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Pruning Peach Trees.

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Pruning Peach Trees.

By J. C. WHITTEN, Horticulturist.

SUMMARY OF RESULTS.

Experiments conducted by this station to determine the best method of pruning peach trees have yielded results which may be summarized as follows:

I. Under normal conditions, when peach trees have passed the winter safely and promise to produce a crop of fruit, they should be pruned each winter by cutting back the main limbs, so as to leave one-half to two-thirds of the new growth which contains the fruit buds.

II. When the fruit buds have been winter-killed the opportunity may be seized to cut back the main limbs more severely, thus securing more compact trees, and avoiding the formation of long, straggling limbs which the trees have a tendency to form if they are not cut back.

III. The amount of cutting back depends upon the extent to which the trees have been injured.

IV. If only the fruit buds have been killed, and the wood of the tree is uninjured, trees of compact form, if they have been annually pruned, should have their main limbs shortened so as to leave only a few inches

of the new wood. If, however, the limbs are getting long and straggling they may be cut back into two or even three year old wood. Before severe cutting is done the grower should be certain that there are not enough live buds left to produce fruit. The peach sets such an abundant quantity of fruit buds that if a small percentage of them have escaped injury there may still be enough to produce a paying crop of fruit.

V. When the winter is so severe that not only the fruit buds are killed but the wood of the tree is badly discolored the trees may be invigorated by cutting them back quite severely. The following is a summary of results of pruning peach trees during the severe freeze of 1898-9:

VI. Peach trees which were not pruned, or in which only a part of the new wood was removed after the severe freeze of 1898-9 started into growth first in spring and for two weeks after growth began they appeared to be in more vigorous condition than did pruned trees.

VII. This apparent vigor of trees that were not severely pruned was only temporary, however. Some of them died a little later and none of them made satisfactory growth throughout the season. They seemed to have used up all their energy in making a start. At the close of the season they had made but little new growth and this was confined mainly to the tops of the branches, the old limbs and trunks containing only dead twigs. Their annual layer of new wood was very thin and some of their roots died.

VIII. Trees of bearing age that were cut back so as to leave only the trunk and bases of the main limbs died

in some cases and where they did live their growth was unsatisfactory, many of the sprouts starting from the unreliable seedling stock below ground.

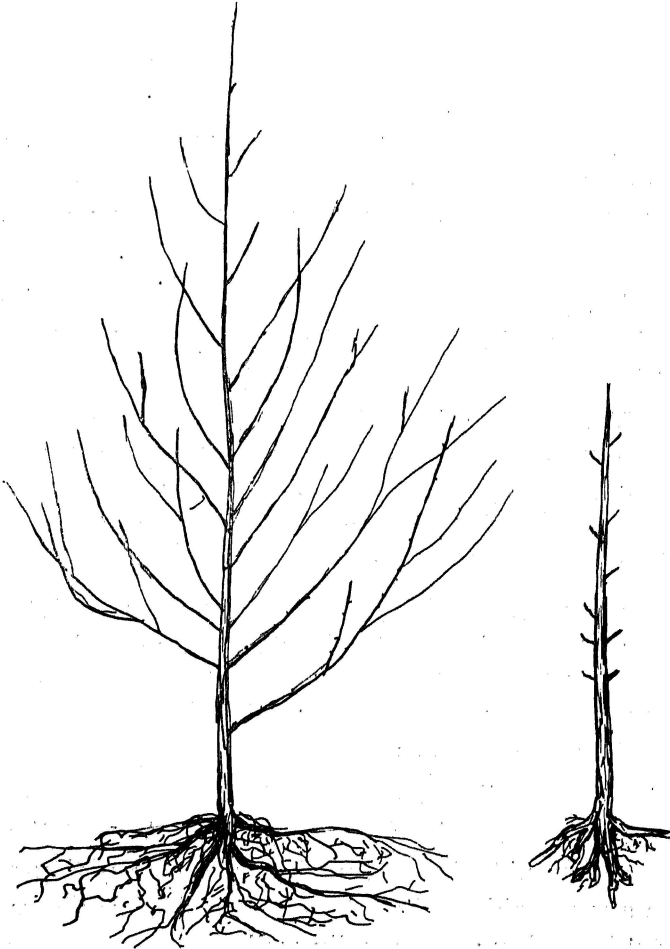


Fig. 1.—One year old peach tree, before and after pruning, at the time of planting in the orchard.

IX. Trees of bearing age which were cut back into two year old wood in the case of young trees, and

to three or four year old wood in older trees, thus leaving stubs of the main limbs from three to four feet long made the best growth. They made from six to nine feet of new growth and entirely renewed their heads during the following season. They also developed a good layer of new wood on their trunks and formed a good crop of fruit buds.

X. In the case of two year old trees, those that were cut back so as to leave the trunk and spurs of the main branches two or three inches long did best and made fine heads.

XI. One year old trees that were cut back nearly to the original bud and had a single sprout trained up during the growing season made fine trees.

XII. The principal growth took place near the extremities of the parts of the tree that were left after pruning. Trees that were cut back into more than four year old wood failed to grow at all in some cases, showing that in very old wood the buds are too dormant to be easily started into growth. The amount to cut away in renewing winter injured trees requires good judgment in choosing between leaving too much wood (which results in weak growth and too high heads) and cutting back too far into old, dormant wood that will not start new limbs.

XIII. Experiments to determine the best time to prune showed that trees that were pruned any time after the severe cold spell up to the time the buds began to start in spring grew equally well.

XIV. Good cultivation is of more than usual benefit to peach trees during the spring and summer following severe winter injury.

PRUNING UNDER NORMAL CONDITIONS.

Of all our orchard trees the peach stands in greatest need of regular pruning. Not only should peach trees be pruned every winter but they should be cut back more severely than any other of our fruit trees. In order to understand the full import of this

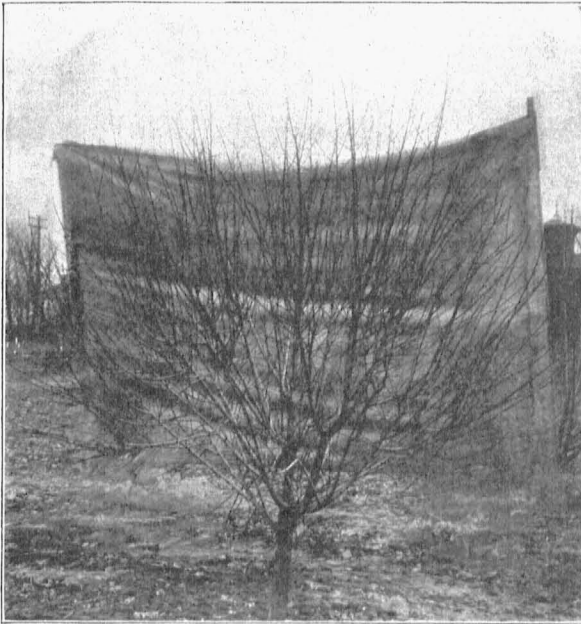


Fig. 2.—Peach tree ready to be pruned the fourth winter after planting in the orchard.

statement it will be necessary to keep in mind the habit of growth of the peach as compared with some of our other fruit trees. The fruit buds of the apple and pear are mostly borne on old, short spurs, attached to the older limbs. These fruit spurs of the apple and pear lengthen but little each year. The fruit then is

mostly borne in the body of the tree instead of on the new growth at the extremities of the branches. On the contrary, the fruit buds of the peach are borne chiefly on the long whips of new growth which is most abundant at the extremities of the limbs. In order to secure an abundant crop of peaches it is necessary to so treat the trees as to secure abundant new wood growth the year before the peach crop is expected. Let us see what this treatment consists of.

If the peach tree is allowed to go unpruned it will make comparatively vigorous wood growth while it is young, and will produce a few good crops of fruit. The new wood growth is mainly produced at the extremities of the wood which grew the previous year. Every year then the new wood, containing the fruit buds, is farther and farther removed from the main trunk of the tree. Wood growth becomes weaker and weaker each year. The twigs in the interior of the tree begin to die, leaving long, straggling main limbs, which are bare of fruiting wood except at their extremities. These fruiting twigs are weak and so far removed from the trunk of the tree that the limbs are liable to break down if a crop of fruit is produced. Furthermore these long, bare limbs and the unshaded trunk of the tree are liable to injury from sunscald in this climate. Gathering the fruit from these high limbs is expensive and such fruit as may be produced on such weak growth is of inferior quality.

The object of pruning is to avoid the undesirable form of unpruned trees just described. In place of long, straggling limbs it is desirable to secure low, compact trees in which the fruiting wood is kept as near

the trunk of the tree as possible. In order to accomplish this it is necessary to properly shape the trees from the beginning.

PRUNING AT TIME OF PLANTING.

Medium sized, one year old trees or large, strong June buds are the best for planting. Extra heavy,

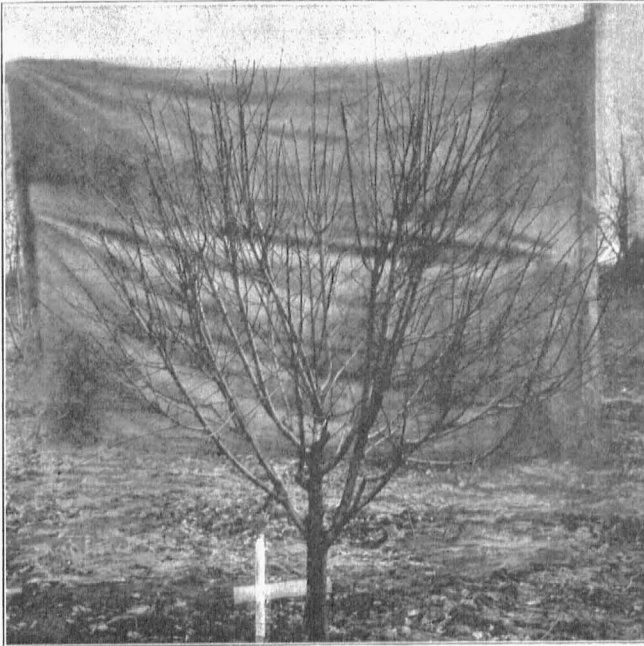


Fig. 3.—Peach tree, four years after planting, pruned by shortening the new wood and thinning out surplus twigs in the body of the tree. Correct pruning under normal conditions.

one year old peach trees are too large for profitable orchard planting, though they are satisfactory for the home garden. At the time of planting in the orchard, each tree should be pruned by cutting off all the side branches so as to leave but a single bud

at the base of each. This reduces the tree virtually to a single whip. The main trunk, or leader should then be shortened to fifteen inches to two feet in length, depending upon the size of the tree, so the head, or branching system will form near the ground. The trunk of the tree, below the head, should not be more than one foot in length. Fig. 1 shows a typical one year old tree, before and after pruning at the time of planting out. If pruned in this manner the new limbs will form close to the trunk of the tree, instead of out at the ends of long branches which the tree possessed before it was pruned.

As the tree begins growth after planting, some sprouts are liable to form near the roots and on the short trunk of the tree, below the main limbs. These should be rubbed off during the summer. The main limbs will start from the short spurs which were left and will form a fine head the first year.

The following winter the trees should be pruned by severely cutting back this new growth. The side limbs should be shortened to five or ten inches long at the base of the head, those above being cut still shorter as one prunes upward, so as to form a cone shaped head. The strongest, upper shoot should be selected for a central leader and cut off so that it will stand several inches (perhaps a foot in the case of strong trees), longer than the upper limbs. Laterals should be removed from these shortened limbs, so that the next years growth will not be too dense. The following winter (when two summers growth have been made after setting the trees in the orchard), the trees should be again severely pruned, perhaps three-quarters of the

new wood should be removed by shortening the main limbs. The lower limbs should be left longest so as to secure a cone shaped tree. If a leader has been maintained up to this time the branching system will have been formed so that the limbs will not split down when they are later loaded with fruit. After this it is not essential to give attention to maintaining a leader. In case the trees have developed enough fruit buds to

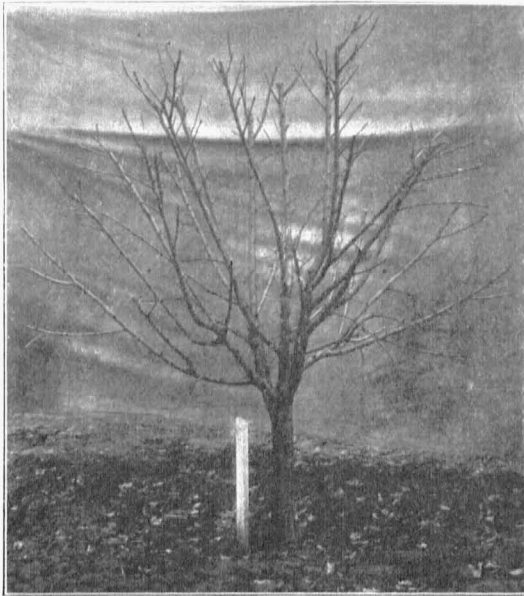


Fig. 4.—Peach tree four years after planting in orchard, showing how pruning should be done after fruit buds have been killed in winter.

produce a crop (as they sometimes will do at this age) the pruning should not be quite so severe, but enough new wood should be left to produce some fruit.

The third summer after setting, the trees should be old enough to form a fine setting of fruit buds for

the next year. Now that the trees are old enough to bear they should be pruned each winter by cutting back so as to remove one-third to one-half the new wood. Enough fruit buds will be left if they are uninjured to produce all the fruit the tree ought to carry if they are pruned in this way. It should be remembered that the peach normally sets a great many fruit buds,—more in fact than the tree can support if they all develop peaches. The cheapest way to remove a part of this surplus is by annually removing a part of the new wood containing fruit buds. The careful grower will soon learn to determine just how much wood to remove in order to leave the corret amount to produce fruit enough for a good crop. Fig. 2 and 3 show a typical peach tree before and after pruning.

Some of the advantages of pruning back the trees each winter are: It shortens the limbs, thus keeping the bearing wood nearer the body of the tree, so the limbs are less liable to split down. The growth will be more vigorous. The lower trees may be more easily pruned and managed than high ones. In thinning and gathering fruit it is particularly desirable to have it as near the ground as possible. Pruning partly thins the fruit by removing surplus wood containing fruit buds.

PRUNING WHEN FRUIT BUDS HAVE BEEN KILLED.

Occasionally the fruit buds of the peach are killed by a severe winter. As soon as the cold spell is over it is easy to tell whether or not the buds are injured by cutting through them. If the pistil in the center of the bud looks fresh and green the bud is all right. If the pistil looks brown and shriveled, leaving a dark

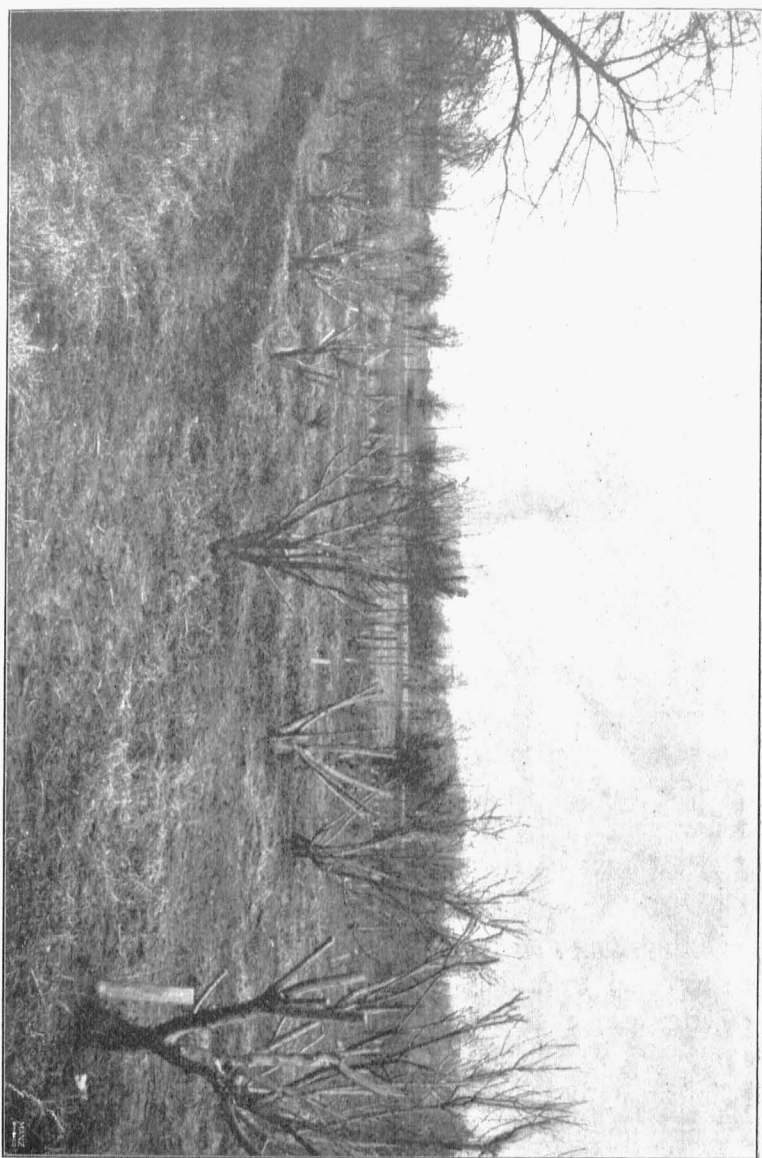


Fig. 5.—Peach trees cut back with varying degrees of severity after being injured by the severe winter of 1898-9.

spot in the center of the bud, the latter is dead. Usually some of the buds winter kill. It is necessary then to examine a good many buds on the different varieties to make sure whether or not enough buds are left uninjured to produce a crop of fruit. Almost every winter some one reports that the peach buds are all killed because he found upon examination that some of the buds were dead. One should guard against assuming that the peach crop is ruined because he finds that the first few buds he opens are dead. It is necessary to thoroughly examine a number of trees of all the different varieties. If, however, one finds that the fruit buds are killed, as is the case in some sections at the present writing (March, 1903) it is well to seize upon the opportunity to cut back the trees somewhat more severely than usual. If the trees are getting tall and straggling they may be shortened back somewhat and thus gotten into a more manageable form.

The amount to cut back depends upon the shape of the tree and whether it is high or low. If the tree has been well pruned every winter and is compact and low it may be best to cut so as to leave short spurs of the new wood. Fig. 4 shows how the tree in Fig. 2 would look if it were pruned in this way.

If the trees have never been pruned, or if they are getting long and straggling and if the new growth is short and weak they will make stronger growth and a better crop of fruit buds for the next season if they are cut back somewhat severely. In such cases the main limbs may be cut back into two, three or sometimes into four year old wood. One should however be careful not to cut back into wood that is so old and dormant that

it will not form new branches the following summer. If the bark looks bright and smooth it will generally put out new limbs. If it looks dull colored and rough the wood at this point may be too old to make new growth. Usually the limbs may be cut back to some vigorous side branch, a spur of which may be allowed



Fig. 6.—Poor growth of peach tree which was not pruned after severe winter injury.

to terminate the limb, just below the cut. Fig. 4 shows such short spurs of fresh wood at the tops of the limbs that have been shortened. Where the trees are cut back thus severely the small, weak twigs along the trunk of the tree and on the bases of the shortened limbs should be cut off close to the point of attachment.

PRUNING WHEN THE WOOD OF THE TREES HAS BEEN
INJURED.

Sometimes a cold winter is severe enough not only to kill the fruit buds of the peach but also to injure the wood of the tree as well. Such a winter occurred in 1898-9. The question of how to prune the trees after such winter injury became an important one. Fortunately such winters are very infrequent. Should such a winter again occur, however, the following account of our results in cutting back the peach trees would be of interest to the fruit grower.

The winter of 1898-9 was very severe on peach trees. At the Experiment Station the thermometer registered 26 degrees below zero at one time during the cold snap in February, and similar conditions prevailed throughout this section of country. After the freeze it was found that the fruit buds of the peach were killed, except in a few favored spots. The trees themselves were badly injured also. This injury to the trees was worse in some cases than in others, but in general the sap wood was badly discolored, turning brown to the very heart of the tree.

Before cold weather came on, trees were in a condition that might have been expected to render them unusually susceptible to injury from so severe a winter. Instead of properly ripening their wood in autumn, growth continued until cut short by cold weather. Had the trees become fully dormant by a gradual ripening of their wood, instead of being checked by cold weather in the midst of tender growth, no doubt they would have suffered less from the severity of the winter. This late growth was induced by a series of conditions extending

back to 1897. Since there is a lesson to learn here about the cultivation of orchards it may be worth our while to consider the causes leading up to this late autumn growth.

First, nearly all the peach orchards of the State had suffered much from the combined effects of the drought



Fig. 7.—Poor growth of peach tree which was only slightly cut back after severe winter injury.

of 1897 and from bearing an abnormally heavy crop of fruit that year. Trees that were not given unusually good cultivation, to conserve the moisture in the soil until this heavy fruit crop was mature, suffered, and entered the season of 1898 with less than their normal amount of energy and vigor. Having less than their

normal amount of energy to expend, this energy was more quickly used up, which favored shortening their period of growth in 1898. The month of August, 1898, was hot and dry and this induced trees that had nearly finished their active period of growth to begin to shed their leaves and to go into a semi-dormant condition. September and October were unusually moist, warm and springlike, and trees that had gone into partial rest were stimulated into a second period of growth, akin to a spring awakening, and were caught by winter in a growing condition rather than a ripened one, thus rendering them susceptible to winter injury.

As evidence of the tenability of this argument, phenological notes taken at the Station during a number of years show that trees that lack energy shed their leaves uniformly earlier than do vigorous trees of the same kind, and that they are more liable to become partially dormant during a dry time in late summer and then make an autumn growth if warm rains favor it. Studies in orchard cultivation show that proper stirring of the soil to conserve its moisture tends to oppose this undesirable condition of affairs, by promoting a more uniform growth so the trees go into a dormant condition at the normal time, thus avoiding a second active growth. A fuller account of this matter may be found in Bulletin No. 49 from this station on orchard cultivation. Bulletin No. 38 on winter protection of the peach also shows that the hardiness of buds depends largely upon their dormant condition.

The cold weather did not injure materially the root systems of the trees in most cases. Where snow covered the ground, the injury did not generally extend

below the snow line. In some instances where a cover crop had been grown in the orchard the trees seemed to be injured less than where the ground was left entirely bare. This has led to the frequent statement that trees in sod or in weeds were less liable to winter injury than were those that had received good cultiva-

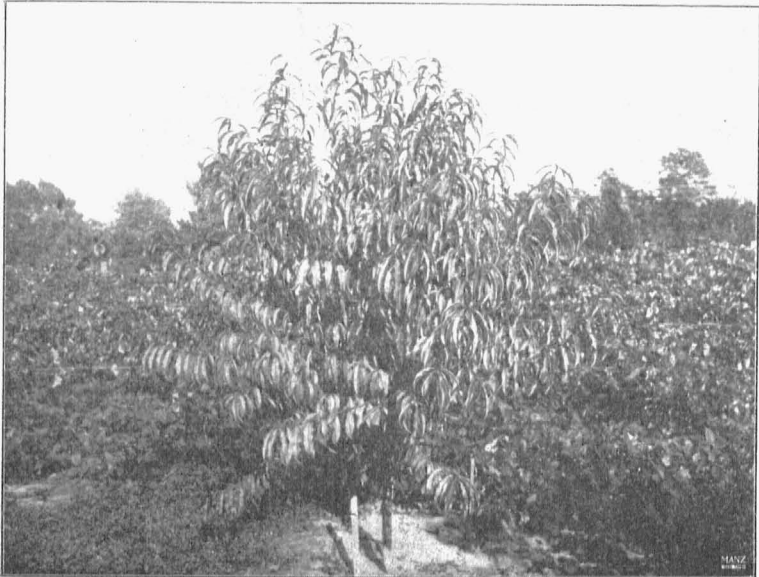


Fig. 8.—One season's growth on two year old peach tree which was properly cut back as shown in Fig. 9.

tion. In the station grounds, however, trees that were cultivated well suffered less and have made better growth than those that were in sod or that were cultivated but little. Observation in many orchards in the State and conversation with some of the largest peach growers have led to the conclusion that well managed

trees suffered least and that allowing the orchard to go to neglect is not a protective measure against severe winters. While we recommend growing cover crops of cow peas or other plants after cultivating during the early part of the season, our observations lead us to prefer a clean dust mulch to allowing the orchard to go uncultivated as a safeguard against severe winters.

The injury to trees seemed to vary in different places. In rare cases some of the fruit buds were not killed and here and there a few peaches were borne the past summer (1900) as a result. Most of the fruit buds were destroyed, however, and in all cases the wood of the trees was badly discolored.

PRUNING TO OVERCOME WINTER INJURY.

As soon as the extent of the injury to the trees by the cold weather became apparent the question of how to prune to enable the trees to regain their vigor began to be discussed. Some growers advised cutting back the entire tree to the uninjured wood, which meant close to the ground in trees that were injured that low, and to the top of the snow or other cover in case of trees that had some protection about the roots, with the hope of training up a single sprout from the stump the next summer. Others advocated the opposite extreme of no pruning at all. Many growers took a medium ground between these two extremes and proposed pruning back so as to leave stubs of the main branches from two to four feet long, according to the age, shape and condition of the tree. This applied to trees of fruiting age, most growers agreeing that very young trees should be cut back about as young trees usually are at the time of

setting. Each of these methods found numerous advocates, and as a result, orchards may be found which show the results of these various methods of treatment.

In answer to numerous inquiries at this time, the station advised pruning back the injured trees so as to leave arms of the main branches two feet long in young trees, to four or five feet long in old trees, depending upon the conditions of the tree.



Fig. 9.—Two year old peach tree properly cut back after severe winter injury.

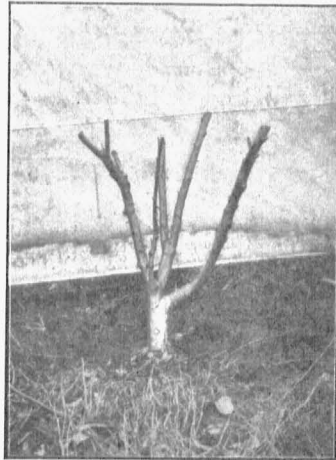


Fig. 10.—Five year old peach tree properly cut back after severe winter injury.

The reason given was that the wood of the trees was so much weakened that the root system would not be able to support growth in the entire tree. Since the root systems were practically uninjured, however, it was thought that root pressure would be sufficient to promote vigorous growth in a small portion of the top if the larger proportion of it were removed.

Hon. L. A. Goodman, Secretary of the Missouri

State Horticultural Society, published an admirable circular of information, advocating a severe but judicious cutting back, which he termed "dehorning" the trees. This was explained to mean cutting back the main branches into two year old, three year old or four year old wood, thus leaving stubs of the main branches a few feet long, the exact amount of cutting depending upon the age, vigor and condition of the tree. Mr. Goodman was lecturing in the Agricultural College at the time and his advice was of great assistance in beginning some experiments in the treatment of injured trees which were being outlined by the Experiment Station.

In view of the conflicting opinions as to the best means of procedure, the station began some experiments to determine the following points:

1. What degree of cutting back is best for injured peach trees of various ages and conditions?
2. At what time should this cutting be done?
3. May young peach trees in the nursery safely be transplanted; if so, at what time should this be done?
4. What will be the relation of good cultivation to the recovery of injured trees?

Peach trees of various ages, from one year olds in the nursery to old, bearing trees were cut back with different degrees of severity, from leaving only the stump in a few cases to cutting not at all in others. In a majority of cases the old trees were cut back into three or four year old wood, thus leaving arms of the main branches three to five feet long. Figure 5 shows a view of some of the peach trees cut back to different lengths and some not cut at all.

Most of the trees were cut back in February, shortly after the freeze. Others were cut back at subsequent intervals, the last cutting being made when the leaves were just starting.

RESULTING GROWTH OF TREES.

As growth proceeded during spring and summer,



Fig. 11.—One season's growth of five year old tree after being cut back as shown in Fig. 10.

the effects of cutting back became apparent. Trees which were not pruned at all started into growth first. For the first two weeks they grew better than did those that were cut back. Their growth was mainly confined to the tips of their branches, there being almost no indication of growth in the body of the tree. The earlier

starting of unpruned trees led some men of hasty judgment to conclude that pruning back was a grave error. One grower near the station said that he had made a grave mistake by pruning; that the branches he had cut off and piled up were starting off better than were the pruned trees in the orchard. In a short time, however the pruned trees began to grow. Their growth which was tardy at first soon became accelerated. In a short time they began to outstrip the unpruned trees which seemed to have used up all their energy in making a start. The full season growth showed that extreme practices of pruning not at all and of pruning so as to leave only the stump of trees of bearing age were alike unsuccessful. Unpruned trees made very little growth during the whole season and this was confined to the tips of the main branches, thus leaving the lower parts of the trees bare of growth and filled with dead twigs. Some of these trees died after they had made a feeble start in spring. Old trees that were cut back to the ground or so as to leave only the stump, died in many cases and those that did sprout made an unsatisfactory growth, the new sprouts attached to the weakened stump being easily broken off. In many cases where this has been practiced in other orchards the sprouts have started from below the original bud so in case they ever bear fruit it will be from the unreliable seedling root.

Figure 6 will give an idea of the average condition of unpruned trees near the close of the season's growth.

Trees that were pruned in the usual manner of cutting away one-third to one-half of the one year old wood fared but little better than those that were not pruned at all. Figure 7 shows the average condition of

trees thus treated. The dead half of the tree in figure 7 shows the amount of pruning that was given.

Figure 8 taken in October, shows the growth made by a two year old tree that was pruned so as to leave only the trunk and short spurs of the main limbs, as shown in Fig. 9.

Figure 10 is a five year old tree properly pruned. It was cut back into two and three year old wood. Figure 11 gives an idea of the growth made after such pruning.

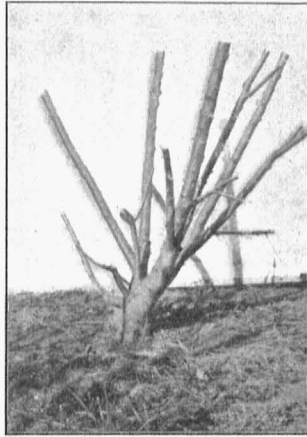


Fig. 12.—Eight year old peach tree properly cut back after severe winter injury.

Figure 12 illustrates a seven year old tree properly pruned back into three or four year old wood. Figure 13 shows one season's growth made by a seven year old tree thus pruned.

Figure 14 shows seven year old trees that were not cut back far enough. This is as the trees appeared in June, having a broomlike growth at the extremities of

the old branches, there being little or no growth in the body of the trees. The lower parts of the limbs are more bare than they appear in the cut. Most of the growth that appears to be down on the old limbs is really on the ends of large limbs that extend toward the front of the picture, their bare bases being hidden behind.

Figure 15 shows two trees in June, that had been well cut back. The one in the foreground had begun good growth right in the inner body of the tree, so as practically to renew the whole head. The one to the left and rear was pruned in the same way but was more tardy in starting into growth. Many trees properly pruned were slow in starting, but subsequently made splendid growth. The tree shown here was one of the last to start, at the time shown having only begun to put out a few leaves. By October, however it had so nearly overtaken these that started early as to be almost indistinguishable from the vigorous looking specimen now shown in the foreground.

The foregoing cuts show better than words can do that the best results were obtained by cutting trees of bearing age back into the two to four year old wood, the severity of the cutting depending upon the age and vigor of the tree. Trees pruned in this way have practically renewed their heads. Their wood has ripened up in good condition, despite the fact that they have made six, eight and even nine feet of new wood. The smaller twigs of this new wood are carrying enough fruit buds to promise a full crop of fruit next summer.

Almost the only healthy wood which exists in peach trees in this section to-day is that which grew during

the past summer. It forms a fresh, vigorous layer outside the discolored and decaying wood which was so much injured by the severe freeze. Examination of numerous trees shows that those which were properly cut back have made, on an average, a much thicker layer of new growth than those which were not pruned. Occasionally a tree which was not pruned has made a good



Fig. 13.—One season's growth of eight year old peach tree after being cut back as shown in Fig. 12.

annual layer of new wood, but this is the exception. It is also noticeable that the injured wood itself is usually softer, more punky and decaying faster in trees that were not pruned. A study of the roots shows that in some cases a part of the root system of unpruned trees is decaying. This is especially true where a section of

the branches above ground has died, as shown in Figure 7.

Good judgment is necessary to determine just how far back a peach tree should be cut in order to renew its head to the best advantage after winter injury. It depends somewhat upon the age and vigor of the tree and also upon the extent to which the wood has been injured. While the above cuts show, in a general way how to do the work and illustrate the growth that results from this cutting, it is not possible to lay down any rule that will apply equally well in all cases. It will be well to bear in mind the following suggestions. Cutting back may be so severe that the remaining stumps will not sprout and the trees will die. The old trunks may have no active buds to push into growth. In general it may be said that the older the wood the more difficulty there is in its sending out new branches and the more slowly it will start in spring. Stated differently, the newer the wood the more readily will its buds start. This was illustrated by unpruned trees starting into growth ahead of pruned ones, and also by the fact that where trees were not pruned very severely most of the new growth was near the extremities of the branches (see fig. 14). Trees that were cut back the least severely, however, made the weakest growth, while the strongest growth was made by those that were cut bak quite severely, provided they were not cut so low as to leave no active buds to make growth. If the wood is not much injured buds will start from older wood than they will if the wood is much weakened. Trees that have a smooth, bright looking bark will more readily send out branches from their trunks

and bare limbs than will those whose bark is thick, rough and dull colored. The amount to cut, then, becomes a choice between leaving too much wood to secure vigorous growth and cutting back so far that buds will not start from the parts that remain.

This "heading in" of peach trees, as it is sometimes called in this section, has been occasionally prac-



Fig. 14.—Peach tree showing unsatisfactory growth on account of not having been pruned back severely enough after winter injury.

ticed by the more extensive peach growers for years. It is not essentially new to orchardists. Many orchardists renew the heads of their peach trees by similar cutting back every few years. In this way they renew the vigor of their trees by promoting strong wood growth and get the heads of their trees nearer the

ground where they may be more readily managed for a few years. The lower heads are more easily pruned and sprayed and the fruit is more readily thinned and gathered. The time usually selected for this cutting back is after a severe cold snap has killed the fruit buds, thus preventing the possibility of a fruit crop. At such a time the trees may be cut back below the wood of fruiting age without loss. A knowledge of this cutting back is useful in enabling the grower frequently to renew his trees. Even though we may not have so severe a winter as that of 1898-9 for many years it will be advisable for growers to understand how to renew their trees by judicious cutting back. The pruning shown in the cuts in this bulletin is somewhat more severe than is often practiced in renewing the heads of peach trees when the wood is not injured. The less the wood is injured however, the more readily it sends out branches, so cutting to the extent here shown may be practiced with safety.

TIME TO PRUNE.

Trees pruned at different times, from just after the freeze until the leaves had made some growth, showed no material difference in the growth. Pruning should be done, however, before the leaves start to any great extent.

RELATION OF CULTIVATION TO THE GROWTH OF INJURED TREES.

At no other time in recent years has the value of thorough cultivation of orchards been so evident as during the summer, following the severe freeze. On the

station grounds there is a marked difference in the recovery of trees that were well cultivated and those that were not. Careful observation of commercial orchards shows that this is generally true. In fact good cultivation has proved to be as important as the method of pruning to overcome the severe effects of the winter. Even where trees were properly pruned, good cultiva-



Fig. 15.—Peach tree in foreground showing good growth in June and one in background showing tardy starting into growth. Both trees properly cut back after severe winter injury.

tion was necessary to properly aerate the soil in spring and to conserve the moisture, later in summer. The reduced tops of trees that were severely cut back were not large enough to carry sufficient foliage to properly nourish the large root systems below ground, and it

became necessary to take every possible means of stimulating a vigorous leaf and wood growth to properly nourish the roots. Nor does the need of good cultivation stop with a single summer.