Pruning and Training Apple Trees
by Lee Calhoun

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Otherwise sensible people often become paralyzed when faced with pruning their apple trees. It is understandable; you work hard to make your trees grow and then you are told to cut off big chunks. It is almost like maiming a friend.

Apple trees will grow and fruit without any pruning. They will assume the top-heavy, umbrella shape which you see so often on old trees. This shape means that the lower limbs have been lost completely, shaded out by higher limbs. It also means that quality fruit is produced on the top of the rather flat canopy, almost out of sight and reach. To make matters worse, large limbs often split off because they are growing at a weak angle from the trunk. This damages or kills the tree.

By shaping your tree when it is young, and by careful placement of main branches, you can have a productive, long-lived apple tree. It will be healthier and easier to care for. Shaping a tree can be lots of fun, almost like solving a puzzle, and you should approach it with a sense of adventure rather than dread or fear.

I suggest you read the general principles below several times until you understand them. With this basic knowledge, you will then understand that each pruning cut or training bend has a purpose and is not a senseless hacking and deforming of a helpless tree.

Pruning and training almost never permanently damage a tree. If a tree has a healthy root system and is properly fertilized and watered, it will react swiftly to your efforts by putting out new growth (hopefully where you want it). So, buy yourself a good set of hand pruners and have at it!!

Note: Most pruning is done in mid to late winter, well before bud break in early spring.

GENERAL PRINCIPLES. Pruning means cutting off part of the tree. Training means bending part of the tree. Both techniques are used to shape the tree and to let sunlight into the interior of the tree.

When making a pruning cut, always cut back to something such as to a bud or to a limb. The pictures below show how to cut back to a bud.
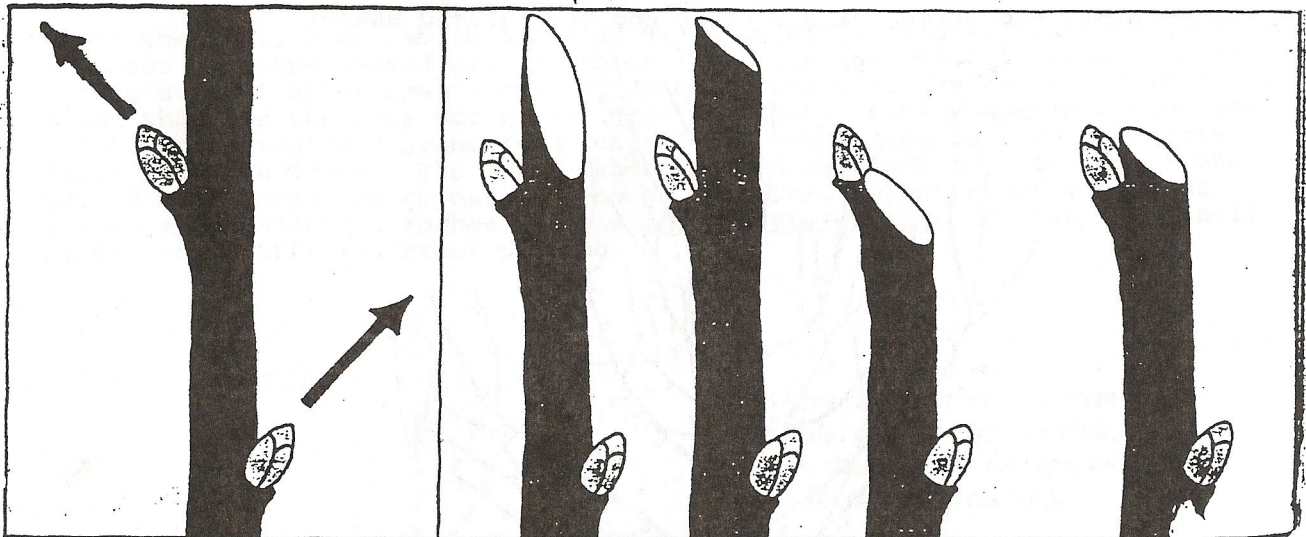
To prune properly, first select a bud pointing in the direction you wish new growth to go in. Using clean, sharp pruning shears, cut just above the bud on a slanting line parallel to the bud's direction of growth.

The three pruning cuts on the left are incorrect; the one at the right is made properly. The cut at the far left slants too steeply, exposing too much vulnerable heartwood. The next cut is too far from the bud; the

stub will not heal. The third cut comes too close to the bud and may cause it to dry. The ideal cut, right, starts slightly above the tip of the bud and slants down at a 45° angle, ending level with the base of the bud.
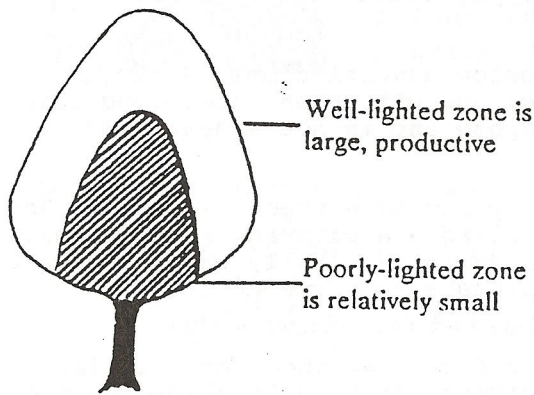
Branch bark ridge

Cut here
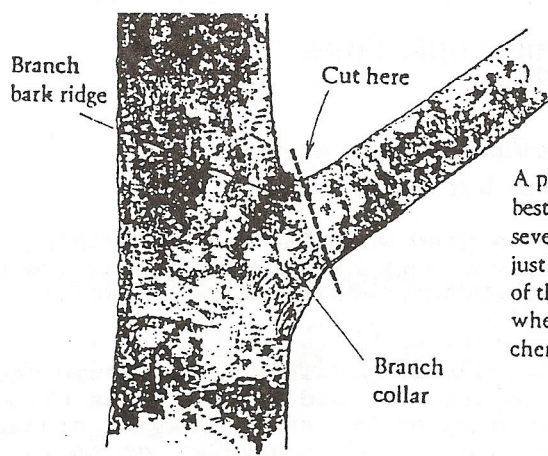
Branch collar

A pruning wound heals best if the branch is severed from the trunk just along the outer edge of the branch collar, where wound-healing chemicals abound.

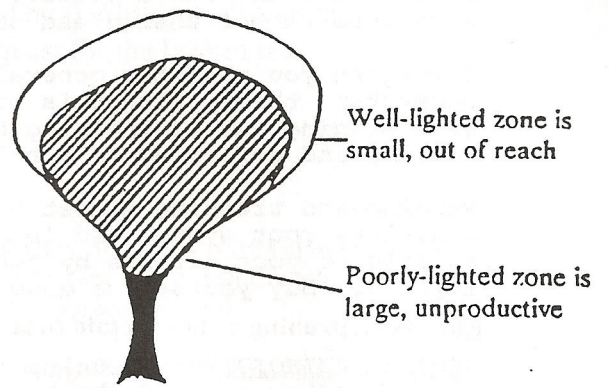When cutting back to a limb or to the trunk, always leave the branch collar on the tree.

The branch collar is the wrinkled or swollen area where a twig or branch joins a larger limb.

Tests have shown that so-called tree-wound paints do more harm than good.

The easiest method of shaping an apple tree is called the central leader system. With this method, the tree is shaped like a pyramid or Christmas tree, wide at the bottom and narrow at the top. A single trunk or leader rises up through the center of the tree. This shape lets the bottom branches receive sunlight and gives good light distribution around the tree, as the following diagram shows.
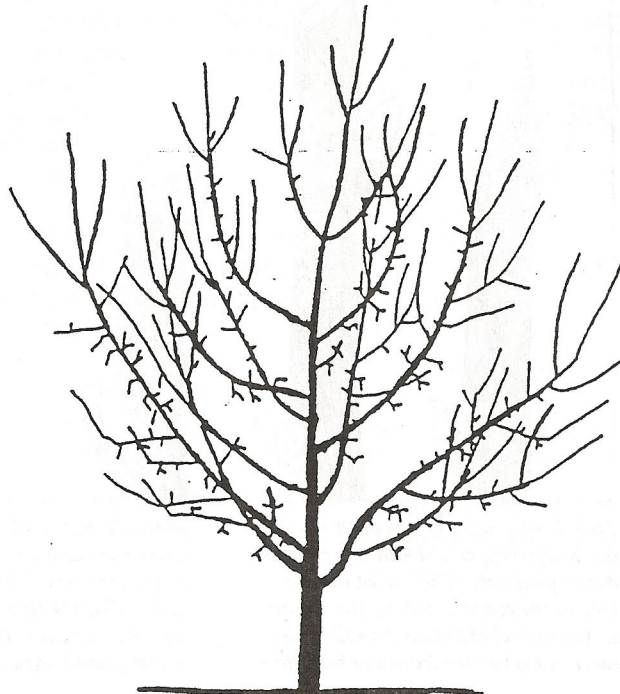
Well-lighted zone is large, productive

Poorly-lighted zone is relatively small

Good Shape

Well-lighted zone is small, out of reach

Poorly-lighted zone is large, unproductive

Bad Shape

The drawing below shows a well-shaped, five year old central leader tree. You can see the strong single trunk and the pyramid shape.

The main branches which grow out of the central trunk are called scaffold branches. It is important that these branches have a wide crotch angle where they intersect the trunk. A narrow crotch angle is weak and the limb will often split off under a load of fruit.

Wide crotches (left) are stronger than weak, narrow crotches (right).

A pruning cut stimulates the buds for several inches below the cut to start growing.

Limbs or shoots growing upward (or vertically) tend to elongate or grow rapidly with little fruiting. Limbs growing more horizontally tend to set more fruit but their elongation or vegetative growth slows.

THE CENTRAL LEADER AND SCAFFOLD BRANCHES. When you receive your tree, it will have been pruned at the nursery suitable for planting and early growth. Usually it will be unbranched and pruned off about three feet high. This first pruning cut will stimulate the buds below it to start growing the first spring. The topmost two or three buds form upward growing shoots whereas the three or four buds below these form more outward growing shoots. Look carefully at the following diagram.

Upward growing shoots

Horizontal growing shoots
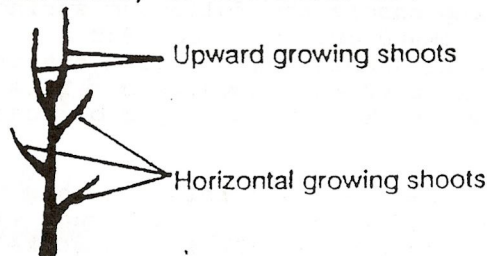
Early the first year (about April or May), select a single, best-placed, and most vigorous upward growing shoot to be the new central leader. Snap off or cut all other upward growing shoots flush with the trunk. Select about three of the more horizontal growing shoots, evenly spaced around the trunk, to be scaffold branches. Cut off all other outward growing shoots flush with the trunk. The bottom shoot should be about two feet about the ground. It cannot be emphasized enough that this selection of a central leader and scaffold branches is done in the late spring. Do not wait until winter to do this important pruning.
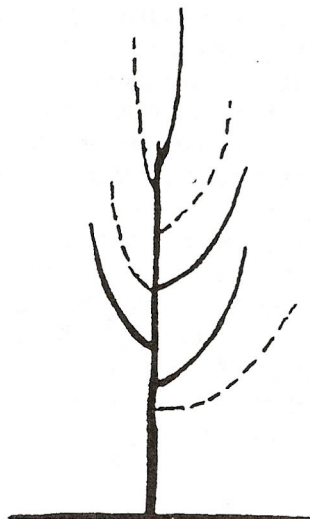
Dotted lines show excess branches which are removed early the first summer. Preferably these should be removed when they are about 3-6 inches long.

When they are 6-8 inches long, examine the outward growing shoots which you have selected to be scaffold branches. If their crotch angle where they join the trunk is less than 45°, spread them carefully with a toothpick, a clothes pin, or a nail (sharpened on both ends) to a 45° angle. These young branches are limber and spread easily.

Weak crotch angle

Strong crotch angles
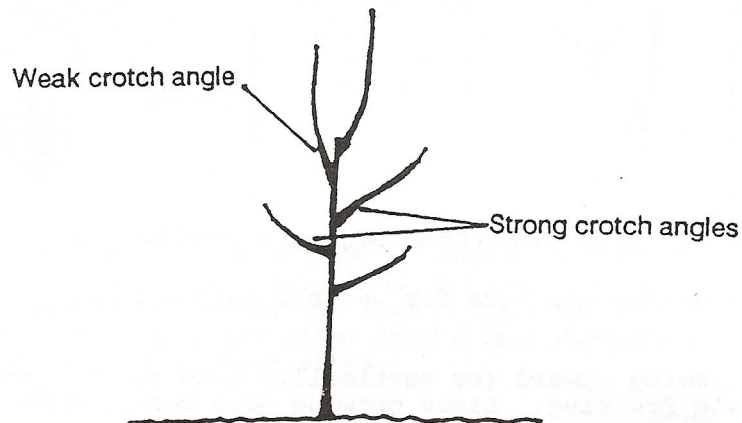
Even branches with a good crotch angle tend to grow upward out towards their ends. This is good as it allows branches to elongate rapidly. They will come down into a more horizontal position under a fruit load or you can train them downward later.

The first winter after planting, your young tree should have a new central leader and several scaffold branches which have grown several feet. Cut off the new central leader about three feet above the highest scaffold branch. This will again stimulate the buds below the cut to form both upward and outward growing shoots the following spring. As before, in late spring, select a single upward growing shoot for a new central leader and about three outward growing shoots for scaffold branches. All other unneeded new shoots are removed in late spring. This procedure is repeated yearly, as the tree grows, to form a new layer of scaffolds and a single central leader.

After five or six years, the lower scaffold branches will be quite large. You may decide to cut some of them off at the trunk with a saw to open up the tree for more light penetration. It is a mistake to keep too many scaffold branches after the tree gets large.

PRUNING AND TRAINING BRANCHES. Pruning off the ends of branches causes side branches to form which provides more space for fruit spurs. Each winter, prune off about one-fourth of the new growth on the ends of each scaffold and other main branches to stimulate side branching. Make each pruning cut just above an outward-facing bud.
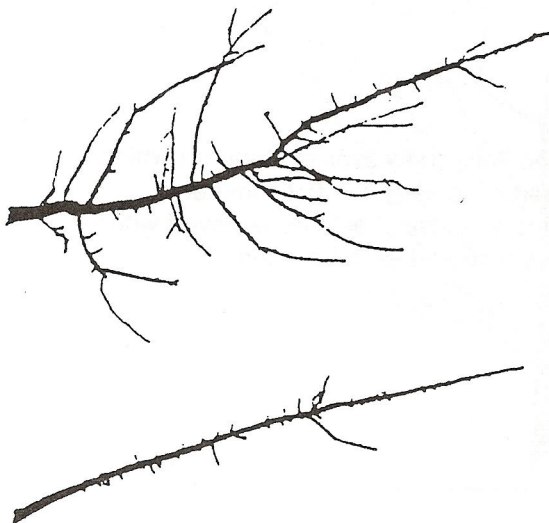
The upper branch was constructed using heading cuts each year to develop many sub-lateral fruiting branches. The lower branch was developed by allowing the branch to go unheaded. Note the difference in structure of the two branches. The headed branch has a greater potential for fruiting than the unheaded branch. It also has a larger diameter due to the greater leaf area carried on the side shoots. This helps it carry a heavy crop without additional support. Once the branch is constructed, heading cuts should not be used except where further extension growth is needed.

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Shoots growing vertically from branches are not fruitful and should be removed. Cut or snap them off early each summer (or in the winter if you forget to remove them earlier).

Remove these vertically growing shoots
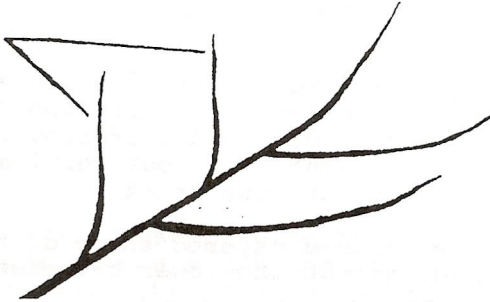
Learn to recognize the short fruiting spurs and <u>do not prune them off</u>. Learn to recognize the fat buds which form fruit and which look entirely different from the flat growth buds which form new shoots.

Spurs: Fruits are produced on these short growths.

Fruit Buds: Large and round, they will produce blossoms, and then fruit.

Growth Buds: smaller and flatter than fruit buds, they will produce shoots
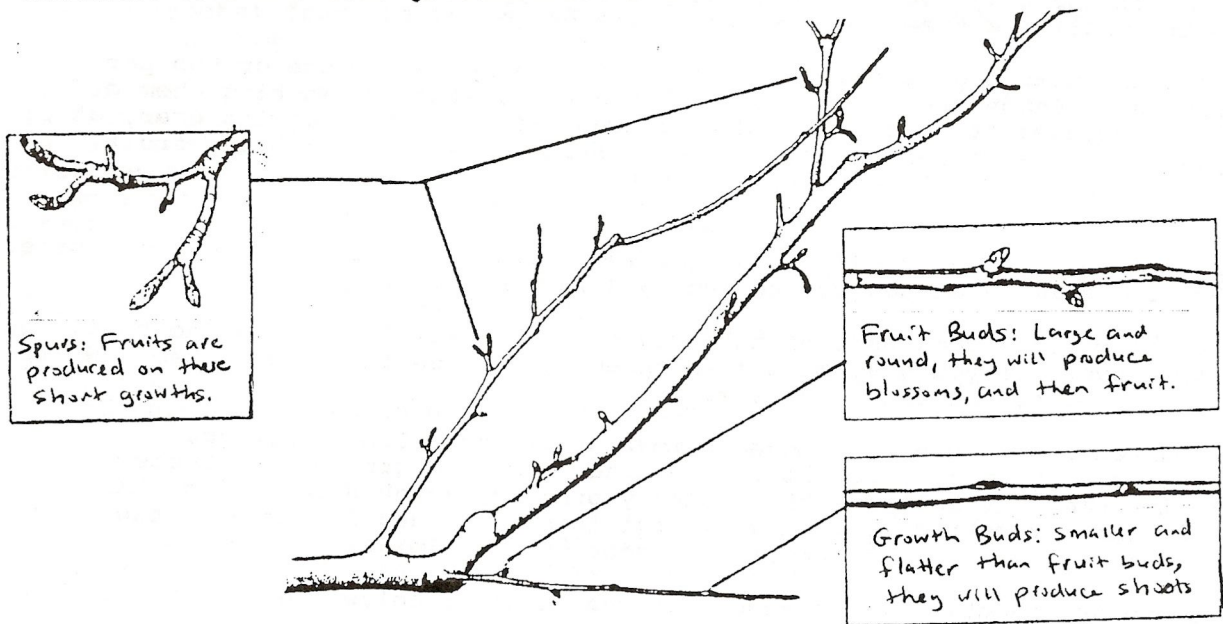
Often branches will fork at their ends. Cut off all but one leg of the fork, leaving the leg which points in the best direction.

About the fourth or fifth year, you should train the scaffolds down into a more horizontal position and pull or push them laterally to fill holes or reduce shading. A more horizontal position will also induce fruiting.
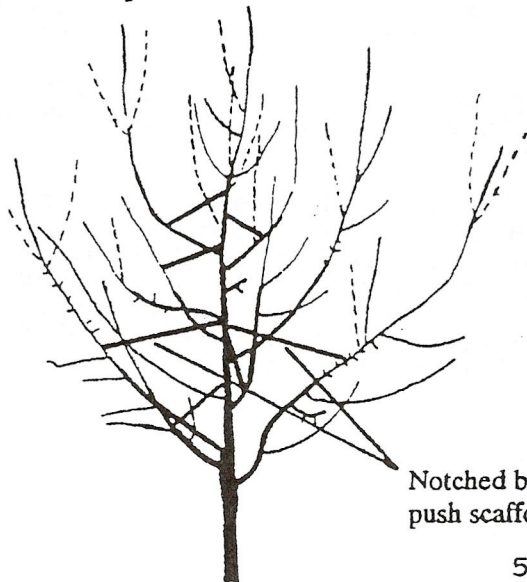
Dotted lines show branches pruned off

Notched boards used to push scaffolds downward

A 45° angle is best. You can use boards notched on each end to spread branches or you can tie them down with twine anchored to a stake. Remove any twine in midsummer to prevent girdling. Do not bend scaffold branches downward more than 60°.

OTHER PRUNING PRACTICES. Keep the interior of the tree open. To do this, cut out branches which rub or are too close together. Eliminate branches which shade others or are not fruitful. Thin out interior twiggy growth (but not fruit spurs). Cut out vertically growing branches and those growing inward toward the trunk.

Maintain the desired tapered shape of the tree by pruning back any upper branches shading out the lower branches.

Do not allow any apples to be borne the first three or four years. Fruiting slows tree growth and can stunt a young tree. Pinch off the blossoms or tiny fruit. Allow only a few apples to be borne the next few years until the tree reaches its mature height.

When the tree begins bearing fruit, thin the apples to one or two per cluster. Remove the others when they are pea-size by pinching them off. This improves fruit size and discourages the tree from bearing every other year. It also helps to keep branches from breaking under heavy fruit loads, usually a disaster for the tree.

A FINAL WORD ABOUT PRUNING AND TRAINING. Don't be afraid to cut your tree. Pruning stimulates new growth and is seldom harmful.

Buy yourself a good pair of hand pruners. The Felco brand is the best, but expensive. If you have more than three trees, you should buy them. Write me for sources of these pruners.

Unwanted growth can be removed summer or winter. The sooner you cut or snap off upward growing shoots and other unwanted growth, the better. Early summer is best for this. Heavy pruning, such as removal of large scaffolds or cutting back the central leader, is usually done in the late winter when the tree structure is unobscured by leaves.

Remove any shoots arising from the tree roots or below the lowest scaffold.

PRUNING OLD APPLE TREES

An old and neglected apple tree can never return to full productiveness, but pruning and good care can often extend its life. If you just want lots of apples, consider planting young trees which can be grafted with twigs from your old tree. Consider too, the effort and time required to restore an old tree.

IMPROVING THE SOIL. Look first to the soil. A tree forty or fifty years old has usually exhausted all nutrients from the soil within reach of its roots.

Eliminate all competing vegetation (such as brush, weeds, grass and other trees) from the trunk out well beyond the reach of the branches (the "drip line"). Spread ten pounds of agricultural limestone and two pounds of a complete fertilizer on the ground of the cleared circle and till or harrow it into the ground no deeper than three inches. You can use 10-10-10 fertilizer but a "slow release" fertilizer such as 20-9-9 or 31-3-8 is better. The slow release fertilizers are sold for fertilizing lawn grasses.

If you have access to a good mulch (such as pine bark, pine needles or spoiled hay), spread it under the tree out to the drip line. Hold the mulch about a foot away from the trunk.

Fertilize an old tree twice a year, in March and June, using the above guidelines. Add limestone in winter every third year. After the first fertilization, just spread the fertilizer and limestone on the soil surface rather than tilling it into the ground.

REMOVING DEAD LIMBS AND WATER SPROUTS. The first pruning task is removal of dead wood. Big dead limbs are cut off at the trunk (remember to leave the branch collar) usually with a chain saw. (Using a chain saw is inherently dangerous. If you are not sure of yourself, hire an expert!!) Dead wood can be removed at any season. After removing dead limbs, remove all suckers growing from the base of the tree and all water sprouts (long whip-like shoots) from the trunk and lower limbs. These, too, can be removed at any time.

Every old tree has its own peculiar shape and its own pruning problems. This little guide can only give some guidelines. As a general rule, old trees are too tall and have far too many limbs. It is best to spread out drastic pruning of old trees over a two- or three-year period. Heavy pruning always results in a rash of upward growing water sprouts which must be removed every year in late July through August.

REDUCING UPWARD GROWING TRUNKS. Many old trees branch out about five feet above the ground into four or five upward growing trunks. One or two of these trunks should be removed by chain saw (usually the ones in the middle to open the center of the tree to sun and air). Cover the stubs with a piece of sheet metal to shed water and reduce rot.

TOPPING THE TREE. An old tree can be reduced in height by cutting off the tops of all upward growing trunks to a side branch at the desired height. Usually it is desirable to reduce the height by 8-10 feet. Many water sprouts will develop on these top-most side branches and must be removed yearly.

REMOVING LARGE BRANCHES. Each large branch should have its own space and should not be crowded or shaded by other large branches. If two branches are sharing the same space, remove one of them by cutting it off at the trunk of the tree. The general rule is that large branches should be separated vertically by at least two feet. Old trees often need to lose ten or twelve large branches over a period of several years. This, again, is usually chain saw work and extreme care is needed to avoid injury. The diagram below shows how to remove large branches without damaging the tree.

NOTE: Printed with permission from Lee Calhoun

Second cut removes most of branch
Branch bark ridge
First cut prevents bark tearing
Third cut removes stub at branch collar.
Branch collar