TRAINING the SPUR-BEARING DELICIOUS APPLE VARIETIES
COMMERCIAL APPLE GROWERS in Illinois are planting many of the new varieties which have the spur growth habit. The growing and fruiting characteristics of these trees make early training extremely important if the trees are to bear early and maintain a thrifty growing condition. Because of the same characteristics, training is also difficult.

In general, these are the things to watch for when training the spur-bearing varieties.

**Prevent overdominant lower branches.** The branches nearest the ground grow rapidly. In one or two years they equal or surpass the original trunk in size. The result is a weak tree with only two or three main limbs, which arise from the trunk at the same height above the ground. This predominance can be prevented by selecting scaffold branches early and lightly heading back the lowest one.

**Retard early spur formation.** The first growing season after planting, the trees produce spurs rather than side branches. This tendency can be reduced by summer training and by heading back certain branches to keep the newly set trees growing vigorously.

**Prevent development of narrow-angled side branches.** Spur-type varieties produce fewer and, as a rule, weaker side branches than standard varieties. The result is a sparse, upright-growing tree. Choosing well-spaced, relatively wide-angled branches as scaffolds will help to eliminate this structural weakness.

**EARLY TRAINING**

According to Illinois tests during the past four years, spur-type varieties should be trained to form short, modified-leader trees with three or four scaffolds. No two main scaffolds should arise from the same area on the trunk, but should be at least 4 inches apart. The following stub-pruning method has proved successful in Illinois.¹

¹ First described by Leif Verner in “Hormone relations in the growth and training of apple trees.” Idaho Res. Bul. 28. 1955.
At planting time. In spring, cut newly set whips back to a height of 30 inches (Fig. 1). This will cause branches to develop as low as 20 inches from the ground, which is a desirable height for the first scaffold branch. Fall-planted trees should not be cut until the following spring because of the danger of winter injury.

If you plant nursery trees that have already branched, do not keep any branches lower than 18 to 22 inches or any that form angles of less than 55 degrees with the trunk. However, removing these branches completely at this time may cause partial girdling, which will reduce the growth of the young tree. It is better to cut them back to 5-inch stubs and rub off all the buds that form on them as soon as growth begins. The stubs will stay alive and will help conduct water and food materials but will not grow in size. They can then be removed the following spring without damage to the tree.

If one or more branches have wide angles and can be saved for scaffolds the first year, prune the lowest one back to 12 to 14 inches and the others to 7 to 9 inches. This will keep these branches from becoming more dominant than the leader. Head the leader 10 to 14 inches above the highest permanent lateral branch (Fig. 2).

All other laterals can be cut to 5- or 6-inch stubs and left as temporary branches. The stubs help to keep the angles of the permanent branches wide, and to prevent the branches from growing back toward the center of the tree. They also provide more leaf surface, which will increase tree growth.

In the summer of the first year. The two or three uppermost buds on the headed-back leader will develop into vigorous, narrow-angled shoots. A growth hormone is formed in these shoots and translocated downward. It accumulates at the crotch areas of the branches below and increases the width of the angles.

If the top shoots are allowed to remain until they are 6 to 8 inches long, they will provide enough hormone to insure wide-angled crotches in all
WHEN WHIPS ARE PLANTED
As soon as whips have been planted in the spring, cut them to 30 inches in height. This will cause branches to develop at a desirable distance from the ground. (Fig. 1)

The first summer, remove all but one of the top shoots when they are 6 to 8 inches long. The one that is left forms a modified leader. Remove growth lower than 18 to 22 inches from the ground. (Fig. 3)

Choose as many scaffold branches as possible during the second spring. (Numerals indicate the three that were chosen on this tree.) Stub all temporary wood. Top the leader to 10 to 14 inches above the top scaffold. (Fig. 5)
BRANCHED STOCK

Remove all sharp-angled branches and all branches lower than 18 to 22 inches from the ground. A wide-angled branch that isn't too low may be saved as a scaffold. (Fig. 2)

Choose additional scaffolds whenever possible during the first summer. Remove top shoots as described for whips in Fig. 3. Stub all temporary growth. (Fig. 4)

By the second spring, one can usually choose three or four scaffolds if trees were branched when planted. Stub all other growth, including leader, back to 6 to 10 inches. (Fig. 6)
Prune as little as possible after the second summer; otherwise the whole tree will be stunted. Cut back the growth above the top permanent scaffold to keep the leader dwarfed. Eventually the leader will be removed. (Fig. 7)

growth below them on the trunk. If, however, the top shoots are allowed to remain all summer, the growth below will be stunted, allowing a high-headed, narrow-angled tree to develop.

Thus when the top shoots are 6 to 8 inches long, remove all but one. The remaining one forms a modified leader of the tree (Figs. 3 and 4). In southern Illinois this pruning can usually be done about the first of June; in the central part of the state, about the middle of June; and in the north, two weeks later. All growth below 18 to 22 inches from the ground should also be removed from whips at the same time (Fig. 3).

Summer pruning has a dwarfing effect. Temporary branches can be kept smaller than permanent scaffolds by pruning the new growth twice the first summer. This is done by pinching out the rapidly growing tips (Fig. 4). The first pruning can be done when the top shoots are removed; the second, five or six weeks later.
The second spring. Choose as many scaffolds as you can from last year's growth (Figs. 5 and 6). The first one should be 18 to 22 inches from the ground. All others should be 4 to 8 inches apart vertically on the trunk, and each one should be at least 90 degrees around the trunk from the next one below it.

Leave the other branches as temporary growth. Cut them back to keep them from outgrowing the permanent branches. One-year growth may be cut back to about 5-inch stubs; two-year growth, to about 10-inch stubs (Figs. 5 and 6). As the tree gets older, allow these temporary branches to become longer, but not more than 24 inches.

The tree may not grow enough for you to select all the permanent scaffolds by the second year. If this is the case, head the leader 14 inches above the top scaffold. Check any over-vigorous permanent growth by moderately heading it back. If it is possible to choose all the permanent scaffolds, head the
leader, as well as all other growth above the top scaffold, back to 6 to 10 inches.

**During the second summer.** Pinch the terminals from the growth on the stubs as recommended for the first summer. If you have chosen all the permanent scaffolds, pinch back the leader in the same way as the stubs. Repeat this operation four weeks later. Also at this time pinch the terminals from all new shoots growing on the main trunk.

On trees where you have not chosen all the scaffold branches, prune the leader as in the first year. Pinch the side growth as recommended for fully trained trees. If possible, choose the rest of the permanent branches; then pinch back all other new shoots, including the leader.

**FUTURE PRUNING FOR TRAINING**

In the following years prune as little as possible. The main scaffolds should now be far enough ahead of the temporary limbs to omit summer pruning. Continual summer pruning will dwarf the whole tree.

In the dormant seasons restub the new growth on the vigorous stubs. Cut back all other new growth by about one-third except that on permanent branches. Remove any interfering inside growth. The leader above the top scaffold branch can be kept dwarfed by stubbing back all new growth to 10 to 16 inches (Fig. 7).

Most of the inside stubs and the dwarfed leader should be left until the tree begins to fruit. Some of the stubs can be removed earlier if the centers of the trees appear too thick. Remove the rest over a period of three years, leaving the top until last. Be careful not to remove too much wood in any one year. This could throw the tree out of a normal bearing cycle.

(This circular was prepared by Frank W. Owen, Associate Professor of Horticulture.)

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