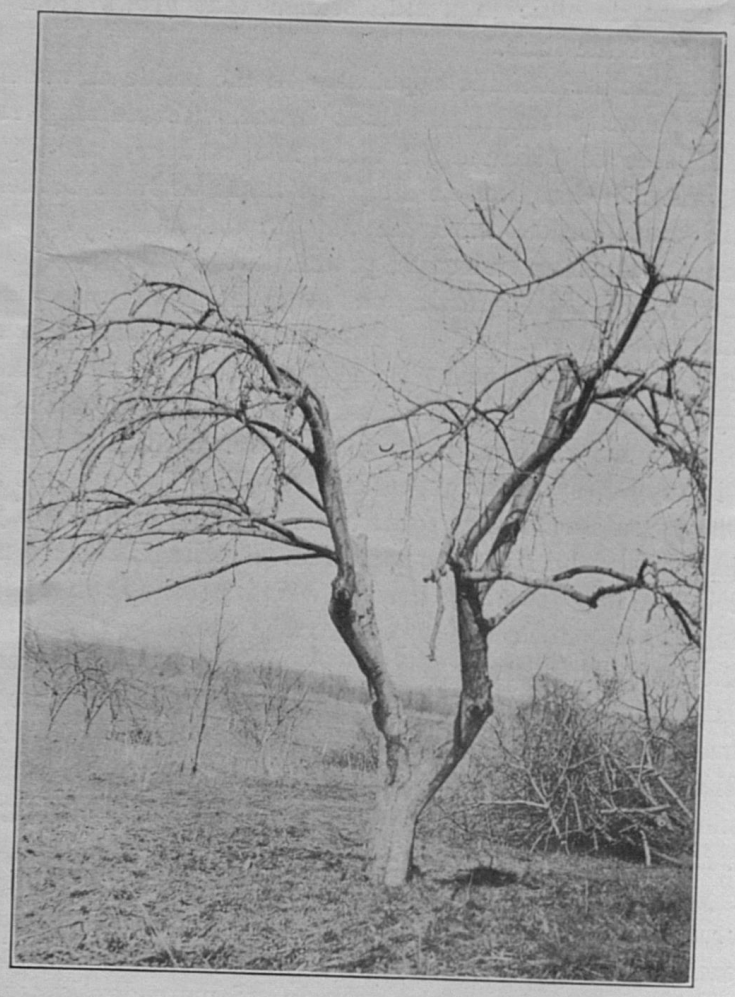


Fig. IX. BEARING TREE OVERPRUNED.
Too many limbs removed from center and top of tree.

PRUNING THE PEAR.

The pear requires practically the same kind of pruning as the apple, with the following exceptions.

The trees are smaller and usually grow more slowly; consequently, the pruning should be less severe. Heavy pruning also encourages excessive twig growth and such twigs are more susceptible to blight than those of slow growth. Pears usually grow upright in form, particularly when young. The tops often

become crowded and some thinning should be done. However, the tops should be allowed to be considerably more dense than apples, since the weight of the earlier crops tends to spread these branches considerably and, if thinned in the same manner as apples, the bearing tree would become too open. This would permit considerable sunscald as well as reduce the bearing area.

PRUNING THE PEACH.

The peach is a rapid grower and requires annual pruning. The pruning has two principal objects. First, the training of trees into desired forms to serve our purposes. This is described under the heading "Training the Young Tree." Second, the control of fruit production, which is discust under the heading "The Bearing Tree."

The early spring is preferred for this work, because hard freezes or late frosts often influence the kind and amount of pruning that should be done; this will be considered further in the discussion of pruning bearing trees.

TRAINING THE YOUNG TREE.

Pruning at Planting Time.

After planting, the young tree should be headed or cut back to 18 to 20 inches from the ground. Trees of medium size are preferred because they produce few branches while in the nursery, and heading is practically all the pruning they need. However, some trees, particularly those of larger sizes, will be considerably branched. Sometimes the lowest branches are more than 20 inches from the ground and, if headed at this height, it may be discovered that, as a result of the nursery practis of removing all growth on the lower trunk, no buds are left to develop branches. In such trees the head may be formed higher by selecting three or four branches which are well placed for main limbs, cutting these back to two or three buds, and removing all others.

It has been customary to go over the tree once or twice thru its first summer and cut out all *undesirable* shoots. This is usually a mistake; it is better to remove such shoots by rub-

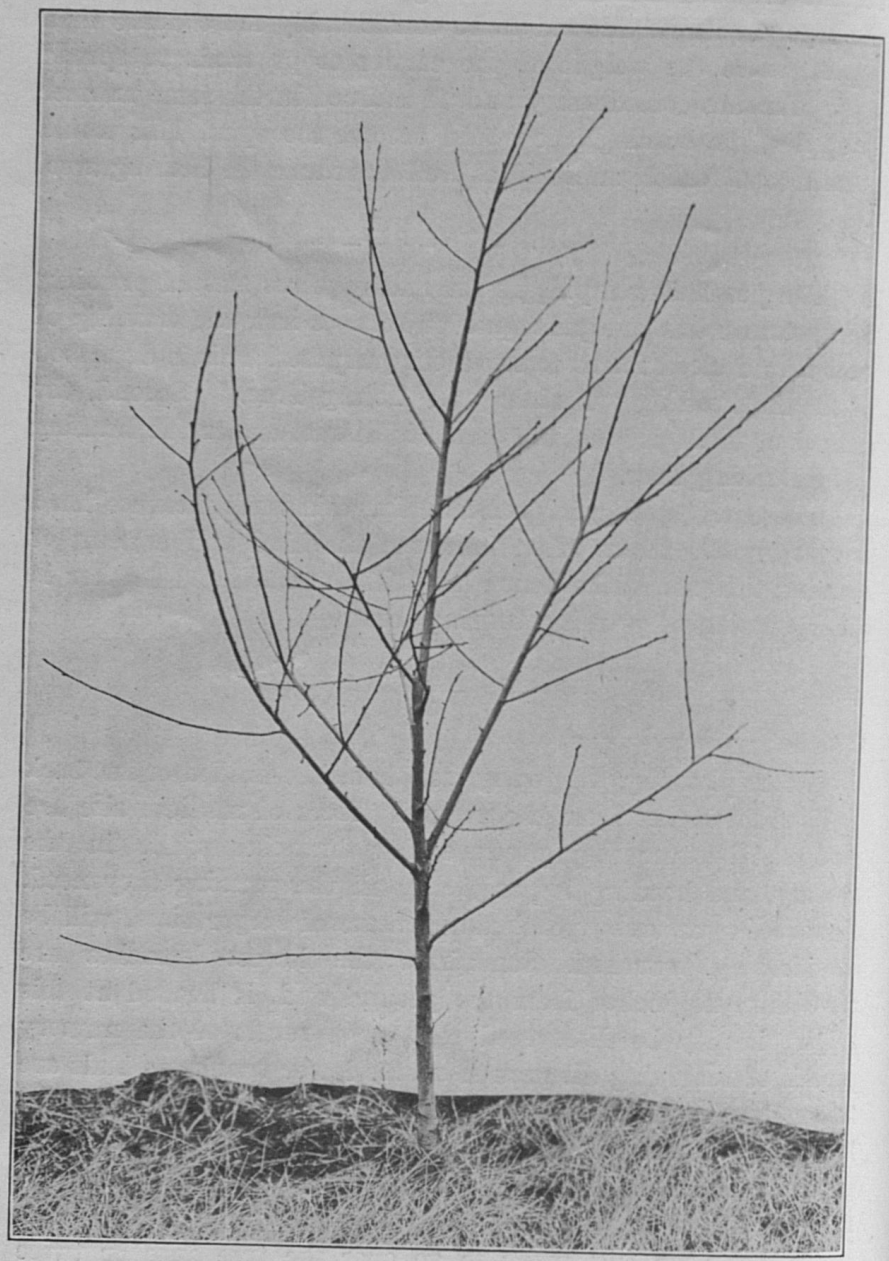


Fig. X. PEACH TREE TWO YEARS AFTER PLANTING; BEFORE PRUNING.

bing them off just as they are starting, or else defer cutting them out until they have completed their growth in the fall, thus retaining all the leaves possible to provide nourishment for this critcial period in the life of the young tree.

The "open head" type of training is most satisfactory for the peach, and the branches which are to form the framework of the tree should be selected with this type in mind. The branches should be well distributed around the tree and far enough apart vertically so that a crotch will not be formed

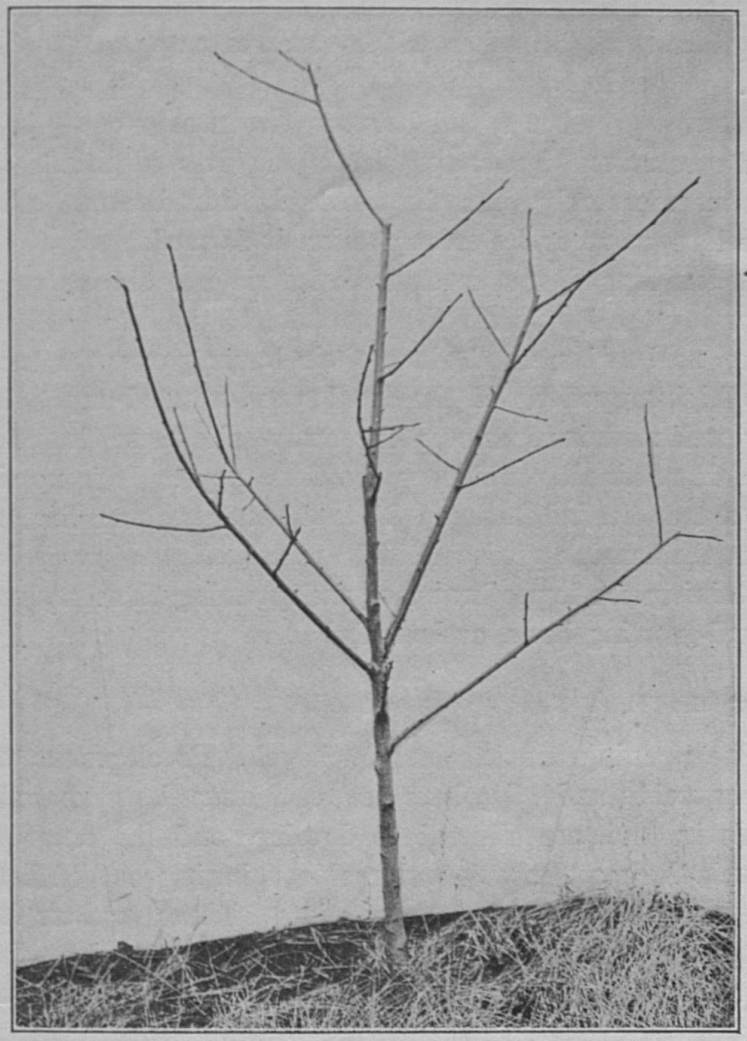


Fig. XI. PEACH TREE SHOWN IN FIG. X, PRUNED.

later. Branches closer than 6 inches apart will soon increase in diameter so that a crotch will be formed, and the tree will be mechanically weak.

Pruning the Second Year.

After one season's growth the pruning consists largely in the further selection of scaffold branches, as this can not be completed with most trees at planting time. All other branches springing from the trunk are cut away and those reserved are shortened about one-half. This is important in order to strengthen those branches which are to support the future crops.

Narrow crotches found between two nearly equal branches may be corrected by cutting back the less desirable branch much more severely than the other. It thus becomes a branch of the longer one and a strong union is formed.

A low-topped tree is desired, but is not always produced by starting the head near the ground. If the scaffold branches develop no bearing wood along their lower parts, the tree may be as high-topped as if the head were started much higher. Many well-meaning pruners cut away all these lower twigs which, if retained, could bear the first crops. It is possible to train a tree headed between 20 to 30 inches from the ground, so that the bearing surface will be practically as low as desired, by retaining the lower branches and pruning them annually to outward-growing buds, or laterals.

Pruning the Third Year.

The pruning consists largely in the development of the main branches and all others are cut out. Laterals and sub-laterals in turn are allowed to develop, and the new wood is cut back. In most cases considerable thinning out of branches on each scaffold limb will be required. Three or four laterals should be left on each scaffold limb, and later sub-laterals from these, so that the tree will have a strong framework and a large bearing area. In general, the pruning during this period is severe.

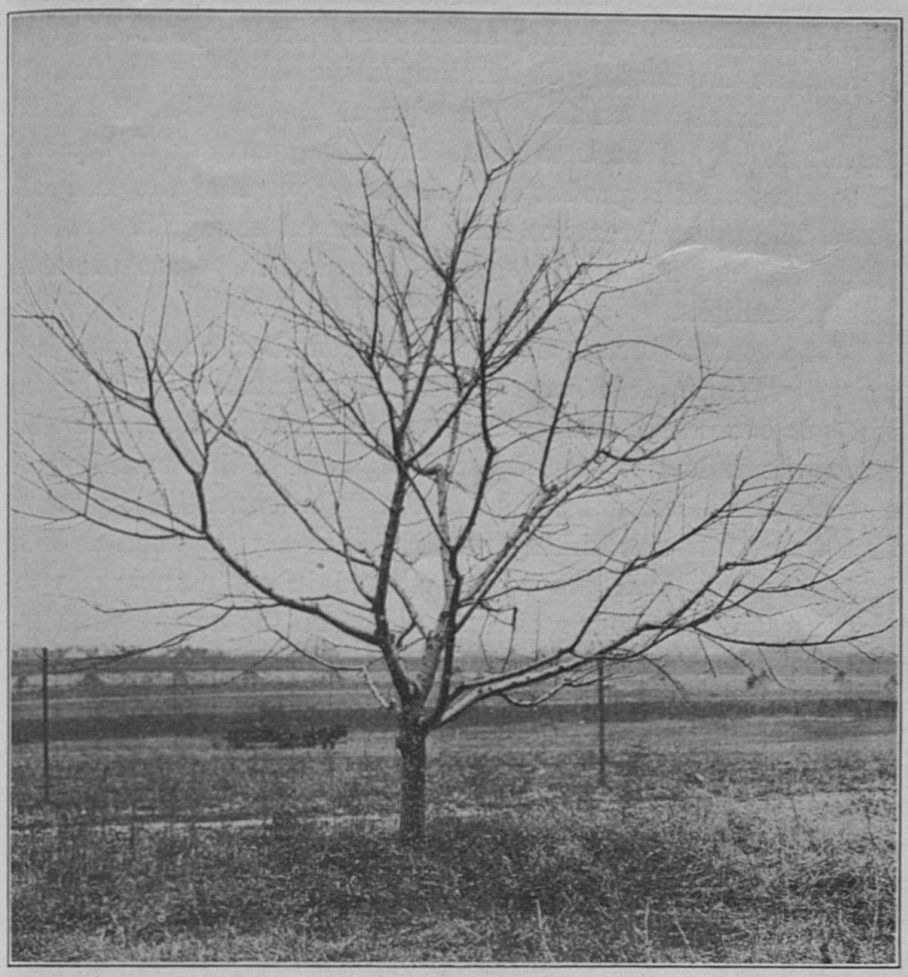


Fig. XII. A WELL-FORMED PEACH TREE.

THE BEARING TREE.

Pruning the Fourth and Subsequent Years.

The tree is now old enough to begin to bear. From now on the severity of the pruning will be considerably decreased. One of the most important requirements in skillful pruning is to be able to recognize bearing wood. *Only shoots of the previous year's growth bear fruit.* If we cut back severely we may prune away nearly all the bearing wood, and of course no fruit will then be borne. If we do not cut back the new growth at all, the fruiting wood gets farther from the trunk each year until

practically all the peaches will be found at the ends of tall, slender branches where they are not only hard to pick but greatly increase the liability of breaking down the tree; besides, the bearing surface is small. The tips of the new wood should, therefore, be cut back to cause branching out, so that plenty of bearing wood is produced in the lower parts of the tree each year. The upper branches must be thinned enough so that the lower ones are not densely shaded, because they soon die from lack of sunlight.

The central branches are cut back and thinned enough to prevent crowding. If some of the taller branches grow beyond reach it is often desirable to cut them back quite severely, but it must be understood that by so doing most of the fruiting wood of these branches will be cut away. Consequently, an opportune time to do this kind of pruning is in a year when no fruit is in prospect. This can be determined in early spring by examining the fruit buds which are found on the new wood. These buds usually occur in pairs with a leaf bud between them. If they are black in the center when cut, no fruit will be produced, even tho they blossom.

When possible, it is desirable to defer pruning until severe winter weather is past, since the peach is easily injured by late freezing. However, this is not always advisable, especially in large orchards, where all favorable weather must be used to get the work done.

Pruning Neglected Trees of Bearing Age.

Since the fruit is borne only on wood of the previous season's growth, it is easy to understand why old, unpruned trees have all their fruit near the ends of the branches and principally at the top. This makes the harvest tedious and expensive, and the crop is usually small. Such trees usually have not made a very strong growth, and severe pruning would thus remove the bearing wood. Often a little thinning of the thick branches and slight cutting back is all that can be done, unless the fruit is sacrificed for one year. It is desirable, also, to encourage growth by good culture and the use of fertilizers.

It is difficult to rejuvenate an old, neglected peach tree

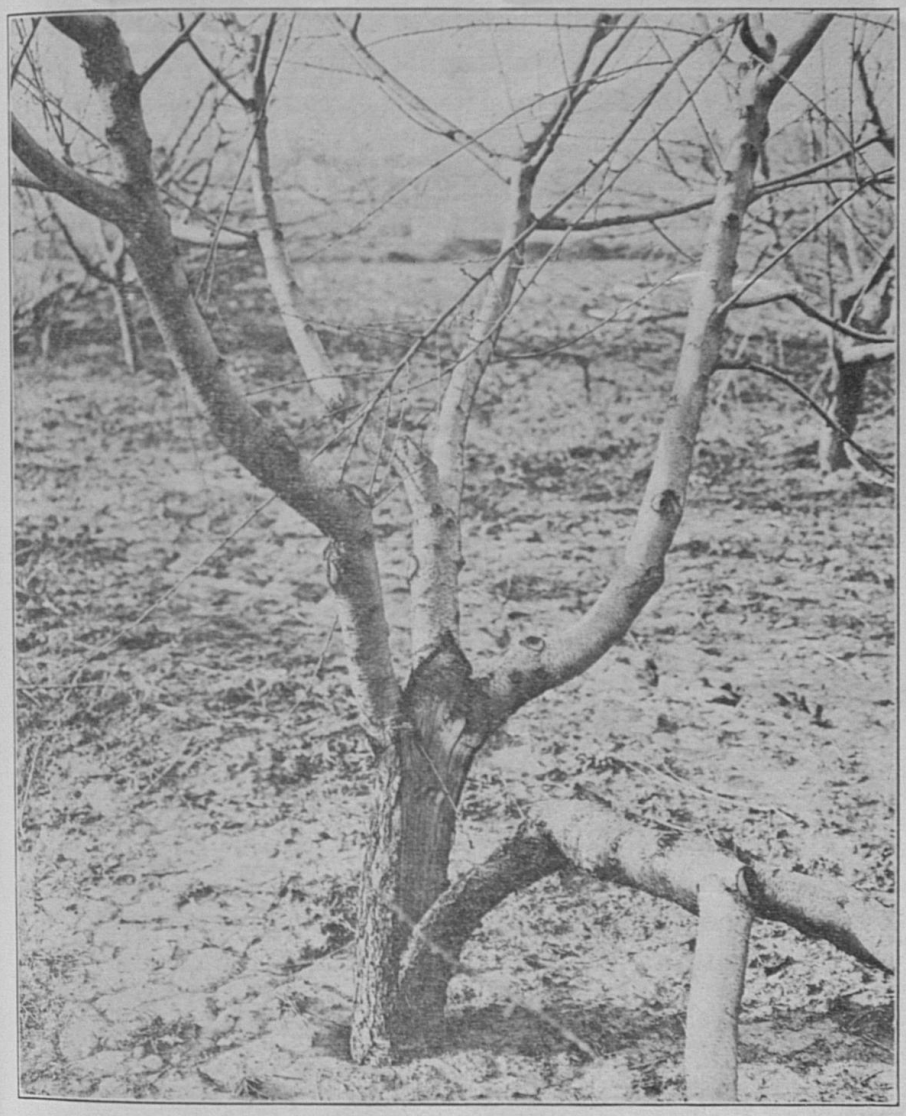


Fig. XIII. TREE WITH A BAD CROTCH, RUINED BY ICE STORM.

satisfactorily, but trees which are still healthy and vigorous may be renewed by rather severe cutting back. The tall branches are cut back to laterals, sometimes removing three or four years' growth, crowded lateral branches are thinned and the central ones cut back to encourage renewal of bearing wood.

After severe winter injury such as occurred in 1917-18, the pruning should be rather light until the extent of the injury

is fully determined. If cut back heavily, considerable wood that might produce leaves may be cut away, and this would further devitalize the tree. If much wood has been killed this should be removed as soon as practicable. The following year such trees will be considerably invigorated if some of the larger branches are cut back into two or three year wood; however, not all the bearing wood need be removed.

The practis of "dehorning," i. e., cutting the top back to twigless stubs, following severe winter injury, has been quite generally recommended in the past, but our observations do not justify this method of pruning. Many trees so treated did not start into growth at all, whereas lightly-pruned trees standing near them had practically recovered a year or two later.

PRUNING THE PLUM.

The early pruning of plum trees is very similar to that for peach trees. Many varieties of plums have a decided tendency to grow upright in form. Therefore, pruning to encourage low heading and spread of branches is especially desirable. The growth is not as rapid as that of the peach and the pruning is relatively less severe. After the tree comes to bearing age the annual pruning required is usually rather light. The fruit is borne chiefly on short spurs on two or three year old wood. The annual pruning of the bearing tree consists largely of cutting back the upper branches so that most of the fruit may be harvested from the ground, and in thinning out the smaller branches to allow sufficient sunlight and air in the center of the tree. Particular care should be taken to retain a goodly number of short spurs and twigs in the lower and central parts of the tree.

PRUNING THE SOUR CHERRY.

It is sometimes stated that cherries do not require pruning. We find, however, that better trees result from some corrective pruning when they are young, similar to that proposed for the apple, and that bearing trees produce better if crowded branches

occasionally are thinned. Usually a number of small twigs are removed rather than larger branches. In general the pruning required by cherries is light as compared with that of apples or peaches.