

Follow Proper Pruning Techniques

Proper pruning enhances the beauty of almost any landscape tree and shrub, while improper pruning can ruin or greatly reduce its landscape potential. In most cases, it is better not to prune than to do it incorrectly. In nature, plants go years with little or no pruning, but man can ruin what nature has created. By using improper pruning methods healthy plants are often weakened or deformed. In nature, every plant eventually is pruned in some manner. It may be a simple matter of low branches being shaded by higher ones, resulting in the formation of a collar around the base of the branch, restricting the flow of moisture and nutrients. Eventually the leaves wither and die and the branch then drops off in a high wind or storm. Often, tender new branches of small plants are broken off or are pulled up by wild animals in their quest for food. In the long run, a plant growing naturally assumes the shape that allows it to make the best use of light in a given location and climate. All one needs to do to appreciate a plant's ability to adapt itself to a location is to walk into a wilderness and see the beauty of natural growing plants.

Pruning, like any other skill, requires knowing what you are doing to achieve success. The old idea that anyone with a chainsaw or a pruning saw can be a landscape

pruner is far from the truth. More trees are killed or ruined each year from improper pruning than by pests. Remember that pruning is the removal or reduction of certain plant parts that are not required, that are no longer effective or that are of no use to the plant. It is done to supply additional energy for the development of flowers, fruits and limbs that remain on the plant. Pruning, which has several definitions, essentially involves removing plant parts to improve the health, landscape effect, or value of the plant. Once the objectives are determined and a few basic principles understood, pruning primarily is a matter of common sense.

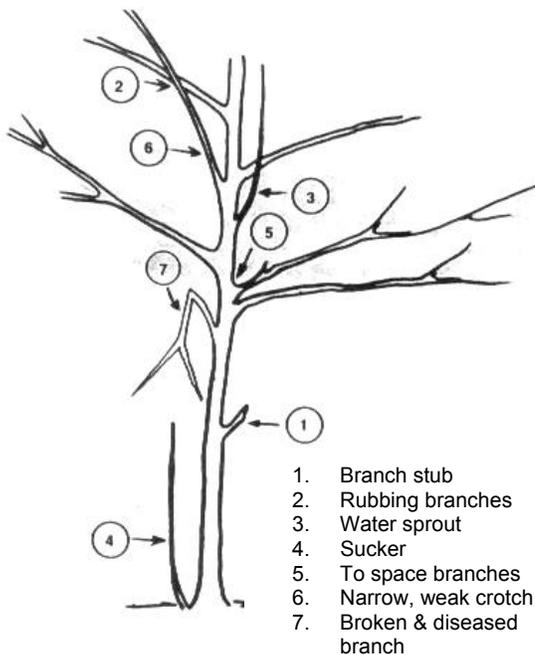
The necessity for pruning can be reduced or eliminated by selecting the proper plant for the location. Plants that might grow too large for the site, are not entirely hardy or become unsightly with age should be used wisely and kept to a minimum in the landscape plan. Advances in plant breeding and selection in the nursery industry provide a wide assortment of plants requiring little or no pruning. However, even the most suitable landscape plants often require some pruning. The guidelines presented in this publication should be helpful when pruning any plant.

Plan Approach to Pruning

Pruning should follow a definite plan. Consider the reason or purpose before cutting begins. By making the pruning cuts in a certain order, the total number of cuts is reduced greatly. The skilled pruner first removes all dead, broken, diseased or problem limbs by cutting them at the point of origin or back to a strong lateral branch or shoot. Often, removing this material opens the canopy sufficiently so that no further pruning is necessary.

The next step in pruning is to make any training cuts needed. By cutting back to lateral branches the tree or shrub is trained to develop a desired shape, to fill in an open area caused by storm or wind damage or to keep it in bounds to fit a given area. To properly train a plant, one should understand its natural growth habit. Always avoid destroying the natural shape or growth habit when pruning unless maintaining a close watch over the plant, for after a period of time it attempts to assume the more natural growth habit.

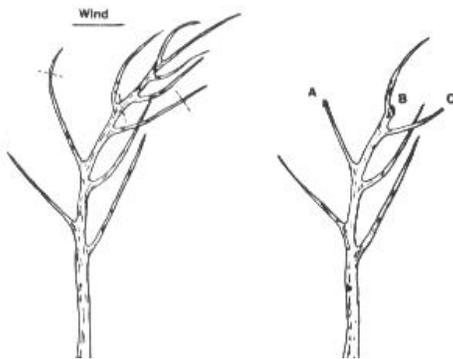
Make additional corrective pruning to eliminate weak or narrow crotches and remove the less desirable leader where double leaders occur. After these cuts have been made, stand back and take a look at your work. Are there any other corrective pruning cuts necessary? If the amount of wood removed is considerable, further pruning may need to be delayed a year or so. Remove water sprouts unless needed to fill a hole or to shade a large limb until other branches develop. If the water sprouts are not needed, remove them, but make the cut as close to the trunk or limb as possible so no stubs are left and the chance of additional sprouts arising from the adventitious buds near the wound is reduced.



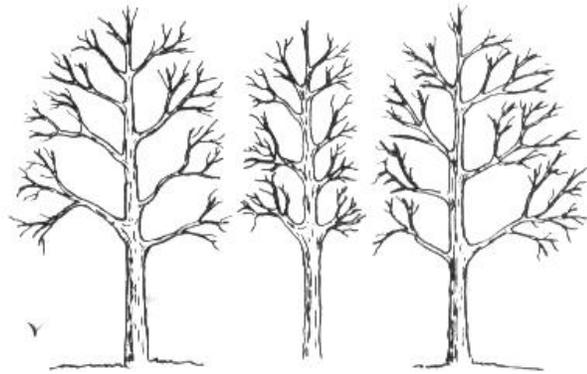
Remove problem areas

REASONS FOR PRUNING

- To improve the chance of survival at transplanting time.
- To direct or *correct* growth in shade trees or avoid later problems.
- To maintain the natural shape of the tree.
- To maintain or limit the size of a plant so that it doesn't grow out of bounds.
- To remove undesirable growth that detracts from the plant.
- To remove broken, unsightly, diseased or insect-damaged growth.
- To remove suckers or water sprouts.
- To improve future flowering and/or fruiting by removing old flowers and fruit.
- To remove storm damage.
- To remove rubbing branches.
- To remove existing stubs that allow diseases and insects to enter the plant.
- To develop a particular form such as a hedge.
- To produce compact growth and prevent legginess.
- To maintain maximum coloration on those plants selected for twig or stem color.
- To improve or maintain flowering by selectively removing some branches, allowing light to penetrate to the interior of the plant.
- To rejuvenate old or declining plants by removing older wood so young growth can develop.
- To increase safety to humans or property under trees by removing large branches that are weak, broken or interfering with the house or other landscape features.



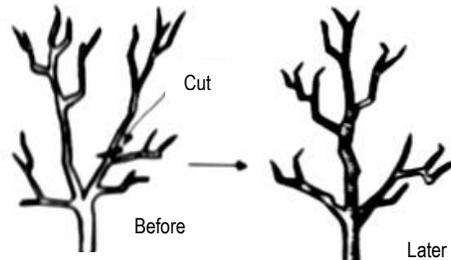
Tree deformed by the wind (left) has curved branch (right) headed to bud (A) pointing into the wind, leader thinned to more upright growing lateral (B) and a downwind branch (C) headed to form a more symmetrical tree.



Prune tree in center to reduce competition with the others. It can be removed with little loss.



Do not allow lateral branches to compete with the main leader.



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WHEN TO PRUNE

Pruning can actually be done at any time of the year; however, recommended times vary with different plants. Contrary to a popular belief, pruning at the wrong time of the year does not kill plants, but continual improper pruning results in damaged or weakened plants. Do not prune at the convenience of the pruner, but rather when it results in the least damage to the plant. There is little chance of damaging the plant if the rule is followed. In general, the best time to prune most plants is during late winter or early spring before growth begins. There are exceptions to this rule, and they will be noted under the discussion of the specific plant groups. The least desirable time is immediately after new growth develops in the

spring. A great amount of food stored in roots and stems is used in developing new growth. This food should be replaced by new foliage before it is removed; if not, considerable dwarfing of the plant may occur. This is a common problem encountered in pruning.

It also is advisable to limit the amount of pruning done late in summer as new growth may be encouraged on some plants. This growth may not have sufficient time to harden off before cold weather arrives resulting in cold damage or winterkill. Late pruning also removes valuable resources. Prune plants damaged by storms or vandalism or ones with dead limbs as soon as possible to avoid additional insect and disease problems that may develop.

Definitions

Bleeding – the flow of sap from a cut or injured surface of a plant.

Broad-leaved evergreen - an evergreen plant with broad leaves that are *not* needle-shaped.

Budded - the propagation of a plant by inserting a dormant bud of one plant into the stem of another.

Caliper - refers to the diameter of a tree. In nursery-landscape practice, caliper is measured 6 inches above the ground level up to and including 4-inch diameter size and 12 inches above the ground level for larger sizes.

Candle - refers to early spring growth of pine shoots before needle expansion.

Central leader - the main stem of the tree from which other branches develop. In most cases, it is the trunk.

Crotch - the angle developed between two connecting branches.

Deciduous - plants that normally have leaves only during the growing season and lose their leaves during the dormant season.

Dieback - the dying back of stems due to adverse weather conditions, insects, diseases or other causes.

Dormant - the period of the year when a plant is not growing.

Drop-crotching - thinning type of pruning in which a main branch or the leader is removed by cutting to a large lateral. The cut is made at the crotch formed with the portion removed and the lateral remaining.

Dwarfing root stock - root used to reduce the size of a plant on which it is grafted or budded.

Espalier - to train a plant on a wire or trellis against a wall or other support.

Grafted - the propagation of a plant by joining two different plants together by inserting a shoot from a desirable plant into the stem or root of another plant.

Lateral - a branch originating from the main trunk.

Legginess - growth that is generally tall without much foliage near the ground.

Multiple stemmed plants - plants with more than one stem from the base compared to plants with only a central leader.

Narrow-leaved evergreen - an evergreen plant with leaves which are needle-shaped.

One-year whip - refers to a 1-year-old unbranched tree.

Permanent branch - a branch that is part of the major growth habit of the tree, usually originating from the trunk.

Radial branch spacing - the distribution of branches around the trunk of a tree.

Scaffold branching - a permanent branch originating from the trunk and becoming a part of the major branching or framework of the tree.

Shearing - cutting back plants with hedge shears resulting in a very formal habit. Limit shearing to hedges, topiary or where a formal garden is to be maintained.

Spore - reproductive organ of fungi similar to a seed.

Sucker - a vigorous shoot originating from root or stem tissue below ground.

Temporary branch - a branch usually originating from the trunk that is removed by pruning after permanent branches have been selected.

Terminal - tip ends of branches.

Thinning - removal of connecting branches to point of origin or shortening the length of a branch by cutting to a lateral.

Trained - to dictate the development and growth of a plant by physical means, such as pruning.

Transplanting - moving a plant from one place to another.

Vertical branch spacing - distribution of branches tip and down the trunk of a tree.

Water sprout - vigorous shoot arising from the trunk or older branches.

Wound - area where the bark of a plant is cut or damaged.

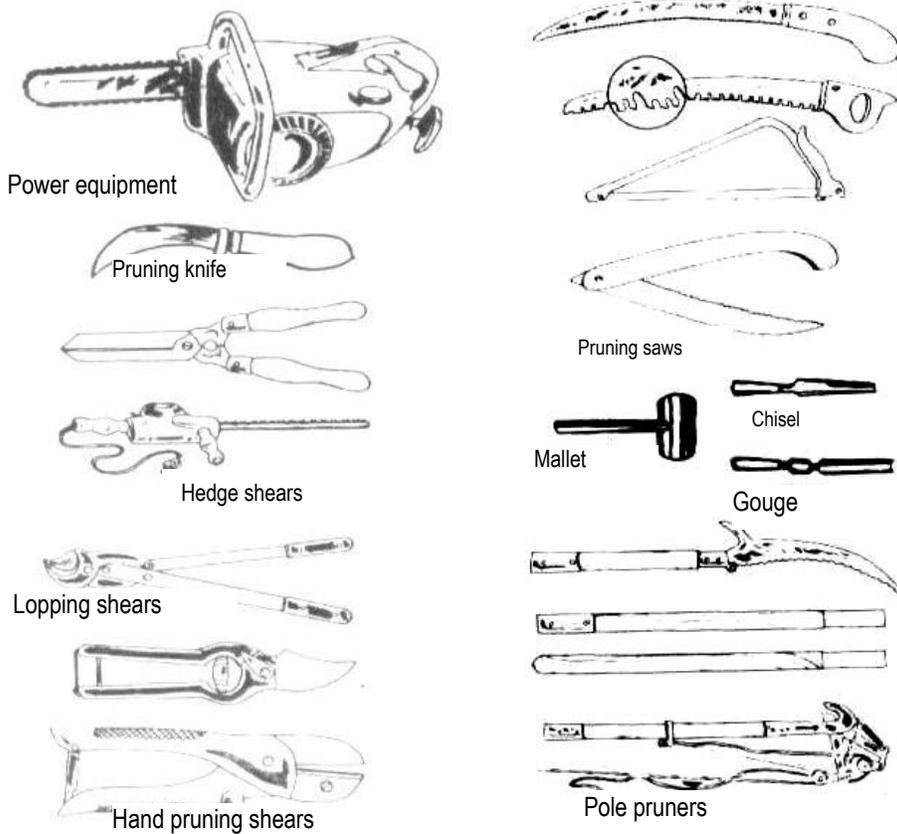
Wound dressing - a specially formulated material applied to tree wounds to protect the wood from cracking.

Pruning Equipment

To know the rules of pruning is most important, but of equal importance is using the correct tools. Equipment can be limited to a few items if the proper ones are selected. Select tools that will do the job, keep a sharp edge, and are relatively easy to sharpen and handle. Some of the most commonly used pruning tools are shown below. Good equipment properly cared for does a better job and lasts longer. Store equipment in a dry room and keep it sharp and in good operating condition. When pruning diseased plants, disinfect all shears and saw blades after each cut to prevent spreading disease to healthy plants. An example of this is pruning fire blight from pears, pyracantha or cotoneaster. Use alcohol or bleach to disinfect equipment between each cut. Mix at the rate of one part bleach to nine parts water.

Power equipment such as lightweight chain saws can be purchased or rented. These are particularly useful in cutting fallen trees or large limbs. Only professional arborists should use power saws for pruning in trees because there are many ways a person can be hurt.

Hedge shears are used mainly for shearing plants into hedges or formal shapes. The most common type is manually



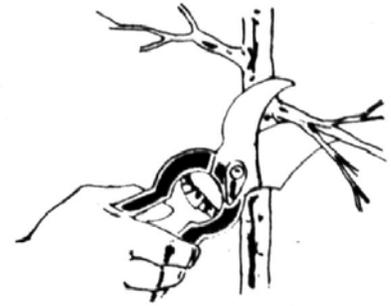
operated; however, if large areas of hedges are involved, power-driven shears may be more practical. Pruning saws, both rigid or folding, are very useful for cutting larger branches that cannot be handled by hand shears. Tree saws are available for removing large tree branches. Pruning saws, which usually cut on the pull stroke, are preferred over a carpenter's saw because they cut faster and easier. The teeth in these saws are set for a wider cut allowing the sawdust to kick out resulting in less binding in green wood.

Pole pruners are used for removing tree branches that cannot be reached from the ground. Two types are generally available. One has a small tree saw attached to the end and can be used for removing small as well as large branches. The other, more commonly used pruner is similar to a large pair of loppers. A cutting action is brought about by pulling on a rope or a lever. Regardless of the type selected, pruners are available in various lengths. The wood or aluminum poles are either one piece or may consist of collapsing sections. Do not work around electrical power lines when using pole pruners. This is especially true when using those with aluminum handles as aluminum is an excellent conductor of electricity.

Lopping shears are for cuts larger than those made with hand shears. Usually they will cut branches up to 2 inches or more depending on the size of the blade opening and the tree species. Loppers also work well on plants with stickers or thorns. Exercise care when using loppers around electrical wires. Select loppers with handles that are a comfortable length to use.

There are many kinds of hand pruning shears. Most of them are designed for cutting stems up to 1/2 inch in diameter. If one has to push or twist the shears to make a cut, the branch is too large. To make a close cut with the least effort, place the blade against the branch or trunk from which the limb is to be removed.

Other tools, which are sometimes necessary, are chisels, gouges, pruning knife and mallets. These all come in handy when repairing storm damage or other wounds.



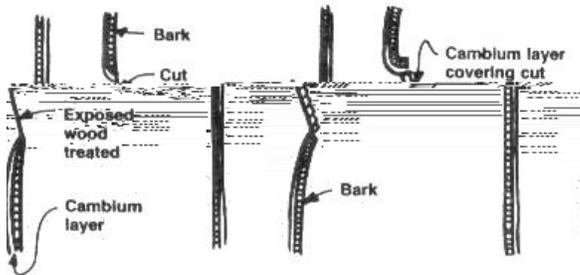
Proper cutting technique.

Wound Healing Process

Understanding the healing process that takes place on pruning wounds enables one to use the proper pruning techniques. The cambium is the essential tissue involved in this process. Therefore, try to protect this layer and provide conditions favoring its growth in the healing process. Where the branch is cut, tissue begins to develop, laying down both wood (xylem) and bark (phloem) cells as before. This growth continues until the layers meet near the center and unite to form a solid layer of wood, cambium and bark over the cut area. There is no connection between the old and new wood. If the cut surface is smooth and free of infection after a few years, such a wound is difficult to locate.

Movement of food, nutrients and water in the tree is largely lengthwise of the stem. Therefore, the most rapid

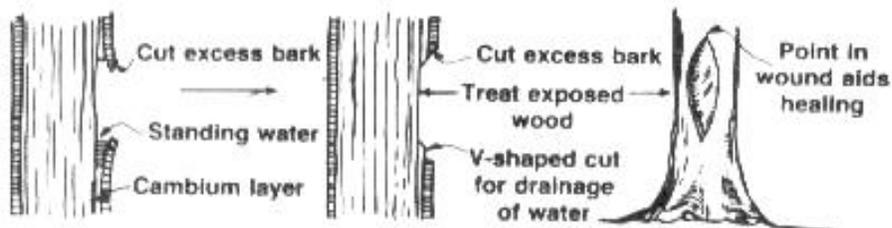
growth of the cambium is in that direction also. For this reason, a long narrow cut, tapered at top and bottom, heals more rapidly than a round one even though more total surface has to be covered. Cambium tissue develops only a short distance from the main food stream. This explains why stubs, even those only an inch or two, seldom heal over. Under such circumstances it is only a question of time before rotting fungi become established and the heart of the tree is rotted. This is why it is so important to make the cuts flush. After making a flush cut, smooth the bark around the cut in an elliptical shape with a sharp knife so there is a smooth edge allowing more rapid healing of the wound.



Healing process of cut.



On injuries, shape edge of wound to an elongated ellipse. Irregular-shaped wounds (right) may need to be enlarged slightly to attain an elongated ellipse.



Treatment of tree wound.

Wound Dressings

In recent years, much has been written about the advantages and disadvantages of using a wound dressing on large cuts. Normally, the wound dressing is used only on cuts larger than an inch in diameter. However, some scientists have found that wound dressings are strictly cosmetic and have little to do with preventing insect or disease damage to the wound area. A pruning paint slows down the healing process when applied to the cambium tissue exposed by the wound; however, wound dressings prevent wedging or checking cracks that develop in large untreated cuts allowing deep penetration of diseases and insects into the tree.

Therefore, it is best to use pruning paint on large cuts to prevent cracking but make sure it's only used on the wood and not applied to the exposed cambium layer or healing may be delayed.

Since the pruning paint has a tendency to weather and crack, it is necessary to periodically inspect the wound surface and repaint if needed. Clean the surface with a wire brush before repainting, avoiding damage to the new callous tissue or covering it with pruning paint. Purchase wound dressings or pruning paints from local garden shops and nurseries.

Make Pruning Cuts Correctly

To encourage rapid healing of wounds, make all cuts flush and smooth. This requires good, sharp pruning equipment. Do not leave stubs since they usually die back resulting in decay that can be serious, especially if large branches on the main trunk of the plant are involved. Once die back starts, the disease may spread easily to perfectly healthy tissue. The problem is the same if the branches are broken off rather than cut. Avoid tearing the bark when removing large branches. It is better to make a jump cut to relieve the weight of the branch; then make the cut flush with the limb or point of origin. Some specific rules are given in the discussion on how to prune various plants. Remember, no two plants are exactly the same so pruning techniques vary between plant species.

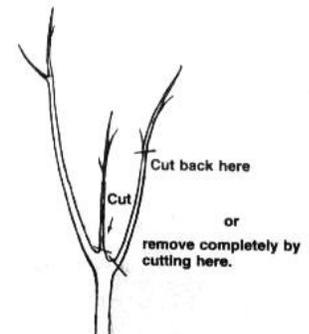
Most woody plants fall into two categories based on the arrangement of the buds on the twigs and branches. In general, the bud arrangements determine the plant's typical growth habit. Buds may have an alternate or an opposite arrangement on the twigs. A plant with alternate buds usually is rounded, pyramidal, inverted pyramidal or columnar in shape. Plants having opposite buds rarely assume any form other than that of a rounded tree or shrub with a rounded crown. The position of the last pair of buds always determines the direction in which the new shoot will grow. Buds on top of the twig probably will grow upward at an angle and to the side on which it is directed. In most instances, it is advisable to cut back each stem to a bud or branch. Selected buds that point to the outside of the plant are more desirable than buds pointing to the inside. By cutting to an outside bud, the new shoots will not grow through the interior of the plant or crisscross.

To open up a woody plant, prune out some of the center growth and cut back terminals to the buds that point outward. In shortening a branch or twig, cut it back to a side branch and make the cut $\frac{1}{2}$ inch above the bud. If the cut is too close to the bud, the bud usually dies. If the cut is too far from the bud, the wood above the bud usually dies, causing dead tips on the end of the branches. When the pruning cut is made, the bud or buds nearest to the cut are usually the new growing point. When a terminal is removed, the nearest side

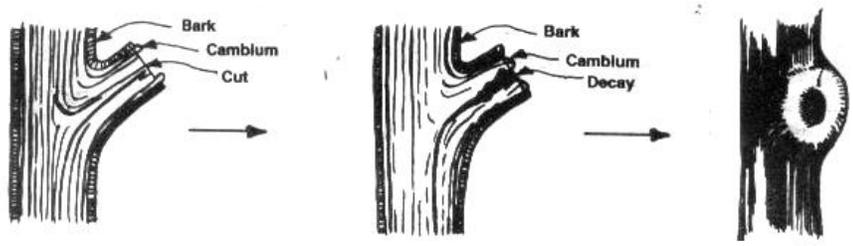
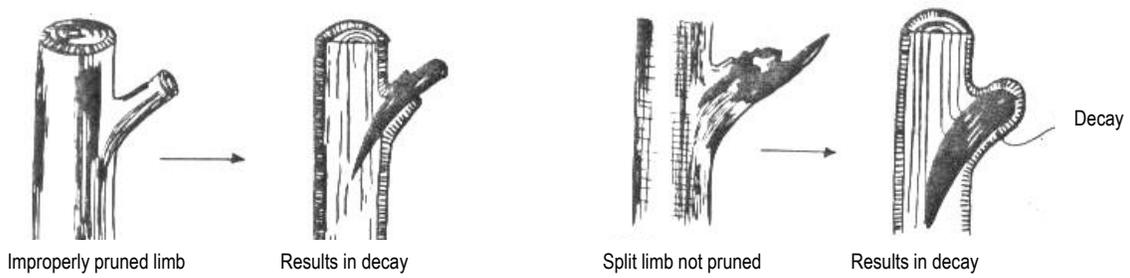
buds grow much more than they normally would since apical dominance has been removed, and the bud nearest the pruning cut becomes the new terminal. If more side branches are desired, remove the tips. The strength and vigor of the new shoot is often directly proportional to the amount that the stem is pruned back since the roots are not reduced. For example, if the deciduous shrub is pruned to 1 foot from the ground, the new growth will be vigorous with few if any flowers the first year. However, if only the tips of the old growth are removed, most of the previous branches are still there and new growth is shorter and weaker. Flowers are more plentiful although smaller. Thus, if a larger number of small flowers and fruits are desired, prune lightly. If fewer, but high quality blooms or fruits are wanted in succeeding years, prune extensively.

Dehorning or cutting back mature trees and leaving large stubs cause weakened trees with short, life spans. This commonly is done on mimosa trees, and most people think this is an acceptable process. However, it shortens the life of the tree and weakens it so it loses its natural shape and resistance to insects and diseases. It is better to maintain the natural shape of the tree when pruning.

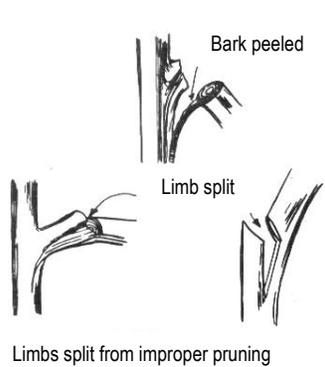
The height of a tree or shrub with two or more stems of equal size and vigor competing for dominance can be controlled by the length they are cut back. A tree or shrub with two branches growing at the same height is commonly known as a split crotch, double leader or weak crotch. For a stronger plant that can take the ice and wind better, cut one branch back or remove it completely. The remaining branch assumes apical dominance over other cutoff branches.



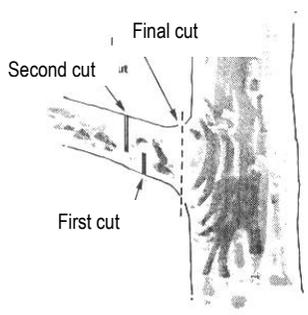
Leader has been choked out by rapidly growing laterals. The lateral shoots should have been pinched or removed much earlier. To cover the situation, remove the original leader (middle) as well as the right lateral branch.



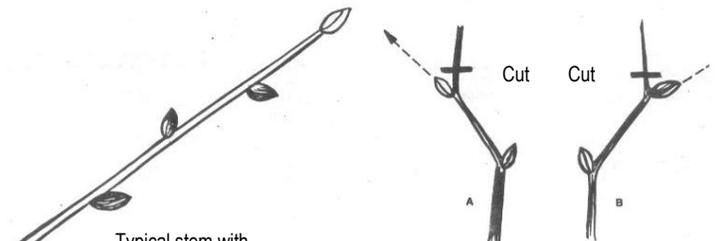
Healing process of improperly pruned limb.



Limbs split from improper pruning



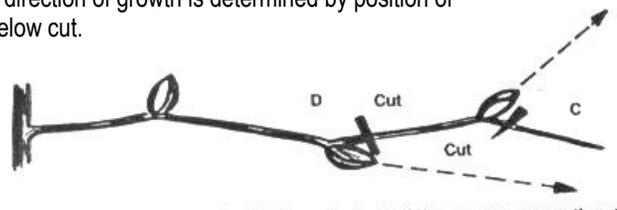
When removing large limbs, make 3 cuts to prevent stripping the bark.



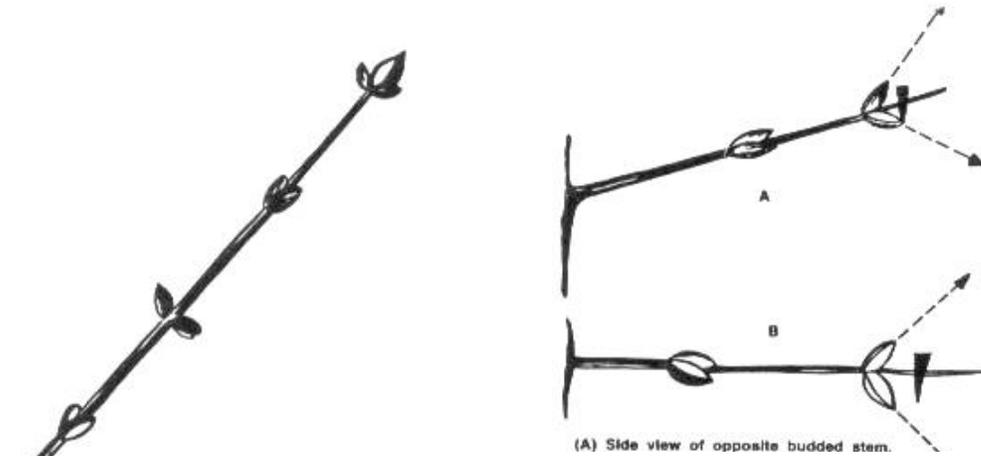
(A) (B) Top view of alternate budded branch shows pruning cut to direct growth to right or left side.

After pruning, direction of growth is determined by position of bud directly below cut.

Pruning typical stem with alternate buds.



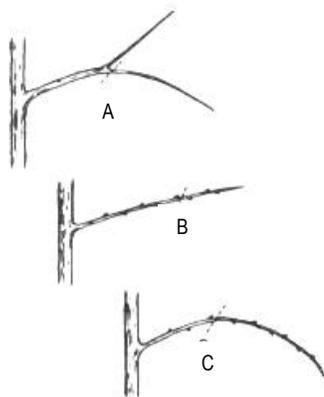
Side view of alternate budded branch. Cut at (C) encourages growth out and up. Cut at (D) encourages horizontal growth, rarely downward.



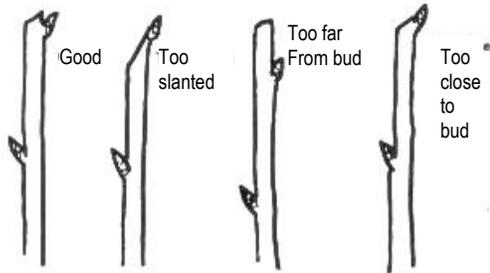
A typical stem with opposite buds. Each pair of buds usually arranged at right angles to pair above them.

(A) Side view of opposite budded stem. Buds in vertical plane. Top bud produces most vigorous shoot in out and up direction. (B) Top view of opposite budded stem. Buds in horizontal plane. Both buds usually grow at equal rate in horizontal plane.

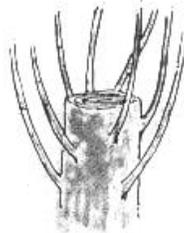
Pruning typical stem with opposite buds.



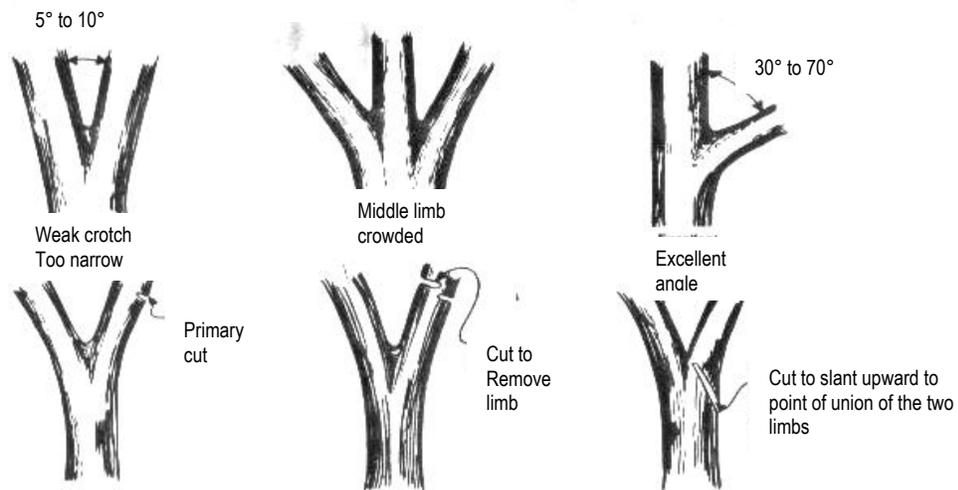
Prune back horizontal limbs (A) to a more upright lateral, (B) to an upward growing bud near the tip of a flat limb or (C) at the top of the bend.



Pruning small branches



Topped trees produce vigorous watersprouts.



Pruning procedure for eliminating a narrow crotch

Pruning Newly Transplanted Trees or Shrubs

Two reasons for pruning newly transplanted plants are to compensate for root loss at digging and to train the plant. Begin pruning at planting time. Pruning bare root or balled and burlap nursery stock at planting time helps compensate for roots lost in the digging process. A living, healthy plant has its root mass and its leaf mass in a state of equilibrium most of the time. There are just enough leaves to manufacture food and just enough roots to take in water and minerals. The two parts supply each other and depend on each other. When a plant is dug, much of the root system is left behind. After transplanting, the leaves require more water than the damaged root system can supply; as a result, the plants wilt. It will soon die unless something is done to reduce the moisture loss either by cutting back the top or by changing the environment. By cutting back the top of the plant so that one-third to one-half of the leaf area is removed, one can compensate for the loss of the roots cut by the spade in the digging process. It's also a good idea to remove one-half to two-thirds of the leaves of plants at planting time. This pruning helps reestablish the plant. Trees dug during the growing season usually have all or almost all of the leaves stripped off at digging time. Several men wearing leather gloves can strip a 5 to 6-inch tree in a few minutes once it is dug and lying on the ground.

Usually it is not necessary to prune container-grown plants. However, check the root system of these plants and make sure the roots are not circling in the pot. If they are, cut them and the top of the plant some to compensate for root damage.

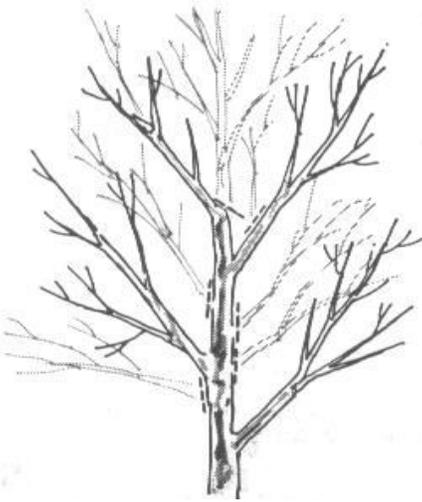
Pruning to compensate for root loss is also a good time to do any necessary corrective pruning. When a tree is planted, corrective pruning frequently is needed to remove undesirable and structurally weak branches and to develop a good arrangement of scaffold branches. Some branches may be left on the trunk as temporary branches and removed as the tree matures. Nursery trees are often headed back at 5 to 6 feet high to force the growth of lateral branches. While these trees may be compact and well proportioned for their size, the lateral side branches may be too low and close together and usually there is no leader. The best time to prune a tree is during the dormant season before new growth begins and at the time of planting. Some root loss almost always occurs when a tree is dug, so thin about 20 to 30 percent of the branches to compensate for root loss. Light pruning during the growing season directs the growth where it is most effective and reduces the amount of corrective pruning needed later. Thinning is the removal of a branch at its point of origin on the parent stem or back to a lateral side branch, which becomes the new leader for that branch. Heading back is cutting a branch back to stub, lateral bud or weak lateral branch. This usually results in dense, vigorous,

upright new growth directly below the new cut and is not recommended.

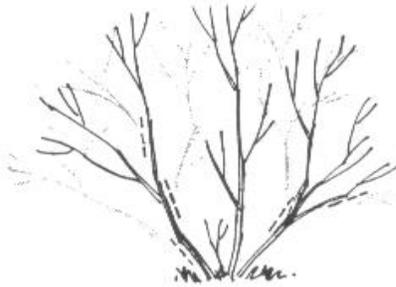
It is important not to cut back or remove the central leader of trees such as pin oaks, bald cypress and sweet gum as this ruins their form. On trees with a modified leader such as maple, purple leaf plum and linden, thin the terminals back slightly to a lateral, which then becomes the new leader.

The height of the first branch depends on the use of the space under the tree. These branches retain their position on the trunk, but as they increase in diameter, they appear to come closer to the ground. Select the main scaffold or lateral branches that grow at wide angles to the trunk. They are stronger and have more connective wood at the top, bottom and sides where attached to the trunk. A narrow angled crotch usually is weak and has little connective wood. As the branches become heavier and begin to spread, the crotch is apt to split during a storm. Remove scaffold branches with a narrow angle of attachment as soon as possible. The location of the first permanent lateral branch above the ground depends on how the tree is used in the landscape. Branches below this point can be treated as temporary branches and reduced in length or removed in 1 or 2 years. When training a tree, prevent lower branches from growing faster than the main trunk. Lateral branches should always be smaller in diameter than the trunk. Whenever a trunk or branch forks, usually one branch is larger than the other. If the branch is too large in relation to another branch or trunk, prune it more severely to reduce its total growth. The vertical distance between the main scaffold branches should be 8 to 24 inches and more for larger trees. Select branches so that they develop like spokes in a wheel around the trunk as shown below. Good vertical spacing prevents one limb from growing directly over another. Upright branches always are more vigorous than horizontal branches. If a lateral branch that begins to grow upright is allowed to continue, the leader may become less dominant. Therefore, remove upright, competing branches on a young tree as soon as possible. When two or more upright growing laterals develop at the same point on the trunk, they are likely to choke out the leader. These laterals should have been pinched or cut back earlier. Now remove the original leader and one of the laterals, as well. Whenever a terminal leader has lost its dominance, select a new one and thin out the original leader.

When cutting branches that cannot be held by one hand, three separate cuts are necessary. The first two cuts will remove the branch without tearing the bark as the branch falls. The remaining stub is cut off by a final cut made between the center of the shoulder ring, if present, and the upper or lower side of the branch as shown on page 7.



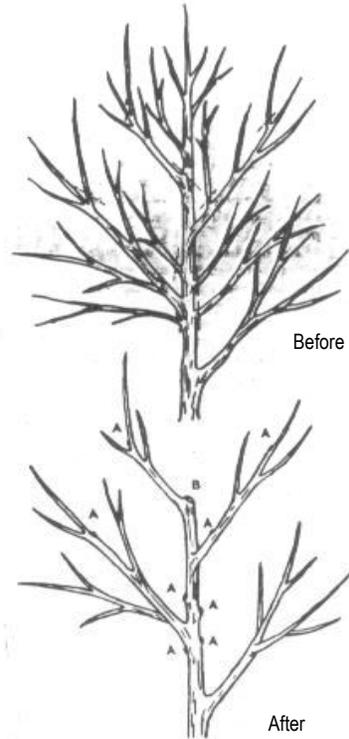
Use thinning-out pruning to reduce growth and retain natural shape at planting.



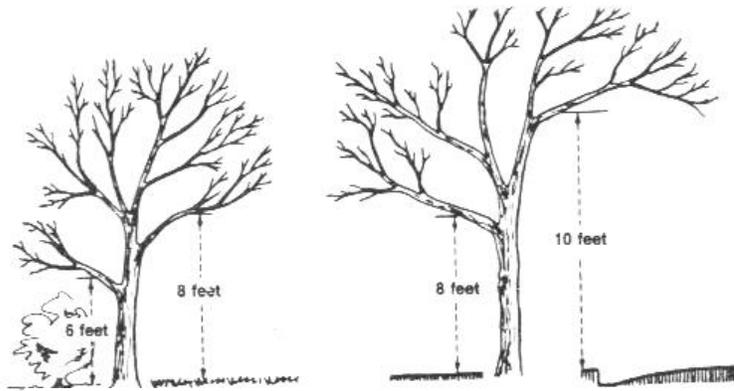
Light shaded branches and dotted lines show how to thin deciduous shrubs. Thinning is cutting off a branch where it is attached to the trunk or a main stem.



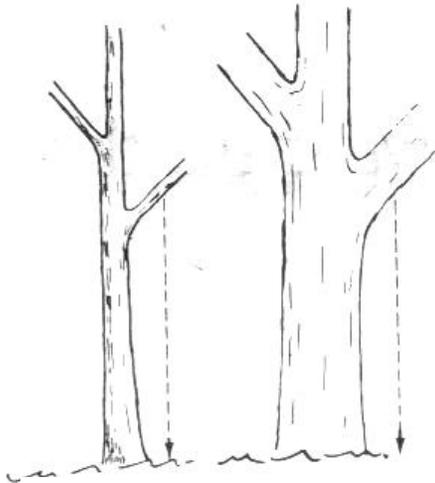
Check for circling roots and remove.



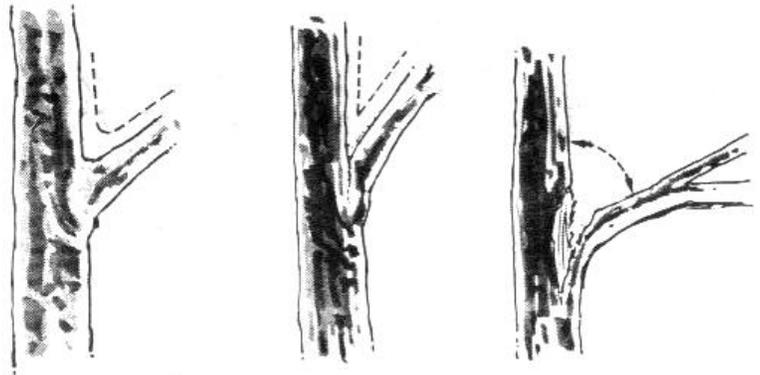
Thinning-out removes a branch (A) or cuts to a larger one (B).



Height of lowest branch should depend on use of space underneath the branch.

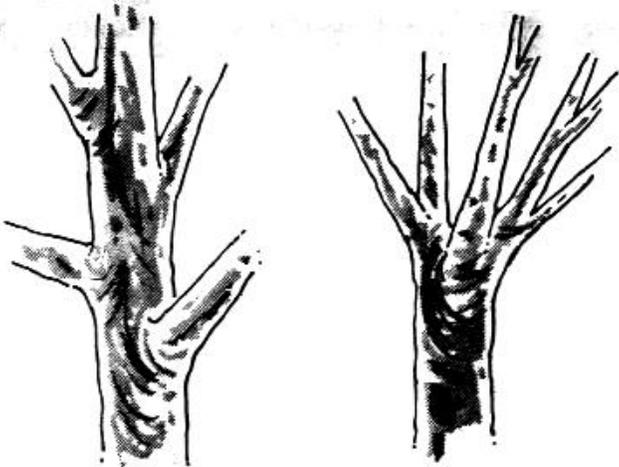


Branches retain their positions on the trunk but as they increase in diameter, they become closer to the ground.

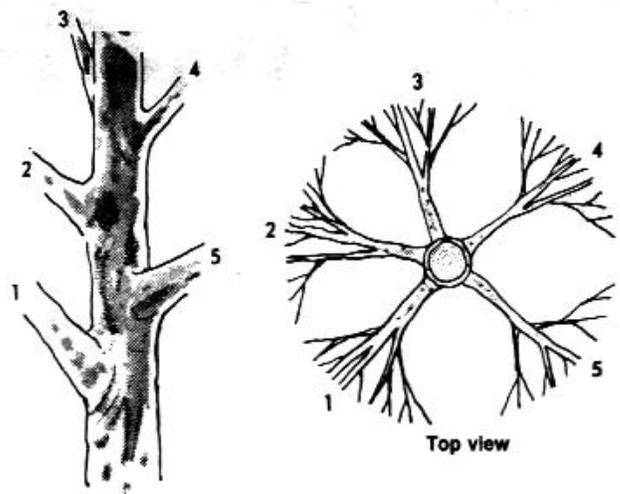


When possible, select scaffold branches with wide, strong angles.

A branch with a narrow-angle attachment is more likely to split.



Well-spaced branches have stronger attachments than those growing close together or in a cluster.



Branches with good scaffolding require proper vertical and radial spacing on the trunk.

Pruning Mature Trees

The home gardener should limit his pruning of mature trees to smaller branches that can be reached from the ground. Leave the trimming of large branches and work off the ground to professional tree men who are skilled climbers and have proper equipment and insurance. Trees generally require less pruning than other ornamentals in the landscape but may occasionally need corrective pruning to maintain health and vigor. Selecting shade and flowering trees for the best quality reduces the need for pruning. Trees that are fast growing and are on the borderline for hardness require more pruning and should have limited use in the landscape.

Base tree selection on height and spread when fully grown. Flower, fruit and foliage characteristics also are important considerations. Trees planted in the landscape often need corrective pruning to reduce height and spread, to allow more sunlight for grass and flowers and to eliminate branches. Early removal of double leaders or narrow shaped crotches prevents or reduces broken branches in storms as well as splitting trunks as the trees mature. The crook that results at the base of a new leader seldom is noticeable after two years' growth.

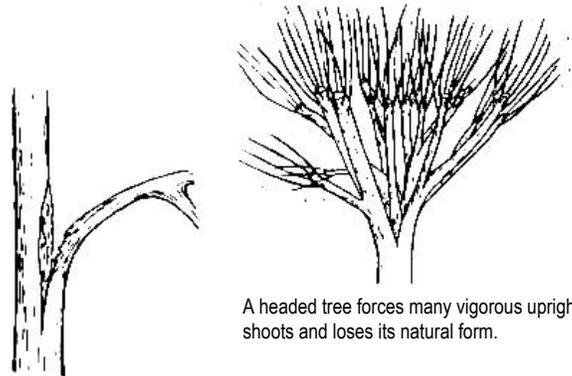
Early corrective pruning for young trees is recommended over drastic cutting of large limbs in a mature tree. As a general pruning principle always cut back to a lateral side branch or bud.

Prune to conform to the natural shape or branching habit of the tree. A pruning cut to a bud should be only $\frac{1}{2}$ inch above the bud and slightly slanted away from the bud.

Thinning is a method of pruning usually recommended for most landscape trees. When thinning, remove an unwanted branch at its point of origin or to a strong lateral branch. This method conforms to the tree's natural branching habit and the results are less conspicuous. Thinning makes a more open tree and emphasizes the internal structure of the branches. Thinning also reduces breakage in wind and ice storms. Live oaks, in particular, need to be thinned out for this reason in the northern half of Texas. Unfortunately, topping or heading is used too often to reduce tree size. While more rapid than thinning, the results usually are much less desirable. Regrowth is vigorous and upright from the stub. New branches form a broom-like growth arising from adventitious buds just below the surface and usually are weakly attached to the bark of the stubbed-back branch. Actually it is a bunch of water sprouts weakly attached to the main trunk. Therefore, during wind or ice storms, the branches break off easily.

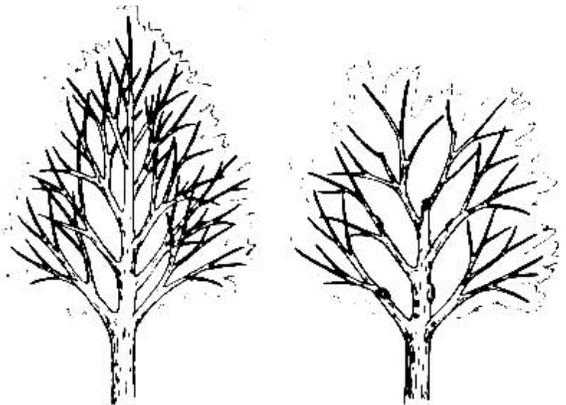
Topping also shortens the life of trees, rendering them susceptible to insect and disease attacks. It also destroys the tree's natural shape. Do not prune the central leader of trees unless necessary. Over a period of several years, remove or cut back branches that compete with the leader if the branches are large. The crook leader seldom is noticeable after a few years.

Again, never leave short stubs when cutting branches or twigs. Make the pruning cut flush with the point of origin. When cutting branches of a size and weight that cannot be held by hand, three separate cuts are necessary; this is called a jump cut. The first two cuts remove the branch about a foot from the parent stem without tearing the bark as the branch falls. The remaining stub is cut off by a final cut parallel with the remaining limb



A branch with narrow-angle attachment may not split until branch is quite large.

A headed tree forces many vigorous upright shoots and loses its natural form.



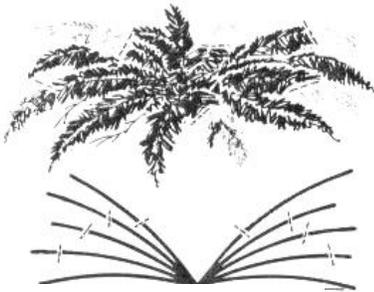
Thinning reduces the height and opens up a mature tree (left) retaining the natural appearance and form (right).

as shown on page 7

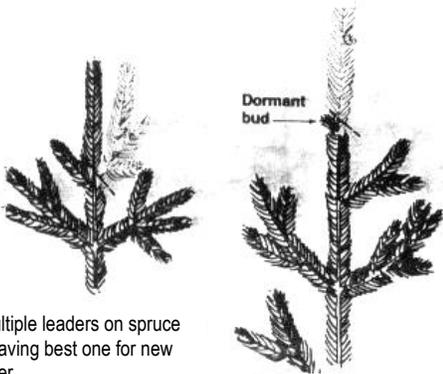
The ideal time to prune most trees is during the dormant season before new growth begins. Flowering trees that bloom in the spring are an exception for they should be pruned after flowering. Other possible exceptions are maple, dogwood, birch and elm trees where a flow of sap may occur from pruning wounds made in the winter. This "bleeding" is not harmful, but is unsightly. Delay pruning until midsummer on these plants to prevent bleeding. An advantage to summer pruning of other trees is that areas requiring thinning can be seen easily. Also, the dead wood shows up easier during the summer months than in the winter months. In the summer observe and mark large branches that need to be removed in the dormant season.

Pruning Narrow-Leaved Evergreens

Since narrow-leaved evergreens produce new growth in spring and fall and do not grow much in summer, prune about the first or second week in April in warmer sections of Texas and about the first or second week of May or June in cooler areas. About the only exception to this rule is pines, which should be pruned when the candle growth develops in the spring. Prune evergreens according to their growth habits. Allow these plants to assume their natural shape. Do not shape them into balls, birds or other formal habits. Pruning is a matter of cutting the branches so that a more desirable plant is attained through compact, controlled growth. This requires pruning individual stems rather than shearing. Shearing not only ruins the natural growth habit but prevents light from penetrating into the center of the plant resulting in foliage drop. In addition, insect and disease control becomes difficult as spray materials cannot penetrate to the center of the plants.



Tip pruning on evergreens



Remove multiple leaders on spruce and pine, leaving best one for new central leader.

Cut back central leader only when it outdistances the rest of the plant. This forces a lower bud to become the new leader.

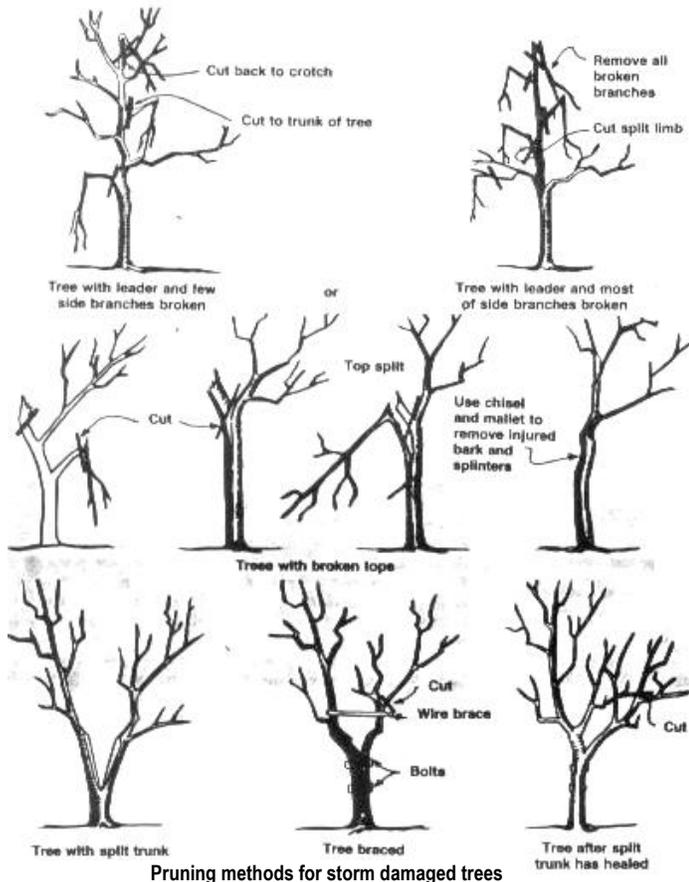
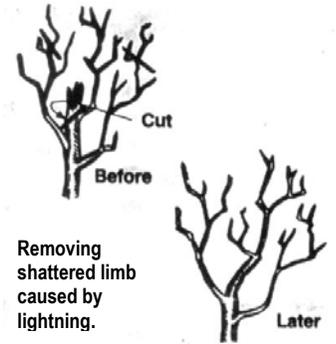
There are certain rules to follow for various types of narrow-leaved evergreens. Start pruning when evergreens are small, usually the first year after they come from the nursery. Then if they are pruned a little each year, severe pruning, which exposes full branches, is not necessary. Remove dead branches whenever they occur. New foliage from surrounding branches will fill in these gaps. The spreading forms of junipers should have the tip ends of their growth trimmed each year. This holds the plants in check and induces a compact growth habit. An example of a vigorous-growing, spreading evergreen is pfitzer juniper. It is common for this plant to grow 12 to 18 inches or more each year. To maintain the natural shape of this plant, it is necessary to cut back to growing points. It also may be necessary to cut back into the previous year's wood to maintain the plant's size and shape.

For the narrow-leaved upright evergreens, such as pines or junipers, little pruning is required. When pruning any narrow-leaved evergreen do not cut into bare wood behind the foliage on the tips. Since few adventitious buds are formed on older twigs, the plants may be damaged beyond repair. Do not cut the central leader of these plants except to remove a multiple leader. This may occur when the plants are young. Remove all but one of the stems, leaving the straightest and strongest. When pines are young and growing vigorously, the top growing point may outdistance the rest of the plant, resulting in an open space between the main body of the plant and the growing tip. To encourage the plant to branch and be more compact, cut the top back to a dormancy bud located near the main body of the plant. If this cutting back is done when the plants are young, there is little effect on plant appearance. It is better to select a compact or dwarf form of narrow-leaved evergreen than to do a lot of pruning. Many narrow-leaved evergreens will have much of the inner foliage turn brown in the fall, which is the natural pruning process. The amount of browning may vary considerably from season to season. This is a natural shedding of older leaves and is comparable to the dropping of leaves by deciduous plants. This occurs principally on cypress and some pines, especially in the warm areas of the state. Extensive periods of hot, dry weather also contribute to the loss of leaves on narrow-leaved evergreens.

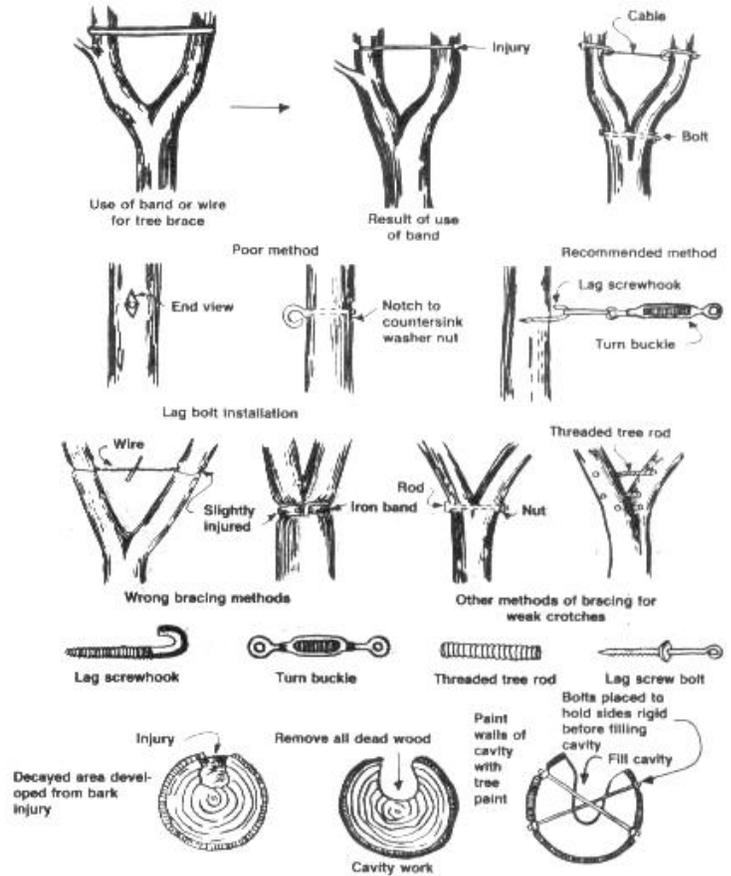
Repairing Tree Injury

Injuries to trees that expose the wood or kill the bark allow insects or disease organisms to enter the tree. Proper treatment protects the tree and promotes faster healing. Few trees reach maturity without receiving one or more wounds from a variety of sources. Yet trees have survived for centuries to become the oldest creatures on earth despite wounding. Some recent work has involved dissecting trees in an effort to understand how they compartmentalize and close an injury. Trees do not heal in the true sense of the word. Injured tree tissue is never repaired and returned to the former state as is a cut on a person's hand. Trees react by closing the wound and compartmentalizing or isolating the injured tissue from the surrounding tissue. During compartmentalization enclosure, contents from the injured cells leak onto the uninjured surface where they oxidize and form a barrier to prevent further infection. Then the most recently laid down wood is altered as is the tissue around the injury. This is accompanied by discoloration, the extent of which depends on the kind of tree, the vigor, kind of wound, location of the wound and the time of wounding. New growth rings are laid down the following spring and callous tissue begins to grow over the injured tissue. Over a period of time, calloused tissue closes the wound.

Homeowners can help the plant compartmentalize the damage more rapidly than it does in nature. If bark has been crushed or stripped from the trunk, remove the injured bark, shape the wound and apply a tree wound paint or dressing on the wood but not on the edge of the bark. Cut away all damaged bark and remove isolated scraps from the wound area. For faster healing, shape the edge of the wound as nearly as possible to an elongated ellipse. If this shape cannot be obtained, shape the top and bottom of the wound area so they come to a point, even if the wound must be enlarged slightly. Remove all splintered wood and smooth the surface of the exposed area with a chisel. After the surface of the wound dries, apply tree wound paint to reduce drying and cracking of the inner wood. Large or slow healing wounds may need additional applications of paint since the paint can crack or slough off, losing its effectiveness. For a year or more



Pruning methods for storm damaged trees



Tree bracing and treatment of wounds.

after a tree has been struck by lightning, it is often difficult to determine the extent of the damage, since much of the injury may be internal. Trees that seem badly damaged may live while others apparently only mildly injured may die. If the tree can be saved, remove all shattered parts and damaged limbs; then smooth and paint exposed wood. Again, do not use pruning paint on the edge of the bark as it can damage the cambium tissue. In storm-damaged trees, remove all broken branches and reshape the tree as well as possible at that particular time. Try to encourage new branch development in areas with broken branches. Broken trunks, split crotches or cracked limbs

often are mended by restoring the damaged part to its original position and holding it there permanently. Consult professional arborists to install screw rods or cables in trees where this work is necessary. When inspecting large trees, carefully dig around the base of the plant where the trunk goes into the ground and check for girdling roots, which wrap themselves completely around the trunk of the tree, restricting the flow of nutrients and water to the tree. If these girdling roots are found, remove them or sever a section of the root thereby preventing regrowth between the tree and severed root.

Pruning Deciduous Shrubs, Small Trees When Transplanting

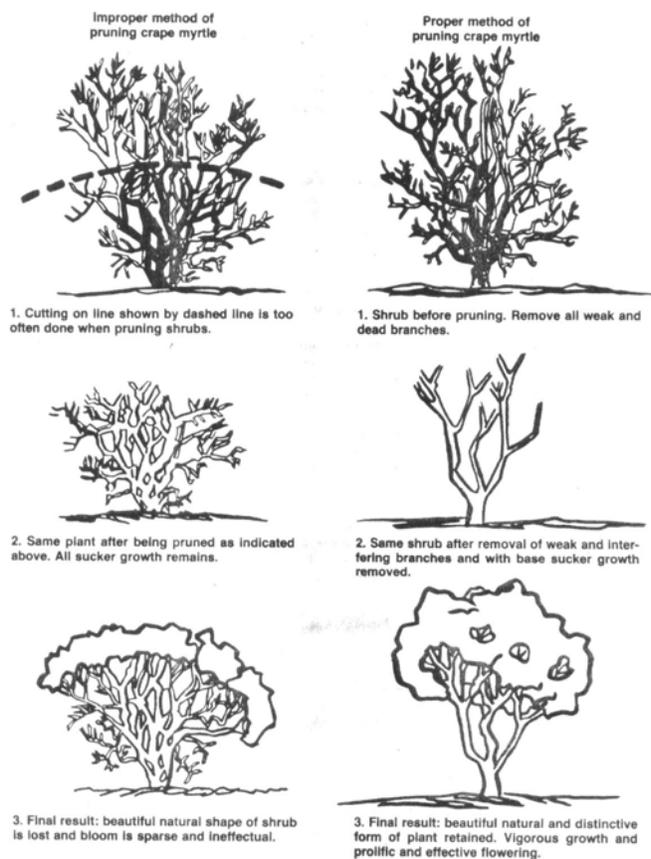
When shrubs and small trees are transplanted, whether bare-root or balled and/or bur-lapped, pruning usually is necessary. Light pruning of roots on bare-root plants may be needed to remove any that are broken, damaged or dead. Prune shrub branches to offset the loss of a portion of the root system damaged in the digging process. Use the thinning method to reduce the overall height and width of the young shrub by as much as one-half to one-third or more. Shrubs transplanted from containers require little

pruning. Occasionally branches may have been damaged in transit; remove these at planting time. Also, check the root system of container plants for girdling roots. If present, score the root ball with a sharp knife in three or four places around the sides to a depth of 1/4 to 1/2 inch to cut the roots. If severe root pruning is needed, it may be necessary to remove some of the top growth to compensate for the root loss.

Pruning Mature Deciduous Shrubs, Small Trees

Correct pruning is one of the most essential of all maintenance practices for shrubs and small trees in the home landscape. Proper pruning helps maintain vigor, control the shape, form a desirable landscape effect and add years to their usefulness. Prune deciduous shrubs to maintain their natural habit of growth, encourage vigorous growth in plants with colored twigs and improve survival chances at transplanting time. Pruning methods used on deciduous shrubs and small flowering trees depend on the plant's growth habit and blooming characteristics. Some plants should be pruned as soon as they have finished flowering in the spring; others should be pruned before growth starts in the spring.

Most deciduous shrubs and small trees, which bloom during the spring, produce their flowers on the previous season's growth. If such shrubs and small trees are pruned early in the spring before they flower, most of the flower buds will be removed. Prune all plants that fall into this group only after they have finished blooming. Prune spring flowering spireas, jasmine, lilacs, beauty bush, flowering quince, mock orange or philadelphus and red bud trees immediately after they have finished flowering in the spring. Shrubs and trees that bloom from early summer until fall usually form flowers on new wood produced the same growing season. This gives them sufficient time to produce flowering stems from early spring until the time they flower. Prune this group of plants while they are dormant during late December through February. In North Texas, it's generally best to delay pruning until February or March or until the danger of late frost is past so that the growth stimulated by pruning will not be killed. Some of the shrubs that bloom on current season's growth include abelia, butterfly



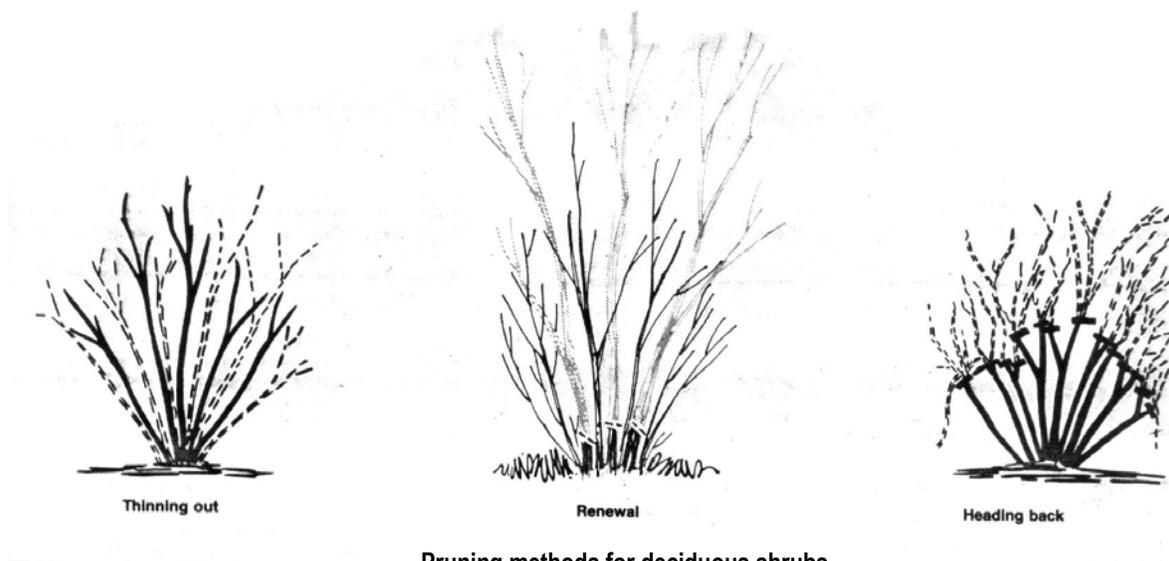
The general procedure illustrated also applies to many other large shrubs or small trees of similar structure.

bush, crape myrtles, shrub althea and some of the hydrangeas. Three methods used to prune deciduous shrubs and small trees include thinning, renewal or rejuvenation and heading back or shearing. In general, thin most deciduous shrubs rather than shearing or cutting back. Thinning prevents excessive or unsightly branch formation at the top of the plant and maintains the natural growth habit. This is done by cutting off a branch where it is attached to the main stem. This is the least conspicuous of all pruning methods and is best for plants that are too dense. To develop branches, which grow toward the outside of the plant, remove inward growing branches and prune to an outside facing bud or branch. Plants can be maintained at a given height and spread for years by thinning. This method works best with hand pruning shears, not hedge shears. Thinning allows for growth and development of side branches. Thin out the oldest and tallest stems first. Make pruning cuts about ½ inch above the buds, slightly angled away from the bud.

Rejuvenate shrubs that have become too large or contain considerable unproductive wood by cutting off the oldest branches at the ground, leaving only the

newest stems. If there are not many younger stems, remove the older wood over a 3-year period to maintain the overall shape of the plant. New shoots that develop can be cut back to various lengths by the thinning method that encourages strong branch development. Plants that often become overgrown and can be rejuvenated include forsythia and spirea. Plants, which are extensively overgrown, severely weakened or otherwise unhealthy, can be cut back completely to the soil in late winter. These shrubs may not bloom for a year or two, depending on the rate of growth. There's also a chance of losing these plants.

Heading back or shearing refers to cutting back a branch anywhere along the length of the stem. The cut may be above the bud, below a bud or only a stub. Heading back or shearing concentrates vigorous, upright new growth below the cut. This method frequently is done with hedge shears without regard to the natural form of plant branching. If every branch or twig is headed back, more growth develops than was removed by the pruning and the natural form of the plant is altered by extra growth. Hedges are pruned to a definite size or shape with hedge shears.



Pruning methods for deciduous shrubs.

Pruning Rose Canes

For Transplanting

Potted or container-grown rose plants need no pruning at transplanting time except to remove dead wood. Prune packaged and dormant rose plants if not prepruned by the nurseryman. If not pruned, cut them back to about 4 to 6 inches above the bud union. Leave three to five major canes. Also while pruning, check the root system. Remove any broken or damaged roots.

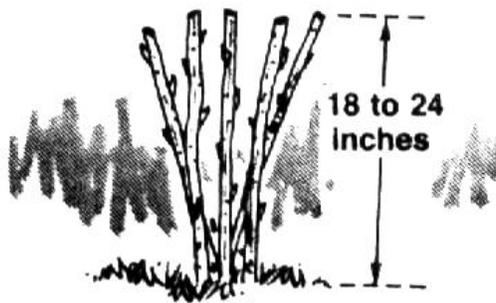
Mature Roses

Rose plants need pruning to tidy up their appearance; control size; and improve their vigor, growing habits and bloom. Pruning methods vary according to the type of rose plant. In South and Central Texas, roses usually are cut back more severely than in North Texas. This is due to the longer growing season, resulting in larger bushes. To keep them in bounds, spring pruning usually is more drastic. Prune about 3 to 4 weeks before the average date of the last killing frost in your area. Roses have a very low chilling requirement to break dormancy. A few weeks of cold weather in December fulfills this requirement and new growth begins the first warm spell in January or February. If pruning is done too early, the new growth begins at the base of the plant, and a sudden cold spell in late February or early March can severely damage or kill the plant. If pruning is delayed, the new growth will be in the top of the unpruned canes and only the upper portions of the bush will be damaged in a late freeze. An exception to this rule involves climbing roses which need to be pruned after flowering in early spring.

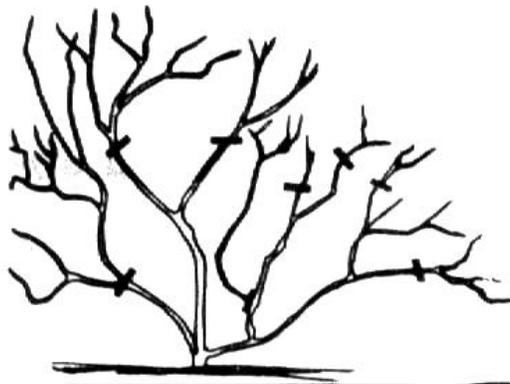
Probably no other aspect of growing roses has aroused as many questions as has the subject of when and how to prune roses even though it is not difficult. By following a few simple

rules you can improve their appearance and vigor and control the quality and quantity of the flowers. Pruning roses dates back to the nineteenth century when rose growers began to severely prune their plants to produce larger blooms for show. Unfortunately, plant longevity was of secondary importance to these exhibitors. Some fundamental practices of pruning roses correctly in all gardens, regardless of type, are: 1) remove any canes that have been damaged by insects, diseases or storms; 2) remove one of two canes which may be rubbing one another; or 3) remove canes that are spindly or smaller in diameter than the size of a lead pencil. After pruning according to these general recommendations, cut hybrid teas, florabundas, grandifloras and polyanthas back to 12 inches for large flowers and 18 to 24 inches for many smaller sized flowers.

Climbing roses generally are pruned to renew plant vigor by removing the old canes since the most productive and finest blooms on climbers are produced on canes that arise from the bottom of the plant the previous year. These newer canes produce more desirable growth and flowers. Since the canes may become quite long, it is necessary to prune them back so they are maintained in the desired area. On all roses, consider the cutting of the flowers as a form of pruning. When gathering roses, always leave at least two sets of leaves on the branch from which you cut the flower to insure plant vigor. When removing faded, spent flowers, cut only as far as the first five-leaflet leaf. When making cuts on the ends of branches, cut at 45 degree angles above an outside bud $\frac{1}{2}$ inch above the bud with the lowest point on the side opposite the bud, but not below the bud itself. When removing branches, never leave stubs since these die and can cause problems on the plant later. Always remove branches by cutting to a lateral branch or bud or back to the base of the rose plant.



For roses not damaged by winter, cut canes back to 18 to 24 inches or to a height in balance with other plants in a rose bed.



Pruning young climbing roses.

Pruning Broad-Leaved Evergreens

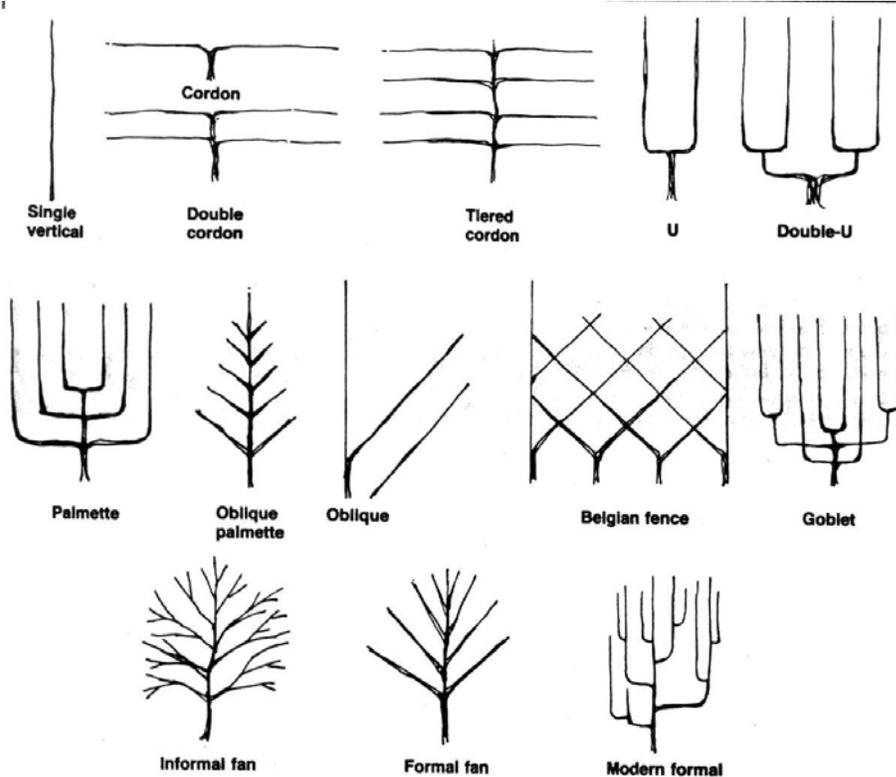


It is difficult to prune Firethorn without eliminating last year's fruits plus fruits and flowers for the next year. Annual, light pruning insures flowers and fruits each year.

Broadleaved evergreens such as gardenias, camelias, azaleas, pyracantha, hollies and photenias require very little pruning. Lightly thin broad-leaved evergreens grown for their showy fruit such as pyracantha and holly during the dormant season if needed for shaping. Remove old or weak stems. This group can go several years without pruning except for some slight cosmetic pruning to keep them neat. If too much wood is removed from these plants at anytime, summer or winter, the amount of fruit is reduced the following season. When these plants become old and straggly, cut them back 6 to 8 inches from the ground before spring growth begins. Don't cut them back too early, however, because a flush of growth could freeze and set them back. Prune only after the danger of the last killing frost is past. Such pruning stimulates the growth of new wood from the base of the plant. Many gardeners prefer to remove only about one-third of the branches at one time and retain the general contour of the plant. This method also can be used. In the long run, probably the best thing to do with overgrown broad-leaved evergreens is to remove and replace them.

Pruning Vines and Ground Covers

The problems and pruning vary with the different uses of vines. Vines left unpruned for many years become unattractive. They harbor wasps, collect trash and lose their landscape effectiveness. Prune them to prevent such hazards. Vines usually cover an arbor or wall. Used in these ways, they are easily pruned to give a clean, well-kept appearance for displaying flowers or fruit. Some vines, such as honeysuckle and winter creepers, grow so fast and thick that considerable pruning may be necessary while other species need little pruning. Prune most vines in Texas during the dormant season around February or May. Prune dead, diseased or damaged vines back to healthy wood. Cut interfering branches of woody vines such as trumpet creepers or wisteria back below the point of interference or at the junction with the main stem. Prune out the top one-third of overgrown or elongated stems. Prune old mature stems that are declining in vigor by one-third or more.



Shown are some espalier patterns. The most commonly used is the Double-U

Each year, prune stems of trumpet creepers and wisteria to promote new growth and flowers. Prune back the top of the plant to force out new branches. Give special attention to wisteria because considerable confusion exists about pruning and flowering. Pruning wisteria extensively during the dormant season encourages rampant vegetative growth the next spring. Instead, in July prune out the long, straggly growth leaving those branches needed for climbing. This is more likely to induce flowering than anything else. Cut shoots back one-third to one-half their length, which includes the production of short spurs upon which next season's flower clusters are borne. Wisterias bloom abundantly if planted in well-drained soil and full sun, watered well the first growing season and pruned in the summer.

Espalier plants are trained in patterns on a flat surface such as a fence or wall. With proper care, plants can be trained into almost any desired shape. Unless one is

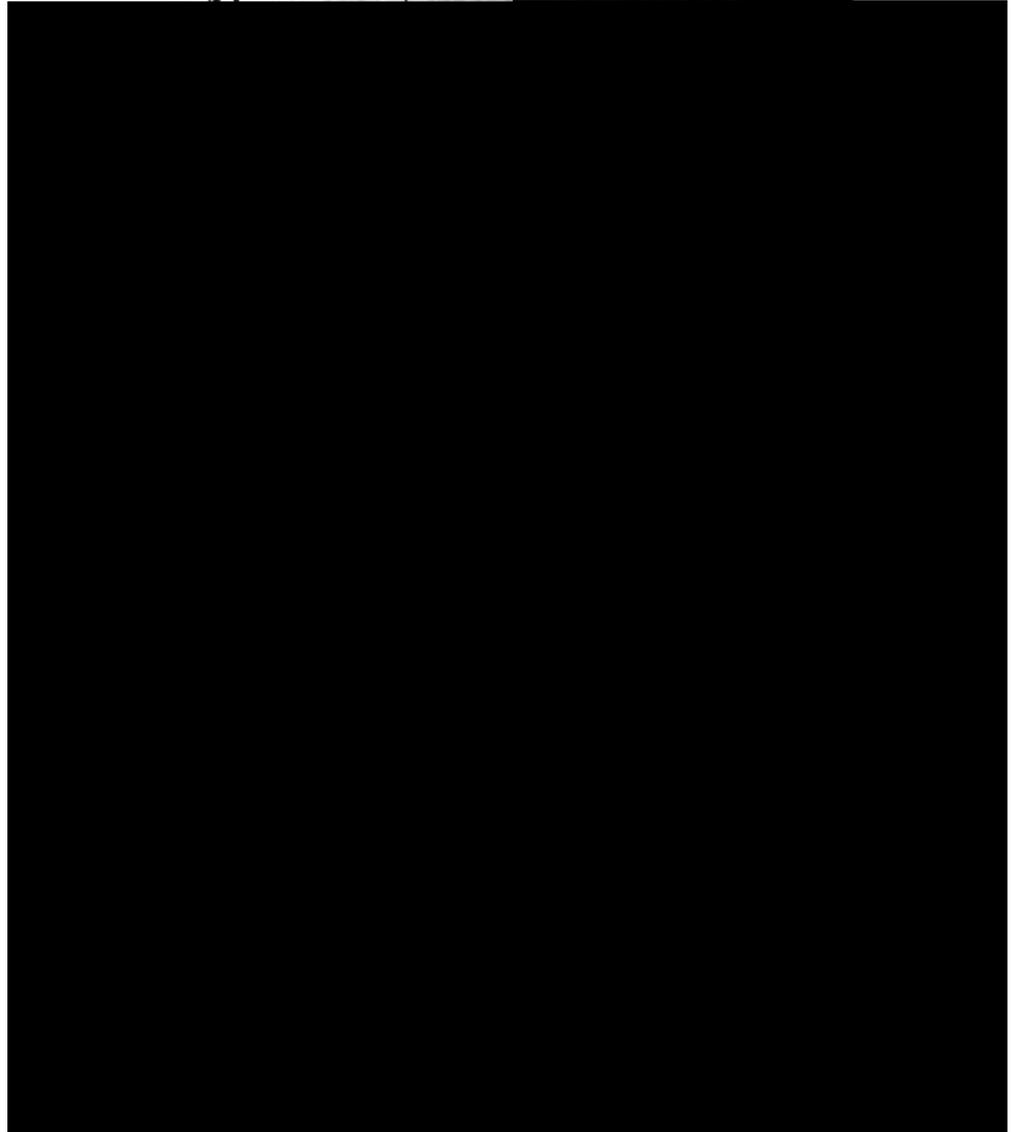
willing to maintain such training indefinitely, however, it's better not to develop such a plant. Usually, it's easier to start with a trained plant purchased from a nurseryman. If a trained plant is not available, use a 1-year-old plant. Most espaliers require pruning throughout the growing season to maintain the desired shape. In most cases, it's better to have some type of a guide or wire on the wall to encourage the plant to move in that direction.

Pruning ground covers usually is necessary only to remove unhealthy tissue. Vigorous ground covers include honeysuckle, winter creepers, Asian jasmine, *Vinca minor*, *Vinca major* and English ivy. These ground covers may be mowed back to 4 to 6 inches in height every few years to keep the beds vigorous, neat and well manicured. The best time to do this is in the early spring after danger of frost has passed but before new growth starts.

Pruning Mature Fruit Trees, Vines

Apple, pear, plum, and cherry trees produce fruit on little spurs that grow very slowly. They require only light pruning to remove inferior or damaged branches and twigs and to open up the plant so light gets in. Peaches, apricots and nectarines are just the opposite. They grow vigorously sending out long whips and getting out of hand if not pruned severely. Keep in mind that last summer's new growth produces this year's flowers and fruit. When growth is shortened and thinned, always leave some of the previous year's growth or the tree will not produce fruit this year. Apricots and plums grow fast like peaches and produce flowers and fruit on new wood. But they also produce fruit on slow-growing, short spurs the way apples do. By opening the center of the tree, light reaches these older fruiting spurs and keeps them in production.

Figs differ considerably in their manner of growth and so do the pruning methods. Prune figs lightly while young to develop an open framework and a well-shaped tree or clump. Once the tree reaches bearing age, little pruning is needed unless it becomes too rank; then thin out entire shoots as needed. In parts of Texas with extreme cold weather, mulch figs heavily each



fall with straw or hay to protect the crown from cold injury.

Loquats and cold hardy citrus usually are cut back to form a large shrub. The only pruning needed is to thin the plant and open up its normally dense center. On loquats remove half of each flower cluster to improve the fruit size.

Prune pecan trees to a central leader and otherwise treat as a large shade tree. On mature trees, remove broken, diseased or interfering limbs. Make all cuts carefully and be sure every limb is removed for a specific reason. Most large pecan trees require very little pruning.

Persimmon trees produce fruit on the current season's growth. Thin or head back as needed to keep new growth coming. Do not cut too heavily or a mass of shoots and little fruit result. Some persimmons overbear with accompanying danger of limb breakage when cut back too harshly. Generally, they prune themselves and many small twigs die back each year.

Pomegranates are large, bushy shrubs or small trees that normally have a single stem. Remove all suckers or extra shoots at the base when they produce this type growth. Head back or thin as necessary to keep the pomegranate vigorous with lots of fruiting wood at all times.

Walnuts require very little pruning after they are established. Remove all water sprouts and dead, diseased or broken branches. To avoid bleeding, walnuts often are pruned in the summer much like elms and maples.

Blackberries are one of the easiest fruits to grow in Texas. They are hardy, productive and undemanding except for pruning. Blackberries produce roots that live indefinitely, but the canes are bi-annual. They come up one year, fruit the next and then die. They are vigorous growers and unless well trained, they soon make a solid mass of briars almost impossible to penetrate. The best time to prune blackberries is immediately after fruiting. Prune the young canes to 3½ feet in height and never allow them to spread more than 3 feet wide. Completely remove the old canes after the fruit is harvested. Cut these back to the ground.

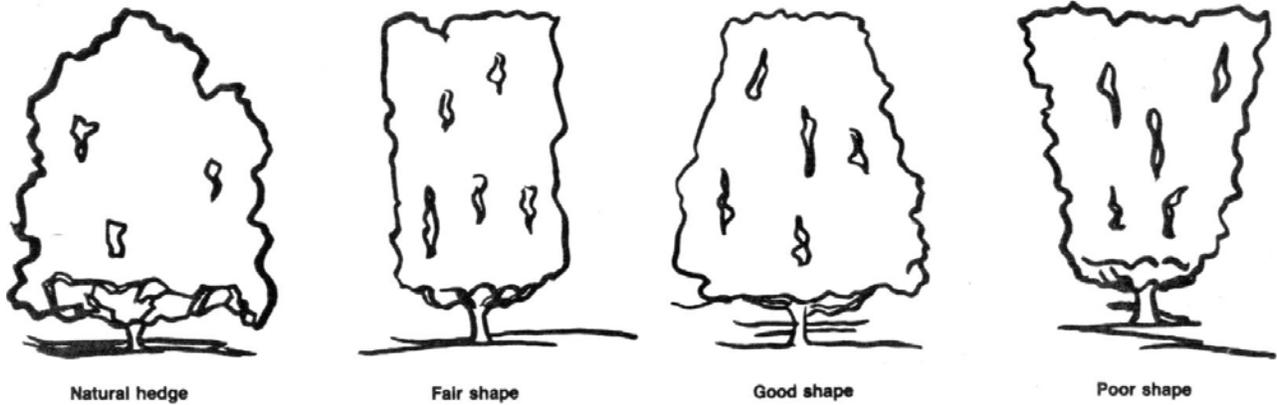
Grapes and muscadines make excellent plants for covering an arbor. They can grow naturally over the arbor with little or no pruning or may be pruned severely on a well-maintained arbor. With the natural system, vines grow randomly, forming a thick mass of canes. There is very little upkeep and the vines produce a dense shade. Since the vines are not pruned annually, significantly less fruit is produced.

In the maintained system the arbor is covered by vines which are pruned to a two-bud, spur-type cordon. Remove about 95 percent of the annual growth each winter. The individual vine is trained into a cordon or horizontal trunk with spurs distributed every 6 inches along the trunk. Each winter prune the canes arising from the spurs so only two to three buds are left on each spur. There should never be more than 20 spurs on a single grape vine or 40 on a muscadine vine. The spurs should be approximately 6 inches apart on a given cordon or trunk. February is the ideal time to prune grapes. Prune muscadine in December to reduce bleeding.

Pruning Hedges, Screen Plants

For a desirable shaped hedge, begin pruning when the plants are small and continue this procedure throughout the life of the plant. A hedge requires more pruning than any other plant because of its formal shape. In general, prune a hedge so it is broader at the base than at the top. A round or pointed top is preferred since a flat-topped hedge is more difficult to maintain and clip and is more easily broken down by weather and other causes. When

the hedge is wider at the base than at the top, more light reaches the lower foliage and it remains healthier and more compact. The taller the hedge, the more important is the shape. Long formal hedges require frequent shearing to keep them attractive. This requires considerable skilled labor. For this reason, it is better to select plant materials for hedges that maintain a certain height thus less frequent pruning is required.



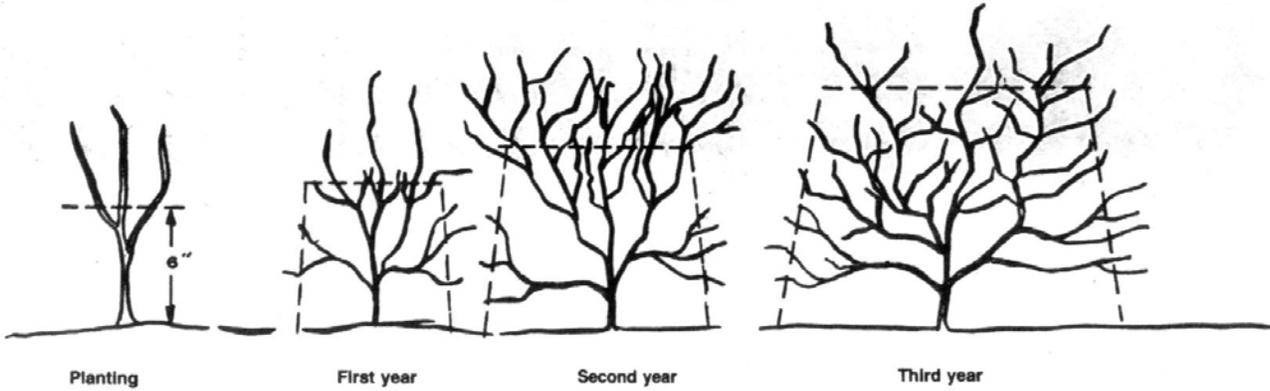
Natural hedge

Fair shape

Good shape

Poor shape

Pruning and shearing hedges



Planting

First year

Second year

Third year

hedge.

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