Penn State **Extension**

Pruning Ornamental Plants

PENNSTATE

Cooperative Extension

College of Agricultural Sciences

Prepared by James C. Sellmer, assistant professor of ornamental horticulture; Vincent J. Cotrone, Luzerne County urban forestry educator; Martin R. McGann, associate professor of landscape contracting; and J. Robert Nuss, professor emeritus of ornamental horticulture

Pruning Ornamental Plants

CONTENTS

INTRODUCTION

Proper ornamental plant care begins with selecting the right plant for the right place, exercising proper care in site preparation and planting, and establishing timely and appropriate maintenance. Pruning is necessary to maintain a healthy and vigorous tree or shrub. However, pruning is *not* a way to fix poor planning and placement of a tree or shrub. If you find that pruning is needed every season to keep a specific plant within your predetermined bounds, you should consider removing the plant and replacing it with another that has growth characteristics better suited to the site limitations.

Pruning is both the art and science of removing plant parts (for example, branches, stems, roots, buds, leaves, flowers, and fruit) for a specific purpose. The science involves the understanding of the plant's biological response to pruning, while the art involves understanding the plant's natural form and shape. With few exceptions, most plants in the landscape should be examined annually to determine pruning needs. Too often, pruning is ignored for several years and then some trees and many shrubs become overgrown, weak, and require drastic pruning to return them to a healthy, safe, vigorous, attractive, and useful condition. Many homeowners regard pruning with apprehension, which often leads to neglected and overgrown plants. This apprehension is often connected to one of the many myths and misconceptions about pruning.

PRUNING MYTHS

- *"Pruning is difficult."* Pruning is straightforward and requires a little knowledge about how plants grow and respond to pruning, a little care, an eye for the plant's form, and a vision for what the plant should look like when the process is complete.
- *"Topping shade trees will keep the trees from causing damage to the house."* Commonly recited by people who have recently topped their trees, this misconception leads to new weak shoots that will be more likely to split off and cause damage. An abundance of misdirected branches will increase the density of the tree canopy, thus placing greater wind pressure on the tree and increasing the shade below the tree, which may shade out the lawn. These weak new shoots will require removal every few years. In addition, wood decay is more likely to spread into branches that were topped or headed back, resulting in poorer tree health and greater likelihood of future limb breakage.
- *"Most trees need pruning."* In fact, mature trees seldom need pruning since they require most of their leafy canopy to make food for the whole tree. On the other hand, young trees usually benefit from pruning to establish a basic branch structure and improve their form.
- *"All shrubs can be pruned with hedge shears."* Hedge shears are intended for shaping hedges only! Using them on shrubs not intended to be hedges destroys the natural grace, form, and beauty of the plants. Hedge shears often leave stubs that die back. Improperly used and dull shears tear leaf tissue rather than cutting it cleanly, leaving brown leaves and leaf edges.
- *"Anyone can prune."* Anyone interested can learn how to prune properly. However, if you are hiring someone to prune, hire a professional. For trees, hire a certified arborist. For shrubs and small trees, hire a qualified horticulturist. In either case, before you hire them ask for references, proof of certification by the International Society of Arboriculture (ISA), and examples of their work.
- *"Tree paint will protect and help cuts."* Research indicates that there is little value in treating pruning cuts with tree wound dressing. Tree paint, especially oil-based paint, inhibits wound closure and may increase decay of inner wood.

Most gardeners can easily care for their plants once they understand what constitutes proper pruning technique and when pruning should occur. Correct pruning is an essential maintenance practice for trees and shrubs in the landscape. Successful pruning begins with (1) knowing why you are pruning, (2) understanding how pruning affects the plant, (3) pruning at the proper time for the plant, and (4) following proper techniques and using proper tools.

IMPACT OF PRUNING

Before you begin pruning or any form of cutting of your plants, you need to consider what you are attempting to accomplish with the operation. You should also consider the properties of the individual plant: its natural form, habit of growth, rate of growth, height, spread, and time of flowering. After considering all these factors, you can begin pruning. For example, a fast-growing shrub such as forsythia might be pruned harder than a slow-growing one, and if flowers are of value you will want to prune after the flowering period. Finally, plants that are pruned can generally go longer without subsequent attention and retain their form and beauty longer than plants that are sheared.

Pruning is an invigorating process. Pruning promotes growth by releasing a plant's internal chemical controls, allowing new branches to grow. Many people prune with the desire to reduce a plant's size. This is one of the most abused and misunderstood reasons to prune. The most common example of pruning is the poorly planned and executed hair-cutting approach to pruning (Figure 1). In an effort to "shorten" a plant, a person indiscriminately cuts all branches evenly, leaving large stubs or poorly placed lateral buds at the end of the cut branches. This form of "hair-cutting, topping, or rounding" results in the following problems:

- Leaves the plant open to rot and insect infestations at branches with stub-ends
- Releases all of the internal control that a plant has over new growth, allowing indiscriminate

growth from lateral buds up and down the cut branches
- Creates weak top growth on the outside edge of the plant that breaks readily in storms
- Shades the interior of the plant, causing internal leaf drop
- Weakens lower branches carrying the load of the excessive top growth
- Reduces flowering and fruiting
- Destroys the plant's overall structure and natural form

In addition, plants pruned in this fashion require more frequent future pruning and are very difficult to retrain into a natural form. This can be avoided by (1) understanding the site chosen for a plant and the growth habit of the plant prior to planting and (2) understanding and using the proper pruning methods to assure healthy, safe, and controlled growth of the trees and shrubs into which you have invested money, time, and energy prior to placing them in your landscape.

Plant architecture and plant names often confuse novice pruners and can result in poorly pruned plants. In most cases, the structure of a shrub is such that new branches, stems, or canes arise from a central crown or collar of the plant. The crown or collar is usually near the soil line and new shoots may arise out of the soil rather than off of an existing trunk. Common pruning techniques such as rejuvenation or renewal pruning take advantage of this collar region and the routine development of new shoots from the collar. However, some plants considered shrubs by their stature and use, such as burningbush *(Euonymus alata),* actually have the architecture of a tree. Looking carefully at burningbush, you will see either a multitrunk main stem or a single trunk with branches arising off of the trunk similar to that of a tree. In cases like this, the technique chosen to prune this plant is that of pruning a small tree. Carefully considering the structure of the plant to be pruned will prevent choosing the wrong technique.

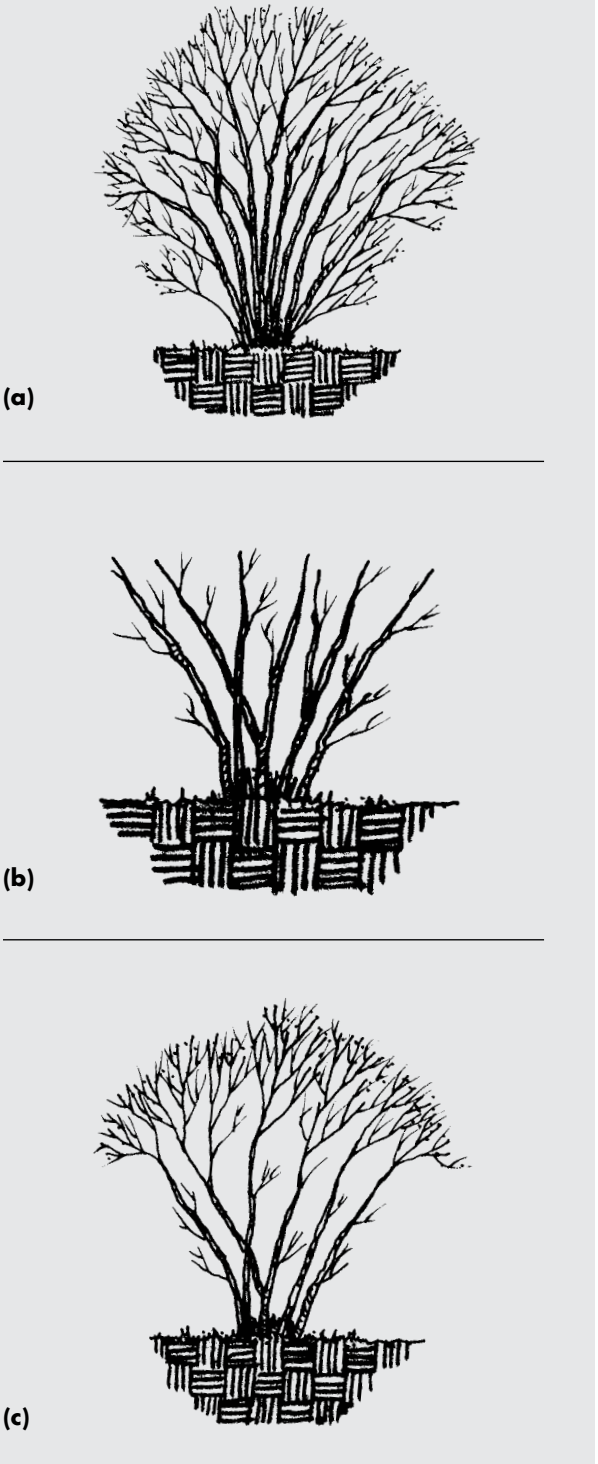

Figure 1. Old flowering shrubs (a) are commonly pruned using improper heading cuts (b) without consideration for where the cut is made on the stem or future growth resulting in the new growth arising near the tips of the cut branches (c).

REASONS TO PRUNE

1. *To maintain the health of a plant by removing dead, diseased, damaged, decayed, or insect-infested parts.* Good sanitation helps keep the rest of the plant clean. Deadwood in a plant is a food source for decay organisms such as fungi.
2. *To protect the structure of a plant by removing crossing, rubbing, broken, weak, overcrowded branches.* This would include pruning to remove storm, animal, or mechanical damage that may occur to a tree or shrub.
3. *To prevent damage to property and increase personal safety.* Pruning can minimize the potential hazards caused by limbs interfering with power lines, branches overgrowing structures, weak limbs breaking in strong winds or under heavy ice and snow loads, and branches and plants that obscure and block visibility along roadways, street corners, sidewalks, and driveways.
4. *To control the size and shape of a plant.* Applied properly this reason can be effective in enhancing the plant's overall health and form (e.g., pruning to open a plant to more sunlight or to allow greater air movement through the plant). Selectively pruning to direct future growth reduces future pruning to protect structure.
5. *To rejuvenate an old, declining plant in order to increase flowering and fruiting and to enhance winter twig color.* Pruning out all older wood on many shrubs will stimulate the growth of new wood. The newer wood should have more flowers and a better form.
6. *To develop a special shape or form, as in hedges, espaliers, and topiary work.* Shearing is used more than pruning for creating particular artificial shapes.
7. *To remove dead flower clusters and developing seed pods.* On shrubs such as rhododendron, pieris, and lilac, the seed pods develop at the expense of the next season's flower buds. Therefore, the seed pods should always be removed unless they have a specific ornamental value. Frequently, when the seed pods are not removed there is a cyclic pattern to the flowering. In such cases the flowers are generally better every other season.
8. *To prepare a plant for transplanting, induce a plant to flower and fruit, or to restrict an aggressive plant's growth rate.* For this, root pruning is a useful technique. Root pruning is the cutting of the root system. Plants that are scheduled to be transplanted benefit from a root pruning one year before transplanting. Such pruning helps to develop a more compact root system with more roots in the ball of soil that is moved with the plant.

PRUNING TOOLS

As with any job, choosing the correct tools for the job will usually produce better results; the same is true for pruning. A variety of tools are available, and selecting the right one for the job is important. Of equal importance is matching the right tool to the type of pruning you are going to do; do not attempt to cut parts larger than the capacity that the tools can accept. Tools should be of the highest quality you can afford, and they should be sharp. Keep them in good condition by lubricating them regularly, cleaning them to prevent rust, and only using them for their intended function.

When pruning specifically to remove diseased plant parts, it is best to alternately use two tools so that one can soak in a disinfestant, such as 70 percent rubbing alcohol or 10 percent bleach solution, while the second tool is in use. Alternatively, a disinfestant can be carried in a squeeze, spray, or mist bottle. Thoroughly wet the cutting surfaces with the disinfestant and allow the tool to drain and air-dry. If sap or resin builds up on the tool, scrub this off with a rag kept in the disinfestant. Then dip, pour, or spray more disinfestant onto the tool. Let it drain and air-dry or let it soak in the disinfestant for 10 minutes. Tools treated with a disinfestant will dull more rapidly and require sharpening more often. Monitor blade sharpness and sharpen as needed to avoid jagged pruning cuts or tearing tissue during pruning.

Hand pruners

Also known as hand clippers, these are a standard for any pruning tool collection. Hand pruners come in several shapes to suit a variety of cutting operations and sizes from 6- to 9-inch handles (Figure 2). Hand pruners are useful in cutting branches up to ½ to ¾ inch in diameter. Hand pruners come in scissor-action (bypass) or blade and anvil types. The blades of both tool types will dull with use and require sharpening.

A dull blade on the blade and anvil tool will result in crushing rather than cutting tissue and care should be taken to prevent crushing of cut ends as it inhibits callusing and opens the branch up to other problems. In addition, the soft metal anvil on the blade and anvil type will require replacing over time.

Lopping shears

Two-handed pruners ranging in sizes of 16- to 30-inch handles used for heavy-duty cutting branches (up to 1½ inch in diameter) (Figure 2). Operating on the same principle and with the same styles as hand pruners, the long handles of lopping shears provide greater leverage for cutting. In choosing loppers, strength for cutting combined with light weight is critical to allow for extended use.

Pruning saws

Commonly used on branches over 1 inch in diameter (Figure 2), pruning saws come in a variety of sizes and shapes depending on the type of cutting to be done, blade types to facilitate cutting, and styles for easy handling, such as fold-up and climber's saws. Pruning saws with slightly curved high-quality steel blades are the most reliable. Most pruning saws cut on the pull stroke for greater ease and safety. Saws with 8 to 10 teeth per inch will give a fairly smooth final cut to larger stems. Bow saws are available for pruning, but their design does not lend itself well to interior cutting and are thus difficult to use in many situations. Chain saws are dangerous to use for pruning. Instead, for very large pruning cuts or to remove small trees, select a hand pruning saw with very coarse teeth. Chain saws are best used for cutting up limbs already pruned or removing dead plants.

Pruning knives

Pruning knives or sharp pocket knives can also be useful for pruning summer growth on trees, shrubs, and roses. They are best used on soft and tender growth. Knives can also be used to trim and smooth saw cuts where a coarse saw was used to remove very large limbs or storm damage.

Pole pruners

Also called pole saws, these tools are for pruning branches beyond arm's reach, such as on shade and ornamental trees and very tall shrubs. Most pole pruners have a lever-action cutting mechanism in the form of a hook for cutting branches up to about 1 inch in diameter. For larger branches, a saw attachment is available to attach to the pruning head. A take-apart handle makes storage easier. Exercising caution with pole pruners near utility lines is a must. Metal handle pole pruners are not safe for use near utility lines. Calling an arborist certified in working near utility lines is the safest decision.

Hedge shears

Intended specifically for the care and maintenance of hedges (Figure 2), hedge shears are designed to remove large quantities of new growth in a single cut in order to create formal shapes. Working on a scissor action, these shears are not useful for pruning large branches or for any pruning where a natural appearance is intended. Many plants are injured each year because of the improper use of electric hedge trimmers. Often the trimmers tear leaves and branches because the operator moves across the hedge at a speed faster than the trimmer can efficiently cut. In addition, electric and manually operated hedge trimmer blades must be kept sharp to avoid tearing tissue.

PRUNING TECHNIQUES

Pruning should be done for a reason. Several basic methods are used in pruning—rejuvenation, renewal, heading, and thinning. Your choice of methods should be based on three factors: (1) your goals for pruning, (2) the type of plant you are pruning, either tree or shrub, deciduous or evergreen, broadleaf evergreen or needle leaf evergreen, and (3) the size of plant you are pruning. Most damage and plant loss is caused by not having a goal, not understanding the architecture of the plants being pruned, not planning before cutting, improperly employing a technique, and choosing the wrong technique(s) for the situation.

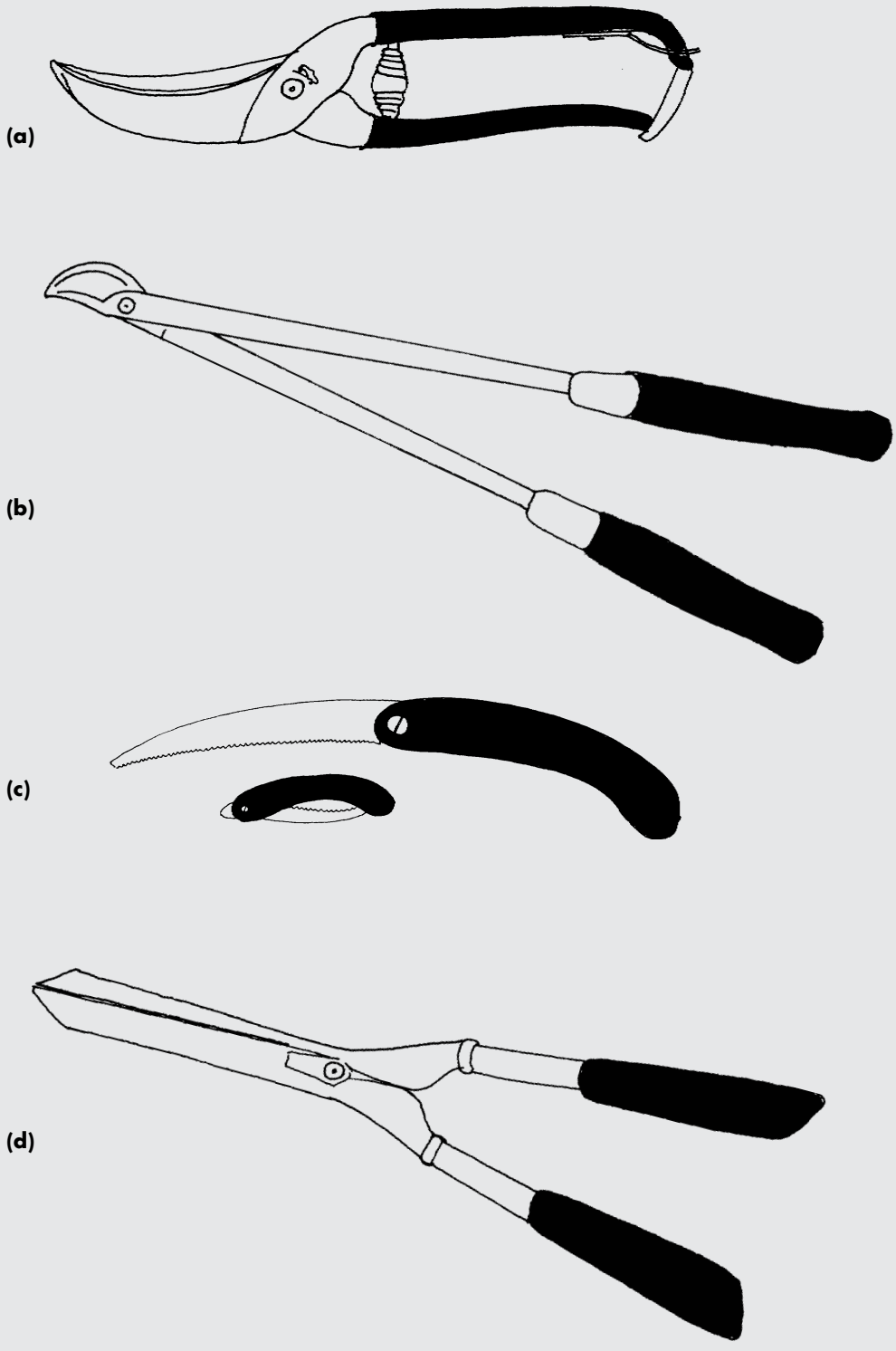

Figure 2. Examples of the most common tools required for pruning small ornamental trees and shrubs, including hand pruners (a), lopping shears (b), pruning saws (c), and hedge shears (d).

Pinching

Usually done by hand on succulent stem tissue and flower buds in order to control flowering and plant size, and to prevent seed development. For example, in order to control plant size and increase plant density, the new candles (terminal shoot) of pines can be pinched before the candle finishes growing (Figures 3a and 3b).

Rejuvenation pruning

The most severe of all the techniques, rejuvenation pruning is most often used to reinvigorate older shrubs that have become too large or contain considerable unproductive wood. The shrub is pruned by cutting off the oldest branches at or near ground level. Such heavy pruning may stimulate an excessive number of new sprouts from the root. This new growth will also have to be thinned to reduce competition and maintain the natural form of the shrub (Figure 4). Some shrubs that tolerate rejuvenation include Tartarian and redstem dogwood, forsythia, rose of sharon, hydrangea, privet, honeysuckle, elderberry, spiraea, and lilac. A word of caution: plants that are stressed or in poor health may not survive this severe level of pruning.

Renewal pruning

Renewal pruning is an alternative to rejuvenation pruning in cases where few younger stems are found on the shrub. It is often a 3-year process used to reinvigorate an older shrub by removing about one-third of the older wood each season over the 3 years to keep the overall shape of the plant. If plenty of newer stems are present, remove older branches to help the plant's appearance. As with rejuvenation pruning, the shrub may respond by producing an excessive number of new shoots. This new growth should be thinned to maintain the natural form of the plant (Figure 5).

Thinning

The complete removal of a branch back to a main branch, trunk, or the soil line, thinning can be applied to both trees and shrubs. This method, the least conspicuous of all pruning, is most often applied to plants that are too dense. By selectively thinning inward-growing branches, you can open the interior of the plant to sunlight and air movement and influence the direction of the new growth outward from the center (Figure 5).

Figure 3a. Pinching new candle growth of a mugo pine.

Figure 3b. Pinching to remove old flower heads from a bush honeysuckle.

Thinning cuts

This method requires care in choosing the point to cut. On trees where branches are being removed back to the trunk or a main branch, first find the branch collar. The branch collar is the point where the trunk

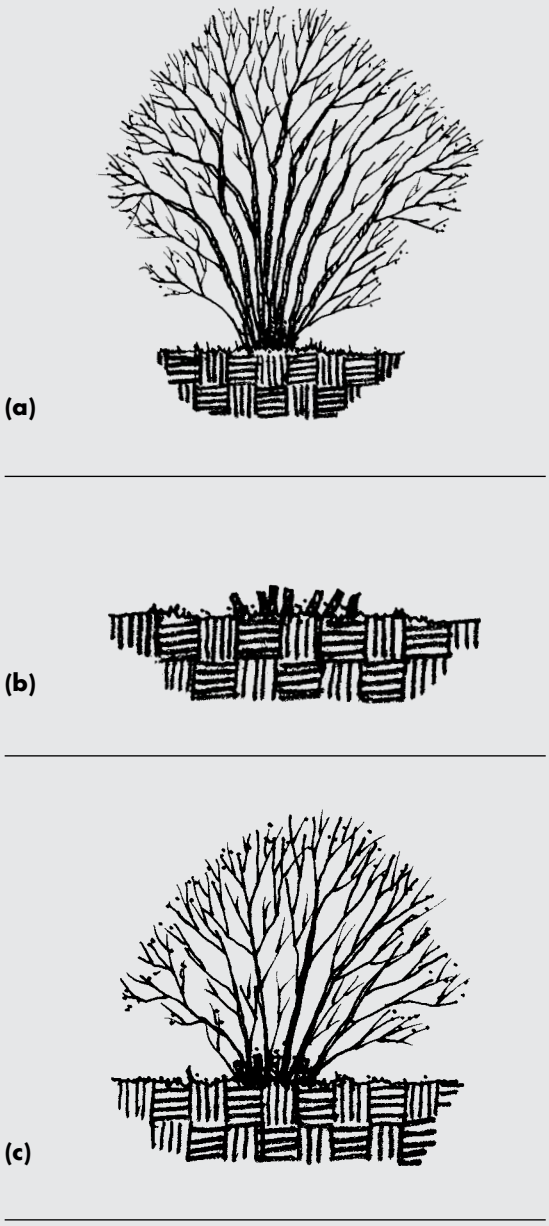

Figure 4. Rejuvenation of an old flowering shrub (a) can be achieved by pruning all stems to within 4 to 6 inches of the ground (b). This severe pruning will result in a smaller and dense plant with vigorous new stems (c) that may require thinning to reduce branch rubbing and assure air circulation through the shrub later in the season.

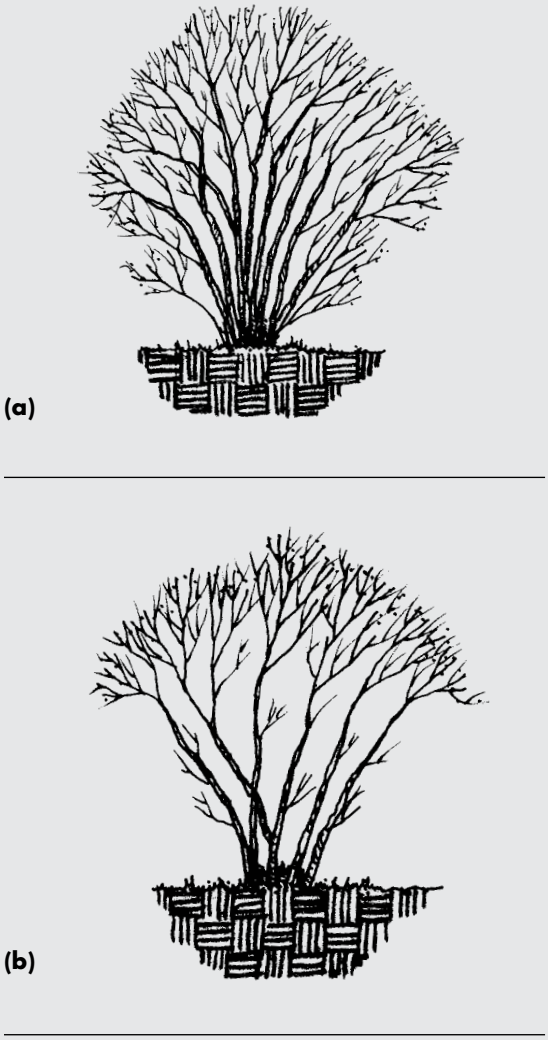

Figure 5. Old flowering shrubs (a) can be renewed by the selective removal of older stems by thinning the stems back to the soil line (b).

or main branch and the branch to be removed are attached. Careful examination of the attachment point should reveal the swollen base of the attached branch. The branch collar is not flush against the trunk but is between the trunk and the branch, often visible by the swollen appearance that extends out and reduces in size to meet the branch's overall diameter. The branch collar may reach out about ½ to 2 inches from the trunk or main branch depending on age of the

Figure 6. A proper thinning cut will remove a tree branch without cutting through the branch collar, ensuring that the wound will close completely and reduce the chance for rot or insect damage to the tree.

Figure 7. A proper reduction cut made on a black alder in the landscape.

tree (Figure 6). A proper thinning cut will not cut through the branch collar or will not be flush against the trunk or main branch and will allow the cut surface to callus and close the wound completely. The response of a plant to a proper thinning cut is the equal formation of callus tissue along the edge of the wound, first forming a donut shape and, over time, closing up completely.

Reduction cuts

Used to shorten branches back to a healthy, properly located, smaller lateral branch. The lateral branch should be one-half to one-third of the diameter of the branch removed in order to reduce sprouting and produce enough energy to close the wound (Figure 7).

Heading cuts

Remove current growth or 1-year-old growth back to a bud, or cut an older branch or leader back to a stub or to a lateral not large enough to assume the terminal role. Heading cuts should not be used to reduce the size of trees (see "reduction cuts"). Heading cuts are most effective on deciduous shrubs. The shape and size of the plant and the direction of new growth can be somewhat controlled by the location of the bud that is left at the end of the cut. An inward-pointing bud will produce growth toward the center of the plant, making it denser; an outward-pointing bud will do the opposite (Figure 8). Heading cuts stimulate the development of smaller shoots and buds lower on the stem that is cut by briefly eliminating the plant's internal growth control on new stem growth. This may result in several lateral buds breaking and expanding to form new branches along the length of the branch or stem of a plant and results in dense growth. However, if every branch or twig on the plant is headed back, it causes more growth to develop than was removed by the pruning.

Excessive heading back in a single season will give the same results as shearing or topping. To be effective, any heading back should take off only a small percentage of the top growth in any one season. A good rule of thumb to follow might be to remove the ends from no more than 25 percent of the branches in a single growing season. Cutting too close to a bud will result in the branch dying back to the next bud. How you place the pruning shears on the plant governs the closeness of the cut. In general, make your cut about ¼ inch above an active bud or lateral branch (Figure 9).

Shearing

A specialized pruning technique in which tips of outer branches are trimmed off, stimulating dense growth toward the outside of the plant. This tech-

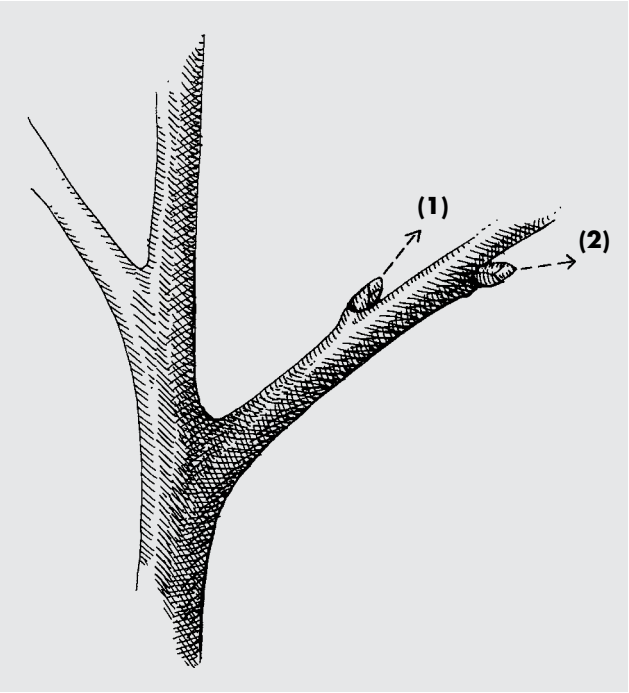

Figure 8. A heading cut should be made back to a bud. Selectively choosing to cut above a bud allows you to direct where the new growth will arise. The inward-pointing bud (1) will produce growth inward, resulting in dense interior growth and the potential for crossing branches; the outward-pointing bud (2) will give rise to outward growth, allowing the shrub to appear more open assuring air flow, interior foliage, and fewer crossing and rubbing branches. Directing the plant's future growth through pruning is called directional pruning.

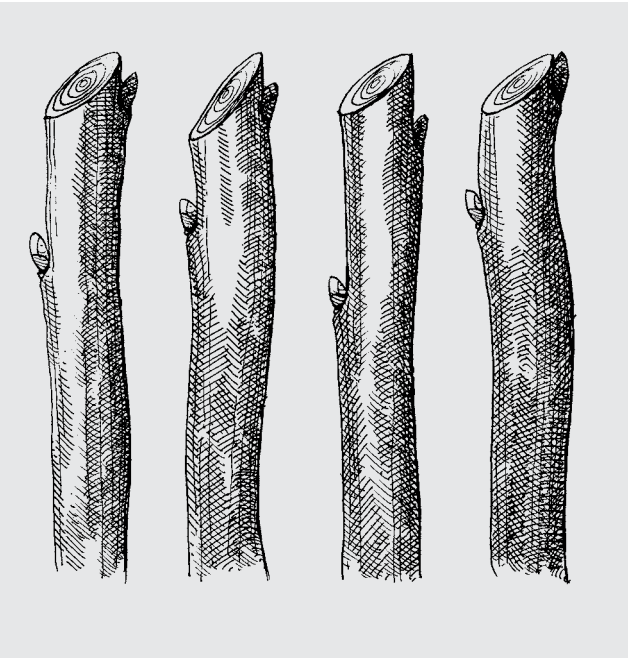

Figure 9. A proper heading cut should be about ¼ inch above an active bud and at about a 30-degree angle.

nique is most often used for formal sculpturing of plants into hedges and topiaries. Over time, shearing results in the loss of interior leaves, creating a shell of foliage on the plant. In maintaining a sheared plant with interior leaves, small holes in the outer surface of foliage should be created to allow light penetration into the center of the plant. Care should also be taken in choosing plants to shear into formal shapes. While yews *(Taxus)* can produce new foliage from older wood exposed to light, most shrubs and trees are not as accommodating. Once the outer foliage dies, the overall appearance of the shrub will become unattractive.

Three cut method for removing large limbs

Cutting large limbs from a tree is easy, but if done improperly it can ruin the plant. A large limb is defined as one that cannot be held in one hand after it has been removed. Removing smaller limbs takes only a single cut—one hand for the pruning tool and the other on the limb. However, on limbs 2 inches or larger in diameter, three cuts are necessary to remove the limb safely. If a single cut is made, the weight may cause the limb and bark to tear several feet down the trunk before the cut is complete. Such a wound is hard to repair and very slow to heal. It generally takes less time to make three cuts than to repair a single improper cut (Figure 10).

The first cut goes up from the bottom of the limb about 10 to 12 inches away from the main stem. The second cut is down from the top, 3 to 4 inches farther out than the first cut. As the second cut approaches the depth of the first cut in the branch, the limb will break off and drop to the ground. Make certain that the limb drops safely and does not injure anyone or damage plants or structures below.

The third cut, made to remove the stub, should not be made flush with the trunk. Research has shown that a protective chemical zone that inhibits the spread of decay exists at the base of large branches. This zone is described as the branch bark ridge or collar in the crotch. It can be observed as a swelling or raised area where the branch emerges from the trunk. The narrow ridge often extends several inches downward along the trunk. When making the final cut, cut down and slightly out from the outer portion of the ridge to prevent injury or removal of the collar.

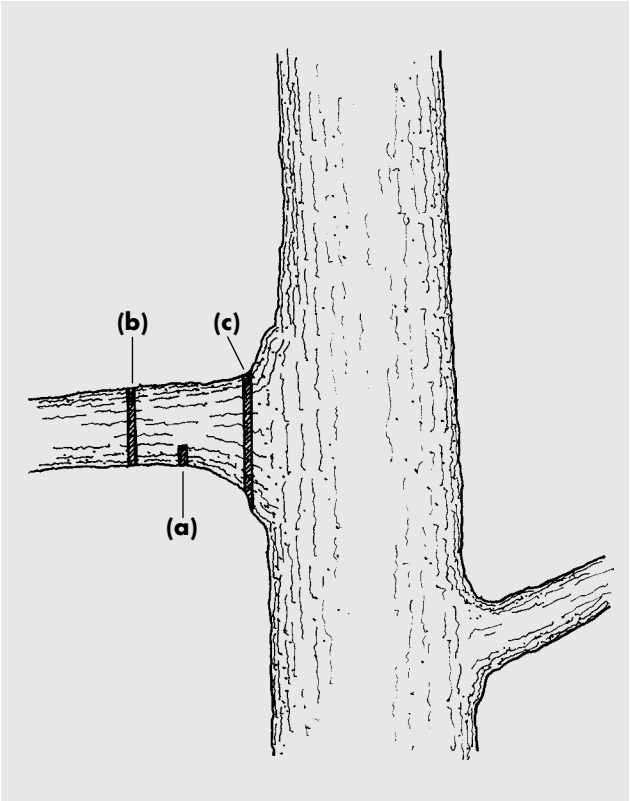

Figure 10. Removing larger branches safely and avoiding greater injury to the tree requires three cuts. The first cut (a) is made from the bottom of the limb about 10 to 12 inches from the trunk. The second cut (b) is from the top, 3 to 4 inches out from the first cut. The third cut is down and out from the branch collar, thus removing the remaining stub and ensuring that the pruning wound closes properly.

WHEN TO PRUNE

Deciding when to prune is almost as difficult for some people as selecting what or how to prune. Two common myths are:

- *"Plants will die if pruned at the wrong time of year."* Pruning at the wrong time may result in injury or reduced flowering, but poor timing seldom results in a plant's death. In general, the best time to prune is when the plant will recover the fastest. Severe pruning should be done just before regrowth starts in the spring so bare stubs will be hidden quickly. Pruning in late summer should be avoided since it stimulates succulent growth, which may not harden sufficiently to avoid winter dieback. Pruning in the late fall will result in pruning wounds that are not completely closed off before winter, causing winter injury in the form of branch dieback due to the dessicating dry conditions often associated with winter weather. Storm-damaged plants should be pruned as soon as possible after the damage occurs. Summer-flowering plants generally suffer the most from late-season pruning. Unless you can prune these types immediately after they flower, it is better to wait until the following spring before growth begins.
- *"All pruning must be done during the winter."* When to prune is very much dependent on the plants being pruned. Plants that flower in mid to late summer (for example, after the end of June) on wood produced that same year can be pruned in the early spring or late winter before growth starts. Fall pruning after flowering also works well on these plants unless they develop a fruit crop that has ornamental value, in which case you might wish to prune them in the spring after the fruit has dropped. Remember that any fall pruning should be done after the plant is dormant. Summer flowering shrubs, such as roses, can be pruned in late winter or early spring without affecting flowers that will be formed on new growth. Spring-flowering shrubs (those flowering before the end of June) should be pruned immediately after the flowers have faded. These flowers are borne on wood produced the year before. Thus, if they are pruned right after blooming, additional flowering wood will be produced for the next year. This means pruning during the growing season. Examples of spring-flowering trees and shrubs include serviceberry, flowering dogwood, magnolia, flowering cherry, forsythia, redstem dogwood, mountain laurel, viburnum, and spirea.

PRUNING DECIDUOUS SHRUBS AND TREES

Deciduous shrubs

The different flowering times, shapes, branching patterns, and fruiting potentials of these shrubs frequently present a problem for the homeowner in selecting a suitable technique or time to prune (Table 1). The greatest variety of pruning techniques can be employed depending on the goal and structure of the shrubs to be pruned. Rejuvenation and renewal pruning can be used to reinvigorate older overgrown shrubs, while heading and thinning can work to maintain form and size. Shearing can be used to create unnatural shapes, hedges, and topiary plants as long as the most adaptable deciduous and evergreen shrubs are used for this purpose and the impact shearing causes on a plant are understood.

Dormant-season pruning may remove too many flower buds, while pruning after the flowering period may also reduce the amount of fruit that is developed. If flowers are of little importance on a plant, it is better to prune it in the dormant season. This is especially true with deciduous plants. The lack of foliage in the late winter allows you to see the overall structure of the plant. It is easier to prune and visualize the potential outcome of a pruning cut prior to making the cut when all of the branches are visible.

Keep in mind, however, that all plants will not need to be pruned every season. If you pay close attention to the plants every year, you may only have to remove a few stems at a time, which will make no difference in the overall appearance of the plant's flower or fruit crop. Summer flowering shrubs generally present less of a problem because dormant- season pruning is actually desirable since flowers are produced on new growth and the fruit probably has dropped by late winter or early spring.

Shrubs or trees that are prized for their fruit should be pruned after the fruit drops or is eaten by wildlife. Although they may flower early in the season, the fruit should be allowed to develop. After the fruit has lost its appeal, then prune. Viburnum and hawthorn species are examples of plants in this group.

On large vigorous plants, heading and thinning can work together to keep the plant within bounds. Thinning helps open the center, and heading cuts control the height of the plant. Keep in mind that any pruning on a plant tends to stimulate additional new growth, which also needs to be pruned out or thinned every so often to prevent the new stems from taking over the entire plant.

Deciduous trees

The most common techniques for pruning trees include reduction cuts, thinning cuts, and large branch removal cuts. However, the frequency and degree of pruning needed will be low for many trees. Once the final shape and form of a tree has been obtained in the early development of a young tree, minimal pruning will be needed each season unless special-needs pruning is necessary (for example, utility and directional). In general, tree pruning should follow a priority order: (1) pruning for health by removing dead, dying, diseased, and decaying branches; (2) pruning for structure by removing weak, rubbing, and crossing branches and branches with included bark; and (3) pruning for appearance and health by removing sprouts and selectively thinning to allow for air movement. In making reduction cuts, take care to select branches to prune based on their diameter. A general rule of thumb is prune branches back to lateral branches that are less than one-half to one-third the diameter of the branch being removed. In general, no more than 25 percent of the living tree top should be pruned at a time. Excessive pruning will unduly stress the tree and result in weak sprouts forming throughout the tree. A brief discussion on pruning shade and flowering ornamental trees follows. For detailed and specific information on pruning landscape trees please refer to Penn State Extension publication *Pruning Landscape Trees.*

Some deciduous trees have an exceptionally heavy sap flow—commonly called "bleeding"—in the early spring. If cuts are made then, the trees will "bleed." While this sap loss does not injure the tree, it can be objectionable aesthetically and cause problems for pedestrians, automobiles, and so forth passing underneath. Excessive sap flow from pruning wounds can be avoided by pruning in midsummer or late fall. Maple, beech, birch, dogwood, elm, honeylocust, Kentucky coffeetree, magnolia, walnut, and yellowwood are examples of trees best treated this way.

Table 1. Pruning techniques for shrubs that can be applied based on flowering time and plant form.

DECIDUOUS SHRUB	FLOWERING TIME[1]	PINCHING[2]	REJUVENATION[3]	RENEWAL[4]	THINNING[5]	HEADING CUT[6]	REMARKS
Abelia *(Abelia)*	summer				x	x	
Almond, flowering *(Prunus)*	spring			x		x	
Azalea *(Rhododendron)*	spring				x-suckers	x	
Bayberry *(Myrica)*	spring					x	
Beautyberry *(Callicarpa)*	summer		x-to 12″			x-new shoots	
Beautybush *(Kolkwitzia)*	spring			x	x-suckers		
Barberry *(Berberis)*	spring			x		x	
Blueberry *(Vaccinium)*	spring				x	x	
Bushhoneysuckle *(Diervilla)*	summer		x				
Butterfly Bush *(Buddleia)*	summer		x-annually		x		Species specific
Chastetree *(Vitex)*	summer		x-annually				
Chokeberry *(Aronia)*	spring				x	x	
Cinquefoil, Bush *(Potentilla)*	summer			x	x	x	
Coralberry and Snowberry *(Symphoricarpos)*	summer		x		x	x	
Cotoneaster *(Cotoneaster)* deciduous	spring				x	x	Size specific
Deutzia *(Deutzia)*	spring			x	x		
Dogwood, Redtwig *(Cornus)*	spring		x-to enhance stem color				
Firethorn *(Pyracantha)*	spring			x	x	x	
Forsythia *(Forsythia)*	spring			x		x	
Heath *(Erica)*	spring		x-every 3 to 4 years		x		
Heather *(Calluna)*	summer		x				Prune only in spring before new growth
Honeysuckle *(Lonicera)*	spring			x	x-suckers	x	
Hydrangea *(Hydrangea macrophylla)*	spring		x-old flowers	x			Do not prune in winter or early spring; winter tender may kill flowers
Hydrangea *(Hydrangea paniculata)*	summer		x		x		
Kerria *(Kerria)*	spring			x		x	Young stems have best green color
Lilac *(Syringa)*	spring	x-old flowers	x-every 5 to 10 years	x	x-suckers	x	
Mintshrub *(Elsholtzia)*	summer		x		x	x	
Mockorange *(Philadelphus)*	spring	x-seed heads		x		x	

DECIDUOUS SHRUB	FLOWERING TIME[1]	PINCHING[2]	REJUVENATION[3]	RENEWAL[4]	THINNING[5]	HEADING CUT[6]	REMARKS
Ninebark *(Physocarpus)*	spring			x	x		
Peashrub *(Caragana)*	spring			x	x		Best bark on young stems
Privet *(Ligustrum)*	spring			x-4 yr cycle		x	
Quince, Flowering *(Chaenomeles)*	spring			x	x	x	
Rose-of-Sharon *(Hibiscus)*	summer	x-seed heads			x-top	x	
St. Johnswort *(Hypericum)*	summer				x	x	
Smokebush *(Cotinus)*	summer				x	x	
Snowbell, Japanese *(Styrax)*	spring			x	x		For tree forms remove suckers and thin tops
Spicebush *(Lindera)*	spring				x	x	
Spirea *(Spiraea)*	spring			x	x-top		
Spirea *(Spiraea)*	summer	x-seed heads	x-every 2 to 3 years		x	x	
Sumac *(Rhus)*	summer		x	x-1 to 2 yr cycle	x		
Summersweet *(Clethra)*	summer				x-old growth		
Sweetshrub *(Calycanthus)*	spring	x				x	
Sweetspire, Virginia *(Itea)*	summer				x	x	
Viburnum *(Viburnum)*	spring, summer			x-to enhance fruiting	x	x	
Weigela *(Weigela)*	spring			x	x	x	
Winterberry *(Ilex)*	spring					x	

1. Flowering time directs the time for pruning. Spring-flowering shrubs should be pruned immediately after flowering and summer-flowering shrubs pruned in the dormant season or just before spring growth.
2. Pinching is the removal of succulent growth, unopened or old flowers, and seed heads with your fingers.
3. Rejuvenation is the process of cutting off old branches at or near the ground in order to promote new growth.
4. Renewal is the process of removing older stems in order to reinvigorate the shrub.
5. Thinning is the complete removal of a branch back to a main branch, trunk, or the soil line.
6. Heading is used to shorten branches back to a healthy, properly located lateral bud or branch. This technique is used to control size, shape, and direction of branches.

Shade trees

Most shade trees should receive most of their pruning at an early age in order to establish form and structure. The common goals for training young trees include establishing a single leader on trees that develop single leaders (for example, maples, oaks, ash); establishing branch spacing; raising the crown of the tree by removing lower branches that may be safety hazards; and removing crossing, rubbing, and broken or damaged branches.

For young trees, crowded and crossing stems should be removed from the main trunk so branches are spread along the trunk in a uniform pattern. These initial branches will eventually develop into the main superstructure of the tree. Try to retain the branches that will add to the overall appearance and form of the tree. Very long branches can be headed back to control the size and to develop additional branching in the center of the tree. Use heading cuts wisely by heading back only to a bud within the present year's growth. In addition, do not head back every branch since this will promote extensive branching that will eventually die out. Finally, never remove the central leader or trunk in a tree—this will destroy the form of the tree and may lead to the development of a double leader (co-dominant leaders) that will weaken the tree.

On large trees needing attention or pruning that you cannot handle easily from the ground, using a professional tree service for the pruning job is the best idea. They have adequate equipment and insurance to handle larger limbs above the ground.

Small flowering trees

Any pruning needed on most small flowering trees will have very little influence on the flower crop. Most pruning will be done to remove crossing branches, sucker shoots from the major branches, or light heading back to control size and shape. It is important not to remove all the twigs and side shoots along the major branches in these trees. Such pruning will expose the inner branches to excess sunlight, which may burn the bark and cause serious injury to the plant.

As with shade trees, small flowering trees should be shaped as soon as they are established. Crowded branches should be removed early. Later, as the tree develops, additional removal of twigs on the major branches will retain the initial form and shape. Similar cautions should be considered in timing of pruning to follow after flowering whether they are spring or summer flowering trees.

Pruning recommendations

The following trees may require thinning cuts and reduction cuts to maintain shape, size, and to remove crowded, crossing, and wayward branches. Suckers and sprouts should be removed.

Burningbush *(Euonymus)*
Cherry, Flowering *(Prunus)*
Crabapple *(Malus)*
Crape myrtle *(Lagerstromia)*
Dogwood, Flowering *(Cornus)*
Enkianthus, Redvein *(Enkianthus)*
Fringetree *(Chionanthus)*
Goldenraintree *(Koelreuteria)*
Hawthorn *(Crataegus)*
Juneberry *(Amelanchier)*
Lilac, Tree *(Syringa)*
Magnolia *(Magnolia)*
Magnolia, Star *(Magnolia)*
Magnolia, Sweetbay *(Magnolia)*
Mountain Ash *(Sorbus)*
Parrotia *(Parrotia)*
Redbud, Eastern *(Cercis)*
Silverbell, Carolina *(Halesia)*
Witch hazel *(Hamamelis)*

PRUNING EVERGREEN SHRUBS

Both broadleaf and narrowleaf evergreen shrubs are used in the landscape. Generally, the broadleaf forms produce attractive flowers in the spring. The narrowleaf forms are used mainly for their foliage and growth habits. The pruning requirements of the broadleaf and narrowleaf evergreens are quite different. Often evergreen shrubs are sheared into formal or topiary shapes. This can lead to a variety of problems for the plant and for the homeowner including bad form, limited internal leaves, and a dissatisfied owner. Allowing the shrubs to reach their natural soft, feathery appearance and form will assure natural forms and a healthier plant. Thinning cuts and varied heights of cuts within the plant can be used to maintain a natural shape. Care should be taken to

avoid cutting branches back to old wood. Narrowleaf evergreen branches do not normally produce new branches from older non-green wood. Growth can be reduced annually with selective heading and thinning cuts. When removing larger branches by thinning, remember to cut close to the main stems while keeping aware of the branch collar and avoiding stubs that will not close up.

Broadleaf evergreen shrubs

Flowering broadleaf evergreens go into the dormant period with their flower buds already formed. These plants should always be pruned immediately after they flower in the spring. This will allow adequate time for the development of buds for the following season.

Many broadleaf evergreens will not develop new shoots after pruning as readily as deciduous plants. When pruning branches to promote new growth or to shape the plant, always cut back to a bud or green shoot. Unless you leave a bud or small shoot at the end of the cut stem, new growth will not appear.

Very old or overgrown plants can be rejuvenated by renewal pruning of the oldest stems over a 3-year period. Each year cut off the oldest stem at the ground. This severe cutting will stimulate new growth from the base of the plant. It is a drastic measure and it may take several additional seasons before the plant is restored to a desirable shape. Never cut all the old stems in a single season—this may kill the plant. An application of fertilizer in the season before the initial pruning will also help to improve the quality of the new plant that develops.

On flowering broadleaf evergreens, remove the flower cluster as soon as it begins to fade. Preventing seed development will enhance the quality and number of flower buds for the following season.

Narrowleaf evergreen shrubs

Since these shrubs are not used in the landscape for their flowers, they can be pruned with less consideration for the time of the year. Gardeners often do some light pruning on these plants around the Christmas season (avoiding frozen plant material) so the greens can be used for decoration.

The most frequently planted narrowleaf evergreens are arborvitae *(Thuja)*, falsecypress *(Chamaecyparis)*, juniper and redcedar *(Juniperus)*, mugo pine *(Pinus)*, and yew *(Taxus)*. With the exception of mugo pine, all of these can be pruned in the dormant season before growth begins. Dormant- season pruning is used to make major changes in the shape and form of the plant. A second light thinning of the new growth can then be made in June to give additional control to the size and shape of the plant.

The major dormant-season pruning should involve heading back the longer stems to a point well inside the plant body. This will allow more air and light to penetrate inside. A branch or so may be removed from inside the plant to open the interior. Never leave a leafless stub because no new growth will develop. Smaller side branches will also develop from lower in the plant to increase the density but not the overall size. Continual shearing of narrowleaf evergreen shrubs will result in a very dense layer of foliage on the outside with little leaf cover deeper in the plant. Dense foliage will not permit the growth of renewal stems from inside the plant.

Any pruning done in June should be minimal—just enough to shorten the elongating new growth and control the size of the plant. Do not try to make a drastic size reduction with June pruning. This frequently results in a larger and denser plant in the long run.

Mugo pine is pruned during the growing season only when the new growth or candle is developed but before the needles begin to elongate. The candle can be pinched in half to help control the size and density of the plant (Table 2).

PRUNING EVERGREEN TREES

The pruning of narrowleaf evergreen trees by the homeowner is a rather easy operation. Once the plants are established on the property, pruning is not recommended. There are occasions when it may be necessary to shorten a branch that interferes with movement near the tree or if it is out of shape with the rest of the tree. Most of the problems begin when these trees are pruned in an effort to keep them small and shrublike. Any pruning that attempts to alter the natural form of the tree destroys the value of the tree in the landscape. If a shrub is needed to meet the needs of the design, plant one.

There are instances when some pruning of narrowleaf evergreen trees is justified. Frequently,

Table 2. Pruning techniques for shrubs that can be applied based on flowering time and plant form.

BROADLEAF EVERGREEN SHRUB	FLOWERING TIME[1]	PINCHING[2]	REJUVENATION[3]	RENEWAL[4]	THINNING[5]	HEADING CUT[6]	SHEARING[7]	REMARKS
Andromeda *(Pieris)*	spring							Every 2 to 3 years open up the outer layer of foliage by cutting into the center of the plant
Boxwood *(Buxus)*	spring			x		x	x	
Cherry laurel *(Prunus)*	spring	x-regularly		x		x		
Heavenly bamboo *(Nandina)*	summer					x		
Holly, Japanese *(Ilex)*					x	x		
Holly, Inkberry *(Ilex)*						x		
Hollygrape *(Mahonia)*	spring				x	x		
Leucothoe *(Leucothoe)*	spring				x			
Mountain laurel *(Kalmia)*	spring				x			
Rhododendron *(Rhododendron)*	spring	x-old flowers		x-every 5 to 10 years	x			

1. Flowering time directs the time for pruning. Spring-flowering shrubs should be pruned immediately after flowering and summer-flowering shrubs pruned in the dormant season or just before spring growth.
2. Pinching is the removal of succulent growth, unopened or old flowers, and seed heads with your fingers.
3. Rejuvenation is the process of cutting off old branches at or near the ground in order to promote new growth.
4. Renewal is the process of removing older stems in order to reinvigorate the shrub.
5. Thinning is the complete removal of a branch back to a main branch, trunk, or the soil line.
6. Heading is used to shorten branches back to a healthy, properly located lateral bud or branch. This technique is used to control size, shape, and direction of branches.
7. Shearing is most often used for formal sculpturing of the plant and involves the pruning of outer branches to stimulate dense growth along the outside edge of the plant.

younger trees will develop very long terminal growth on the central leader. When this occurs there is considerable space between the developing branches on the trunk. The overall density of the tree can be improved by shortening the length of the leader. Unless the side branches are very leggy, there is some question if any pruning of these branches will improve the appearance of the tree in the future.

To shorten the leader of spruce *(Picea)*, fir *(Abies)*, and Douglas fir *(Pseudotsuga)*, cut it back by about one-half in the early spring before growth begins. On each leader lateral buds are visible. Make certain there are a few buds near the end of the remaining stem. One of these buds will develop into the new leader for the tree. To shorten the leader of pines *(Pinus)*, cut the expanding terminal growth or candle in half before the needles begin to develop. Buds will form along the shortened stem to establish a shorter leader the following season (Figure 3a).

Hemlock *(Tsuga)* is one narrowleaf evergreen tree that is the exception to the general restrictions for pruning this group of plants. Hemlock is one of the few trees that will respond well to either moderate pruning or shearing. If grown as a tree, little cutting will be needed except for the shortening of some side branches. As a hedge it can be maintained very well at just about any height set by the homeowner.

Some corrective pruning may be needed on narrowleaf evergreen trees if the leader is damaged during planting, by the weather, or is destroyed by insects or disease. The damaged portion can be removed and replaced by one of the lower limbs in the whorl or branches immediately below the leader. Select one of the side branches at the top of the plant and bend it

into an upright position, taking care not to snap off the branch in the process. Tie the new leader into place against a small stub of the old leader or to a support stake running the length of the central trunk of the tree. After the new leader is able to retain its upright position you should remove the remaining stub back to live wood so it will heal properly.

PRUNING VINES

Consider the purpose or role the vine is expected to fulfill in the landscape design before pruning. The major reasons for pruning vines is to limit their vigorous growth, remove dead wood, and thin stems and branches. Pruning will help to promote stronger growth and induce flowering. Some of the fast-growing vines may need severe pruning or complete cutting back to ground level every few years. Severe pruning is best done in the early spring, just before the new growth starts. Early spring-flowering vines should be pruned after they flower, while other types can be cut in the dormant season when the stems are easily seen.

Many of the common vines tend to make rapid vertical growth with few lateral branches. Such vines should have the leader pruned back during the growing season to encourage more lateral branching and horizontal spread to the vine cover. In time, vertical stems will develop from the horizontal portions to increase the density of the cover. Periodic light thinning may help to increase the density where heavy cover is needed, while frequent rejuvenation pruning will keep vines thinner and less dense. Vines in this category are five-leaf akebia *(Akebia)*, cross vine *(Bignonia)*, Dutchman's pipe *(Aristolochia)*, passion flower *(Passiflora)*, climbing hydrangea *(Hydrangea)*, hardy kiwi *(Actinidia)*, honeysuckle *(Lonicera)*, Boston ivy and Virginia creeper *(Parthenocissus)*, wintercreeper *(Euonymus)*, and trumpetcreeper *(Campsis)*.

Clematis *(Clematis)* and wisteria *(Wisteria)* offer special challenges based on flowering types and vigor. Three different flowering types are found among clematis. Among early spring-flowering types, dead and damaged shoots should be removed and stems should be cut back within the allotted space after blooming; however, total plant removal is not needed each season. Severe pruning is only necessary when plant quality and flowering begin to decline. Early- and mid-season large flowering types should also have dead and damaged stems removed and last year's growth should be cut back to a pair of strong buds (6 to 8 inches from the ground) in the early spring before growth begins. Late large flowering types are best pruned before any growth begins, and all stems should be cut back to a strong visible bud. Pinching old flowers will also promote flowering later in the season. For wisteria, thin out long and vigorous stems to three or four buds to promote branching. Severe thinning with the removal of as much as 30 percent of the top growth has been known to stimulate flowering of older plants that were reluctant to develop flowers.

PRUNING GROUND COVERS

Most gardeners do not give much thought to the pruning requirements of their ground cover plantings. However, since they are also living plants, ground covers may require periodic pruning to keep them within bounds, to remove old or dead wood, or to rejuvenate the bed of plants. A well-maintained bed of ground cover can add greatly to the landscape.

Some established ground cover beds become overgrown with long branches and stems. It is quite easy, as well as desirable, to use hedge shears or a rotary mower with high wheels to mow off the unwanted stems and branches. The debris can be removed with a leaf rake after the pruning operation. Evergreen ground covers such as English ivy *(Hedera)*, pachysandra, *(Pachysandra)*, periwinkle *(Vinca)*, or wintercreeper *(Euonymus)* benefit from such severe cutting back. A light application of complete fertilizer will help to stimulate growth, which will cover the cut ends of the stems. Finally, English ivy should be kept out of trees to prevent damage to the tree and the maturation of the ivy to a flowering and fruiting form, which can be very invasive in the landscape.

SPECIALTY PRUNING

Hedges

There are two types of hedges: formal and informal. The formal hedge is pruned or sheared to a definite size and shape one or more times during the growing season. The informal hedge is often a row of shrubs planted close together and allowed to grow normally according to their natural habit.

Two important pruning operations influence the quality of a hedge. The first pruning should be done the first year after the shrubs are planted. At this time they should be cut back to about 6 to 10 inches above the ground. This severe cut will encourage new shoots to develop near the ground to produce a thick and bushy plant. Any delay in cutting back the 1-year-old plants will generally result in a poor-quality, leggy hedge later.

The second pruning operation is the yearly thinning out of the older wood from the center of the plants. This will retain a full and dense plant in both formal and informal hedges. Shearing will also be necessary to control the size of formal hedges but should be followed every 3 to 4 years with some thinning and heading back of the longer branches. Thinning and heading cuts will eliminate the dense layer of foliage over the outer shell of the hedge. Such a dense layer often shades out the inner portion, and the plants are slow to recover from injury or severe pruning to control size.

The actual shape of any hedge is also very important. Never shear or prune any hedge so it is narrow at the bottom. The bottom of the hedge should be several inches wider than the top to allow for fuller growth. The wide bottom exposes more of the plant to light and eliminates the twiggy base caused by shading from the upper branches
(Figure 11).

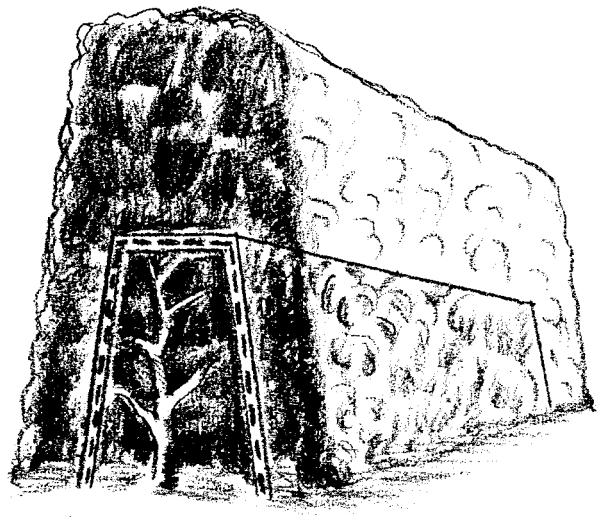

Figure 11. A properly pruned hedge will be narrow at the top and wider at the bottom. The purpose of a hedge is to act as a visual screen. This is achieved by maintaining dense foliage on the outer shell of the hedge. The interior of most hedges are leafless.

Espalier

Espalier is the time-consuming European practice of training a tree or shrub to grow flat against a building or with the assistance of a support. Most trees and shrubs can be trained flat by continually removing growing points that go in unwanted directions. Before locating a plant next to your house for espaliering, place an iron or wooden support a few inches away from the house. This prevents any disfiguration of the wall and allows for plant support and easy plant removal at an future date. Espalier is commonly used in intensive fruit production systems such as apples and grapes (Figure 12).

Topiary

Boxwood, juniper, pyracantha, privet, and yew are commonly sheared and sculpted into unnatural, free, geometric, or representational forms. The goal of the topiary will dictate the techniques used. A general scheme includes finding a basic form by parting the branches, removing the limbs that do not fit the form, shearing some branches, and wiring them into a secondary form or to a frame in order to create a clump, and removing all twigs and leaves between predetermined clumps. Each season new branches and leaves will need to be evaluated and set to the design or removed.

PRUNING ROSES

Rose pruning is dependent on the type of roses in the landscape. Carefree and shrub roses do not need significant pruning, except standard pruning activities similar to deciduous shrubs including pruning

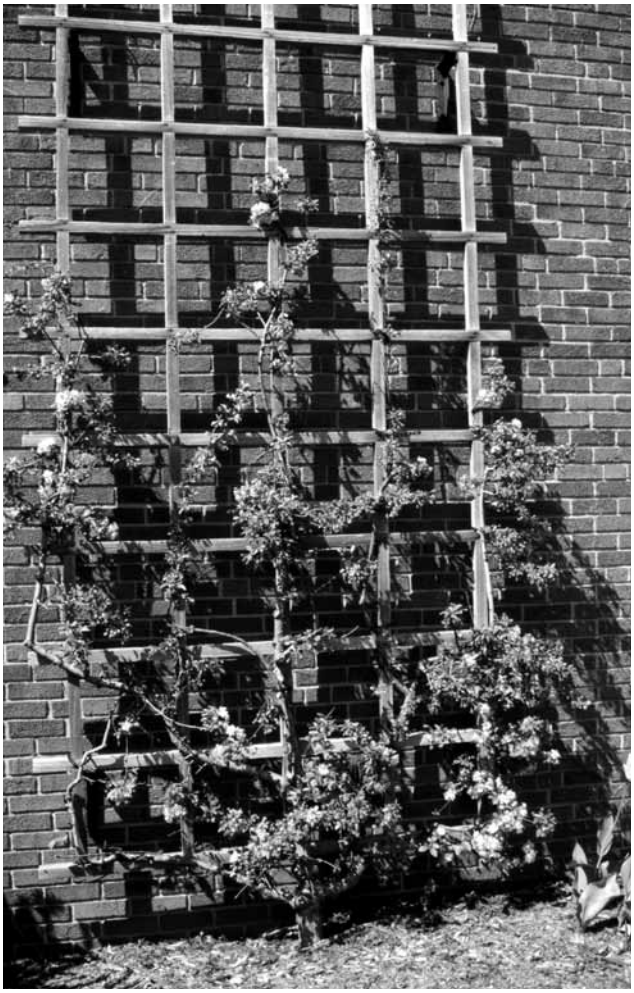

Figure 12. Espalier requires specialized pruning and growth control to attain the desired form.

to remove crossing, damaged, dead, diseased, and rubbing branches, and thinning and heading cuts to manage size and maintain the form and productivity of the rose. Shrub roses including old roses and species roses should be pruned lightly, removing no more than one-third of the growth. Deadheading of spent flowers is an important summer maintenance practice for roses, especially the continuous blooming varieties. Do not remove spent flowers from species roses (e.g., *Rosa rugosa)* that produce large colorful rose hips in the fall. To deadhead, cut back at a 45° angle to the first outward-facing bud in the axil of a leaf with five leaflets.

Bush roses

Bush roses consist of the hybrid teas, grandiflora, and floribunda type roses. In general, roses should be pruned in March or early April just when they are beginning to show new growth. At this stage it is easier to avoid breaking off new shoots. Some heirloom roses are an exception to this rule because they flower on previous year's wood. As with all other pruning, pruning with a plan is important.

Using thinning and heading cuts, prune out dead canes and twiggy growth to open up the center of the rose bush. Head back on the canes to a point about ¼ inch above a bud. As a guide to how far back to cut a cane, inspect the pith with each cut. Healthy cane wood will be represented by a creamy white or green pith. A brown or gray pith represents a dead cane and will require you to prune back to the next live lateral bud pointing outward from the center of the rose bush. Pinching old flowers is necessary to keep these roses flowering. Disbudding or the removal of some buds from the canes or stems will maximize the energy to a select number of buds. For hybrid teas and grandiflora roses, remove side buds by rubbing a forefinger or thumb along the cane as soon as buds are visible. This approach will assure large flowers, leave no visible bud scars on the stem, and will allow the stronger terminal bud to develop to its maximum size. Floribundas and grandiflora sprays require that the center bud in the spray cluster is removed as soon as it is visible. This will allow the remaining buds that are similar size to develop into a more beautiful spray. In pruning to shape, the hybrid teas, grandifloras, and floribunda roses can be pruned 12 to 24 inches in height, leaving 9 to 12 large (½ inch in diameter) healthy canes. Fall pruning is not recommended. Some roses will require winter protection to survive. Just before these roses are hilled up for the winter around Thanksgiving, cut the canes back to about 24 to 30 inches above the ground. This will prevent the branches from whipping in the wind and loosening roots in the soil.

Rambling and climbing roses

Procedures and timing for pruning varies with the type of rose, although the pruning plan remains the same. Climbing roses bloom continuously throughout the summer on current year's wood, while rambling roses bloom once during the season. Climbing roses are moderately vigorous and flexible, lending them to be suitable for supports such as fences, arbors, and so forth. At planting time, climbing rose roots may be pruned; however, avoid pruning the canes. To

train the canes after planting, tie them to a support in a near horizontal position. Horizontally supported canes will produce flowering laterals and a generous flower display while vertically supported canes tend to produce flowers only at their tips. In the early spring of the next growing season, while the rose is dormant, shorten the laterals to four or five buds. This will become an annual activity. Pinching climbing roses differs from other rose types in that the spent flowers should be removed just above the foliage because new blooms will arise from the leaves immediately below the old flower cluster. Examine and remove dead and diseased wood and suckers in the spring. For older climbers, some of the oldest wood can be removed at the base to encourage new canes.

Rambling roses fall into three categories based on the parent roses that were used to create these cultivars. Group 1 ramblers are derived from *Rosa wichuriana*. The cultivars (for example, 'American Pillar' and 'Dorothy Perkins') flower on 1-year-old canes produced from the base of the plant. At planting time, the canes should be pruned to a height of 9 to 15 inches. Train the vigorous new growth horizontally on a support. Profuse flowering should begin in the second season. In late summer or early autumn, remove the stems that flowered and tie the new growth horizontally. To prevent a sparse-looking plant, leave some old canes. Group 2 ramblers (for example, 'Paul's Scarlet Climber") produce new canes on older canes rather than from the soil line. Like group 1 ramblers, group 2 roses produce flowers on 1-year-old wood. Pruning should take place after flowering and should consist of removing old wood up to the new growth then securing the new growth horizontally to the support. Group 3 ramblers (for example, *Rosa filipes* 'Kiftsgate' and 'Wedding Day') are very vigorous and capable of growing 20 feet in one season. These roses are best used as a ground cover or on a large pergola. Very little pruning is necessary, except when a plant begins to overgrow the area. To reduce the size of this type of rambler, thinning cuts can be made within the rose or at the base of the plant.

BASIC SAFETY RULES FOR PRUNING

- For large trees or for jobs you don't have the equipment or skills to accomplish, call in a professional with insurance coverage.
- Keep all equipment sharp and in good repair.
- Use equipment only for the job it was designed to do.
- Do not prune near electrical lines. Call in a professional who is properly trained and certified to prune near electrical lines.
- If a power line is touching a tree limb, call the power company immediately and stay clear of the tree.
- Never climb a tree without a safety rope and saddle.
- Don't work off a ladder.
- Keep your fingers clear when using hand clippers.
- Use care in handling pruned limbs and brush to avoid eye injury.
- Don't use a chain saw over your head or with only one hand.

PRUNING DON'TS REVIEWED

Everything mentioned so far concerns what to do as you prune your plants. There are also certain things that should not be done because of their adverse effect on your plants. Among these are:

- *Never leave short stubs when you make a cut.* Always cut the twigs close to the main stem. Short stubs do not heal over quickly and make an ideal opening for disease and insects. How you place the pruning shears on the plant governs the closeness of the cut. In general, try to get the blade of the tool as close to the main stem as possible.
- *Never prune your spring-flowering plants before they blossom.* The flower buds are formed the season before, and you will cut them off before they have a chance to open.
- *Never cut all the stems or shoots of a plant at the same height.* It gives the plant a "crew cut" look and stimulates excess growth on the top of the plant.
- *Never shear hedges so they are narrow at the bottom.* The bottom should be several inches wider than

the top to allow for fuller growth. The wider bottom exposes more of the plant to the light and eliminates the twiggy base often seen on hedges.

- *Never leave a stub without a bud at the twig end to continue growing.* Slant the cut slightly so a small portion of the twig remains above the bud.

PRUNING TERMINOLOGY

- **Adventitious**—a stem, leaf, or root that arises from an unexpected location. A shoot that grows from a leaf axil is not adventitious; one that grows from a lateral root is adventitious.
- **Branch bark ridge**—a ridge of bark in a branch crotch that marks where branch and trunk tissue meet and often extends down the trunk.
- **Branch collar**—trunk tissue that envelops around the base of a branch between the main stem and the branch or a branch and a lateral. As the branch dies, the collar usually becomes more pronounced, completely encircling the branch.
- **Bud**—an undeveloped or compressed stem.
  a. Lateral bud or axillary buds are located where the leaf petiole is attached to the stem; the axil of the leaf.
  b. Terminal or apical bud—the growing point at the terminal end of a shoot.
- **Callus**—undifferentiated tissue initially formed by the cambium around and over a wound.
- **Candle**—expansion or initial growth from a pine's bud (shoot elongation).
- **Co-dominant stems**—a situation in which two branches or leaders are equally dominant on a branch or tree. Forked branches are commonly seen among trees that are opposite branched such as maple. Double branching is also common in conifers where the terminal candle is broken and lateral buds compete for dominance.
- **Crotch** or **branch union**—the angle formed at the attachment between a branch and another branch, leader, or trunk.
- **Crown**—the leaves and branches of a tree or shrub; the upper portion of a tree from the lowest branch on the trunk to the topmost branch tips of the tree.
- **Heading cuts**—remove current growth or 1-year-old growth back to a bud, or cuts an older branch or leader back to a stub or to a lateral not large enough to assume the terminal role. Heading cuts are most effective on deciduous shrubs.
- **Included bark**—bark that occurs in a crotch between branch and trunk or codominant stems. Included bark usually prevents the trunk from growing around the branch (lacks a collar).
- **Internode**—the sections of stems between the nodes.
- **Latent bud**—preformed buds, usually located under the bark of trees that grow into water sprouts in response to heavy pruning.
- **Lateral**—a branch or twig growing from a parent branch or stem.
- **Leader**—a dominant upright stem, usually the main trunk.
- **Node**—the joint on the stem where a leaf is or was attached. Axillary buds are located at nodes.
- **Pinching**—usually done by hand on succulent stem tissue and flower buds in order to control flowering and plant size. For example, pinch mums to increase the branching and density of the plant, to slow down flowering, and to enhance future flowering.
- **Pollarding**—not similar to topping, but rather is a training system used on some large growing trees in which the trees are annually severely headed to a knob of latent buds at the branch ends to give a formal appearance.
- **Reduction cuts**—used to shorten branches back to a healthy, properly located smaller lateral branch. The lateral branch should be one-half to one-third the diameter of the branch removed, in order to reduce sprouting and produce enough energy to close the wound.
- **Rejuvenation pruning**—involves cutting back to the ground or near ground level the entire top of a declining shrub to promote new vigorous growth and then selectively thinning the new shoots as they begin to grow to prevent overcrowding.
- **Renewal pruning**—the selective removal each season of one-third of the old, mature stems of a declining shrub to promote new vigorous growth while maintaining the overall shape of the plant. These large, old branches are removed at the ground level. Secondary pruning of vigorous new shoots will be required to prevent overcrowding and poor form.

- **Root collar** or **trunk flare**—the junction between the root of a plant and its stem, often indicated by the flare of the trunk.
- **Root pruning**—the cutting of a portion of the root system to encourage new root growth or to check the growth of the top of the plant. Plants are often root-pruned to prepare them for transplanting.
- **Scaffold branch**—a large limb that is or will be part of the permanent branch structure of a tree.
- **Shearing**—a specialized pruning technique in which tips of outer branches are trimmed off, stimulating dense growth toward the outside of the plant. This technique is most often used for formal sculpturing of plants into hedges and topiary.
- **Stub cut**—an indiscriminate heading cut to a point on a branch where no bud or branch exists.
- **Sucker**—an adventitious shoot that grows from a plant's root.
- **Thinning**—completely removing select branches back to a main branch, trunk, or soil line.
- **Thinning cuts**—carefully planned cuts on trees where a branch is removed back to the trunk or a main branch by cutting the branch at the branch collar. A proper thinning cut will not cut through the branch collar.
- **Topping**—employs heading and stubbing cuts and should only be used when a tree is being removed.
- **Water sprout**—a weak attached twig that grows when a latent bud becomes active.
- **Wound wood**—differentiated woody tissue that forms after initial callus has formed around the margins of a wound. Wounds are closed primarily by wound wood.

Notes

An OUTREACH program of the College of Agricultural Sciences

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Visit Penn State Extension on the web: **extension.psu.edu**

This publication is available from the Publications Distribution Center, The Pennsylvania State University, 112 Agricultural Administration Building, University Park, PA 16802. For information telephone 814-865-6713.

This publication is available in alternative media on request.

Produced by Ag Communications and Marketing

Code# AGRS-095 8C8/11mpc1899