

# Pruning – Not a Mysterious Art

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## **Introduction** (*Maintaining the Past for the Future*)

Good design, combined with good quality site preparation, proper installation, and the appropriate maintenance are the essential parameters for a garden to reach its full potential. Having said that, there are few maintenance practices that can be more beneficial or more harmful to a residential, commercial, public garden or park landscape than pruning. Proper pruning helps preserve the vigor, health and beauty of shrubs and trees, allowing them to live to their full life expectancy. In fact, you could consider proper pruning to be one of the best methods of preserving the past while ‘shaping’ the future of a landscape! Like all aspects of horticulture, pruning is part art and part science. Although there are numerous reasons for pruning, one element is always important to remember – shrubs are pruned to retain their beauty in flowers, form and foliage, while trees are pruned principally for safety. Pruning is also a fun and very satisfying part of horticulture and, aside from the pruning of mature shade trees, it should never be considered as something too difficult or too mysterious for the home gardener or landscape service to learn.

## **Reading** (*Going beyond these Notes*)

*An Illustrated Guide to Pruning* (third edition) – Edward Gilman  
Published by Delmar Cengage Learning

## **Why we Prune** (*Reasons for Pruning*)

The reasons for pruning are many, although the most common reason is undoubtedly trying to maintain the size of a plant that simply wishes to grow too large for the site. The old adage of placing the right plant in the right place is never to be disputed. However, there are numerous additional reasons to prune, which include:

1. **Sanitation.** Removal of dead, diseased or insect infected wood. If the disease is transmissible via hand saws and pruners, the tools should be dipped in a 10% bleach or an alcohol solution to prevent further contamination. Sanitation also includes the removal of crossing and rubbing branches. The constant abrasion from rubbing will create or maintain an open wound and allows a port of entry for insect and disease.
2. **Beauty.** Many plants will produce water sprouts (vigorous upwards growth from branches) or suckers (vigorous upwards growth from the roots) that detract from the overall attractive form of the plant. Many plants also have attractive branch patterns come winter that can be enhanced through the judicious thinning of branches. Removal of spent flower heads may also fall into this category based on one’s definition of what is ugly or attractive, although this will not impact the overall health of the plant.
3. **Rejuvenation.** Best recommended for shrubs and hedges, it is the removal of old branches, stems or canes that are losing vigor due to age and decline of the vascular system. Plants such as Forsythia, Lilac (*Syringa* spp.) and Slender Deutzia (*Deutzia gracilis*) benefit from a periodic thinning and removal of the oldest stems every 2-3 years. Other plants such as Rhododendrons, Mountain Laurel (*Kalmia* sp.) and Andromeda (*Pieris* sp.) benefit from a removal of the oldest wood every 20-50 years when they become too leggy and the foliage grows sparse at the base. The new shoots

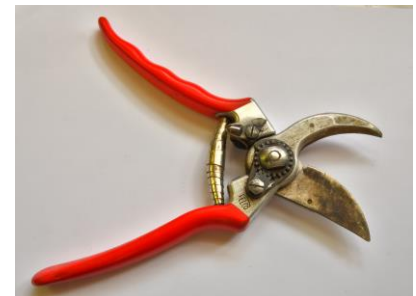
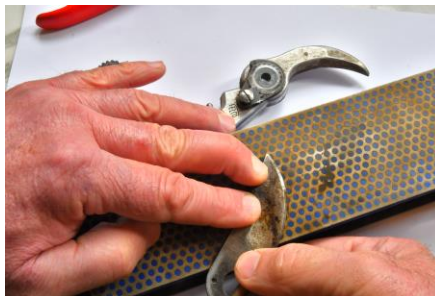
that are produced will yield larger and often more numerous flowers due to the young and more efficient vascular system. Boxwood (*Buxus* spp.), Yew (*Taxus* spp.) and other hedging plants can also be treated in a similar manner when they have become too large or misshapen.

4. Height Control. Selective shortening of upright branches primarily on shrubs, but can also include small trees. Can also refer to the removal of lower limbs of a shade tree, typically to a height of 7-8' over time. This will allow people to walk or see beneath and make a space feel less congested.
5. Balance. Either the shaping of a plant to maintain a uniform appearance unto itself, or to maintain a proper appearance with neighboring plants within the garden.
6. Reduce Transplant Shock. Originally, it was considered beneficial to remove or thin approximately 1/3 of the 'head' of a Balled and Burlapped Tree (B&B) tree or shrub in order to reduce the amount of transpiration or water loss. This in turn would compensate for the reduced uptake of water due to the loss of roots during the digging. It has since been proven that plants benefit from not being pruned, since the carbohydrates produced from the additional foliage from the unpruned limbs helps to redevelop a strong root system more quickly. In addition, the hormone called Auxin is produced in the apical buds of branches and transferred to the roots via the phloem to initiate root production. If the apical buds are removed, Auxin production is lowered and less root growth results. An exception are trees with very dense foliage, such as a Linden (*Tilia* sp.); thinning the canopy will allow the wind to pass through the plant and reduce the likelihood of the plant tipping in heavy winds. If co-dominant leaders exist, it is best to remove them at the time of planting, especially since access is so easy!
7. Special Effects. Includes hedges, pleaching, espalier, and topiary.
8. Safety. Shade and street trees pruning should be completed primarily for reasons of safety. This includes the removal of dead material or branches with a poor structure that are subject to breakage in strong winds or storms. At one time on college campuses safety would also refer to the removal of the lower branches from shrubs so that people hiding or lurking in the shrubs would be noticed – a practice nicknamed pervert pruning!

## **Tools** (*With What to Prune*)

Although it should go without saying, always pick the right tool for the job and make certain that the tools are sharp. Not only does it provide a smoother cut and less damage to the plant, it makes it much easier for the operator as well!

1. Bypass pruners.  
Probably the best all around tool. Operating much like a pair of scissors, the cutting blade actually passes past the lower anvil,



ensuring a good, smooth cut. By reducing the impact upon the phloem and the delicate cambium cells that are located beneath the phloem, cell damage is reduced to a minimum and the wound can heal properly. Once you feel the need to 'wiggle' the pruners in order to make the cut, the stem is too large and it is best to use a saw. The action of 'wiggling'

- the pruners actually harms the pruners. Typically, 3/8" to 1/2" is largest diameter of a stem suggested for hand pruners. The blade of bypass pruners is flat on one side and beveled (angled) on the other. To properly sharpen, dismantle and place the blade flat on a sharpening stone (the diamond impregnated plastic 'stones' work great), moving it back and forth numerous times. Turn the blade over and pass the beveled side over an Arkansas stone to remove any burrs and the blade is sharpened! Add lithium grease to the bolt and points of contact and the job is complete!
2. Anvil pruners. The cutting blade comes down upon the anvil, and does not sweep past as in the bypass pruners. These are not ideal, since they actually crush and damage the cambium in the process of removing the stem or branch.
  3. Loppers. Can either be bypass or Anvil, the longer handles allow you to penetrate further into a shrub, before the shrub can reach the operator. Ideal for plants with thorns or for thinning multistemmed shrubs. Dependent upon the density or hardness of the stem, they are typically appropriate for stems of 3/4" or less in diameter.
  4. Hedge Shears. Unless a very formal appearance is desired, hand pruners actually produce a healthier plant.
  5. Handsaws. Most come with tri-edge saw teeth, which cut on both the push and pull stroke of the cut. This type of blade produces a very smooth cut, again reducing the amount of cell damage and minimizing the introduction of decay agents. The smooth cut also allows rainwater to sheet off faster, further reducing the chance of decay. They are useful on stems 1/2 - 2+" in diameter.
  6. Pole pruners. Complete with bypass pruners, saw blade, or both, these allow you to cut material that is up to 10' off the ground without the need for ladders or climbing the tree.



### **When to Prune** (*Best Times of the Year to Prune*)

The following are four rules that apply. As is always the case there are exceptions to the rules and personal judgment, better known as common sense, should always prevail.

1. Prune when the shears are sharp. Not a bad rule, since breakage and small problems can and should be quickly corrected at any time.
2. Avoid pruning significant growth in late July through September. The removal of large amounts of growth, especially through renewal pruning will result in a significant flush of new growth as the plant attempts to resurrect its photosynthetic and sugar making capacity. This vigorous growth will continue well into autumn and be subject to tip dieback or all out death of a stem following the first hard frost. For plants which are marginally hardy in NJ, such as Wintersweet (*Chimonanthus praecox*), the act of the frost damaging the actively growing stems may actually result in the death of the plant.
3. Immediately after flowering. It is important to distinguish which plants bloom on old wood (flower buds are set the previous fall for spring bloom) or on new wood (flower buds develop on growth produced that spring from April through June). Plants with flowers produced on previous year's wood cannot be heavily pruned during winter dormancy without the obvious loss of flower buds. Pruning just following bloom in May will still allow new buds to form that summer and fall. The rule applies best to broadleaf evergreens, such as Rhododendrons, Azaleas and Mountain Laurels (*Kalmia latifolia*)

- that have a coarse, upright branch structure that is not easily thinned, like multistemmed shrubs such as *Forsythia*, for example. This rule can also apply to plants having a densely multistemmed habit like Bridal Wreath Spirea (*Spirea prunifolium*) and Japanese Kerria (*Kerria japonica*). The dense mass of stems is far easier to cut back heavily, called renewal pruning following flowering versus attempting to thin the older stems in winter.
4. During winter dormancy. Shrubs blooming in June through fall can be pruned back heavily in late February through March and still bloom that summer since they produce flower buds on current seasons wood. Examples include Chaste Tree (*Vitex agnus-castus*), Butterfly Bush (*Buddleia* selections) and Panicle Hydrangea (*Hydrangea paniculata*). Spring blooming shrubs that produce flowers the preceding fall are best thinned in winter or if severely overgrown, cut back severely through a 'Rejuvenation' pruning during late winter. For large shrubs and small trees, it is much easier to see the structure of a plant in winter and remove any rubbing wood. Late winter is also the ideal time for a renewal pruning or stooling of red and yellow twig dogwoods (*Cornus* spp.) and Willows (*Salix* selections). Waiting until late March provides the opportunity to enjoy the last 'bit' of stem color before the spring flush begins

## **How to Prune** (*I have the tools and plants, now what?*)

### **A Thought on Thinking**

It is easy to read about what pruning practices are best for a given tree or shrub, but where and how exactly to begin is often confusing to someone who has not pruned extensively in the past. When considering how to prune a plant I have always found it helpful to walk about the plant and – as odd as this may sound – 'become one' with the plant. In other words, what pruning would help the plant to look or 'feel' it's best? If it was possible to be the plant, what would you be feeling? What weight would you want lifted or the removal of which rubbing stem would make you feel better? In essence, think of pruning as removal of a poor fitting piece of clothing or the scratching of an irritating itch that cannot be reached through the removal of that rubbing branch! Applying human qualities to plants is obviously a stretch. However, we all need to determine how best to approach pruning, and maybe this will help arrange your thoughts and evaluate a plant.

Below is the order of thinking in which I approach a plant; this is certainly not a science, just a thought process that works for me:

- How much of the plant has dead wood, and where is the dead wood located? On Cutleaf Japanese Maples (*Acer palmatum* var. *dissectum*), the inner branches die from lack of light. This is normal. If there are major limbs that are dead along the outside of the plant, there are other problems that need to be addressed.
- What is the natural branching habit and shape of the plant? For example, is it vase shaped, globose, fastigate or pyramidal? This natural form is obviously something you should wish to enhance. If there is a branch that is distorting or altering an otherwise attractive natural habit, it should be removed or reduced in size.
- What portion of the plant is putting excess stress upon the plant? Perhaps there is a cluster of branches adding weight, co-dominant leaders, a poor branch angle or an overly long branch that is compromising the health of the plant.
- How does the plant fit into the garden? What pruning would make this individual plant, or a group of plants fit the scale and context of the garden. If the plant was selected for a

narrow habit to fit a small space, that habit should be preserved. I should note that if the plant genetically wishes to grow far beyond the scale of the garden, a different plant might be the preferred choice rather than pruning.

### **How the Plant ‘Thinks’ (The Physiological Response)**

The pruning of a plant has far greater physiological repercussions than most may think! Going hand in hand with pruning is plant health. Pruning will help maintain plant health, but also try to keep plants healthy and vigorous through proper watering and placement. First some definitions:

- Xylem – non-living tissue that forms the core of stems, branches and trunks of woody trees and shrubs. Typically, it is ‘banded’ with light and dark growth rings, which illustrate periods when it was growing fastest (the light rings) in a given year and when slowest (the dark rings). Its function is for support and is the medium through which water passes up the stem.
- Phloem – located under the bark, it consists of living tissues and allows nutrients to pass from the leaves to the roots and chemicals (hormones) produced in the roots to travel to the upper portions of the plant.
- Cambium – Undifferentiated cells, meaning that they have not specialized into any particular function. This is essentially an area of radial growth and is located between the xylem and phloem, with the cells produced on the inside creating xylem, cells to the outside phloem.
- Callus – undifferentiated cells created to heal wounds.

### The Physiology of How the Plant Responds to Pruning

The action of cutting a branch or reducing the length of a stem is in essence a wound to the plant – with a wound being defined as a penetration or disturbance to the outer protective layer(s). It is also important to note that trees and shrubs do not heal like people, a misconception probably held by many gardeners. In plants, damaged tissues and decay will never vanish. Rather the damage is compartmentalized in an effort to reduce the spread of the decay through a regimented response sequence. Once the cut or wound has been made, the xylem closest to the cut will become plugged with clotting materials called tyloses and various gums to prevent decay from moving up or down the stem. The denser and darker growth rings also help to slow or stop the progression of decay inwards, towards the center of the trunk while a material called suberin is exuded near the wound. Suberin is a waxy material found in bark and helps to prevent water loss to the atmosphere as well as any infection from microorganisms, bacteria and fungi from penetrating deeper into the heart of the plant. This process was first described by Dr. Alex Shigo in 1991 who gave it the name of CODIT or Compartmentalization of Decay in Trees. It is a complex response and to this day it remains not thoroughly understood.

All of these CODIT responses work to slow the onset and movement of discoloration and decay and to contain the damage. In concert with these responses, the collar starts to produce callus material, ‘growing’ over the wound and eventually sealing off the wounded surface to air and oxygen. Once sealed and without oxygen, the decay will spread no further and the amount of decay that has occurred is essentially contained. Unfortunately, it will be present in the plant for the remainder of the plants life and if the wound was open for a significant period of time, it could potentially serve to be a future point of weakness during a strong storm. This highlights why it is important to correct a problem as early in the growth of the tree as possible when the branches are still relatively small or to make corrective cuts to minimize any potential storm damage.

If the intent of the pruning is to make a plant appear fuller, much as would be done through trimming a hedge of Hornbeam (*Carpinus*) or Yew (*Taxus* spp.), the branches would be partially cut back, removing the apical bud in the process. As mentioned prior, the plant hormone auxin is produced in the apical buds, and another impact it has on a plant is suppressing the growth of the lateral buds along the stem located immediately below. This suppressing effect prevents them from breaking bud and in turn, producing shoots. The apical bud also has a direct connection to the phloem and xylem, while the lateral buds fail to have this direct connection. Cytokinins are a group of hormones produced in the roots and responsible for cell elongation. They are transported via the xylem to the apical bud. Interestingly, the lack of connection for the lateral buds to either the phloem or xylem prevents them from receiving large amounts of the Cytokinins. Thus, when the apical bud is removed:

1. The source of auxin production and resulting apical dominance is removed.
2. The lateral buds develop connectivity to the vascular tissues.
3. The lateral buds begin to both receive Cytokinins and start the production of auxins.
4. The buds break dormancy!

Interestingly, this same process happens with herbaceous plants, such as Coleus (*Coleus* clvs.), when the apical buds are pinched to make the plant fuller!

### **Pruning and Physiology of Branch Removal for Trees and Large Shrubs**

Broadly speaking, there are two types of branch attachments.

1. Those that appear at a 45-90° angle from the stem, and there is the development of a swollen area or a 'collar' at the point of attachment
2. Those with less than a 45° angle to the stem and very often appear as two leaders or codominant leaders. There is typically no branch collar present at the point of attachment.

#### Type 1

When removing branches from trees, as well as from large shrubs, the branch should be pruned back to just above the swollen region where the branch meets the stem. This swollen area is called the branch collar, and it contains the necessary hormones to ensure that the bark will heal over the wound. In other words, the collar ensures that the living tissue will rapidly cover the bare wood and prevent long-term decay. If the branch is cut back to a point above the collar, that portion of the branch left above the collar will die back, losing connectivity to the phloem and xylem, and begin to decay. Since it is still present, it is blocking or preventing the collar from expanding and healing over the wound. Dr. Alex Shigo was the first to introduce this theory to the gardening world.

Trees and other advanced plants enter into a process of compartmentalization after being wounded. A material called suberin is exuded over the wound. Suberin is a waxy material and helps to prevent water loss to the atmosphere as well as bacterial/fungal infection from penetrating deeper into the heart of the plant. The xylem plugs itself to prevent decay from moving up or down the stem while the denser and darker growth rings slow or stop the progression of decay into the center of the plant. The collar then starts to 'grow' or expand over the wound and eventually seals off the wounded surface. Once sealed, oxygen can no longer reach the wound preventing the decay from spreading further. The decay that has occurred is essentially contained and compartmentalized. Unfortunately, it will be present in the plant for the remainder of the plant's life.

## Type 2.

Plants with a codominant leader typically do not exhibit the presence of a collar.

Consequently, the branches do not heal over as rapidly and decay penetrates further into the trunk, potentially compromising the integrity of the remaining stem. This type of branch arrangement is also poor since the stems push against each other as the diameter of both stems increase, ultimately resulting in one of the branches breaking away during heavy winds or rain storm. Ideally, codominant leaders need to be removed as early in the life of a plant as possible to minimize later complications.

## **The Cut**

Always try to remove the branch as early in the life of a tree as possible. This will keep the exposed surface area of the cut to a minimum; the smaller the surface the quicker the healing response and the less potential for decay. As mentioned above, for branches make the cut right at the branch collar. Or, if cutting back a stem or branch to encourage a denser plant, try to make the angle of the cut as close to 90° as possible to the central axis of the stem. This will minimize the central portion of the stem exposed to the elements and speed healing. On smaller stems, cut back to about 1/8" to 1/4" above a bud which is oriented in the proper direction. By proper direction, one needs to consider if the stem that results from that bud will grow into the center of the plant and lead to further stem crossing and bark wounding or grow to the outside of the plant and enhance the appearance and health of the plant.

If pruning a relatively large branch, or at least one that is difficult to prevent from dropping by holding it with the hand not making the saw cut, it is beneficial for the tree and the person to proceed with a 3-cut technique! First make a cut under the branch; approximately 8"-12" from the collar. Then, finish cutting through the branch at a point 2 or 3 inches further away from the trunk on this branch. The undercut will prevent the bark from tearing and potentially harming the collar and the bark on the trunk. A third cut can then be completed next to the collar, removing the remaining branch stub.

## **Ornamental and Small Trees**

### **Late Winter Pruning (February and March)**

1. Sucker shoots are stems that result from dormant or adventitious buds located at or near the soil line. They normally grow straight up through the plant, compromising both the appearance and the physical structure of the plant. For grafted or budded trees, these shoots usually originate from the understock and may indicate graft incompatibility. The plant may not be able to deliver adequate carbohydrates through the graft union to the roots, resulting in the roots producing stems and foliage to produce the needed carbohydrates. Avoid buying these plants if this is evident at a nursery. Otherwise, they should be removed since these shoots will overpower the desirable cultivar. Try to prune the sucker as close to the root or below ground stem as possible in order to prevent reoccurrences.
2. Remove most watersprouts from branches. Watersprouts are similar to sucker shoots, except they arise from stems or branches in the canopy of the shrub or tree. Similar to suckers, they look unattractive and typically result in rubbing of stems. The plant often generates these stems because there is a need to produce more carbohydrates. If the watersprout will not compromise the beauty of the plant or create a future rubbing issue, some of the watersprouts should be left to produce the desired sugars. It has also been



- shown that watersprouts enhance the strength of branches; the production of carbohydrates enhances the radial growth or diameter of the branch, thereby increasing its strength.
3. Eliminate crossing and rubbing branches. Rubbing branches wear away the bark and allow decay to enter into the branch, ultimately compromising its health and strength. Usually, these branches are oriented towards and into the center of the plant, where they are destined to grow in close proximity to another stem and ultimately start rubbing that stem on windy days or as the stems increase in diameter.
  4. Shorten disproportionately strong upright growth by pruning back to a lateral bud or possibly an upright oriented branch.
  5. Remove branches that may be visually unappealing to the winter outline of some plants.
  6. Remove branches with potentially weak crotches or the smaller diameter stem(s) of co-dominant leaders. The earlier obviously the better.

### Summer Pruning

1. Remove sucker shoots and thin upward growing water sprouts.
2. Remove growth which has extended into walks or side shoots that have made branches more 'weighty', causing them to droop lower and obstruct paths or impact shrubs below.
3. Remove lower branches or limb-up younger trees as they continue to gain height. Gives the plant a more attractive appearance and allows for more light to penetrate beneath the plant. On younger trees, initially leave the lower branches for several years since research has shown how the carbohydrates produced by the lower branches, creates a stronger and stouter trunk. Once these lower branches become 1-2" in diameter, they can be trimmed if desired. Try not to wait until the branch exceeds 2" since it will require a longer period of time to heal, potentially increasing the likelihood of decay.

### Pruning Conifers and Other Broadleaves

1. Strong central leader evergreens such as spruces, pines or Leyland Cypress can be thinned or have their lower branches removed (elevated), but severe pruning is to be avoided. Removal of the top will destroy the form and a new leader will generally not form or it will be a greatly distorted leader. Removal of too many bottom branches will leave an unattractive cone of upper branches on a stick. In addition, the remaining lower branches will often droop down to fill in for the removed branches. On branches, never prune beyond the point where the needles appear, since these dormant buds will fail to break. Unlike many shrubs, dormant conifer buds on wood older than 2-3 years remain dormant! In order to keep the plants more dwarf, use the technique called Candle Pruning. A candle is the new growth before the needles have begun to elongate. Candle pruning is the concept of breaking this candle to the desired length (as seen at right). New buds will then properly form for the following year and the tree will not appear misshapen, but merely dwarfed and more compact. For example, I have found it is easy through candle pruning to keep a Dwarf White Pine (*Pinus strobus* 'Nana') at 3-4' tall, rather than the 15-20' it is destined to become without pruning.
2. The height of a multi-stemmed and shrubby evergreens can be controlled with annual pruning in March, followed by a pruning in June. Plants that fall into this category





- include *Ilex crenata* (Japanese Holly), *Ilex pedunculosa* (Longstalk Holly), *Taxus* (Yew), *Juniperus chinensis* (Juniper), etc.
3. *Ilex opaca* (American Holly), *Ilex aquifolium* (English Holly) or really any Holly can successfully undergo the technique of being ‘hatracked’ in late February and March. This is a process whereby the branches are cut back to within several inches or several feet of the central trunk to restore the proper scale. The plant will literally look like a hat rack after the process and no foliage will remain. Dormant buds located along the cut-back branches will break dormancy by late May or early June. It will take upwards of 3-4 years for the plant to once again assume a more normal appearance. The plant will be full and shapely, but much narrower. Some corrective pruning will need to be done during the regrowth period, since many of the shoots will initially try to grow straight upwards and not outwards. This process does not work on Pines, Spruce and Firs, since the dormant buds of old growth fail to break dormancy!
  4. Rhododendron and Azalea, *Kalmia* (Mountain Laurel) and *Pieris* (Andromeda) can be pruned back lightly to a leaf or a branch, or pruned back harshly to within 18” of the ground. For the later treatment, the plant will respond by breaking dormant buds along the stem and reflush. It will take two to three years for the plant to regain its normal appearance once again and conceal the large cuts. Large plants can be reduced in size gradually by removing the central portion of the plant the first year and the remainder the second. Light pruning can be done just as the flowers are fading, but for substantial renewal cuts, it is best to prune the plant in late February and March.

### Pruning Shrubs

Know the shrub! As mentioned before, is it spring blooming or summer blooming? In other words, does the shrub bloom primarily on last year’s wood or current wood? If it blooms on last year’s wood, such as the Japanese Hydrangea (*Hydrangea macrophylla*) and the Oakleaf Hydrangea (*Hydrangea quercifolia*), removal or cutting back of the stems during winter will also remove the flower buds for the current year. Therefore, it is imperative that only the oldest canes be removed. This is best performed in the winter, while the dried flower heads are still clinging to the tips of the stems. For the Oak Leaf Hydrangea, only minor shaping is suggested. Plants that bloom on current year’s wood, such as Butterfly Bush (*Buddleia*), Panicle Hydrangea (*Hydrangea paniculata*) and Smooth Hydrangea (*Hydrangea arborescens*), can be cut back more severely in late winter without any impact upon flowering the following summer.

### Specific types of Shrub Pruning

1. Rejuvenation Pruning – For many multi-stemmed shrubs, rejuvenation pruning is beneficial. This entails the removal of stems that are typically three years or older. This is effective for multi-stemmed shrubs like *Syringa* (Lilac), *Deutzia* (Slender Deutzia) and *Philadelphus* (Mock Orange). For Forsythia and *Weigela florida* (Old Fashioned Weigela), the plant will root where the tip of a stem touches the ground. For this reason, it is important to look about the plant to make certain that the branch tips are not rooting and the plant is not spreading beyond its intended boundaries. For plants with red winter stems, such as *Cornus sericea* and *Salix alba* ‘Britzensis’ or *Salix* ‘Swizzlestick’, removal of 1/3 of the stems at the end of each winter will encourage new, brightly colored stems to appear. This is the best treatment if there is deer predation, as the existing stems will prevent deer from getting to the young shoots. If deer are not present, the plants can be cut back annually to 6-12” if so desired.

2. Coppicing or Stooling – Cutting of the plant back annually to the height of a stool or within 12” of the ground. It is very effective for plants with foliage color other than green, and will result in tall whips (upwards of 10’) of colorful foliage. Such plants include many with purple or yellow foliage, such as *Cotinus*, *Catalpa*, *Physocarpus* or *Cercis*. For other plants that have green foliage, such as Empress Tree of China (*Paulownia tomentosa*), the leaves the size of diner plates on stems up to 15’ tall in one season is the result! The major drawback to stooling is the added avenues of decay from the severed stems which can potentially shorten the life span of the plant, although I have not seen that be an issue. For other plants, such as *Buddleia davidii* (Butterfly Bush), or *Callicarpa* species (Beautyberry), which flower and fruit on new wood, it allows the plant to develop new stems that provide a clean attractive habit.
3. Renewal Pruning – The cutting back of overgrown hedges or plants that have gradually exceeded the desired size. Although not possible with some plants like *Pinus* (Pine) and *Picea* (Spruce), it is very effective for many shrubs which will break dormant buds like Yew (*Taxus*).

### **Pruning Vines**

Once again, know the vine and the response to pruning. Some of the major vines that benefit from pruning:

1. *Clematis*. There are three general types of Clematis and techniques for pruning, which are divided into Type A, B and C. For type A, the flowers bloom on last year’s wood, and they can only be pruned just after bloom is complete in early June. An example would be *Clematis montana*. Type B blooms on both last year’s wood as well as that of the current year. At the end of winter, these plants should be pruned back to just above two large and vigorous appearing buds, roughly 3-5’ high on the vine. An example is *Clematis* ‘Nelly Moser’. Lastly, Type C Clematis bloom entirely on new wood, such as *Clematis orientalis*, (Oriental Clematis). These vines can be cut back hard or just remove any wood that died during winter.
2. *Hydrangea anomala* (Climbing Hydrangea) and kin. *Hydrangea anomala* subsp. *petiolaris* (Climbing Hydrangea) and *Schizophragma hydrangeoides* (Climbing Hydrangea Vine) produce flowers on stems that project 12-24” out from the wall, tree or structure they are growing on and these stems should not be pruned to ensure bloom.
3. *Wisteria*. All too often Wisteria vines do not bloom because they are pruned too heavily throughout the growing season. The plants respond by producing more vegetative growth rather than flower spurs. Wisterias should not be fed heavily, nor should they be pruned heavily during the summer. Once the plant has bloomed, take note of the flower spurs (they will have a bean-like fruit pod attached). During the late winter, remove all or part of the stem above the spur in order to ensure flowering for the coming year.

### **Pruning for Special Effects (Look Ma, see what I can do!)**

- Hedges – Many plants can be successfully pruned into a hedge. They should be wider at the bottom than at the top in order to prevent ‘shading out’ of the lower part of the hedge. Although hedge shears are typically used and are appropriate for where one wishes to bring the hard lines of neighboring architecture out into the garden, hand pruners have several advantages, both to the plants and to the gardener.

- The process is nearly as quick and the clean-up is faster, since the gardener is discarding the cutting into a barrel as he or she proceeds.
- The hedge is much looser, and is able to bend rather than break under snow loads.
- A loose pruned hedge allows more sunlight to penetrate into the hedge. As a result, it has more foliage, creating more carbohydrates and a healthier plant.
- Hedge shears cut foliage as well as stems. The cut leaf edges turn brown, creating an unattractive brown cast to the hedge.
- The appearance is often easier to blend into garden designs than the architectural forms created by shearing.
- For deciduous hedges, such as those created by Cornelian Cherry Dogwood (*Cornus mas*), I have found it far quicker to prune the plant in winter than in summer. Being able to see the cuts from previous years and the location of the flower buds makes the job far easier. For example, a hedge that took 4 people three hours to prune in July took one person 1 ¼ hour during the winter!
- Fruit tree production – By thinning the head of the tree and removing upright shoots in favor of horizontal branches, more fruiting spurs are created and more fruit is exposed to sunshine, which improves ripening and eases harvesting.
- Espalier – Plants trained to two dimensions. They can be formal, informal, attached to a wall, or a freestanding. Espaliers can serve as a wall decoration, a freestanding barrier or to create small space fruit production. It is a fun and surprisingly easy technique that is not adequately employed in modern gardens. I have seen Winterberry Holly (*Ilex verticillata*), Chinese Dogwood (*Cornus kousa*), various Magnolia species, including Southern Magnolia (*Magnolia grandiflora*) and Saucer Magnolia (*Magnolia x soulangiana*) and Cornelian Cherry Dogwood (*Cornus mas*) all good candidates for espaliering.
  - The technique was developed in the 16th century, out of the practical need for growing fruit in more marginal climates of northern France and southern England. The early French and English discovered that if they bent apple-tree branches horizontally, they could direct energy away from vigorous vertical growth and into producing spurs (stubby lateral branches that flower and produce fruit).
  - For fruit trees, generally the first year's growth is foliage, second year's growth produces flower buds and the third-year fruit production begins.
  - Fruit tree espaliers can have the new growth cut back to approximately ½" above the previous year's growth in late June or July if time permits. This allows light to both reach and enhance the ripening of the fruit.
- Topiary – Pruning plants into a geometric shape, form of an animal, or some other shape not typical of the plant in nature. This dates back to Roman times.
- Bonsai – A Chinese art form that was developed further by the Japanese. The concept is to dwarf the plant in containers through root, canopy pruning and training of branches with wire. As odd as it sounds, this often allows the plants to live for centuries at a fraction of their mature size.
- Pollarding – can take several forms, but it is the cutting back of new growth or branches to the trunk. It can create tall hedges or dense overhead canopies, or odd-looking trees with little canopy.
- Pleaching – the interlacing of tree branches, typically in a two-dimensional form, creating a very narrow hedge-like appearance. The term is also applied to trees that are limbed-up and the canopy sheared into what appears like a floating hedge or a hedge on stilts!

- Brambles – Raspberry and Black Raspberries are divided into two types: summer bearing (Floricanes) and everbearing (Primocane). Primocane plants fruit on current season's wood while Floricanes bloom and fruit on the previous season's growth. Floricanes should have the current year's wood pruned to the ground after fruit production (late July to mid August), while those that are Primocane should be cut to the ground in the spring to produce heavier crops at the cane tips later that season.

### Flowering Shrubs for Which Annual Pruning is Suggested

(May be Cut Back Severely)

<i>Buddleia</i>	<i>Genista tinctoria</i>	<i>Lespedeza</i>
<i>Callicarpa</i>	<i>Hydrangea arborescens</i>	<i>Rosa</i> (Shrub, Hybrid Tea)
<i>Caryopteris</i>	<i>Hydrangea bretschneideri</i>	<i>Salix</i> (red stemmed forms)
<i>Ceanothus</i>	<i>Hydrangea paniculata</i>	<i>Sorbaria</i>
<i>Cornus</i> (red stemmed forms)	<i>Hydrangea radiata</i>	<i>Spiraea</i>
<i>Elsholtzia</i>	<i>Hypericum patulum</i>	<i>Tamarix</i>
	<i>Lavendula</i>	<i>Vitex</i>

### Prune by Thinning Old Wood Every 2 or 6 Years

<i>Deutzia</i>	<i>Kolkwitzia</i>	<i>Symphoricarpos</i>
<i>Exochorda</i>	<i>Philadelphus</i>	<i>Weigela</i>
<i>Forsythia</i>	<i>Stephanandra</i>	
<i>Hydrangea macrophylla</i>	<i>Syringa</i>	

### Seldom Need Pruning, Perhaps Corrective Thinning

<i>Acanthopanax</i>	<i>Cytissus</i>	<i>Lindera benzoin</i>
<i>Aesculus parviflora</i>	<i>Diervilla</i>	<i>Lonicera</i>
<i>Amelanchier</i>	<i>Edgeworthia</i>	<i>Lycium</i>
<i>Amorpha</i>	<i>Elaeagnus</i>	<i>Myrica</i>
<i>Aronia</i>	<i>Euonymus</i>	<i>Potentilla fruticosa</i>
<i>Berberis</i>	<i>Forsythia suspensa</i>	<i>Rhus</i> species
<i>Chaenomeles</i>	<i>Hamamelis</i>	<i>Ribes</i>
<i>Clethra</i>	<i>Hypericum</i>	<i>Robinia</i>
<i>Corylus</i>	<i>Ilex</i> (deciduous)	<i>Rosa</i> , species
<i>Cotoneaster</i>	<i>Itea virginica</i>	<i>Viburnum</i>
	<i>Ligustrum</i>	