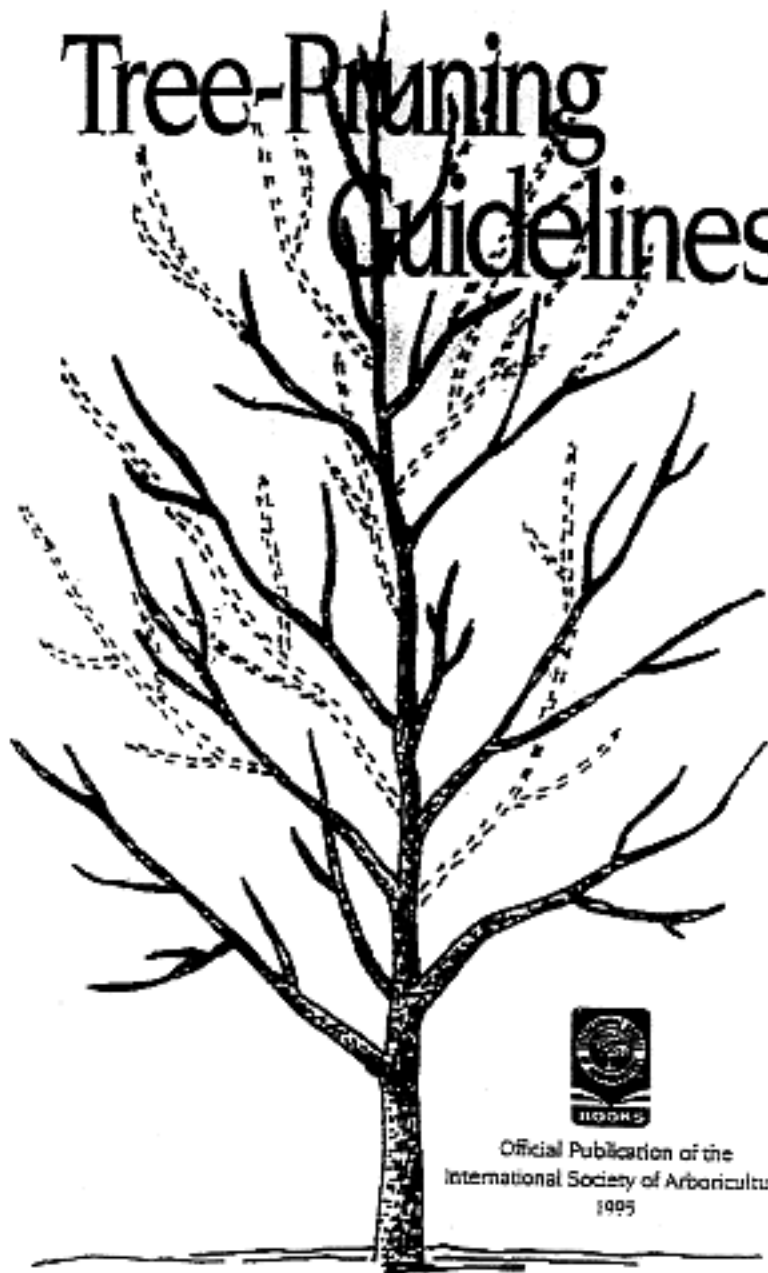


Tree-Pruning Guidelines



Official Publication of the
International Society of Arboriculture
1995

TRAINING YOUNG TREES

Properly trained trees will develop into structurally strong trees well suited to the site and their intended landscape function. These trees will fulfill their intended function sooner and should require little corrective pruning as they mature. Young trees that reach large mature size should have a sturdy, tapered trunk with well-spaced branches that are smaller in diameter than the trunk.

These guidelines apply primarily to decurrent (round-headed) large-growing trees to develop a structure characteristic of the species or cultivar. Trees that will become decurrent seldom have lateral shoots on current-season's growth.

Trees of excurrent (central leader) growth habit usually need little or no training except to remove laterals that are too low or to control laterals that may compete with the leader.

Trunk Development

For most trees, maintain a single, straight trunk or central leader. Do not head the leader except:

- to correctly position the lowest main branch;
- to space other main branches at least 18 inches apart vertically;
- to remove a tight grouping of terminal twigs so that a more vigorous shoot will develop as the leader.

At least one half of the foliage should be on branches (temporary and permanent) arising in the lower two-thirds of a tree. Similarly, branches should have a like distribution of foliage along their lengths. This will increase trunk taper and more uniformly distribute branch weight and wind stress along the trunk.

Permanent Branch Selection

The height of the lowest permanent branch will depend on the function of the tree and local ordinance; e.g.: screen an unsightly view, provide a wind break, shade a patio or be a street tree.

Unless they are too close together or weakly attached, or the tree may not receive adequate water, remove few or no branches on a newly-planted tree. This will ensure a better selection for permanent main branches in subsequent years, promote trunk taper and early rapid growth of a tree.

Potential permanent branches can be spaced 6 to 12 inches (15-30 cm) apart by thinning. By the fifth year, these branches should be thinned to at least 18 inches (50 cm) apart, if at maturity the trunk diameter is expected to be greater than 18 inches (50 cm). Spacing can be less with an expected trunk diameter of less than 12 inches (30 cm) at maturity.

Select permanent branches to maintain an even radial distribution. Where branches are growing one directly above another, maintain at least 15-36 inches (40-100 cm) above the lower branch on small to medium-size trees, and 60 inches (150 cm) on large-growing trees.

Temporary Branches

Retain small branches along the trunk for 1 to 5 years to increase lower-trunk size and taper and to protect the trunk from injury by the sun and vandals. It is more important to have temporary branches below the lowest permanent branch than above.

Preferred vertical spacing of temporary branches is 4 to 6 inches (10-15 cm), with none within 6 inches (15 cm) of potential main branches. Select the least vigorous shoots for temporary branches. If larger-than-desired branches need to be kept as temporaries, head them

back to 2 or 3 buds. It is important to have some on the side of the trunk facing the afternoon sun. Attachment angle of temporary branches is not important since they will be removed.

Temporary branches should be kept short to provide clearance for paths, etc. and to increase height growth of the leader. These branches may need more than one pruning during a growing season, depending on tree vigor.

During the first dormant season, prune to thin the temporary branches. Leave about $3/4$ (three fourths) of those left the first year. Leave them uniformly spaced, remove the largest or cut them back to 2 or 3 buds.

During the next dormant season, reduce the number of temporary branches by $1/5$ (one fifth) to $1/4$ (one fourth) of those present the first year. In most situations, by the fifth dormant season, all of the temporary branches should be removed.

Developing Strong-Branch Structure

The relative size of a branch in relation to the trunk is more important for strength of branch attachment than is the angle of attachment. Branches should be $1/2$ (one half) or less of the diameter of the trunk immediately above the branch.

No permanent branch attachments should have included bark.

Retain lateral branches along limbs, but each should be less than $1/2$ (one half) the diameter of the limb at its attachment. Permanent lateral branches along limbs should be at least 2 feet (60 cm) out from the trunk.

As trees grow to maturity, pruning should focus on maintaining or improving structure, and directing the tree's growth.

A goal of structural pruning is to maintain the size of permanent lateral branches to less than $1/2$ (one half) the diameter of the parent branch or trunk. If a scaffold branch is too large in relation to the leader or another scaffold, thin the competing scaffold's laterals particularly near its terminal. Thin the leader and other scaffolds less, if at all. Thinning laterals from a branch will reduce the weight of the branch, slow its total growth and develop a stronger branch attachment. If pruning the competing scaffold is not appropriate, it should be removed.

On large-growing trees, except for whorl-branching conifers, branches that are more than one-third the diameter of the trunk should be spaced along the trunk at least 18 inches (50 cm) apart, on center. If this is not possible, because of the present size of the tree, such branches should have their foliage thinned, particularly near their terminals.

**1997 SOUTHWESTERN LOW DESERT GARDENING
AND LANDSCAPING CONFERENCE**

PRUNING GUIDELINES FOR LANDSCAPE TREES

Presented by Dennis J. Lynch A.S.C.A.
August 9, 1997

Selection of the proper tree for a specific location is the first step in a successful planting. Quality of the nursery stock, correct installation of the tree can effect establishment and long range development.

Post installation maintenance of trees and other landscape plants is critical to the health and beauty of a landscape. Pruning is usually a primary task in the maintenance program.

Pruning, by general definition, involves the cutting and removal of plant parts in an effort to enhance the contribution that a plant might provide. 'Enhancing the contribution' could include pruning to remove deadwood, reduce potential hazards or improve the branching structure.

It is critical in the pruning process that involved persons understand the reason or desired objective. What do you hope to accomplish by pruning the tree?

The effect that intended pruning may have on the health and dignity of a tree should be considered. Severity of the pruning, tree species and the anticipated response the tree may exhibit are factors.

Tree pruning specifications should be tailored. Age of the trees, species and condition of the trees are considerations.

Young trees are typically pruned to remove dead or broken branches. Pruning should encourage branch structural development. Allowing some smaller branches to remain along the trunk section can increase trunk taper. Topping or heading of trees at planting is not recommended.

The standard of pruning planned for mature hardwood and pine trees should be based on the reasons for scheduling the work.

A large shade tree might be pruned to remove dead, broken or weaker branches. Crown raising can remove lower limbs that interfere with vehicles, pedestrians or other uses.

Large trees located near buildings or use areas might be considered for crown thinning. Proper crown thinning can reduce wind resistance and reduce branch weight.

Thinning by definition involves removal of a lateral branch at the point of origin. Thinning can also shorten a branch by pruning that branch to a lateral large enough to assume a terminal role.

In specific cases pruning can be intended to reduce the size or shape of a tree. Extensive crown thinning can result in a more open crown structure, allowing a view or increased sunlight through the tree.

Removal (pruning) of a branch results in a wound to the tree. Careful selection of branches to be thinned and proper methods can minimize this stress factor. A thinning cut should not leave a stub nor should the cut injure the branch bark ridge. Proper branch removal should not damage tissue located around the pruning cut (frayed, torn bark) or cause injury to other parts of the tree.

Palms are usually pruned to remove dead, broken, low hanging fronds and fruit stalks. In some cases trunks are cleaned to remove frond bases. Severe pruning can negatively effect the health and characteristic appearance of palms

Tools to be used for tree pruning are usually determined by the type, size of tree and size of branches to be pruned. Proper tool application can effect quality of the work. The safety of workers as well as people and property near the work site could be at risk if proper equipment and methods are lacking.

In most cases, especially involving larger trees, it is recommended that the pruning task be assigned to professional arborists.

Suggested references:

Arboriculture Care of Trees, Shrubs, and Vines in the Landscape Richard W. Harris

American National Standard for Tree Care Operations American National Standards Institute, U.S. Department of Labor

Tree - Pruning Guidelines International Society of Arboriculture, P.O. Box GG, Savoy, IL 61874

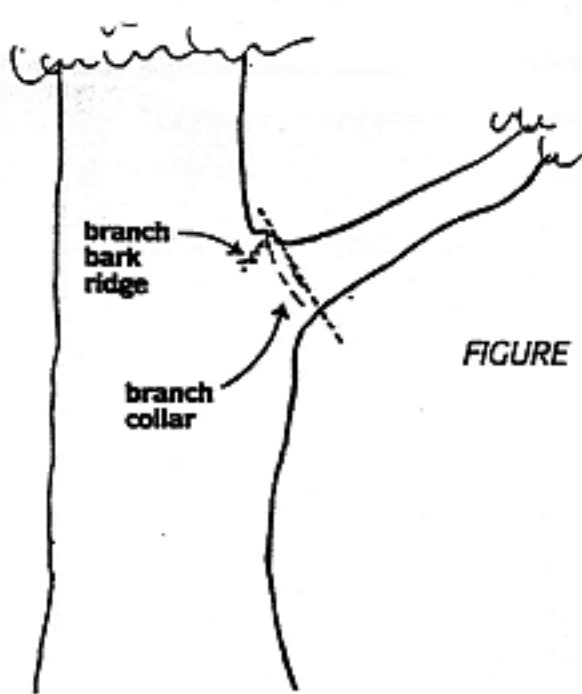


FIGURE 1. When removing a branch, the final cut should be just outside the branch bark ridge and collar.

FIGURE 2. In removing a limb without a branch collar, the angle of the final cut to the branch bark ridge should approximate the angle the branch bark ridge forms with the limb. Angle AB should equal Angle BC.

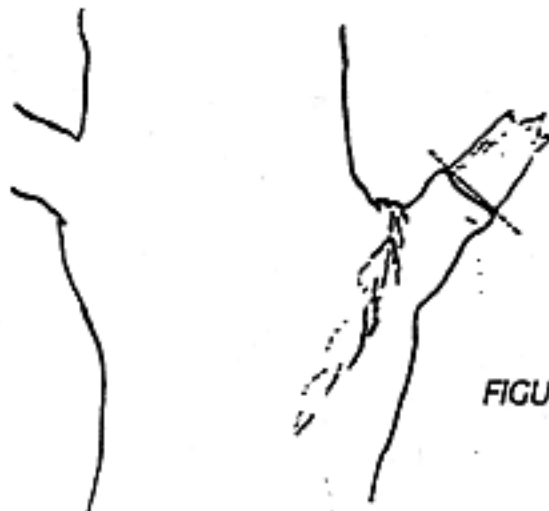
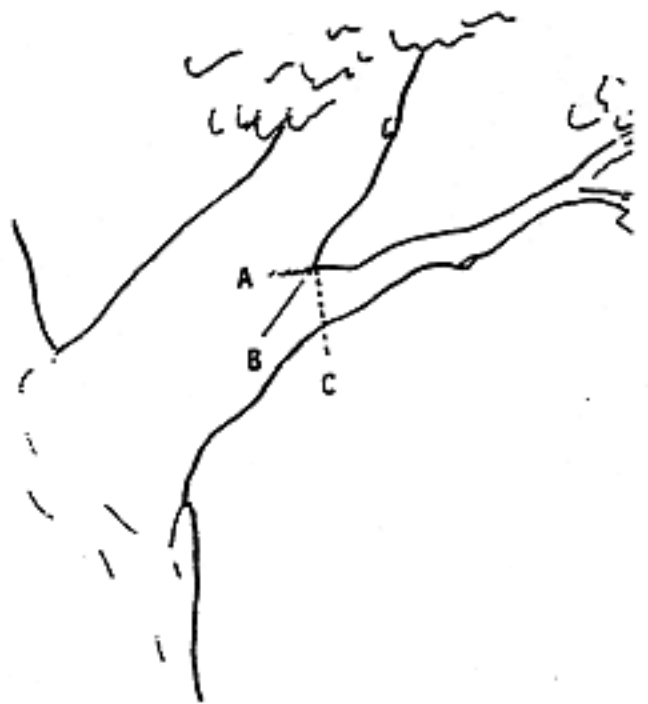


FIGURE 3. When removing a dead branch, cut outside the callus tissue that has begun to form around the branch.

Pruning

Correct and timely pruning can enhance the beauty, health and value of most landscapes. Poor pruning can permanently ruin plants, turning an attractive outdoor scene into an eyesore. To prune successfully, you need to understand the growth habits and unique horticulture of each plant. It's worth repeating: *Pruning can do as much harm as good.* If you are unsure if you are doing the right thing, put down the pruning shears, shelve that chain saw and get some professional guidance. Plants represent a considerable investment in time and money and can greatly increase the value of your home. Hasty, uninformed pruning by you or an unskilled worker can quickly turn your investment into a liability in more ways than one.

Fortunately, extensive pruning is not required for most plants when they are carefully selected and placed in the right locations. This is particularly true of a naturalistic landscape. When considering the placement of landscape plants, become knowledgeable as to their mature height and spread. If in doubt, it is best to mildly exaggerate the mature size rather than underestimate. Placing plants where they have ample room to grow and managing their growth will significantly reduce the amount of pruning they require.

Locate plants carefully around structures, play areas and existing plants. Position trees so that upon reaching maturity they will provide the desired shade, privacy and screening. Also envision how mature trees will fit in with other components and uses of the landscape. Think ahead when locating shrubs, ground covers and accent plants near sidewalks, medians, streets, neighbors and other traffic areas. If plants have sharp thorns or spines they can be extremely dangerous. Place them too close to these areas or too close to each other and you'll be forced to battle plants with shears and clippers for as long as they live.

More and more arborists, municipalities, maintenance contractors and concerned home gardeners are using the theme of *preventive pruning* to control plant growth—first by selecting plants that are naturally dwarf and slower growing, and second, by selecting and placing plants thoughtfully so they will be allowed to grow to their natural height and width.

Developing a Pruning Philosophy

The natural growth habits of most native and introduced plants are normally far more attractive than the will imposed on them by unknowing gardeners. Generally speaking, the basic goal of pruning (when pruning is required) should be to reveal and showcase the plant's natural beauty and form. This usually involves little more than routine removal of crossing or wayward branches and pruning of off-balanced growth and dead or diseased twigs. If your home landscape has natural, native plants on site, consider removing a few of the lowest branches on selected trees and large shrubs. Careful thinning helps bring out the beauty of the trunk or trunks and primary branch framework. Such pruning should not drastically change the shape or height of the plant but rather accent or emphasize its natural character. It's also a good idea to leave some trees and shrubs unpruned so

branches drape and trail to the ground, providing cover and shelter for birds and animals.

Periodic light thinning is the most desirable method of pruning. Some landscape professionals use the term *lacing out* to describe a light thinning of a tree's interior. For some trees and shrubs, thinning prior to seasonal winds and rainstorms reduces the potential for wind damage. With fewer leaves and branches the wind passes through the tree rather than catching in the canopy. Thinning can prevent uprooting of trees (professionals call this *wind throw*) due to wind storms. Young plants are particularly susceptible to life-threatening wind damage. They haven't had enough time to develop deep, wide-spreading roots that will anchor them in the ground.

Do not remove more than 20 percent of tree's canopy during the summer. If too many branches are removed at this time, the once-shaded bark is suddenly exposed to the intense sun, causing sunburn damage. The injured area becomes susceptible to infestations by

Four Simple Pruning Methods

ONE: Complete Renewal Method

Many perennials, grasses and small shrubs grow best when they are cut back severely at the end of their growing season or flowering season. This is often done just prior to the new spring growth surge, so that plants are "renewed," growing and flowering vigorously each year. Use hand pruners, pruning shears, hedge clippers or loppers to prune away dead or tired growth.



TWO: Two-Step Naturalistic Method

Use this method to control the size of shrubs yet maintain a more natural shape. Step One: Roughly prune back branches and stems to create a globe shape. Step Two: Cut every other branch back to the first large V. Vary cuts about 6 to 9 inches long. This gives shrubs an informal, natural look and opens up the interior to sunlight, helping develop new flowering wood.



THREE: Selectively Thin Method

This is the method used to control and train growth in trees, particularly when they are young—the first three or four years after planting. Rather than heading or topping growth, which can cause long-term problems, branches and stems are cut back flush to a supporting branch.



FOUR: Leave-It-Along Method

This is perhaps the best pruning method of all. With time, most trees and shrubs develop into highly attractive plants if left to their own devices. Dead or diseased wood should be removed to keep the plant healthy, but otherwise, just stand back and admire what nature can do on its own.



wood-boring insect pests. Also avoid shearing or heading back glossy-foliaged shrubs such as *Photinia*, *Ligustrum* or *Rhaphiolepis*. Doing this will only stimulate excessive branching.

How to Cut? Where to Cut?

Depending on the size of the stems, use bypass-type pruning shears, loppers or pruning saw. If shears twist and turn when you try to cut through a branch, use loppers. In general, use hand pruners for branches up to 1/2-inch diameter, loppers for branches 1-inch diameter and a pruning saw for larger limbs. Avoid using bow-type saws; the blade is difficult to control. For delicate work such as pinching off new growth, use your fingers or pruning shears.

Where to cut depends partly on how you want the plant to look—bushy and compact, or airy with an open structure, for example. Age of plant is also a factor. Make major cuts first, then work on details. Always remove a branch or stem so it is flush with a side branch, leaf or dormant bud. Never leave a stub. Angle the cuts so they're parallel to the remaining branch. Step back and survey your progress every so often so you don't remove desirable branches.

Heavily pruned plants may develop *suckers* or *watersprouts*. These overly vigorous shoots are unwanted and should be removed as you see them.

Preventive Pruning

One of the best things you can do to reduce time you spend caring for your plants, as well as help ensure their beauty and health, is a program I call *preventive pruning*. The best time to practice preventive pruning is when you begin the plant selection process—at the garden's planning stage. Study the plants that interest you, and learn their mature height, spread, flowering habit, water needs and pruning requirements. The chart on pages 67 to 74 will help you make your selections. Even if you are planting only a few permanent landscape plants, taking the plant's vital statistics into consideration early on can prevent a lot of headaches.

You'll find preventive pruning tips throughout the Gallery of Dry Climate Plants, pages 65 to 156. As mentioned, proper spacing, selecting the right plants for the right locations and planting correctly prevents many common problems. The basic principles of preventive pruning are simple:

Select plants according to height, spread and shape so they can grow naturally in the allotted space with minimal pruning. Space them far enough apart to avoid crowding. This means that when a plant has a mature spread of 6 feet, plants should be located 6 to 8 feet apart.

Often, correct spacing leaves the newly planted area looking sparse. It's tempting to "cheat" and place

plants closer together. This is especially true of arid land plants, many which are rather puny and unassuming in their nursery containers. But don't let them fool you. Avoid planting closely and you'll be rewarded tenfold with attractive plants that will require much less maintenance in the years to come. If the void between plants is bothersome, plant temporary annuals or perennials among the landscape plants, then remove them as the primary plants fill in.

Select plants that are naturally dwarf, reaching knee- or waist-high at maturity. These plants naturally require less pruning and shearing. Dwarf selections are noted in the plant descriptions.

Planting plants that have casual growth habits reduces pruning. Such plants will look attractive even when left alone. Many of the plants described in this book fall under this category.

Selecting plants that are hardy to cold for your climate region is an excellent *preventive pruning method*. If

When and How to Hire an Arborist

Some pruning jobs are best left to professionals. But it can be confusing when it comes time to hire the right company or firm to perform work in a safe, competent manner. Membership in professional organizations such as the International Society of Arboriculture or the American Society of Consulting Arborists tells you the individual is educated and up-to-date on the latest techniques. *Certified arborists* are professionals who have passed extensive examinations covering all aspects of tree care. Certification is not a measure of standards of practice, but it does mean that the individual has achieved a level of knowledge in the art and science of tree care that he or she must continue to keep membership current.

Before hiring, ask for proof of insurance. You could be liable for damages or injuries caused by uninsured tree care personnel.

Ask for references, especially if the work will be complicated, such as removal of a large tree. It's also wise to get more than one estimate if major work will be performed.

Ask for a written contract. Determine start and completion times, responsibility for clean up and hourly rate should extra work be required.

Be wary of tree and yard care companies that go door to door soliciting work. Most established, reputable companies are far too busy (due to references from satisfied customers) to seek employment this way. Be aware, too, that experienced, qualified arborists will not perform certain jobs. For example, they will not top trees, remove excessive live branches or use climbing spurs without just cause.

important structural branches are damaged by severe cold they must be removed, affecting the appearance and health of the plant. If cold damage is extensive, the plant could be killed or damaged to such an extent that it becomes an eyesore and must be removed. Some plants are slow to exhibit the effects of freeze damage. Branches that appear to be dead could produce leaves late in the growing season. Delay pruning suspect branches until the beginning of summer.

Watering correctly reduces excessive growth. Develop an irrigation program for your garden—applying the right amount of water when and where it is needed. A drip-irrigation system is an excellent way to control how much water to give your plants. See pages 33 to 36.

Applying too much fertilizer or fertilizing too often can cause plants to grow too rapidly, which naturally increases pruning amount and frequency. Follow all label directions as to proper dosage and use. Note that

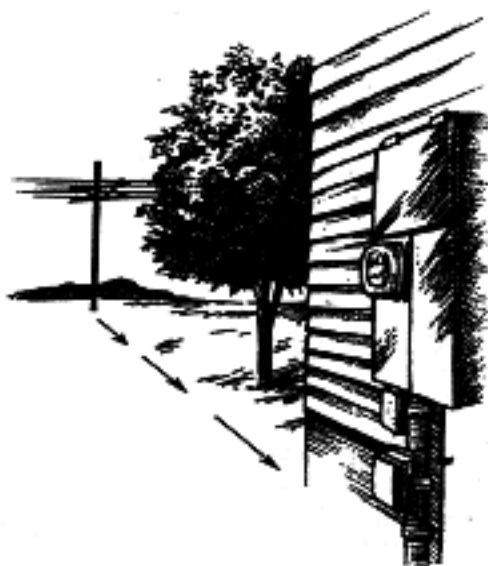
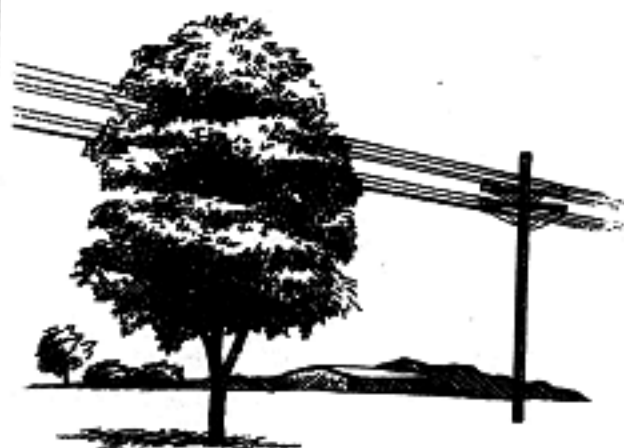
certain plants in the *legume* family can fix atmospheric nitrogen from the air and do not require supplemental fertilizer. Such plants are noted in the Gallery of Dry Climate Plants.

Growth Management

A somewhat extreme version of preventive pruning is a maintenance practice called *growth management*. It involves limiting water and fertilizer to significantly slow plant growth. This naturally reduces the need to prune and thin plants. With time, usually several years, some trees and shrubs may evolve from growth management to become *naturalized*. This means they can be left to grow on their own and will survive with little or no supplemental irrigation. For species that cannot be naturalized, limiting irrigation and fertilizer will reduce growth and pruning. However, use this method with caution, after you've gained an understanding of your plant's cultural needs.

Pruning and Care Safety

Trees that will grow beneath or near utility lines must be selected carefully. Plant only species with a mature height and spread that will fit in the area—usually 20 feet high or less.



Do not prune any plant that is in contact with power lines. Be especially cautious when using metal pole pruners or fruit harvesting equipment that could come in contact with overhead lines. Note, too, that water is an excellent conductor of electricity. Do not use electric-powered tools if conditions are wet.

Be aware of underground utility lines whenever planting new plants or digging around existing plants. Underground electric lines, for example, often travel from a power pole to a utility box located on an outside wall. Call your local utility "blue stake" before beginning any underground work.

Trees are the most valuable elements of a landscape, for many reasons. They add structure, form and character. Many add seasonal color and shade. They provide the framework from which to build a balanced, pleasing landscape. Deciduous trees provide shade in summer, then allow the sun to shine through their branches in winter. Evergreen trees are in leaf all year and serve as windbreaks and screens for privacy.

When you plant trees, be aware that they require more care when young and less and less as they mature. Arid land trees have different requirements compared to trees grown in temperate climates with abundant rainfall. Water use, pruning and fertilization are well defined for each species. Refer to the Gallery of Dry Climate Plants.

Pruning Young Trees

When pruning young trees—those three to four years old—the goal is to establish strong *girth* or *width* in a

it will be able to grow without stakes. If you are growing a multitrunk specimen, your goal should be to develop three to four strong leaders.

To develop strong trunks, do not remove lower branches. They “feed” the trunk in this area and protect bark from sun damage. Leave these lower branches in place for a few years. They can then be pruned up for a more refined look or to allow for pedestrian traffic beneath. Thin the interior to establish the desired branch spacing. Your goals should be to reduce the potential for wind damage while also increasing penetration of light. Remove branches that are dead, weakened, injured, diseased or damaged.

Protect the trunks of young trees from high heat and intense sunlight. If trees produce heavy canopy growth, this is often enough to shade the trunk. Unfortunately, most side branches on single-trunk trees grown in containers are removed at the nursery. Low side branches are often left on multitrunk trees. If trunks require protection from sunburn, apply white

Pruning Young Trees



Leave lower branches on young trees for first three years after planting. They help nourish the trunk to make it stronger. It's acceptable to reduce branch length if clearance is needed.



Thin branches of young trees to develop a proper framework. Avoid heading, also called topping. It will create a less-attractive structure and shortens life of the tree.



If possible, remove branches when angles are too narrow or too wide. These are weak and tend to split or break easily.



When selecting branches that are the proper angle for greatest strength, think 10 o'clock (left) and 2 o'clock (right).

latex paint diluted by half with water. Commercial tree trunk paints are also available.

To thin young trees as well as mature trees, selectively remove branches. You want to improve structure, control unwieldy branches, "lift up" lower branches by removing them from the trunk and thin the interior to decrease wind resistance. Improving branch spacing also preserves the tree's natural shape.

Don't prune too much at one time, especially during summer in hot climates. Pruning removes leaves, branches, buds and stored energy, all of which benefit the tree and are needed for proper growth. Removing too many branches also increases susceptibility to pests, slows growth, undermines health and stimulates excessive sprouting. I once inspected carob and mesquite trees in a parking lot in Palm Desert, in Southern California's Coachella Valley. The trees were exposed to reflected heat and sun, with temperatures reaching up to 120°F! More than two-thirds of the trees had long deep scars, the length of their lower trunks,

caused by sun scald. The damage was a result of overzealous pruning. Too many side branches had been removed too soon, exposing the bark to the intense sun and causing it to burn and split.

Topping Tall Trees: Avoid!

In the West, certain trees such as *Brachychiton populneus*, bottle tree, tall-growing *Eucalyptus* species, and *Populus* species, poplar, are commonly planted where their height and vigorous root systems create serious problems.

In many situations the ultimate height, spread, rate of growth and pruning needs were not matched to the site. In addition, if large trees are not maintained regularly, major problems tend to develop. Aging branches can break and fall, damaging structures and automobiles, with the potential to cause injury or even death. The situation is often aggravated when urban development and housing moves into former agricultural areas where large-growing trees were planted as windbreaks to protect crops.

Pruning Mature Trees



Remove lower branches on trees three to four years after planting to allow for pedestrian traffic beneath. Continue to thin interior to maintain form and so wind can pass through branches.



Heading branches as shown is not usually recommended. It results in lightly attached new growth from each cut, as shown in inset. With time, tree form is ruined. Severe heading is called topping.



step one



step two



step three



Ouch!

Pruning large branches requires three steps, as shown. When making final cut, cut outside branch collar to allow branch to heal.

One-step pruning of large branches (far right) can cause severe damage, resulting in breaking and tearing of trunk, often killing tree.

If trees are pruned and growth is directed in the formative period, from one to five years after planting, future growth can be controlled. Waiting until trees have matured makes resolving problems difficult and expensive if professional tree care personnel are called in to do the job. Cutting the tops off trees—*topping*—merely aggravates the problems. Such trees produce sucker growth and watersprouts, which are lightly attached to the exterior of trunk tissue. Over a period of time, these branches can become a dangerous liability.

Root Pruning: From an Arborist's Viewpoint

In their search for water, the spreading roots of mature, vigorous trees have been known to destroy concrete curbs, walks, walls and driveways. In the process, the bucking and heaving of paved areas creates unsafe conditions for pedestrian and vehicle traffic. Select suitable, noninvasive trees that will be located near paving. To alleviate an existing problem you can either remove the tree or control the roots. If the

tree has value such as providing shade, privacy and beauty, consider root pruning.

Root pruning of large trees should be performed by certified arborists. They have the expertise and equipment to perform this task. Such a procedure should be done over a period of time and performed in increments. Typically one side is pruned during one growing season. The roots are cut at the edge of walks or curbs. A trench approximately 6 inches wide and 18 inches deep is dug, and a plastic root barrier 18 to 24 inches wide is positioned and backfilled with soil. The top growth of the tree will be affected when roots are removed. It is necessary to maintain a balance between roots and top growth or the tree could die. Arborists are trained to do this critical work.

Pruning Shrubs

Attractive shrubs can make the difference between an average garden and a spectacular one. Unfortunately,

Prune Gently



To avoid sunburn damage, prune no more than 20% of tree's canopy at one time. Some trees benefit from a protective white-wash of 50% latex paint, 50% water on lower trunks and branches.

Root Barriers



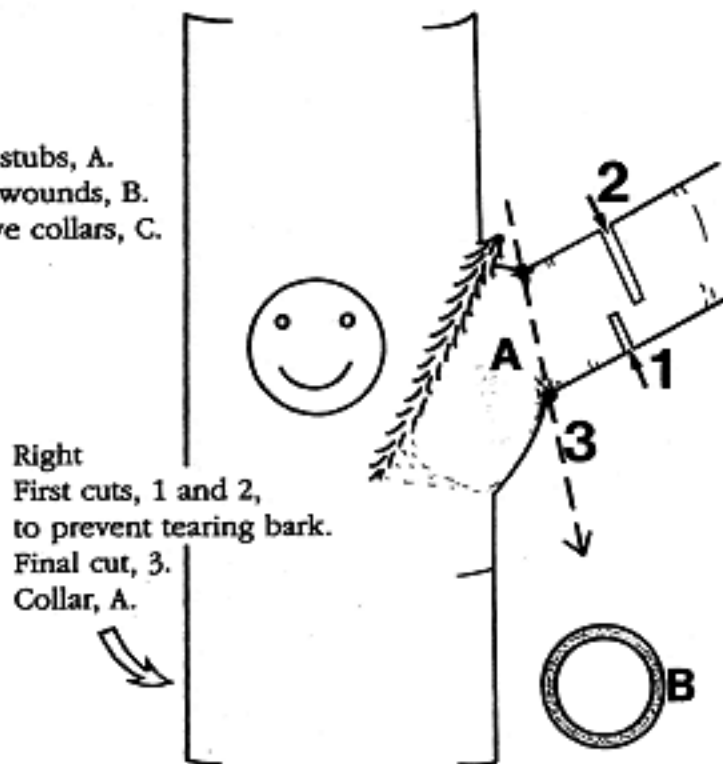
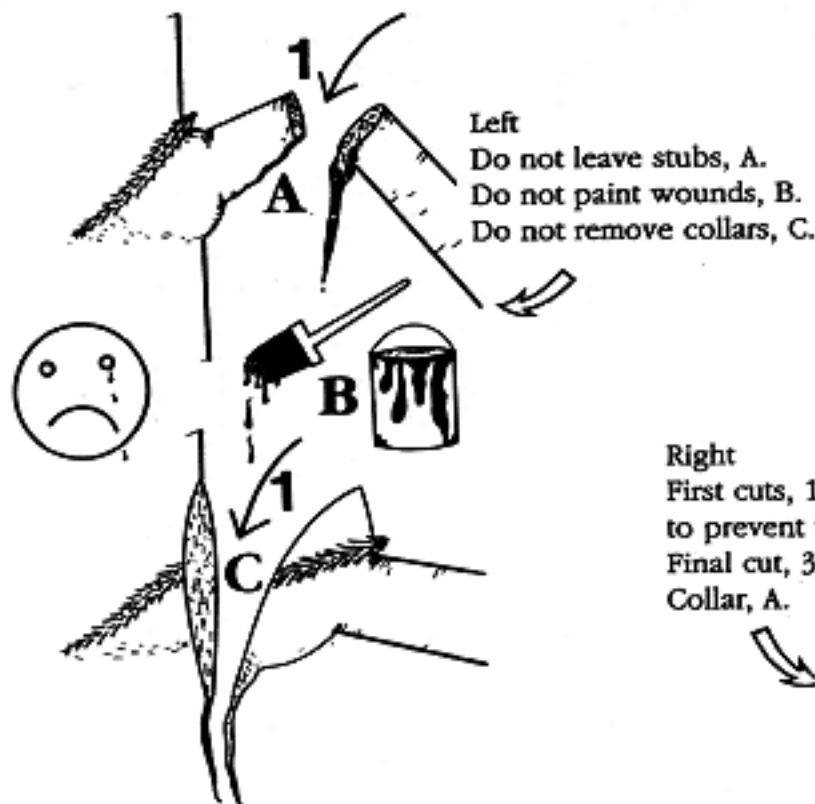
Trees planted near sidewalks or drives can cause damage, raising and breaking paving materials, creating a hazard. Installing a root-pruning barrier at planting time helps prevent damage.

PRUNE CORRECTLY

Make cuts as close as possible to the collar.

Do not injure or remove the collar.

Call a professional arborist if the branches to be pruned are over two inches in diameter. Never prune from a ladder. Never prune near electric utility lines. Never prune with a chain saw. If you do the pruning yourself on small trees or if you have it done on larger trees, here are a few major guidelines:



Callus forms completely around correct cut, B.

Remember:

in nature, trees grow in groups with full crowns. When possible, we should plant trees in groups or clusters and we should not mutilate their crowns!

DO NOT TOP TREES!

is a waste of money and a crime against nature.

