

PRUNING FRUIT TREES



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Contents

WHEN, HOW AND WHY TO PRUNE		Disposal of Brush.....	10
Seasons for Pruning.....	3	PRUNING VARIOUS	
Pruning Equipment.....	4	TYPES OF TREES	
Types of Pruning.....	6	Apple Trees.....	11
Making the Cuts.....	6	Pear Trees.....	21
Wound Dressing.....	7	Peach Trees.....	22
Pruning to Prevent Weak Crotches	8	Sour Cherry Trees.....	28
Pruning as Related to Growth and		Sweet Cherry Trees.....	30
Production of Young Trees.....	8	Plum Trees.....	30
Pruning as Related to Fillers and		Nectarine and Apricot Trees.....	31
Planting Distances.....	10	Quince Trees.....	31

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PRUNING FRUIT TREES

By

Eldon S. Banta and Freeman S. Howlett

WHEN, HOW AND WHY TO PRUNE

Proper pruning is required to train the trees into a desirable form for spraying, thinning, and harvesting. It is necessary to develop a strong framework, thus increasing longevity of the tree and reducing the loss by wood breakage. Improvement of fruit quality depends, in part, on proper pruning.

The kind and amount of pruning is largely determined by the type, age, and variety of fruit tree. The existing framework, condition of bark and wood, and the growth and fruiting habits must also be considered.

Pruning procedures vary according to whether the tree is of bearing age or is nonbearing. Heavy pruning of young trees delays bearing. On the other hand, there is a tendency to neglect the fruit tree during the first 3 or 4 years. Such a procedure often results in the development of narrow-angled, weak crotches between the main scaffold branches and the tree trunk. Trees must be carefully trained during the first two years after planting. Thereafter, light, corrective pruning is desirable, as it hastens bearing and at the same time helps to develop a strong branch framework.

Insufficient pruning of bearing trees may result in small fruit of poor red over-color, low sugar content, and mediocre

flavor. Fruits from trees that have been over-pruned may also be of poor color, but they will be large. Such fruits usually are rather soft and keep poorly in storage.

Seasons for Pruning

Most orchardists prune during the dormant season. At that time other orchard operations are less pressing, and undesirable branches can be more readily selected. Dormant trees are not "barked" easily by men climbing in the branches, and during the dormant season bark seldom pulls away from pruning wounds.

Wounds usually heal best if the pruning is done during the dormant season just before active growth begins in the spring. Flower buds can be easily detected at this time. They may determine the number and location of the cuts to be made. This is especially true in pruning peach trees.

The need for completing pruning and removing the brush before spraying begins is another reason for dormant pruning. Low temperature injury is the major risk with fall or early winter pruning in Ohio. Trees that have been pruned before severe weather are often seriously injured by sub-zero temperatures that follow.

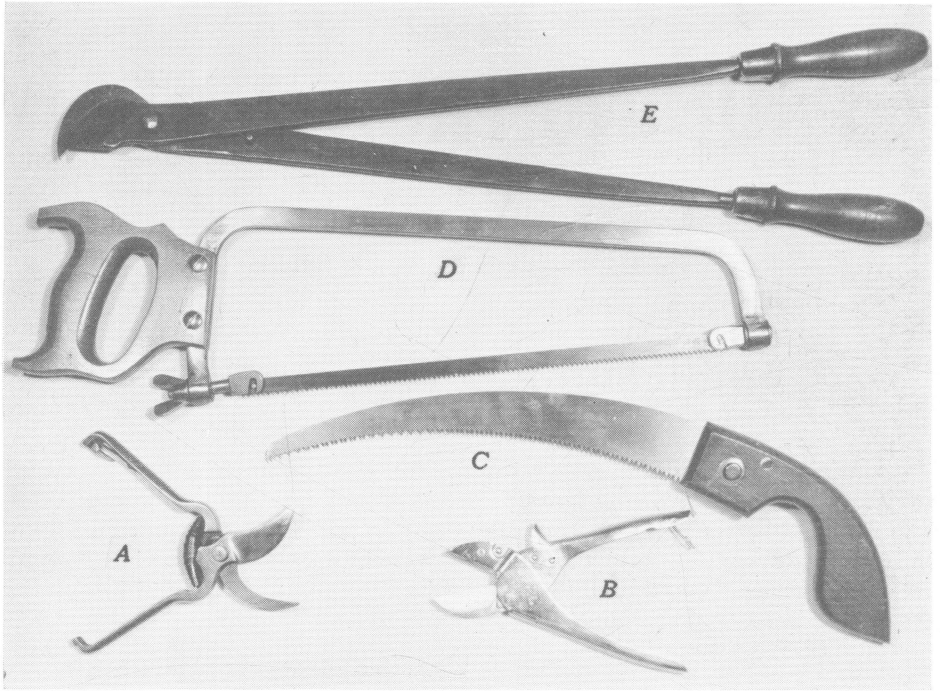


Fig. 1.—Small cuts are made with hand shears. The type hand shears at the left, A, makes snug cuts for all light pruning. The "roll cut" type, B, handles small twigs very easily and is useful for detail pruning.

The curved saw, C, which cuts on a draw, or pull, stroke works fast on larger limbs but does not make as clean cuts as D. The curved saw speeds up peach pruning. The swivel-blade orchard pruning saw, D, makes a clean, close cut in narrow crotches and at difficult angles.

The steel-handled lopping shears, E, are indispensable in peach pruning and are useful for mature apple trees where many limbs over an inch in diameter must be cut. Care in placing the blade of lopping shears against the supporting limb will make a snug cut.

Pruning in November and December is far more hazardous than pruning in late February, March, or early April.

Summer pruning is not generally recommended since it causes more dwarfing of the tree than does dormant pruning. If a dwarfing effect is desired, then summer pruning may be practiced. Water sprouts may be removed in June and July either by hand or shears. These succulent shoots are attractive to aphids, and their removal helps to control this pest with no detriment to the tree or its growth.

Pruning Equipment

For the small orchardist and the home fruit grower, hand tools still provide the best and most economical pruning equipment. (Fig. 1). Hand shears, lopping shears, pole pruners, and pruning saws of various sizes and styles are available. Each tool will perform its job well if the cutting edges are kept sharp and are properly used.

Power Pruning

In recent years commercial orchardists have adapted various types of power-operated equipment to make the pruning operation easier, quicker, and more efficient. Most power pruners work on the principle of compressed air operating a piston which moves the shear head. (Figs. 2 and 3). Some power saws are operated in the same manner. At least one "make" of power pruner operates from the tractor hydraulic system instead of by using compressed air.

Small power chain saws have also been used in orchard pruning. These are especially useful in old orchards which require rather large cuts.

Along with the use of power pruners has come the use of various types of platforms and mobile towers from which the pruning can be done. Some growers have built their own, while others have purchased manufactured products on the market. The development and use of such equipment have increased the efficiency of power pruners and have speeded up the pruning work in large orchards.

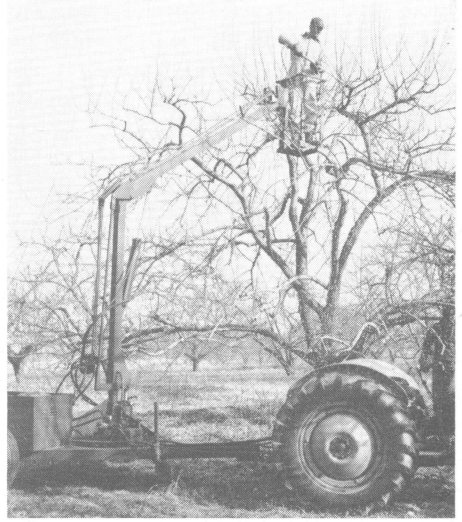


Fig. 2.—Some growers are using mobile hydraulically-controlled towers to increase pruning efficiency.

The use of pruning platforms and towers has also made pruning older trees easier. This type of equipment permits pruning from the outside of a tree towards its center. In this way the outer and higher branches can be thinned easily and effectively. As a result, more light may penetrate the inside of a tree and help induce



Fig. 3.—Some growers have built platforms similar to this one in order to help make the use of power pruning equipment more efficient.

more productive wood in this area. The net results are more efficient use of the entire leaf area of a tree and increased production of well-colored, high quality fruit per tree.

Types of Pruning

The growth response from pruning is localized largely in the immediate area of the cut. Following pruning, small branches and spurs near the cut grow with greater vigor. The growth and fruiting habits on branches not pruned are affected but little by pruning cuts elsewhere. It is often better to distribute several cuts along the entire branch than to remove a single large branch. This provides for more even distribution of nutrients. Small cuts are less likely to induce water sprout growth than are large cuts.

Pruning the young trees is referred to as "training." When numerous cuts are made to reduce the number of large branches or to "open up" a mature tree, it is often referred to as "bulk" pruning. "Detailed" pruning refers to thinning out small



Fig. 4.—Heading back to a strong lateral branch, as shown here, helps to keep tree height under control.

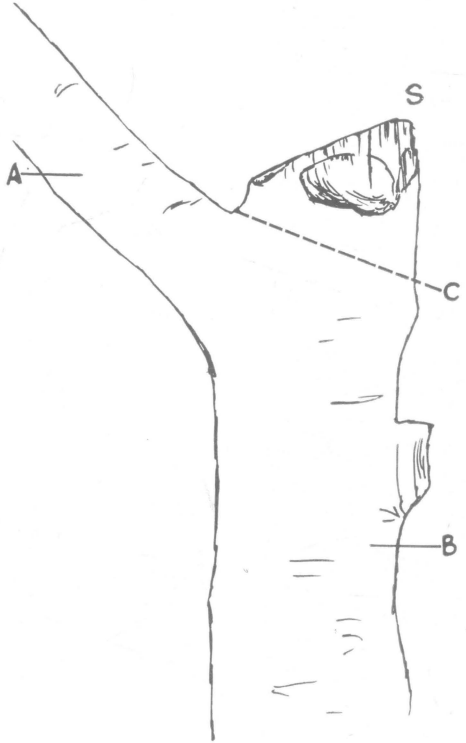


Fig. 5.—The cut S above the lateral A was improperly made and left too high a stub. Line C represents the angle and position at which the cut should have been made across the main branch B. When long stubs remain, decay often develops, and the healing process is delayed. Making proper cuts is especially important when trees are headed back.

branches throughout the tree. "Heading back" refers to removing a part of the terminal growth from a branch, usually pruning back to a lateral. When underhanging branches of small diameter are removed, the term "thin wood" pruning is used.

Making the Cuts

All cuts should be made with sharp tools correctly adjusted. These give clean, smooth cuts. In removing a branch, make the cut close to and parallel with the sup-

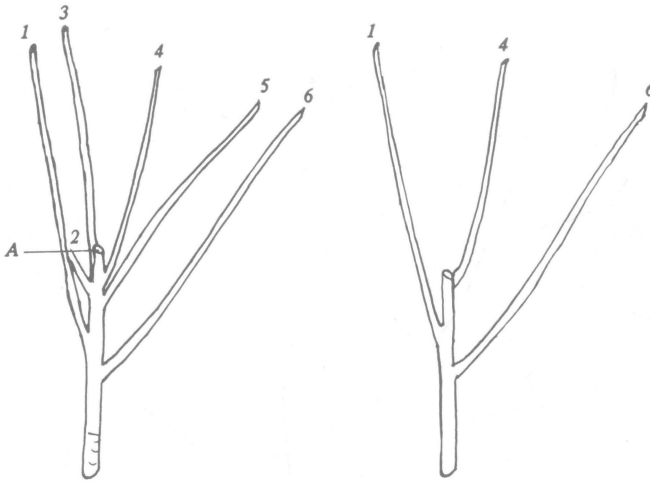


Fig. 6.—Left, the heading back cut made at A forced several buds below it into vigorous growth. A number of such cuts can result in a very thick tree with much unproductive wood. Right, when a condition develops as shown at left, those laterals with narrow crotches should be pruned out. Leave only 2 or 3 well-spaced branches as shown here.

porting limb. When cutting to a lateral, place the cut so it continues the line of direction of the lateral branch. (Fig. 5). Stubs do not heal and may start decay.

In using shears, place the blade against the supporting limb to allow for a smooth close cut. Never wiggle the shears through a cut, as this makes a ragged wound that

will heal slowly, and may spring the shears.

In removing a large limb with a saw, it is often helpful to do so with three cuts. First, make an under-cut 2 inches deep and about 8 to 10 inches out from the base of the limb. Then cut from above starting the second cut 2 or 3 inches nearer the base of the limb than the under-cut. Thus the limb will fall without tearing the bark down into the supporting limb. The short stub can then be removed with a close cut made against the supporting limb.



Fig. 7.—Pruning cuts, properly made, heal quickly.

Wound Dressing

Wounds under two inches in diameter seldom require wound dressings. A wound dressing should be used for larger wounds on main branches or trunks of all fruit trees. The preferred wound dressing has an asphalt base, although others may be used. Paints with lead or zinc are satisfactory. Wound dressings containing bordeaux mixture may injure the cambium and are not recommended. The same is true of creosote paints.

Pruning to Prevent Weak Crotches

A weak crotch usually results when one branch grows from another at a very narrow angle. Crotch weakness may also occur when two or more branches of the same size originate adjacent to each other. The weakness in narrow crotches results from the development of bark inclusions as the tree grows. (Fig. 9).

It is often desirable or necessary to remove entirely certain branches when they begin to develop very narrow angles. If the branch is well located with respect to the general periphery of the tree, it may be headed back severely, thus dwarfing the branch. Eventually it may be removed en-



Fig. 8.—When weak, narrow-angled forks are left at the heads of trees, the result often is splitting. Thus the tree is lost as it reaches bearing age. Proper training can prevent this weakness.

tirely from the tree, especially if another lateral develops which may be used to replace it.

Failure to train a tree properly during the first few years may eventually result in loss of the tree due to severe breakage.

Pruning as Related to Growth and Production of Young Trees

Pruning has a dwarfing effect upon young trees, as has been demonstrated at the Ohio Agricultural Experiment Station and elsewhere. All leaves on a tree contribute food necessary for growth, and any pruning reduces the leaf surface. With young trees, pruning should be only heavy enough to accomplish necessary training purposes. Every unnecessary cut is an economic loss.

Experiments in Ohio have indicated that heavily pruned trees are smaller and do not come into bearing as early as those pruned lightly or not pruned. Unpruned trees, while largest, have been ungainly and with many framework defects. Lightly pruned trees have developed best.

During the first 17 years after planting, light pruning reduced the yield of Baldwin 26 per cent, and heavy pruning reduced the yield 31 per cent, as compared with unpruned trees. With Stayman Winesap, light pruning increased the yield by 11 per cent, while heavy pruning reduced the yield by 28 per cent as compared with unpruned trees. Similar results have been obtained with most other varieties. Golden Delicious and similar varieties that bear heavy while young are less affected by severe pruning than are such varieties as Red Delicious which are often slow to come into bearing.

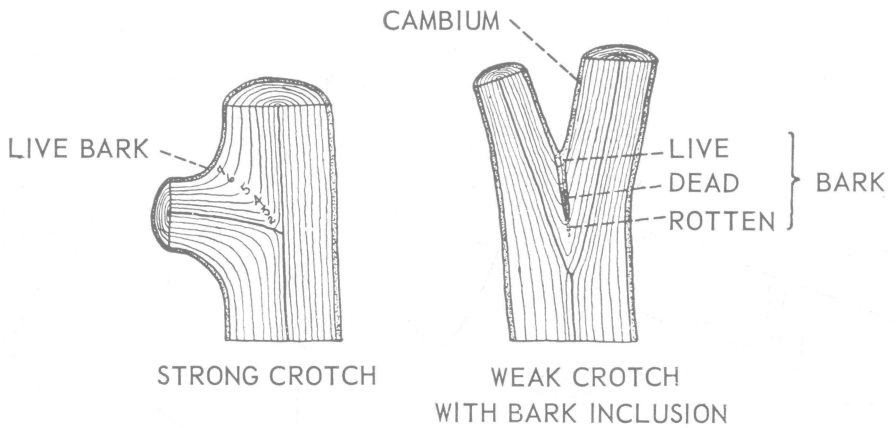


Fig. 9.—Wide crotch angles insure strength. The angle of the crotch on the left is wide. Note relative thickness of the seven successive layers of wood (numbered) laid down by the cambium in this crotch angle.

The angle at the crotch on the right is narrow. The bark of each branch in the crotch angle comes together before the crotch is filled with woody tissue. Annual layers of wood in the crotch are relatively narrow. A cleavage line results from the bark inclusions in the narrow crotch. Note that live bark, dead bark and rotten bark are found in succession down the cleavage line of the crotch, which prevents union and encourages decay. A narrow crotch is weak, splits with overloads, and is often associated with winter injury on adjacent bark.

Use scaffold branches that leave the trunk with a wide angle.

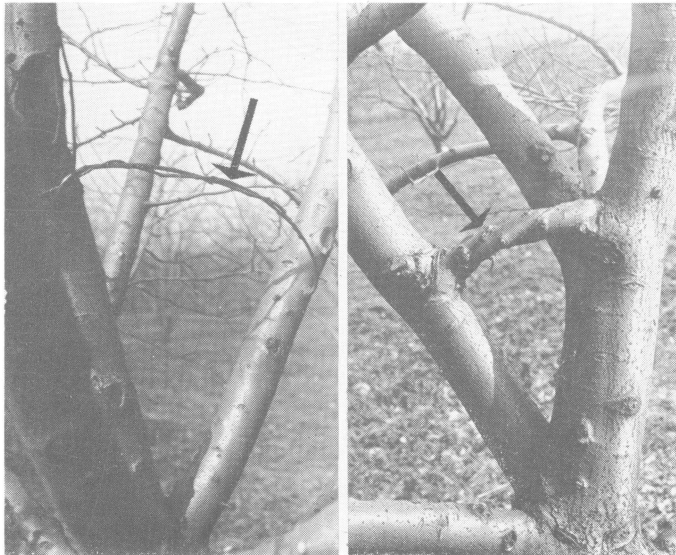


Fig. 10.—At the left are two water sprouts which have been intertwined and tied to form a natural graft brace limb to strengthen a weak crotch. In subsequent growth, a strong permanent brace limb is developed as shown at right. Caution pruners to leave them and not cut them off as freaks.

Pruning as Related to Fillers and Planting Distances

Filler trees are those planted between permanent ones to increase fruit production per acre before the permanent trees fully utilize the area. This method is still followed but not usually recommended. Filler trees are pruned as little as possible, thus encouraging early bearing. Proper training, however, is necessary to develop a strong framework.

As the trees begin to crowd, prune heavily the side branches of the fillers. The permanent trees thus may develop symmetrically with maximum bearing surface. Many heading-back cuts on the fillers will flatten or "fan" them until such time as the permanent trees require all of the area between them. Then remove the fillers because top and root growth will be

competing unfavorably with the permanent trees.

Disposal of Brush

Most fruit growers now leave their pruning brush in the orchard. They rake the brush from beneath trees and pile it in a windrow between tree rows. They then drive a heavy duty rotary mower or brush shredder over the windrow, cutting and shredding the prunings into small pieces. The shredded wood adds some organic matter to the orchard soil. Most machines will handle branches up to two inches in diameter. Larger pieces must be trimmed out and removed by other means.

An older method is to remove the brush from the orchard with a brush rake and burn it, but this is more costly than the above method. Small orchardists, however, may still find this an economical method.



Fig. 11.—Prunings in the orchard can be shredded by heavy duty rotary mowers or similar equipment. This method of brush disposal leaves a small amount of organic matter that otherwise would be removed or burned.

PRUNING VARIOUS TYPES OF TREES

Apple Trees

Modified-Central-Leader System of Training

Experience and research have shown that the modified-central-leader system of training is the most satisfactory method of training apple trees.

The First Year

At planting—When possible it is best to plant 1-year-old unbranched trees of largest size, about 1 1/16 inch in diameter and about 5 to 7 feet tall. This permits heading back to 44 inches after planting. (Fig. 12). This allows for greater vertical distances between the laterals which will form the main scaffold branches than if the trees were headed to 32 inches as was formerly the practice.

If branched one- or two-year-old trees must be planted, then pruning involves selecting the most desirable laterals and removing all others. Selected laterals should have as wide-angled crotches as are possible with the variety at hand. They should be 8 to 10 inches apart, each occupying a different sector of the tree. With some trees, none or only one lateral may be suitable enough to remain. In other cases 2, 3 or 4 may be satisfactory for developing into the main scaffold branches. Only 4 should be left for primary scaffolds. The main laterals are cut to disproportionate lengths. The leader, or top lateral, is usually left about twice as long as the longest side lateral.

Small size one-year-old trees are less desirable than the size mentioned above, but sometimes they may be the only ones available. Such trees should be headed

back to more mature wood depending on height of whip. One lateral branch is allowed to grow into the leader the first year. The second year, training may begin as described above or in the following section on deshooting.

Dwarf and semi-dwarf apple trees are pruned essentially the same as described for standard trees. Dwarf trees on the EM (East Malling) IX rootstock may be headed back to a point about 24 inches above the bud or graft union where the scion variety joins the rootstock, if a low-headed tree is desired. Semi-dwarf trees on EM VII and II are headed to a height of 40 to 44 inches above the bud or graft union.

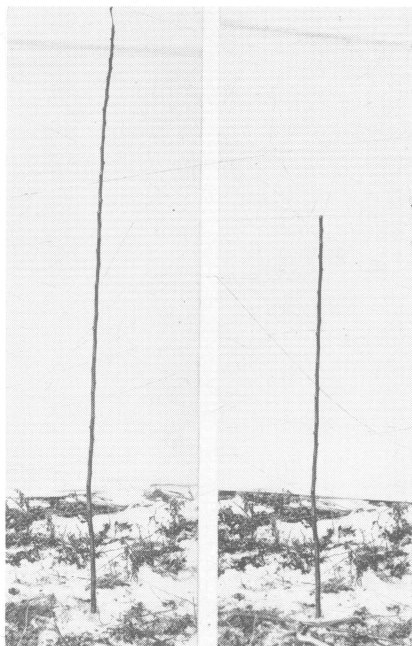


Fig. 12.—Left, one-year-old apple "whip" at planting time; trees 4 to 5 feet in height are preferred. Right, same tree after cutting back to 44 inches in height.

Deshooting—Results of unpublished experiments at the Ohio Agricultural Experiment Station show that removal of unnecessary shoots during the first growing season is most helpful in proper training of the trees. All new shoots are allowed to grow on the tree until early or mid June. At this time 3 to 4 shoots, properly spaced vertically and around the trunk, are selected to become the main framework. All others are promptly removed. The shoots remaining for the main scaffolds should have the widest angles possible, preferably greater than 45 degrees. It may be necessary to go over the trees again a month later and remove any new shoots that arise from the trunk, as these may interfere with growth of the main scaffolds.

On small trees only 2 or 3 laterals may be selected the first year. The remainder, one or two, may be chosen from shoots that develop the second year higher on the trunk.

Spring Pruning—Pruning after the first season's growth usually involves the spacing of primary scaffold branches around

and up the trunk and controlling the dominance of the leader. If deshooting has been practiced the previous summer, then little or no lateral spacing is needed at this time.

Where deshooting was not followed, or when it becomes necessary to make some changes in the framework of the tree, the main scaffold branches of the tree are selected at this time. All others are pruned off. Ideally, the four lateral branches chosen for the framework should be spaced 8 to 10 inches apart vertically on the trunk, the lowest being at least 24 inches above the ground. Each lateral should occupy a quarter sector of the tree.

If a weak crotch has developed between a scaffold branch and the main trunk, it will be desirable to remove the branch. It may be possible to select another lateral from growth made the first year to take its place. If one of the laterals makes exceptional growth to the point of being as long as the leader, between $\frac{1}{3}$ and $\frac{1}{2}$ its length should be removed, thus dwarfing its growth. This will allow the leader to

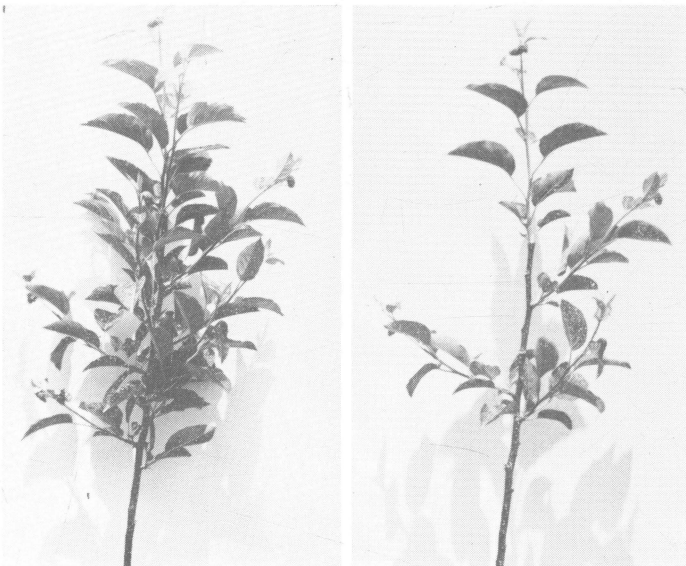


Fig. 13. — Left, one-year-old apple tree during its first growing season, before deshooting. Right, the same tree after deshooting in June. Four primary scaffold branches have been selected; all other shoots were pruned off.

maintain its dominance with respect to the other scaffold branches.

From Second Year to Bearing

If the newly-planted tree is properly deshooted and trained during the first year, little pruning will be necessary for the next 4 or 5 years. During this period pruning is purposely kept to a minimum. It is designed to maintain the shape of the tree through maximum growth of the main scaffold branches. Such pruning involves removal of cross branches that rub together, water sprouts, and small branches from the interior of the tree as well as those which interfere with the development of the primary scaffolds. A branch growing in one direction may not need to be removed completely, but cut back to a lateral, thus directing growth in another direction.

If the leader should tend to outgrow the other laterals and dwarf them, it should be headed back somewhat and possibly have some branches removed from it. In this way the leader may be maintained as the dominant lateral. At the same time its growth will not be reduced to the level of other laterals.

The same principles of pruning and training as described above for standard trees apply to dwarf and semi-dwarf trees. In fact, such trees may need practically no pruning between training and bearing.

Young Bearing Trees

Only light, thinning-out type of pruning is desirable for young bearing trees. Few, if any, large cuts should be necessary. Young bearing trees do not need re-invigoration, and satisfactory growth should be maintained by good soil management and fertilizer practices. The cuts that are made should remove thin, unproductive wood throughout the entire tree. Dead, diseased, or insect-injured wood should be removed as well as water sprouts.

Older Bearing Apple Trees

Trees that are too thick or too high cannot be adequately sprayed. This should be considered when pruning older trees, especially where fixed boom or air blast sprayers are being used. The color of the fruit produced is also an important guide to the amount of pruning. Poor color will, in many cases, indicate a need for more pruning, particularly of the thinning-out type. Heavy pruning, however, may result in large, poor-colored fruits. This is very likely if nitrogen applications have been heavy. The rate of nitrogen application should be reduced when pruning is increased.

Annual pruning is a good practice. When followed, only moderate pruning is necessary. The thinning-out process should remove branches that are severely shaded and which bear few fruiting spurs. Small diameter branches may be removed to thin out thick areas. Branches that bend to the ground need to be removed or headed back to upward-growing laterals.

Diseased, broken, and insect-injured branches should be removed in the pruning process. Interfering branches that may cause limb rubbing are undesirable.

The most desirable height of older trees is between 15 and 18 feet for effective spray coverage and efficient harvesting. In heading back tops of trees, it is best to cut to a strong lateral. Failure to head back to a lateral will result in a whorl of shoots that makes a very dense unproductive top.

Annual dormant pruning of bearing trees helps to promote regular bearing. Such pruning helps to reduce fruit overloads, as well as the labor expenditure for hand thinning. When pruning is irregular, trees become overthick and often biennial in bearing habits. Crop overloads result in further exhausting the tree dur-

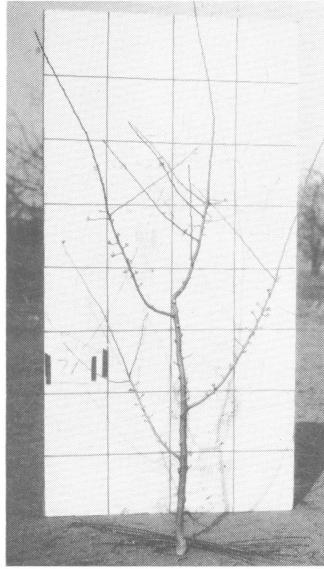
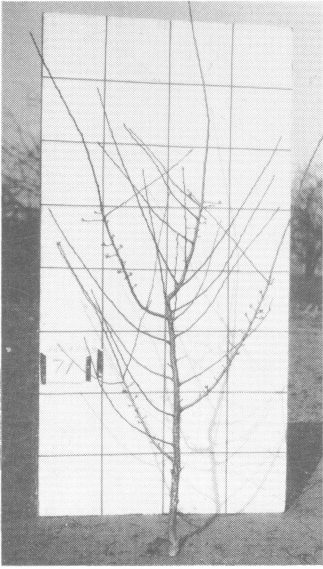


Fig. 14.—Stayman Winesap apple tree after two years' growth in the orchard; left, before pruning and right, after pruning. Note that branches from the main trunk, which compete with the main scaffolds, have been removed.

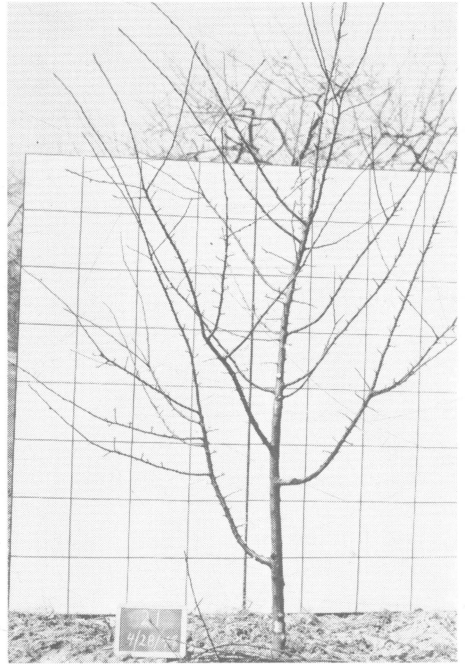
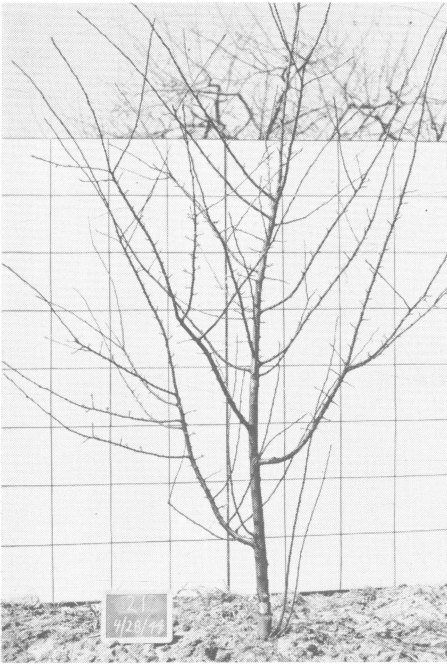


Fig. 15.—Another Stayman Winesap tree after four years' growth in the orchard; left, before pruning and right, after pruning. Note that the center of the tree has been kept open while little pruning has been done on the lateral branches.

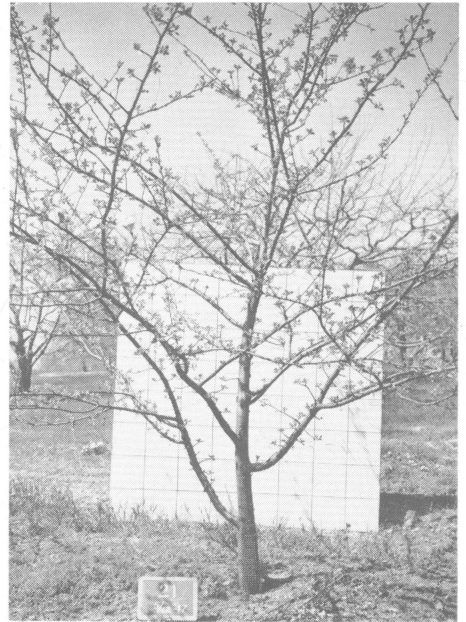
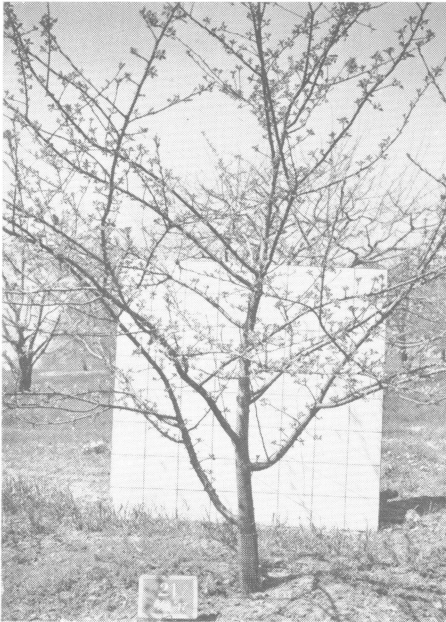


Fig. 16.—The same tree as in Fig. 15 after seven years' growth in the orchard; left, before pruning and right, after pruning. It is especially important during the early years of tree forming to remove as little wood as possible. The more severe the pruning, the later the trees will reach bearing age.

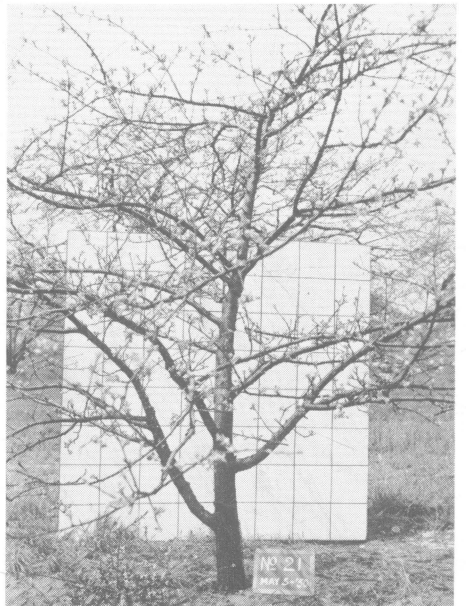
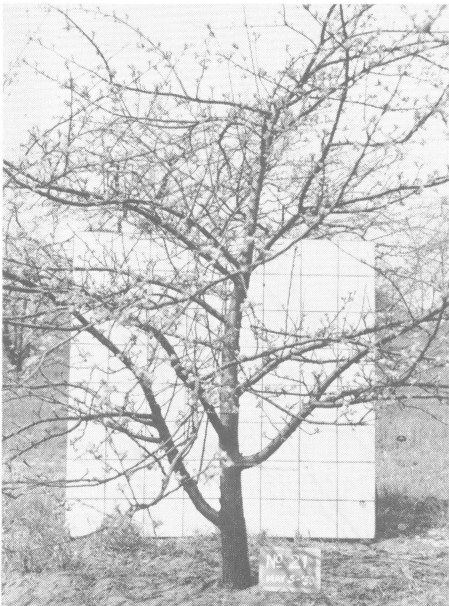


Fig. 17.—The same tree as in Fig. 15 after 10 years' growth in the orchard; left, before pruning and right, after pruning. Even at this bearing age, very little wood should be pruned out annually. Removal of a small amount of wood each year maintains a better shaped and more productive tree than severe pruning every 2 or 3 years.



Fig. 18.—A mature Jonatan tree with strong, open framework that will carry heavy crops of highly colored fruit. This is the result of proper training during the first few years of the tree's life.

ing seasons favorable for heavy cropping as well as adding to the expense of thinning.

Individual Varieties

Apple varieties differ in growth and fruiting habits. This makes it advisable to consider the growth habit of each variety when developing pruning techniques.

Yellow Transparent—Trees of this variety produce many branches and become very dense. When the main branches are well spaced, the weight of fruit spreads the tree quite satisfactorily. This variety needs very little heading back to outward growing laterals, if enough large branches are removed by pruning. Small cuts, well distributed on branches which are left, help considerably to improve size of fruit. The amount of thin-wood pruning should be increased as trees grow older.

Yellow Transparent is greatly benefited by pruning just ahead of expected heavy crops as well as by early fruit thinning. Since it is difficult to sell small fruits, both pruning and thinning are needed in

a relatively high degree to improve size of this variety. Over-pruning should be avoided since it induces succulent growth which is quite susceptible to the fire blight disease.

Lodi—Lodi is similar in growing habit to Yellow Transparent, and should be pruned in a similar way.

Wealthy—Red over-color is important with Wealthy, and the pruning program should never allow the trees to grow dense. If Wealthy is allowed to overbear, it becomes a weak grower and a biennial cropper more quickly than if moderate annual crops are encouraged. It is important to do considerable thin-wood pruning throughout the tree in order to promote vigorous productive growth. It is necessary to maintain a considerable amount of shoot growth on Wealthy. Pruning, then, should have this objective in view. Hand thinning early in the season increases the number of fruits larger than $2\frac{1}{4}$ inches in diameter. It also improves color measurably.

Moderate annual pruning is recommended with the Wealthy variety since it is susceptible to fire blight. Heavy pruning may result in succulent growth which is very susceptible to this disease.

Franklin—Franklin tends to bear fruits throughout the tree in a pattern similar to McIntosh, one of its parents. If the tree is permitted to grow too dense, a large percentage of the fruits will be poorly colored. Detailed, annual pruning, therefore, is essential to the production of highly colored Franklin apples. Franklin's bearing habit, similar to McIntosh, makes it necessary to thin out rather heavily the centers of trees. Other pruning practices described for McIntosh also apply to Franklin trees. It is important to restrict the amount of nitrogen applied to Franklin trees, if the highest colored fruits are to be produced.

McIntosh—The McIntosh variety, if trained well in the beginning, tends to produce scaffold branches with reasonably wide-angled crotches, thus resulting in a spreading type tree. Adequate limb spacing is, therefore, important to allow thorough spraying for pest control, especially scab. The tops should never be allowed to grow too tall or dense to spray thoroughly.

McIntosh does not usually set as heavily as Golden Delicious. It tends to produce fruit spurs throughout the tree, and proper pruning is important in securing well colored fruit of good size. These spurs should be removed, as they appear, and the tree should be kept open to favor good sunlight exposure. To maintain high color on this variety, nitrogen applications should be kept at a minimum; the rate should be in accord with the degree of pruning.

Cortland—Cortland trees develop many small branches and need pruning to re-

duce the number of these branches. Detailed pruning is thus required. Removal of slender underhanging branches is very important with Cortland as these produce poorly colored fruit and shade other branches and fruits. Larger branches may be thinned out by distributing small cuts beginning at the end of the branch and working to its base.

Jonathan and Its Red Strains—Trees of Jonathan and its red strains develop many branches varying in size from small to medium. Soon after the trees come into bearing, shading occurs throughout the tree, a fact which can be particularly serious. Branch spacing and thin wood pruning, properly carried out, will encourage production of fruits of desirable size and color, since this variety does not respond well to heading-back cuts. It is best to confine pruning to branch removals and to distribute small cuts on the remaining branches.

Proper pruning is essential to improving fruit size of Jonathan. In many cases it may be even more important than hand thinning in this respect. Thinning experiments have shown a rather narrow margin of actual profit on well pruned Jonathan trees. Possibly most hand thinning can be eliminated when proper pruning and chemical thinning are carefully done.

Heavy pruning of Jonathan will increase the hazards from fire blight, a disease to which this variety is very susceptible. It may also reduce fruit color. Nitrogen fertilization should be restricted on this variety in order to improve color and to reduce fire blight susceptibility. The heavier the pruning, the less nitrogen should be applied.

Melrose—Melrose develops naturally a structural framework intermediate between its two parent varieties, Jonathan

and Delicious. The variety tends to form crotches of a somewhat wider angle than Delicious but narrower than those of Jonathan.

A relatively large number of medium-size branches develops as the tree reaches bearing age. These are larger than those found in Jonathan but slightly thinner than those developing in Delicious. Consequently, pruning of the maturing tree requires removal of a number of these branches throughout the tree. This will permit entrance of sufficient light to encourage proper development of the attractive red over-color which Melrose fruits can have.

Since the fruits of this variety tend to become over-size, proper coordination of thinning and pruning is necessary.

Delicious and Its Red Strains—Delicious and its various strains possess an inherent tendency to develop narrow crotches. Such crotches frequently develop bark inclusions which contribute to a weakened crotch structure. Therefore, deshoooting and corrective cuts, to space the most desirable branches along the stem of the newly planted tree, are important in early training. When necessary, braces developed from intertwined water sprouts can be used to help strengthen weak crotches.

Delicious may develop too many medium-size branches, resulting in over-dense trees, unless wise removal of excess branches is carried out. Since this variety is planted primarily for sale fresh for eating, sufficient annual pruning is necessary to produce a high percentage of attractively colored apples. This means that trees must be kept reasonably open to permit entrance of sunlight. Removing small diameter and underhanging branches from both the interior and the periphery of the tree will allow light to enter.

Delicious has a somewhat precarious fruit-setting habit. Detailed pruning with hand shears may improve the set of fruit. Hand thinning may be important with Delicious to secure a high percentage of large well-colored fruit, particularly if pruning has not been properly done.

Golden Delicious—This variety is an early bearer. Consequently, tree form should be developed as early as possible. It is not difficult to develop a strong, well-shaped scaffold system on this variety.

Golden Delicious has a tendency to develop weak, narrow-angled crotches, but the tendency is not as strong as that of Delicious. It is, therefore, necessary to develop a framework with wide-angled crotches. Developing branches often become long, and with the first heavy crop of fruit they break because the wood of this variety is rather brittle. It becomes necessary, therefore, to prune annually and to keep all branches within reasonable lengths.

This variety tends to set fruit heavily in alternate years, especially on the smaller wood in the center of the tree. Fruits produced in the shaded interior are usually of inferior size, green color, and mediocre quality. Therefore, annual, detailed pruning in the interior section is necessary to remove most of the thin wood which produces the inferior fruit. Branches in the outer portions of mature trees also need considerable thinning out, and some heading back of long branches annually.

Stayman Winesap and Its Red Strains—This variety tends to develop many coarse, rather large branches. Consequently, heading-back and proper selection of primary and secondary branches are necessary on young trees. As a maturing tree, Stayman Winesap is an open grower which requires few large branch removals. Corrective cuts, when necessary, should be made to avoid double leaders or weak crotches.

Stayman Winesap sometimes develops many sharp-angled, weak forks. Making corrective cuts to eliminate these structural weaknesses before the branches attain large size is desirable. Frequently, water sprouts can be intertwined between weak crotches to make a natural brace and strengthen the framework. Because Stayman is an open grower, lopping shears can be used considerably in the pruning work. Small cuts, well distributed, give a large food supply to the remaining fruit spurs.

Turley—Turley is a Winesap seedling and should be pruned similar to Stayman Winesap.

Rome Beauty and Its Red Strains—Trees of this variety are characterized by many slender branches which cause much shading. Hand and lopping shears should be used to prune bearing Rome Beauty trees. This pruning will open the thick areas at the ends of the fruiting branches with each large branch being pruned as a unit from the end back to the base. The cuts are distributed as evenly as possible, and weak wood is removed. It is important that the cuts be well scattered. Underhanging slender branches should be removed. On old trees it is necessary to prune from ladders placed to reach the outer portion of each large limb, or to use pruning towers or platforms.

A common mistake in pruning bearing Rome Beauty trees is to start at the base of a large branch and prune outward, taking off all branches for a considerable distance. This leaves a long stretch of naked wood toward the base of the branch, with a cluster of unpruned bushy twigs at the end.

Well-pruned bearing Rome Beauty trees need a relatively small amount of hand thinning of the apples during the growing season.

Ruby—Trees of Ruby are prone to develop narrow-angled crotches. In this respect it is similar to its two parents, Gallia Beauty and Starking. Therefore, in training the young tree, it is essential to use all possible methods in developing a primary scaffolding with wide-angle crotches.

The growth habit of Ruby is intermediate between Gallia Beauty or Rome Beauty and Starking, but more nearly resembles Gallia Beauty. Pruning mature trees is similar to that of Gallia or Rome Beauty.

Rejuvenating Older Trees

Apple varieties produce fruits of the highest quality and return the most profit during the period between 15 to 25 years of age. Under present circumstances it is recommended that apple trees be removed shortly after they have reached 30 years. This recommendation is based upon economic considerations in both production and marketing of apples.

Possibly, under special conditions, a given orchard might be continued for a longer period. In such cases it is usually necessary to rejuvenate the older trees through rather thorough and skillful pruning. Tall branches can be headed back to strong side laterals at desirable heights. Such pruning should not leave weak branches at the cut. If large openings are left in the center of the tree, sunscald may develop on the main scaffold limbs, and their future life maybe impaired. This type of injury cannot be avoided if a heavy rejuvenation is carried out.

To rejuvenate older trees you must understand the principles of tree growth, then develop your skill in pruning accordingly. If you are in doubt as to procedure and extent of pruning, you should

depend mostly on detailed thinning out of the branches in tree tops and in the outer and lower segments of the tree. It is necessary to shorten or remove long lateral branches that droop down and excessively shade those beneath them.

When a tall tree is lowered, it is usually best to stretch the pruning over a 2- or 3-year period. Thus, if you want to lower a tree 6 feet, you would remove 2 feet of the older wood each year for 3 years. This method helps to reduce the number of water sprouts developing in the tree tops each year as a result of pruning.

Crowded Trees

Frequently, overcrowding occurs in orchards because the planting distances were close, and all trees are permitted to remain for the life of the orchard. The present tendency to plant trees more closely naturally results in the trees becoming crowded sooner than was formerly the case. By using the triangular system of planting, you may plant a greater number of trees per acre, yet the distance between

trees may be great enough to avoid crowding in the later life of the orchard.

When very close plantings are made, the early removal of alternate trees is essential to continued production of high quality fruit in the orchard. If these trees are not removed, long-lasting ill effects on both trees and fruits can result.

Cutting out the diagonal rows to stagger the trees sometimes relieves the situation. Trunks of filler trees can be marked with paint. Then heading-back pruning can prevent excessive crowding until circumstances warrant removal of the trees.

After the appropriate trees in a crowded orchard have been properly removed, the remaining trees can be pruned effectively. They usually produce higher quality fruit than could have been secured if all the trees remained.

Other Systems

The vase-form or open-center systems of training and pruning are sometimes used with the apple tree. When these forms were in fashion years ago, a large or excessive number of primary scaffolds



Fig. 19. — When large pruning cuts are made on mature trees, they often induce heavy water-sprout growth as shown here. These are usually removed in subsequent pruning; however, a water sprout is occasionally used to replace a branch that has broken or has been pruned away.

branches were left to form the tree framework. The primary disadvantage in this was that the crowded branches had narrow, weak crotches subject to breakage and low temperature injury. If only three, or at the most four, wide-angled laterals are left on the two-year tree, the crowding of branches and narrow crotches may be largely prevented. If no additional laterals are allowed to develop during the following years, then the open-center tree may become as satisfactory for fruit production as one trained to the modified-central leader system.

The open-center systems of training may be at least as satisfactory as the modified-central-leader system for dwarf and semi-dwarf trees. This is particularly true when mature trees are to be maintained at not more than 12 feet in height.

Pear Trees

The authors of this publication strongly recommend that pear varieties be propagated on Old Home blight-resistant intermediate rootstocks. This procedure does not enhance the blight resistance of the susceptible variety. It does, however, greatly reduce tree losses that ordinarily result from fire blight infection in the spurs and shoots originating from primary scaffolds and the trunk.

Old Home Stock

The one-year tree of Old Home should be stimulated to make vigorous growth during the second growing season. This will cause development of branches of sufficient size for inserting the buds of the desired variety into the laterals of Old Home originating from the trunk. The budding is started during the summer of the second growing season in the

orchard and should be completed by the end of the next growing season.

If two-year-old trees are planted, the usual procedure is to select six or more well-located laterals for use as scaffold branches. Each is headed back at a point 3 to 6 inches from the main trunk. This procedure will usually result in the development of vigorous growth from buds close to the end of the laterals, including the leader. As soon as the new growth develops sufficient diameter, buds of the desired variety may be inserted.

If one-year-old unbranched trees are planted, the whip is simply headed at a point 36 to 44 inches long. Lateral branches will develop and some may become large enough for budding during the first summer.

Stock Other Than Old Home

If trees of the desired variety are planted, that is, Old Home is not used, then much the same procedure may be followed in pruning at planting as with the apple. The one-year whip is headed back to mature wood or to a height of about 36 to 44 inches. All laterals are allowed to grow at will during the first season.

If two-year-old trees are planted, six or more well-located laterals are selected and headed back to unequal lengths. Undesirable laterals are removed. The dominant lateral is left longer than the others, which are also intended for scaffold branches. This is similar to the apple except that several more laterals are allowed to form scaffold branches.

Nonbearing Trees

The same procedure is followed with pear as with young apple trees. The development of strong crotches is equally important, but if too vigorous growth is induced fire blight may be greatly increased in the young tree.

Prior to bearing, pear trees may appear too dense due to the upright-growing branches. However, later the tree will spread naturally from crops of fruit. As a result, it is unnecessary and hazardous to remove branches to thin out the tree. Thinning out the branches of the young pear tree may stimulate vigorous new growth which is very susceptible to fire blight. Very little pruning is the rule.

Bearing Trees

Very light pruning is practiced on bearing pear trees. Even moderate pruning may induce development of water-sprouts and fast-growing terminal growth. This type of growth is very susceptible to fire blight infection.

Pruning cuts may be restricted to branches that severely rub each other and to water sprouts as they appear. In all cases, only cuts to remove limbs of small diameter should be made. Heading back of terminals should never be done except as the tree becomes too high. Heading back to a lateral branch at that time should be light and cuts made in the smallest diameter wood possible. It is not necessary to prune pear trees each year because new growth should not be heavy or vigorous. However, each year the trees should be examined to determine if pruning is necessary.

Removing Blighted Terminals and Water Sprouts

During the winter pruning and before growth starts, blight cankers on branches and blighted terminals should be removed. Cankers can be easily detected by their dead, blackened, and sunken appearance. Blighted terminals are blackened and often retain the dead leaves through the winter.

Beginning shortly after bloom inspect the trees frequently until midsummer for shoots and spurs that may be infected with blight. Promptly remove the diseased portion 4 to 6 inches below the obviously injured part and carefully disinfect the wound. A satisfactory disinfectant may be made by mixing 1 part bichloride of mercury (poisonous) and 1 part cyanide of mercury (poisonous) in 500 parts of glycerine. Some dye may be added to make the treated points identifiable.

Water-sprouts, short growths, and spurs on trunk and lower branches should be removed prior to blooming. This will eliminate possible blight infection of flowering points at the terminal ends of these spurs and short growths, thus protecting the trunk and main branches to a considerable extent.

Peach Trees

The open-center system has been the most common training method followed in Ohio, although the modified-central-leader system is practiced in some areas. One reason for this probably is the ease with which a peach tree can be trained to the open-center system.

The First Year

Open-Center Training

Beginning with the one-year-old peach tree, the procedure is to select 3 or 4 laterals that are well spaced vertically and around the trunk. The lowest branch should be about 15 inches and the highest 30 to 32 inches above the ground. The main stem or trunk is cut off just above the topmost lateral. All other laterals are removed except those to be left as scaffold branches. These are cut back to short spurs with two buds. If no desirable laterals are available, all laterals should be

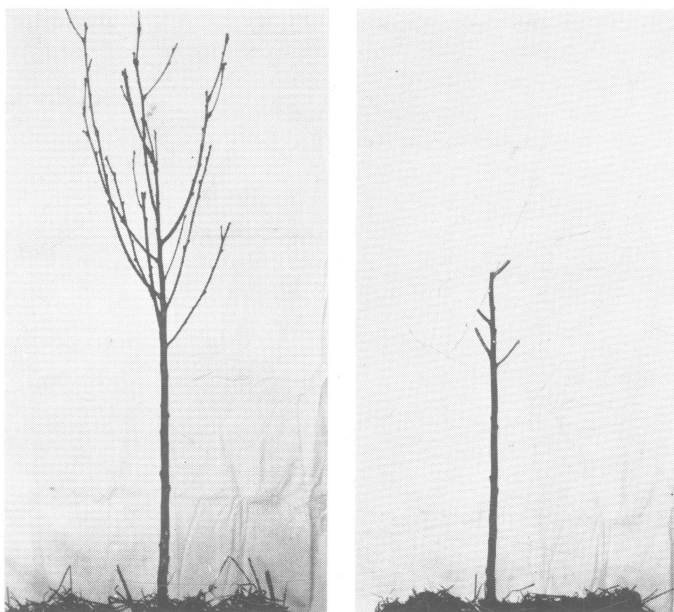


Fig. 20. — One-year-old peach tree at planting (left). Same tree after pruning (right). The tree was cut back at about 30 inches in height with four well-spaced side branches remaining to develop into the main scaffolds for an open-center-type tree. Only three of these need to remain after the first growing season.

removed and the whip headed to about 24 inches high, and all branches cut back to one bud. All side shoots may be allowed to develop during the first growing season, or deshoooting may be practiced in June as was described for the apple tree.

After the first year's growth, 3 or 4 strong, outward-growing lateral branches, well-spaced around the tree, are selected to form the head. All other branches originating on the trunk are removed. Two to four inches of vertical distance between the primary scaffolds are desirable. Any strong, upright, central shoots and those that cross the head should be removed. The lateral scaffolds should be headed back only where growth is excessive without branching. One or two strong secondary laterals on each primary scaffold are allowed to develop. No laterals should be left closer to the trunk than 15 inches. These secondary lateral branches are best trained somewhat upright and to the outside by making thinning-out cuts and

heading back to strong outward-growing laterals.

Injury to terminals during the growing season from oriental fruit moth often



Fig. 21.—Peach tree after one year's growth with top removed and trained to the open-center system. Note the wide angles between scaffolds and the main trunk.

stimulates lateral branching. If this injury is extensive, and if trees become too dense, some of the laterals should be thinned out. It may be desirable to do some thinning-out pruning during the summer to direct growth where it is wanted.

Sometimes the scaffold branches may be stunted during the first or second growing season. This is particularly true when winter injury damages the young tree. On such trees, one or more strong shoots may arise from the trunk below the scaffolds selected. In such cases it may be best to prune away the old scaffolds and build a new framework from one of the vigorous branches.

A modification of the open-center method has been adopted in some other states and in Ohio to a limited extent. This method involves the heading back of trees at planting to 24 to 30 inches in height. Several lateral branches develop the first season in the area 6 to 12 inches below the cut. In early or mid-June 2 or 3 of these laterals are selected to become the main scaffold branches. The scaffolds selected must have wide-angled crotches, preferably 60 to 90 degrees, with the main trunk, and may be close together. All

other branches and the terminal growth are then cut to one-half or one-third of their original length.

This procedure leaves considerable leaf surface on the tree and yet provides for maximum growth of the 2 or 3 main scaffolds. It may be necessary to head back a second time during the summer the more-vigorously-growing extra laterals that were first headed back in June. The extra laterals may be removed completely the following spring during dormant pruning. Some may be headed back again, then removed completely during the second dormant pruning. It is necessary to keep any new branches from developing in the crotch area by removing them as they appear. The 2 or 3 main scaffolds, if properly selected, may grow into a productive and long-lived tree.

Modified-Central-Leader Training

Large vigorous peach trees are well-adapted to this training system. This method is essentially the same as that described for apples. Peach trees, however, may be headed somewhat lower at planting, preferably 36 to 40 inches high. Laterals lower than 15 inches above the ground should be removed. In early June



Fig. 22. — Deshooting is an effective method of establishing strong frame work on peach trees. The one-year tree is cut to 2½ feet at planting, and the lateral shoots are cut to 1 and 2 buds. When shoots are 8 to 12 inches long in June, 4 or 5 well-distributed ones are selected as shown on right.



Fig. 23.—Peach tree after one year's growth trained to the modified-central-leader system.

the best 3 or 4 wide-angled branches can be selected for the tree framework.

All other branches may be removed at that time by deshoooting, or they may be severely headed back as described in the

previous section. Later, at the time of the first spring pruning all unnecessary laterals may be pruned off. The framework of the tree should be established at least by the second growing season and preferably the first. Future training will be primarily for developing a symmetrical and open habit of growth.

From Second Year to Bearing

Once the tree framework is established, the only pruning necessary for 3 or 4 years is that which will keep the center open. Any dead, broken, or injured branches should be removed each year. Secondary branches arising on the lower part of the primary scaffolds are often the first branches to bear fruit and should not be removed during the first few years. Some branches may need to be thinned out after the second or third season. When the low branches cease to bear quality fruit they should be removed.

Any heading back of the main scaffold branches should be delayed until the tree comes into bearing. The one exception to this is when a main scaffold grows so vigorously that it unbalances the tree. Such a branch should be headed back to



Fig. 24.—A mature peach tree trained to the open-center system.

a desirable secondary lateral branch during the spring pruning. If necessary to reduce its growth even more, the branch may be partially deshooted in early June.

Light pruning of young peach trees gives two distinct advantages: (1) it promotes early, heavy fruit production, and (2) the early fruit production helps to develop an open type of growth which is essential for maximum production of quality fruit. Light pruning may also aid in reducing tree susceptibility to winter- or low-temperature injury. Research results at the Ohio Agricultural Experiment Station and those in other states have supported these advantages of light pruning.

Bearing Trees

A well-grown peach tree usually begins bearing the third or fourth year. At this age pruning is light, with only a few cuts needed to keep the center open and the bearing wood thinned out.

It is necessary to prune bearing peach trees every year in order to insure satisfactory production of terminal growth and fruiting wood, as well as for a maximum of quality fruit. Thus, good pruning practices promote the renewal of healthy fruiting wood. Since flowers of the peach tree are formed on terminal growth of the current season, the greater the amount of terminal growth the larger the prospective fruit crop. One reason for keeping the peach tree open is to provide favorable conditions for maximum development of terminal growth throughout the tree, and hence an evenly distributed crop on the tree.

Well-grown peach trees seldom fail to form sufficient flower buds for a heavy fruit crop. Usually there are far more than needed for a satisfactory crop, thus fruit thinning becomes necessary. Prun-

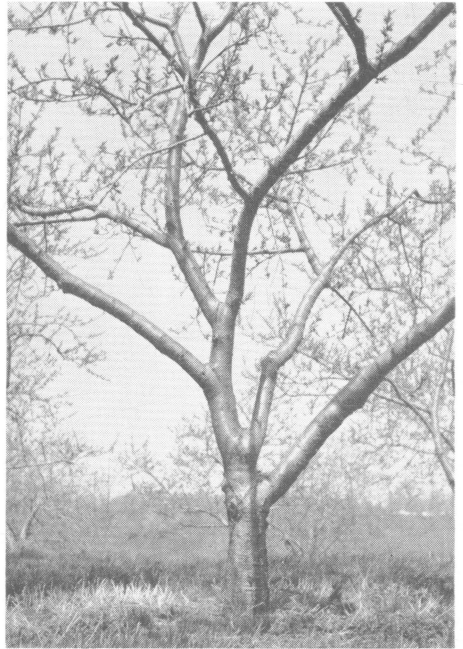


Fig. 25.—A mature peach tree trained to the modified-central-leader system.

ing, can greatly reduce the amount of thinning necessary with the peach tree.

When and How Severely to Prune

Pruning practices for bearing peach trees in Ohio are often determined by the kind and amount of winter killing of flower buds and wood. When examined internally, flower buds killed by low temperatures have dark centers. Winter-injured wood shows brown discoloration. Usually a temperature of 10 degrees F. below zero is critical for dormant wood and flower buds, with considerable variation by variety and conditions of tree growth.

It is recommended that pruning be delayed until after danger of winter killing of buds and wood is past, at least until late February or early March. The proper amount of thinning-out pruning, with

large cuts as needed, can then be given. If no winter injury to flower buds has occurred, general over-all pruning may be practiced.

When part of the buds have been killed, very light pruning is advisable. Heavy pruning would reduce yield without improving quality. Usually the largest number of live buds is in the tops of trees. Thus pruning should take advantage of this situation and provide a maximum of bearing wood in this area of the tree.

If all flower buds appear killed, delay pruning until blossoming time. Then, if no blossoms appear, thin out the trees and cut them back sufficiently to keep them at desirable sizes and heights. The tree may be pruned at this time to provide for equal branch distribution and the development of bud-wood throughout it. Some small well-placed laterals should be left at desirable locations to provide for development of new fruiting wood during the next few years.

If the crop is lost and wood severely injured, there is great temptation to "dehorn" peach trees with large heading-back cuts. Experience has shown that cutting back to stumps of limbs, after wood is severely winter injured, is often fatal. The best procedure is first to apply in early spring a liberal application of quickly-available nitrogen-carrying fertilizer, such as nitrate of soda or ammonium nitrate. After growth starts, the dead wood should be removed as quickly as possible. If the trees recover well, cuts may be made to lower, thin out, and spread the tree top.

Where trees have had some neglect and the crop has been killed without injuring the wood, a mild dehorning may have a place. In this case, it is best to keep the cuts in wood that is 2 or 3, but not over 4, years old. Some of the prominent secondary branches may be left on the primary scaffold limbs. These branches may be headed back lightly. When dehorning,

cut out entirely the most objectionable upright branches in the center of the tree. Prune the tree to form a low, open, and spreading type of framework.

When uninjured peach trees are dehorned heavily, the resulting growth is too profuse and rank to train easily. It may not bear heavily for 2 or 3 years. Dehorning, therefore, can never take the place of keeping bearing trees in proper balance and vigor by well-planned, annual pruning.

Placing Renewal Cuts

As peach trees reach a height of about eight feet, it is important to head the upward growing branches back to strong outward growing laterals. This cut to a lateral can serve as a renewal point for several years. It is preferable to make the cut at a height you can reach easily with lopping shears or a short pole pruner while standing on the ground. Make a renewal cut on each main branch as soon as it reaches sufficient height to require such a cut. This cut is ordinarily made in two-year-old wood, but sometimes it is necessary to make the cut in older wood. Remove the largest upright branch at a prominent crotch at the renewal height.

New shoots develop near the renewal cut. The best of these can be used the next year or two for fruiting. The larger upright branches near the cut are pruned away in succeeding years. In this way, the tree is kept within bounds and maintained in an open-spreading form.

Often, 1 or 2 cuts of the heavier upright wood near the renewal cut will be enough each year to keep the branches in bounds. Thus, considerable fruiting wood will be renewed. On soils that promote development of large trees it may be necessary as trees grow older to do a considerable amount of the pruning from step ladders or from pruning platforms or towers.

Sour Cherry Trees

Young Trees

The modified-central-leader system of training is preferred for the sour cherry tree. Young trees are trained similar to apples. Five or six primary scaffold branches distributed over 3 or 4 feet of trunk may form a satisfactory framework. The top-most scaffold, or leader, may be headed to an outward growing lateral branch after it grows to a desirable height, possibly between 10 and 12 feet above the ground.

As with other fruits, each scaffold branch should originate from the trunk with a wide angle. This will reduce or eliminate the chances for bark inclusions to develop and will provide a strong framework.

Sometimes it is necessary during the first two years to use branches lower on the trunk than seems desirable. When this

is done, they may be removed later if more desirable scaffold branches can be selected higher on the trunk.

As trees become dense, an increasing amount of thinning-out pruning is necessary to keep tops and periphery open. It is also important to prevent inside and lower fruiting wood from dying because of too much shading. Annual terminal growth of 12 to 15 inches of large diameter wood is associated with good fruit production.

Many branches of the sour cherry develop at odd angles and cross the tree. Such limbs seriously shade lower wood and should be pruned out before damage occurs. Occasional cutting back of upright wood to outward laterals is necessary on the main branches.

Mature Trees

Mature sour cherry trees perform best under light, annual pruning. Remove dead wood and broken branches as they appear. If the tree is grown with enough

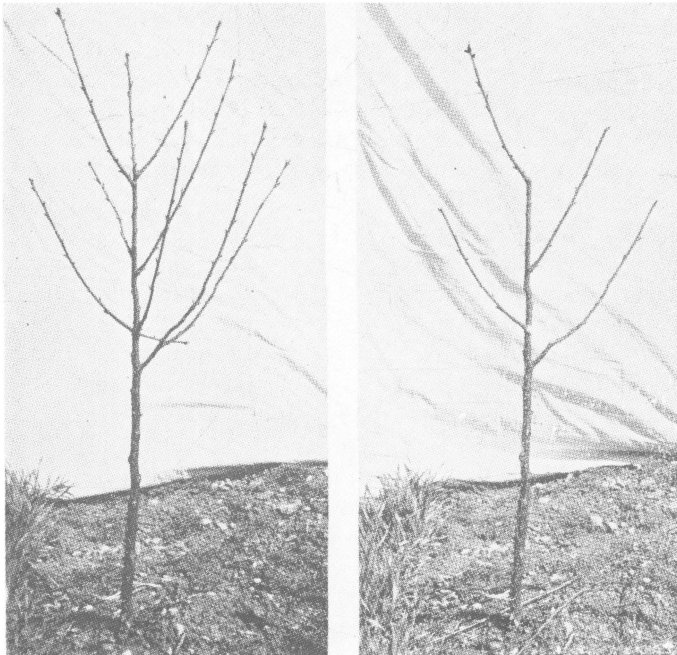


Fig. 26.—A one-year-old Montmorency cherry tree before and after pruning at planting time. Modified leader has been established. Three wide-angled branches have been left well spaced around the leader. It may be possible in later prunings to remove one or more of these and use branches starting higher on the trunk for wide scaffold spacing.



Fig. 27.—A mature Montmorency cherry tree before pruning.

Fig. 28.—A mature Montmorency cherry tree after pruning. Note that the tree has been thinned out slightly and the smaller, less productive wood has been removed.



nitrogen-carrying fertilizer, some thinning-out pruning is necessary to aid thorough pest control and to make harvesting easier.

Sweet Cherry Trees

The modified-central-leader system of training, as described for the apple, is most desirable for the sweet cherry tree. Three or four primary scaffolds with eight inches or more vertical distance between them and with proper spacing around the trunk are desirable. The sweet cherry tree is occasionally injured by low winter temperatures, and the injury is usually greatest in the areas of narrow crotches. Therefore, special attention must be given to avoid narrow crotches in selecting the primary scaffolds.

After the primary scaffolds have been selected, care should be used in the selection of secondary branches. These are likewise an important part of the branch structure and should not be too close to the main trunk. The first secondary branch should be 15 to 18 inches from the trunk. Thinning out cuts are preferable to heading back. The latter type of cut is necessary to prevent excessive growth in length, but must be made wisely and kept to a minimum.

When the leader reaches the desired height, 15 to 18 feet, it should be headed back to an outside branch. Mature sweet cherry trees require only light annual pruning. The primary objective here is to remove dead and broken branches and weak branches that may develop in the center of the tree. As trees grow older, it may be necessary to head back branches when they become too tall or too long. Such a procedure may help to develop new fruiting wood near the center of the tree and to prevent limb breakage.

Plum Trees

A well-pruned tree is especially important in the spraying operation for the control of brown rot in plum orchards. European plums, such as Reine Claude, Italian Prune, German Prune, Bradshaw, Imperial Epineuse, and Stanley, are best pruned and trained to the modified leader, as described for apples. Selected scaffolds on the plum tree may be closer vertically than with apples. However, about six inches of vertical spacing between scaffolds are desirable.

Lighter pruning may be followed with European and with Damson plums, such as French and Shropshire, than with apples. As the trees reach heavy bearing and reduced growth of terminals and as fruiting spurs take place, the amount of pruning should be increased. Detailed pruning throughout the tree and enough thinning-out pruning to maintain desirable growth over the lower branches is recommended for mature trees.

Varieties of the Japanese-type plums, such as Methley, Formosa, and Burbank, grow in a more spreading fashion than do European plums. The trees also tend to grow thicker. Thus, training young trees and pruning mature trees are similar to those of the peach, except that fewer heading-back cuts are generally required than with the peach. Considerable thinning out of small diameter wood in mature trees is necessary to maintain production of large size plums.

Nectarine and Apricot Trees

One-year-old nectarine and apricot trees from 3 to 5 feet in height and $\frac{1}{2}$ inch or more in diameter at the base are preferred for planting. The trees may be trained to

the open-center system as described for peach trees. The modified-central-leader system can also be used, but this is often more difficult to develop properly with these fruits than with apple trees.

With young as well as with mature trees, long slender branches may require some heading back to laterals in an outward growing direction. Trees should be kept open with considerable thinning-out pruning in order to induce annual formation of fruit-bearing wood. In the case of the apricot, fruits are borne on short spurs that are rather short lived. Since the nectarine is actually a "fuzzless" peach, the habit of tree growth of the two fruits is very much the same.

Pruning nectarines should be done in March in order to reduce the hazard of winter injury. Apricots often bloom very early and consequently all or most of the flowers are killed by spring frosts. Delaying pruning until after bloom may be advisable with the apricots.

Quince Trees

Wood and buds of the quince are quite hardy and rarely, if ever are injured by low winter temperatures. The newly-planted and young trees may, therefore, be trained to almost any system as described for other fruits in this bulletin. In general, the training system should fit the spreading habit of growth that is characteristic of the quince.

Quince fruits are borne terminally on short shoots that arise from terminal or lateral buds which were formed on the previous year's growth. Some apple varieties, such as Rome Beauty, produce a similar type of fruit-bearing wood. Because of this type of growth, the quince tree is best pruned by a detailed thinning-out process. The degree of pruning, however, should be light, as advised for the pear, since fire blight is also a serious hazard in quince production. Pruning can be done at any convenient time during the dormant or delayed dormant season.



Proper pruning, adequate fertility, and effective spraying promote good growth of fruit trees. From such trees of select varieties come high quality fruits.

