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CHAPTER 15

Landscape Design

Edited and revised by Ralph Winslow, University of New Hampshire Cooperative Extension

Landscape design can be defined as the art of organizing and enriching outdoor space through the arrangement of plants, structures, and land form in agreeable and useful relationship with the natural environment and the desired use.

Designing a landscape is an art and a science. Landscaping means creating a plan to make the best use of the space available in the most attractive way. It means shaping the land to make the most of the site's natural features and advantages. It means building such necessary structures as fences, walls, and patios. Finally, it means selecting and growing the plants that best fit the design.

The smaller the house, grounds, and budget, the greater the need for correct and complete planning, because every square foot of space and every dollar must produce maximum results. Plan for the best use of the site and minimum upkeep as well as pleasant appearance.

Program Development and Analysis of Site and Family Needs

The first step in landscape design is to develop a specific program based upon:

- The people who will use it, their cultural needs, individual desires, and economic abilities
- The climate
- The site, its immediate surroundings, topographic and ecological conditions, and all objects, natural and man-made now existing on the site or planned for the future
- The available materials and methods of fabrication

The next step in landscape design is to conduct a site inventory and to develop a site analysis. Analyze the site in terms of what features to keep, what features to accentuate and what features to remove. Next, bring to mind what cultural, physical and emotional needs to address. Specifically analyze how the existing landscape fits in with these needs and what manipulations will be needed to develop the ultimate landscape.

Factors Influencing Landscape Design

The Lot and Its Characteristics

In laying out a design, consider preserving the site's best natural resources, such as mature trees, brooks, ponds, rock outcroppings, good soil, turf, and interesting variations in the terrain. These natural elements affect the ease of construction and landscape possibilities. A careful survey of the area should be made to determine whether site conditions will be a deterrent or can be incorporated into a design plan. Examples of problems are thin, overcrowded trees which should be removed. There might be micro environmental problems on a site that requires special consideration, such as low places with poor air drainage or a spot with poor soil and water drainage.

Changes in elevation can add interest and variety to the home landscape. The character of the land, its hills, slope, and trees should help determine the basic landscape pattern. A hilly wooded lot lends itself to an informal or natural design, with large areas left in their natural state. In such a setting, it may be particularly appropriate to retain large trees.

Because natural slope variations are usually an asset, excess grading of terraces or retaining walls should be avoided. If these features are necessary to facilitate construction or control water drainage, they should be designed to enhance the natural terrain.

Neighborhood Sights and Sounds

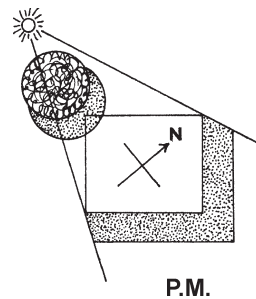
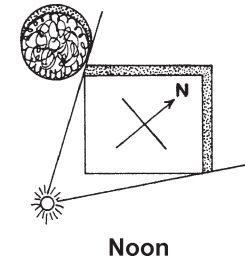
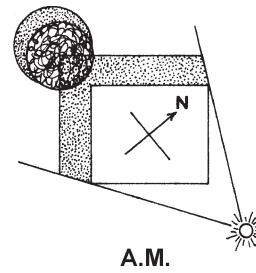
It is important to keep in mind throughout the design process the elements of the surrounding environment. These elements include both visual and audio stimuli. A basic rule to remember is: keep good elements as visual and audio “assets” and screen out the undesirable elements. Don’t let your design get too complex though--often a shrub or two will provide all the screening that is necessary.

Climate

Climate includes light, all forms of precipitation, wind, and temperature. All these affect the way a house should be placed on a lot, how the land is used and what is planted. In planning the grounds, don’t fight the climate; capitalize on its advantages. For example, orienting the long axis of the house to face between due south and S 17°W will maximize solar gain and enhance winter warming and summer cooling. In warm regions, enlarge the outdoor living area if possible. In cold regions, plant so that the winter scene is enjoyed from the inside.

Evergreens and hedges are picturesque when covered with snow. Since people respond differently to sun and shade, it is important to study the amount and location of each on the lot. Sun and shade patterns change with the seasons and vary each minute of the day. The sun is highest and shadows are shortest in the summer.

Northern exposures receive the least light, and therefore are the coolest. The east and west receive more light; western exposures are warmer than eastern because they receive afternoon light. The southern orientation receives the most light and tends to be the warmest.



Plan future shade from tree plantings with great care in order to keep sunny areas for garden, summer shade for house and terrace. Deciduous trees (those that shed their leaves) shade the house in summer and admit the sun in winter. Place trees off the corners (rather than the sides) of the house where they will accent the house but not block views and air circulation from windows. Remember that over-planting trees tends to shut out sun and air.

Family Activities

Use of the land is an important factor in landscape design. Analyze the activities of the family. For example, small children need open lawn for playing, gardeners need space for growing vegetables and flowers. Make allowances for future changes. Consider outdoor living, recreation, gardening, and household servicing.

Cost-Effective Maintenance

Decide on maintenance standards. For the person who enjoys spending many hours about the yard, landscape design may be elaborate. However, in general, the simpler the site, the less there is to maintain. A low-maintenance plan is the goal of most homeowners. This may be achieved, to a large extent, in the planning stage, by careful attention to the nature of the site. Existing trees, elevations, and the use to be made of the area should be prime considerations. Low maintenance may be achieved by adopting one or more of the following possibilities:

- Minimize lawn area. Consider using dwarf turfgrass varieties.
- Use ground covers and low maintenance perennials with natural pine, straw, barkchips, or other mulches.
- Use paving in heavily traveled areas.
- Provide mowing strips of brick or concrete to edge shrub and flower beds.
- Use fences, walls or informal hedges instead of clipped formal hedges for screening.
- Use raised flower beds and planters for easy access and lower maintenance.
- Install an underground irrigation system in areas of low rainfall.
- Keep flower beds small. Use flowering trees and shrubs for color.
- Be selective in the choice of plant materials. Some plants require much less care than others.
- Use native plant materials, as appropriate.
- Keep the design simple.
- Use mulches for weed control when possible.
- Group high water use plants in one area of the landscape to conserve time and water when irrigating.
- Use dwarf, compact and insect and disease resistant varieties.

Definition of Areas and Design Considerations

Areas of the landscape are defined in terms of desired use: the public area, the private area, and the service and work area. The public area is the section that passersby view. The living or private area is for the family and may contain a patio, deck or porch for outdoor sitting, entertaining or dining. The service and work area should provide a place for special interests such as a garden shed or tool storage area. Well defined and adequate separation between these use areas is usually desirable to avoid conflicts, especially in terms of pedestrian and vehicular circulation.

When defining the areas of the landscape, think in terms of a series of “outside rooms”, each with a floor, walls and a ceiling. This will help you to define the areas as well as help you to establish what plant material to use and where to place it.

Private or Outdoor Living Area

The private living area or outdoor living room has become an important part of the American home. No yard is too small to have a private sitting area where family and guests can gather. Where possible, there should be easy access from the house to the outdoor area. The ideal arrangement is to have the living room open onto a porch or terrace, and/or have the kitchen near the outdoor dining area. The outdoor living room can be simple. An open, grassy area enclosed by a wall or shrubs enables the homeowner and guests to sit outdoors in private. A more elaborate outdoor living room can be developed by introducing a series of gardens or garden structures such as paving material, benches and planters.

The outdoor private area can serve the following functions:

- Outdoor entertaining
- Family relaxation
- Recreation
- Outdoor eating
- Aesthetic enjoyment

The following are guidelines to consider when planning major private areas:

Privacy: The area should be enclosed from public view or nearby neighbors. Properly grouped shrub borders and trees will do this. For a small area, use a fence to save space. The private area should be screened from work areas, such as clothes lines, wood piles, garden sheds, and other less pleasant views.

Livable touch: Furniture should be attractive, designed for outdoor use, and appropriate for the size of the landscaping. Garden accessories should be kept to a minimum and be simple and unobtrusive.

Year-round interest: If the area is visible from the house or if the area is frequented in the winter, the outdoor living area should be planned so the selection of plant material is varied and so there is interest throughout the year. For winter interest, select shrubs and trees with interesting form and texture, colorful bark, evergreen foliage, or colorful fruit. The rest of the year use flowers, shrubs, and trees to create interest. Landscape embellishments such as pools, statuary, stone steps, paving, walls, bird-feeding stands, and other architectural features will add interest to the garden. Architectural details do not change with the seasons, and they give interest and meaning to the garden throughout the year.

Climate control: Control of weather in the outdoor living area helps to extend the period of usefulness. Shade trees screen the area from the hot sun. Windbreaks cut down some of the wind in the fall. An awning or lattice roof can protect against inclement weather. A garden pool or fountain can convey the effect of coolness during the hot summer season.

The terrace or sitting area: The center of activity for a living area is often a space arranged with garden or patio furniture. It may be a porch, deck, or terrace next to the house, or the special section of the living area. This latter area might be under the shade of a large tree or in a shady corner. The sitting center may be either paved or in turf. Flagstone, brick, concrete blocks, or concrete with redwood dividers are materials commonly used for surfacing the outdoor terrace. The size of the paved terrace depends upon its expected use and the type and amount of furniture desired. An area 10 feet by 10 feet will hold four chairs and is about the minimum size

for accommodating four people comfortably. Increase the size if space is desired for a picnic table. This area may also include a grill or outdoor cooking area.

The play area: To accommodate the special interests of small children, a play area can be a part of the outdoor living area. For very young children, a small area enclosed by a fence near the kitchen or living area may be desirable. A swing, sand box, or other equipment can be placed here. In yards with a good deal of open lawn space, there is room for croquet, badminton, or a portable wading pool. A large tree in the back yard may be ideal for a tree house. A paved driveway or parking area makes an ideal area for badminton, basketball, or shuffleboard for older children, as well as tricycling or roller skating for younger ones. Since ages of children in a family are always changing, it is necessary to make design adjustments to meet changing recreational needs.

Enclosed Front Yard as a Private Area: The area in front of the majority of homes has traditionally been left more or less open so the passing public can view the home. Plantings, such as hedges or a screen planting of trees and shrubs along the street in order to make the public area private, have been used to provide privacy for the front area. Privacy in the front yard may be desirable when a picture window faces the street or when the front yard is used for outdoor sitting. Where space is limited, a tall attractive fence may provide privacy and be used as an attractive background for shrubs and smaller plants.

Service and Work Area

When designating the service area, consider proximity to out-buildings, such as a garage. Space often needs to be provided for permanent clothes lines, garbage cans, trash burners, air-conditioner units, tool storage, wood storage, vegetable garden, compost, cutting garden, cold frame, small greenhouse, or kennel. Service facilities should not be visible from the outdoor living area or from the street. However, an exception might be an attractive greenhouse or tool storage building designed and constructed so that it blends well into the overall setting, with an interesting composition of plant material around it. Wood or wire fences, brick or masonry walls, or plant material alone or in combination are the materials most commonly used to hide or screen service areas.

Public Area

This is the area, generally in the front facing the street, that the public sees. The landscape in this area should create the illusion of spaciousness. Keep the lawn open, keep shrubs to the side and in foundation plantings. When selecting shrubs to frame the front door, consider their texture, color, size, and shape so they will enhance the total effect of welcoming guests. Tall trees in the backyard and medium-sized ones on the sides and in front will help accomplish this effect. The house is to be the focal point of the view.

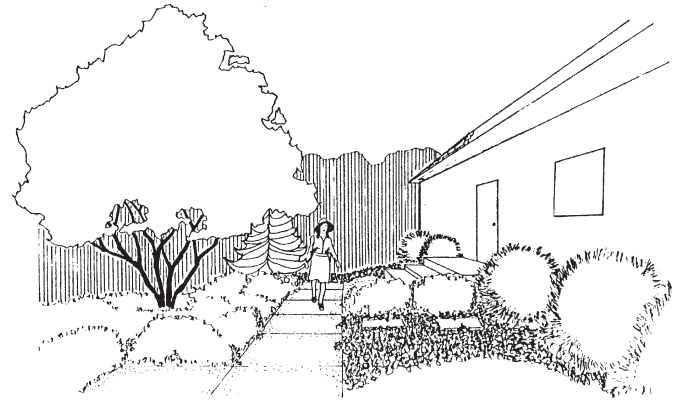
Driveways should be pleasing in appearance, useful, and safe. The landscaping of many homes is spoiled by poorly designed and maintained driveways. Some driveways tend to cut up the yard unnecessarily. Parking areas and turnabouts should be provided when practical. If possible, the driveway should be hard-surfaced because it is neater and requires less maintenance than unpaved driveways. Do not plant tall shrubbery at a driveway entrance or allow vegetation to grow so tall that it obstructs the view of the abutting road in either direction.

In planning the home grounds, give careful consideration to foot traffic patterns so there will be easy access from one area to another. This traffic may be served by walkways, terraces, or open stretches of lawn. In areas of heavy use, paved surfacing material is best.

Design of the walk system to the primarily-used door will often depend on the location of the door and guest parking as well as the topography of the land. If guest parking is at the edge of the street, a straight walk is probably best if the grade is suitable. When the guest parking area is planned for the property, the walk might more logically lead from the guest parking area to the front door. Foot traffic can use the driveway.

Sometimes the topography of the land will make it desirable to have the entrance walk start at the edge of the property and curve to the front door to take advantage of a gradual grade. However, avoid curved walks that have no apparent reason for curving.

For a residence, make the primary walk at least 4 feet wide. Build walks so they are safe. Avoid using materials that are rough or raised, since it is possible to trip over or catch one's heel on such materials. Design steps so they will be safe, especially in wet or icy weather. Make the treads wider and the risers shorter than the treads and risers used indoors. Install handrails where needed.



Elements of Design

There are no hard and fast rules for landscaping since each design is a unique creation. However, the following list of design elements are good basic guides and should be incorporated as part of the final plan. Landscaping, as in other art forms, is based on certain elements of design, which are discussed here.

Scale

Scale refers to the proportion between two sets of dimensions. Knowing the eventual or mature size of a plant is critical when locating it near a building. Plants that grow too large will overwhelm and may potentially be destructive to a building. Small plantings around a large building can be similarly inappropriate. It is essential, therefore, to know the final size of a particular plant before using it in a landscape. Both the mature height and spread of a plant should be considered.

Balance

Balance in landscaping refers to an aesthetically pleasing integration of elements. It is a sense of one part being of equal visual weight or mass to another. There are two types of balance -- symmetrical and asymmetrical. Symmetrical balance is a formal balance. It has an axis with everything on one side duplicated or mirrored on the other side. Asymmetrical balance is balance which is achieved by using different objects to achieve equilibrium. For example, if there is a very large object on one side of a seesaw, it can be counterbalanced by using many objects of a smaller size on the other side of the seesaw or one object of equal size. In each instance, balance is achieved. This applies to landscaping when there is a large existing tree or shrub. To achieve visual equilibrium, a grouping or cluster of smaller plants is used to counterbalance the large existing plant. Balance may also be achieved through the use of color and texture.



Symmetrical Balance



Asymmetrical Balance

Unity

A garden with too many ideas expressed in a limited area lacks unity. Too many showy plants or too many accessories on the lawn would claim more attention than the house itself. Using too many accent plants or plants with contrasting textures, form, or color violates the principles of unity. In order to achieve unity, it is necessary to group or arrange different parts of the design to appear as a single unit. The design should be pleasantly viewed from every angle. Repetition of landscape elements, described below, can enhance unity.

Rhythm

Rhythm is a repetition of elements which directs the eye through the design. Rhythm results only when the elements appear in regular measures and in a definite direction. Rhythm can be expressed in color as well as form.

Simplicity

Every square foot of landscape does not have to have something in it. Such objects as bird baths and plastic yellow daisies are often overused in the landscape. There is a design concept expressed as "less is more." This statement is especially true regarding landscape design. Keep the landscape simple and it will look its best. Avoid cluttering the yard with unnecessary objects. This includes plant material, statuary, and miscellaneous objects. When too many extras are introduced the yard takes on a messy appearance. Use statuary or specimen plants with discretion. The simplest landscapes are often the most attractive. Remember -- create spaces, don't fill them up.

Accent

Accent, also referred to as dominance, focalization, or climax, is important in the total picture. Without accent, a design may be dull, static, or uninteresting. Various parts, if skillfully organized, will lead the eye towards the focal point. This may be a garden accessory, plant specimen, plant composition, or water in some form. Emphasis may also be obtained through use of contrasting texture, color, or form, or by highlighting portions of a plant composition with garden lights.



Accent



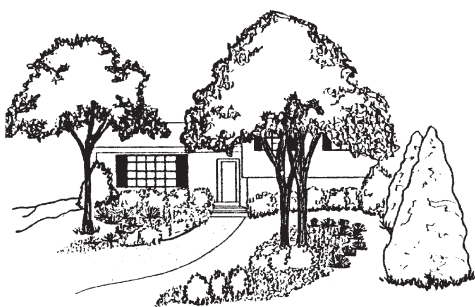
Repetition

Repetition

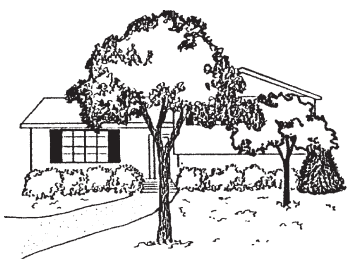
Do not confuse repetition in the landscape with monotony. A row of sheared hedges lined up in front and down the side of a home is not repetition; it is monotony. Repetition is something more subtle. For example, the use of curves in the landscape design. Curves may begin in bed lines in the front yard, continue in the side yard, and be picked up once more in the backyard. Alternatively, the repeated use of right angles on a grid design can successfully be used to achieve unity in the landscape. The right angles may begin in the front yard, perhaps on the sidewalk, then be used in the bed lines which go around the property, and be picked up again in the backyard. By subtly repeating such design elements as bed lines in the yard, one can achieve a continuity or flow to the entire landscape.

Harmony

Harmony is achieved through a pleasing arrangement of parts.



Harmony

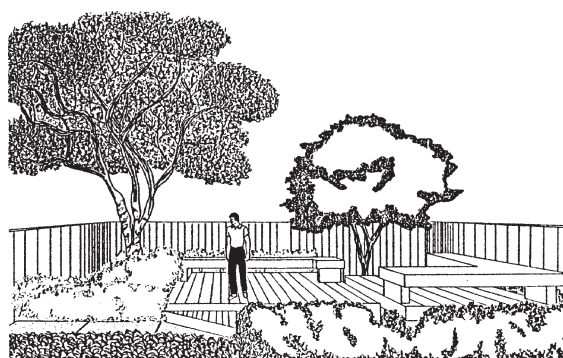


Lack of Harmony

Space Dividers, Accents, and Transitions

An easy method of combining plant and architectural characteristics is the consideration of space dividers, accents, and transitions. These three elements are present in all successful landscape compositions.

Space dividers define or give privacy to spaces, create the background for outdoor living activities, and create dominance. Dividers can be made up of fences, walls, plants as hedges, or plants as borders. Space dividers must have height, must be arranged in groups that border spaces (open lawn or patio area), and must contain the most visually uniform characteristics in the composition.



Space Dividers

Transitions form the connecting link between the space dividers and accents, or between the house and the land. To harmonize these elements, the transitions must be composed of characteristics that are found in both the space dividers and accents.

Accents, which should be in the minority of the composition, create interest by contrasting characteristics with the space dividers. Like sculpture, they may be displayed in two ways: 1) hidden in niches within the space dividers, or 2) standing free within the room created by the space dividers. In any design, only one of the two methods should be employed or visual confusion may result.

Dominance and Contrast

In any composition, a majority of dominant or repeated characteristics are accented by a minority of contrasting characteristics.

For a garden in which a viewer spends little time, the magnitude of contrast between the dominant characteristics and accents is very strong. Gardens of this type include entrance courts, street side

foundation plantings, entrances to public buildings, or plantings seen from the highway. The magnitude of contrast refers to the degree of change between visual characteristics such as plant type, height, form, color, and texture. Generally, the ratio of dominant characteristics to contrasting features should be about 8:2 or 9:1. Also, the accents must be concentrated in one area. Gardens of this type take on a bold, architectural effect, as in many of the contemporary California gardens. The effect can be grasped and understood at a glance.

- The contrast between the space dividers and the accents is created by:
- Tree types: evergreen and deciduous.
 - Form: the evergreens are pyramidal as contrasted with the rounded viburnum.
 - Height: the evergreens grow to at least 40 feet as contrasted with viburnums, growing to about 15 feet.

Drawing a Landscape Plan

The following section provides the information necessary to draw a landscape plan that embodies the elements of good design. These steps are for those who want the fun and satisfaction of preparing their own landscape plan. They are:

1. Preparing the map.
2. Deciding how the ground area is to be used.
3. Placing use areas on the map.
4. Developing the landscape plan.
5. Preparing a planting plan.

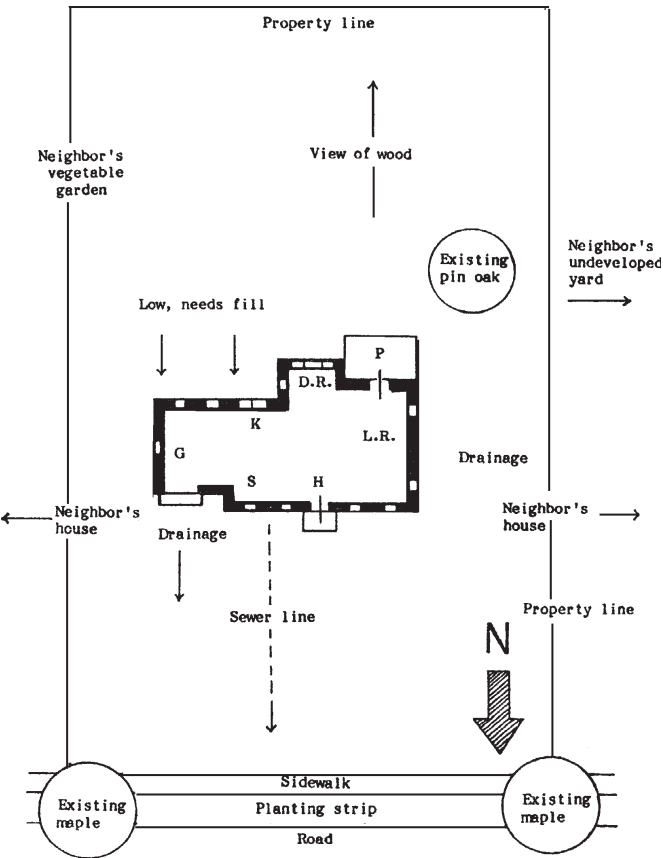
Completing these steps will enable you to develop a final plan that can be implemented over several years as time and money permit.

Step 1 - Preparing Baseline Map.

Prepare a scale map of the home grounds and take the site inventory. Use graph paper and let one square equal so many feet, or draw to scale using a ruler or an engineer's scale.

Suggested Scale	Small Lot	Large Lot
Engineering	1 inch equals 10 feet	1 inch equals 20 feet
Architectural	1 inch equals 8 feet	1 inch equals 16 feet

- The map should include the following:
- Property lines
 - Undesirable features of home grounds or adjoining property
 - North arrow
 - Views - point arrows in direction of each good view
 - House, garage, other buildings
 - Doors, windows, porches, and location of rooms
 - Existing trees, rock outcroppings
 - Walks and driveways, if already constructed
 - Contour of the land (use an arrow to show direction of surface water flow)
 - Scale used
 - Location of septic tank or sewer lines
 - Location of utility lines



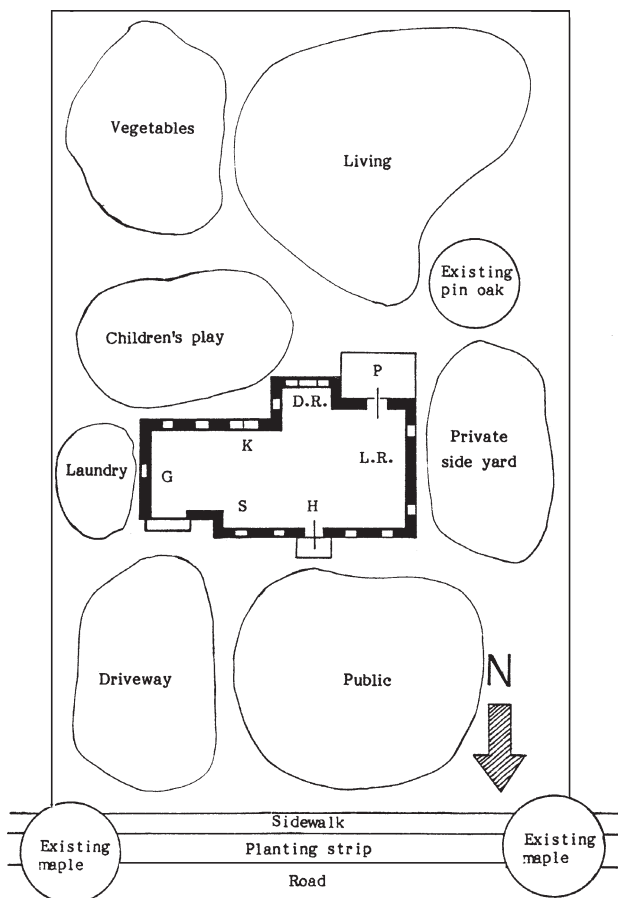
Step 2 - Deciding the Ground Area.

- Items listed below are most often included in the final development. Make a list that suits your individual needs.
- front lawn area or public area
 - laundry area
 - vegetable garden
 - cooking and eating area

- garden pools
- walks
- flower beds
- outdoor living or private area
- children's play area
- small fruit
- driveway
- guest parking
- turnabouts
- garage
- other items particular to your land area

Step 3 - Placing Use Areas on the Map.

Place the use areas on the map. Fit them together with two considerations, traffic flow and use. How will people move from one area to another or from the house to an outside area be functional in relation to the house? Will it make use of existing features such as views or changes in the terrain? Try different combinations in relation to rooms of the house, surrounding areas, and potential views.



Step 4 - Develop the Landscape Plan.

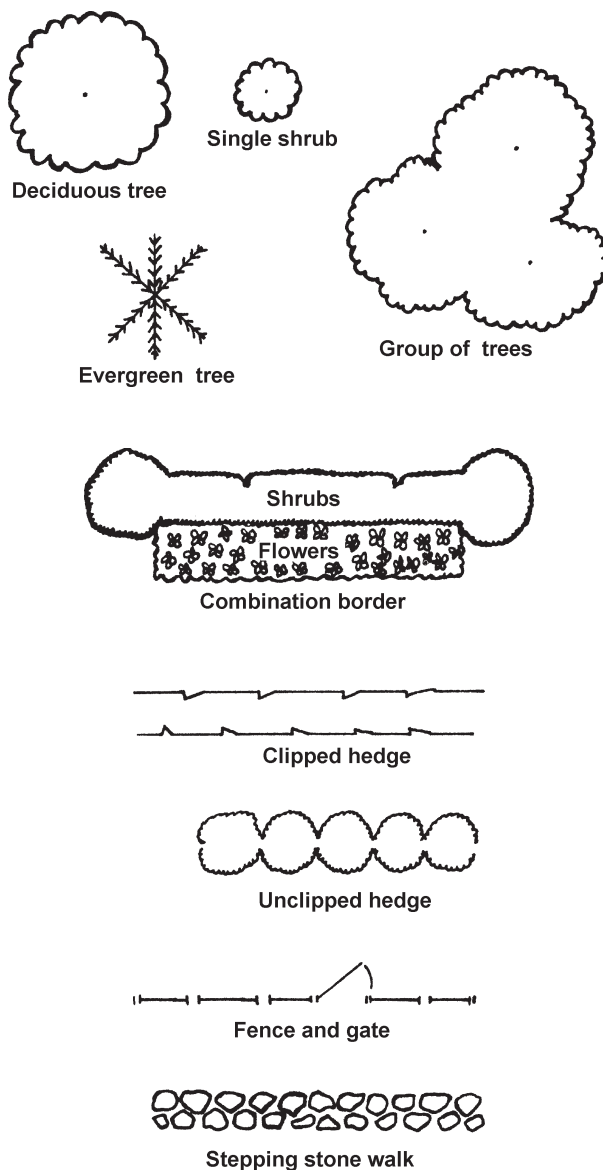
Design driveways, parking areas, and walks.

Indicate where landscape elements are needed for (1) separating areas, (2) screening undesirable views, and (3) providing shade, windbreaks, beauty.

Do not attempt at this point to name the trees and shrubs, but think in terms of plant masses that will serve a purpose and help tie the various areas together into a unified plan considering design elements previously discussed.

In preparing the plan, use landscape symbols to indicate trees and shrub masses.

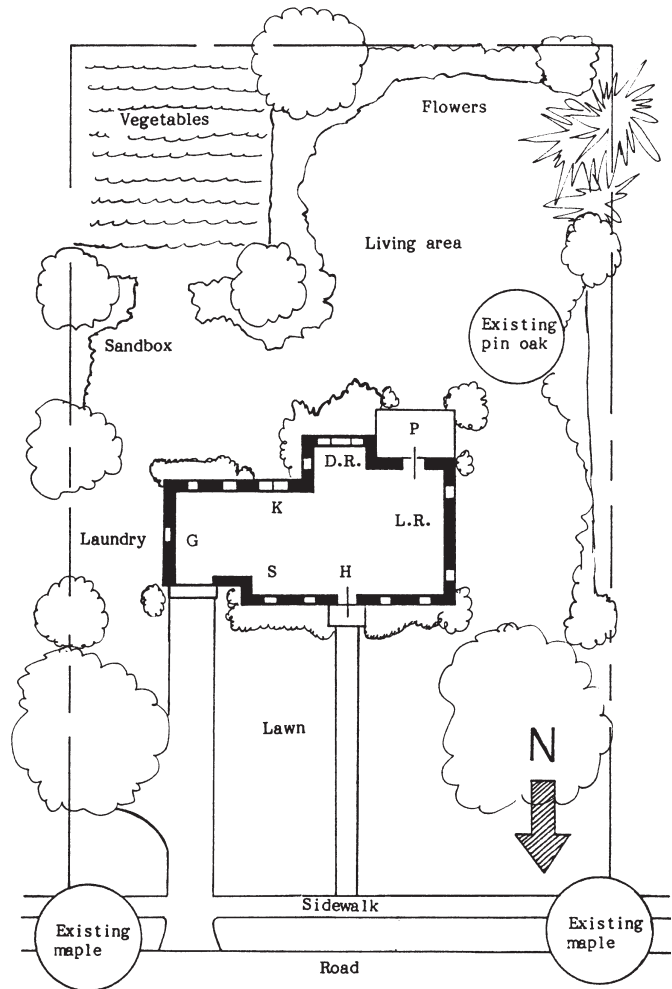
Landscape Symbols



Draw symbols to scale to represent the actual amount of space that will be involved. For example, a white pine tree at maturity will have a spread of approximately 20 feet. Make the scale diameter of the symbol in this case 20 feet.

Indicate on the map where paving, plants, and structures will be. In developing the plan, see that the proposed scheme is practical and that the following questions are addressed:

- a. Is the driveway design pleasing, useful, and safe?
Have the following been provided for: safe entrance? turnabout? guest parking?
Will guests use the front door?
Is the coal bin or oil tank handy to the driveway but screened from public view?
Will the proposed drive be too steep?
- b. Are the walks convenient? Are they of a suitable width and constructed with appropriate paving material?
- c. Will the view be attractive from the living room?
the picture window?
the porch?
the dining room?
- d. Has an outdoor living area been provided, and is it adequately screened from neighbors?
the service area?
the buildings?
- e. Is the clothesline close to the laundry?
- f. Do all the parts fit together into a unified plan?
- g. Have a good setting, background, and privacy been provided?
- h. Are the house and major plants set back in case the highway department/local government widens the street?
- i. Will the proposed location of the septic tank and drainage fields interfere with planting needed shade trees?



Step 5 - General and Specific Planting Plan.

First, for each tree or shrub mass on the plan, make a set of specifications. These specifications should include:

Height - low, medium, tall

Form - spreading, upright, arching, globe

Purpose - shade, background, hedge, screen, accent, mass

Seasonal Interest - fruit, flowers, foliage

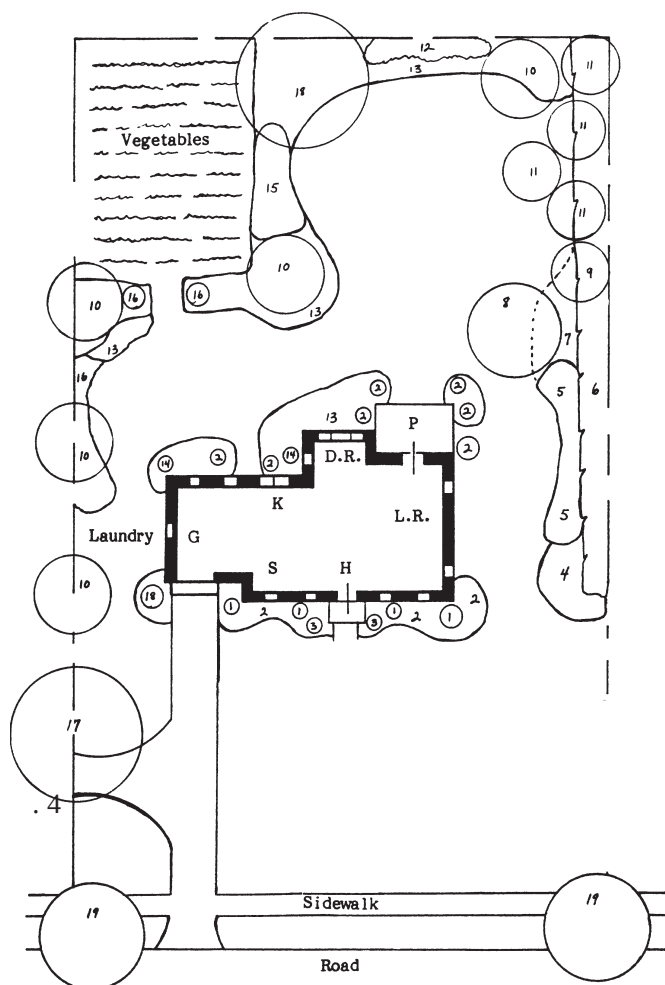
Type - evergreen, broadleaf evergreen, deciduous

Maintenance - subject to insects or plant diseases

Cultural Needs - shade, sunlight, moisture requirements

Then, select a plant or group of plants to meet the specifications. Consult garden books and nursery catalogs. Visit a local ornamental or botanical garden or nursery. Become familiar with plant material and discuss your plant with nursery staff.

Designate specific plantings on the map developed in Step 4.



Planting Plan

Planting Key

- | | |
|----------------|-------------------------|
| 1. Yew | 11. White pine |
| 2. Holly | 12. Spirea |
| 3. Daphne | 13. Perennial border |
| 4. Barberry | 14. Weigelia |
| 5. Azaleas | 15. Flowering Quince |
| 6. Hemlock | 16. Potentilla |
| 7. English Ivy | 17. Flowering Crabapple |
| 8. Pin Oak | 18. Lilac |
| 9. Hydrangea | 19. Existing Maple |
| 10. Viburnum | |

Selecting Plant Materials

Well-chosen plantings are usually essential to achieving a desired landscape effect. There are hundreds of varieties of trees, shrubs, vines, groundcovers, perennials and annuals from which to choose. Remember, plants are not merely ornamental accessories. They have mass, define space in, and, consequently, contribute to the overall the garden design. When selecting plants, consider both their cultural needs and aesthetic value.

Cultural Characteristics

Hardiness: This is the plant's ability to withstand winter and summer climatic changes, which will determine its longevity or permanence. In New Hampshire we are usually more concerned with a plant's ability to survive our long, cold winters, than with its ability to survive summer heat. Plant hardiness zone ratings are based on an area's mean minimum winter temperature. A hardiness zone map for New Hampshire has been included at the end of this chapter.

Soil, moisture and drainage: These are important parts of a plant's environment. Some plants respond unfavorably when a change occurs in this environment; some plants can tolerate extremely dry or wet conditions while others cannot.

Degree of sun or shade: This depends on where the plant is to be located in the garden. Some plants require shade, while others require full sun for best growth.

Maintenance: When selecting plant materials, consider the level of maintenance that may be required. Choose trees and shrubs that are generally low maintenance and tend to be disease and insect resistant. Usually a fast growing plant has a short life span and will consequently need replacing after a few years.

Pollution and salt resistance. Depending on the growing environment, tolerance of pollution, either atmospheric or soil or of salt, especially for street, may be an important consideration.

Ornamental Characteristics

Plant Size: The size which a plant attains at maturity must be considered when selections are made for the landscape plan. A common mistake is selecting plants which soon become too large for their location. The drastic pruning which then becomes necessary adds to the cost of maintenance and may reduce the grace and beauty of the specimen. Overgrown plants which are left unpruned will alter the balance and accent of the design, and may partially hide the house which they are supposed to complement. The use of newer, more compact cultivars may prevent this problem, as well as contributing to lower maintenance.

The landscape picture is constantly changing because the plants which give it form and substance are continually growing. This fact presents a challenge to the landscape designer which is not found in most other artistic media.

Plant Form: Trees and shrubs used in landscaping develop many distinct forms. Some common forms include:

- prostrate or spreading
- round or oval
- vase
- pyramidal
- columnar

The form of mature shrubs and trees is usually more open and spreading than that of young plants. For example, the head of a young oak tree may be pyramidal in shape; during middle age the head is an irregular oval; and during old age a large, massive oak may have a spreading vase form.

Ground covers, such as turf, low-spreading shrubs, creeping plants, and prostrate vines are important materials in landscaping. The principal use of turf is for the lawn area. Other ground cover plants are commonly used on banks which are too rough or steep to mow or under trees where grass grows poorly.

Shrubs are woody plants which grow to a height of 12 to 15 feet. They may have one or several stems with foliage extending nearly to the ground. The following examples represent some of the more common forms of shrubs:

- Low spreading: junipers
- Round or Upright: many types of deciduous shrubs
- Vase: Vanhoutte spirea
- Pyramidal: arborvitae
- Columnar: junipers

Trees are woody plants which typically grow more than 15 feet tall and commonly have only one main stem or trunk, although there are many multi-stem types. The crown or leafy portion of the tree develops a typical form such as;
Round or Oval: most common trees such as maple, oak and pine

- Vase: elm
- Pendulous or Weeping: willow, cherry
- Pyramidal: spruce, fir and hemlock
- Columnar: Lombardy poplar

Trees are long-lived and relatively inexpensive, given their initial cost and maintenance when compared with lawns or flower beds. In the past many builders have committed costly errors by destroying trees when establishing new residential subdivisions. Most real estate developers now appreciate the value of trees and attempt to save them when land is graded prior to construction. Regardless of our affection for trees, we must recognize they do not live forever. Decrepit, hazardous, or improperly located trees should usually be removed and replaced with new, more suitable species.

Plant Texture: The texture of plant materials is dependent on the size, branch structure and disposition of the foliage. Plants with large leaves which are widely spaced have coarse texture. A plant with small, closely spaced leaves has fine texture. Extremes in texture which prevent harmony in the composition should be avoided. On the other hand, some variation in texture is needed to give variety. Texture can be influenced on a seasonal basis, depending on whether the plant is deciduous or evergreen.

Plant Color: Although green is the basic color of most plant materials in the landscape picture. Visual variety may be enhanced by using plants with lighter or darker foliage. Also, fall foliage color may be introduced by the selection of flowering shrubs which may also produce colorful fruit. Care should be exercised in the use of particularly showy plants such as hydrangea and blue spruce. Such plants may so dominate the landscape as to destroy the balance and unity of the composition. Select colors which relate to the house exterior and other landscape elements, depending on their location and relationship.

Other Characteristics: Other ornamental characteristics to consider when selecting plant materials include winter habit, bark, fragrance, persistent fruit, and multi-seasonal appeal.

Deciduous Shade and Flowering Trees

Trees are the basic element for any landscape plan. They set the stage for the entire home grounds design. The type used and their location determine to a great extent what other plantings are appropriate.

Trees are the most permanent plants we grow. Many will live and enhance the landscape for 100 or more years if they are given a chance. Because of the permanency of trees and their importance in the landscape, care must be taken to select the best species for each situation. The wrong tree or one planted in the wrong spot can actually detract from the overall landscape. Five to ten years of precious tree growing time may be lost before the mistake is realized.

How to Choose Trees

No species or variety of tree is sufficiently superior to be called “best” without some qualifications. However, there are many excellent varieties. Choosing a variety with the characteristics that will provide the greatest satisfaction in a given situation requires careful consideration.

Most people make the mistake of selecting a particular tree and then trying to fit it into their landscape. A better approach is to decide where a tree is needed and what that tree should do in the landscape. After the desired type of tree has been determined, then it is appropriate to select a species to fulfill those requirements.

Avoid trees that are susceptible to storm damage, ones that are hosts to destructive insect and disease pests, and those that produce an over-abundance of objectionable seeds or fruits. The choice will generally depend on existing conditions at the planting site. These include room for top and root growth, soil type, subsurface drainage, and the kind of plants you will be able to grow under the tree.

A tree is a long-term investment. Therefore, start with a high quality plant. Trees at least 5 to 8 feet tall, either balled and burlapped or container grown, are usually the best buy. Difficult-to-transplant species may be more easily established if you start with smaller sizes. A reputable dealer can help select the tree and will guarantee it to be alive and healthy.

Most of the tree species described in the following section are commonly available in retail nurseries and garden centers. Some species have been included on the list because they are commonly available even though they may not be recommended for general landscape planting. A local nursery will probably not stock all of the species included in this list, but will generally be able to obtain a specimen for you if given enough time. If you don't have a green thumb, a nursery professional will probably plant the tree for a small additional cost.

Improved varieties are available for most of the species included in the list. The term cultivar was coined by L.H. Bailey to designate a cultivated variety. In most cases a cultivar is asexually propagated from the original selected parent material. Most of the selected cultivars are superior to the standard varieties grown from seed and are well worth the added cost needed to produce and purchase them.

Trees are often divided into three groups according to their size. Large trees generally reach a mature height of greater than 60 feet. Trees with a mature height between 30 and 60 feet make up the medium-sized group. Small trees usually grow to a height less than 30 feet. The need for small trees may often be satisfied by flowering trees.

Environmental Considerations

Whether a tree lives up to its potential for health and beauty is largely dependent upon its environment: soil, water, light, and surrounding buildings and vegetation. Purchase trees on the basis of their expected behavior under the prevailing growing conditions unless these conditions can be changed significantly.

Few trees tolerate wet or very heavy soils. Very sandy or gravelly soils can cause problems for trees as well; they tend to remain too dry. Nearly all trees, however, respond favorably to deep and fertile topsoil with good internal drainage. When the soil is inhospitable, try to identify species that will tolerate that problem or add good soil in raised beds to help ensure that trees will thrive and flower well.

Flowering and fruiting as well as growth rate and density are greatly influenced by the duration and intensity of sunlight. Most flowering trees are adapted to full sunlight and perform better away from buildings or trees which cast dense shade

during most of the day. Those preferring shade flower best where there is partial shade all day, especially in the afternoon.

Availability and Adaptability

Our range of choices among trees is largely determined by their general adaptability to the area. The climatic range over which a tree will thrive is usually reflected in the species or varieties offered in local retail nurseries and garden centers.

Flowering Trees

In the home landscape, flowering trees are secondary in importance to shade trees. The basic elements of framing, background, and shading are provided by shade trees, while flowering trees provide showy and unusual features with their floral beauty and seasonal interest. In addition, many flowering trees have colorful or interesting fruits which may be edible or attractive to birds.

Flowering trees must fit into the landscape. Only after deciding where they can be used most effectively should you try to select the variety to be used. If a certain type of flowering tree is desired, make the necessary changes to fit it into the landscape rather than simply placing it in the first open space.

Use relatively few flowering trees in the landscape. A small, residential property usually needs only two or three trees. Rows, large masses, and formal designs can be used more readily on estates or commercial properties.

When selecting among the many species and varieties of flowering trees available, consider:

- Size, form, and overall appearance of the tree.
- Intensity, duration, and color of the flowers and season of bloom.
- Cultural requirements, including pruning, fertilizing, and protection from insects and diseases.

Give consideration to those trees with other striking features. Some trees which do not have spectacular flowers compensate by providing brightly colored or persistent fruits, pods, fall leaf color, bark, or uniquely colored summer foliage.

Whether a tree is considered a flowering tree is often a matter of opinion. All trees produce flowers, but whether we value them for the blossoms depends on how colorful, spectacular, or unusual they

are. Few large trees are noted for their flowers. While their flowers may be noticeable, large trees usually are valued more for other reasons.

Fruiting characteristics and site selection should be considered together. Soft-fruited trees and those which attract birds create periods of inconvenience when they drop fruit and create litter problems on paved surfaces such as patios, walks, driveways, or game-courts. Some native flowering trees are beautiful, hardy and adaptable to landscape conditions. They should be used wherever possible.

Rare and Unusual Trees

There are many tree species that can be successfully grown in northern New England, but are rarely seen in our landscapes. Although not ordinarily recommended or readily available, these trees may be useful to carry out a specific landscape theme, to substitute for an exotic type which is not locally adapted, or may be prized for unusual form, flowers, fruits, bark, or foliage. Trees listed in this publication are reasonably reliable and most are hardy throughout the region.

Unusual forms of common tree species such as corkscrew willow, columnar or cutleaf maples, and trees with unusual foliage color are not included. Brooklyn Botanic Gardens Handbook No. 63, 1200 *Trees and Shrubs - Where to Buy Them*, is an excellent source of information on where to obtain plants that are not commonly available in nurseries and garden centers. It may be ordered from the Brooklyn Botanic Gardens, Brooklyn, New York 11225.

Problem Trees

When selecting a tree to plant in the yard, it is nice to know exactly what you are getting. Many people plant a sapling, enjoy it for a few years, and then discover some serious disadvantages when the tree reaches an effective height. The following list of trees have certain disadvantages which you should be aware of before you plant them in your yard. Most are inappropriate for street tree use.

Box Elder (*Acer negundo*).

This tree has weak wood, is short-lived, is susceptible to box elder bugs, and most types have poor forms.

Silver Maple (*Acer saccharinum*).

One of the worst trees available because of its brittle wood and tendency to become hollow and hazardous. Its shallow surface roots can ruin sidewalks and driveways and prevent turfgrass growth underneath. Also susceptible to insects. Outlawed in some localities.

Tree of Heaven (*Ailanthus altissima*).

A weed tree that sprouts up everywhere and has a disagreeable odor. It is outlawed in some cities.

Catalpa (*Catalpa* sp.).

Catalpas have messy flowers and seed pods.

Flowering Dogwood (*Cornus florida*).

Because of the increasingly common occurrence of dogwood anthracnose, use of this tree should be tempered. Substitute *Cornus kousa* or use disease resistant varieties as they become available.

Ginkgo (*Ginkgo biloba*).

Do not plant the female Ginkgo as its fruits have a very offensive odor. Use male selections only.

Black Walnut (*Juglans nigra*).

The tree roots produce a toxin that is harmful to certain other plants, including tomatoes. Avoid planting it near vegetable gardens.

Mulberry (*Morus* species).

Mulberries have messy fruit.

Sycamore (*Platanus occidentalis*).

Leaves and seeds from this tree are messy; it has brittle wood and surface roots. Anthracnose, a late spring blight which occurs most years, will attack it.

Poplars (*Populus* species).

These trees have brittle wood and surface root systems, but their main problem is their susceptibility to canker diseases which disfigure and usually kill them. Some also have messy flowers or send up suckers from their roots.

Black Cherry (*Prunus serotina*).

Has objectionable fruit, is susceptible to insects, and is susceptible to black knot fungus.

Black Locust (*Robinia pseudoacacia*).

This tree is good for fence posts and firewood, but not for landscaping. It has brittle wood, is susceptible to cankers, and over time develops into a copse of suckers.

Problem Trees continued

Willows (*Salix* species).

These trees have very brittle wood and are susceptible to canker diseases. Their roots will clog sewer and drain pipes. Some are attractive on large lots, especially near water and in wet areas.

European Mountain Ash (*Sorbus aucuparia*).

Not for hot locations, insect and disease problems can often weaken it and cause premature death.

American Elm (*Ulmus americana*).

Use only Dutch elm disease resistant varieties, as available.

Siberian Elm (*Ulmus pumila*).

Its brittle wood will result in severe damage in ice storms, and its seeds and suckering habit make it a pest. Also very short-lived. Note that the Chinese elm (*Ulmus parviflora*) is often confused with the Siberian elm, but is far superior.

In the following list of recommended trees, it is as impractical to list all the superior species and varieties as it is impossible for every nursery to stock all of them. Every retailer will have some desirable varieties not listed here. On the other hand, not all dealers will have all those listed. Several trees may not be readily available in the nursery trade or may have limited uses in the landscape.

Selected Shade and Flowering Trees

AMUR MAPLE, *Acer ginnala*

The Amur maple is a small, round-headed, extremely hardy tree. Its red fall color is as brilliant as any of the maples. The winged seeds often hang on the tree after the leaves have fallen, adding interest to the tree in winter. It is one of the best of the small trees, requiring practically no attention and able to grow in a wide range of soil types. (15 to 18 ft. height; spread may equal height)

PAPERBARK MAPLE, *Acer griseum*

This round-headed, rather open maple grows moderately fast while young. The bright, copper colored bark peels off in paper-like strips creating intense winter interest. The compound leaves resemble box elder and change to a russet-red in the fall. Paperbark maple is best used as a lawn or specimen tree where it is visible in winter. It tolerates a wide range of soils and

exposures; it may need extra water during hot summers. Best used in southern New Hampshire only. (20-30 ft. height; spread: 1/2 to equal height)

JAPANESE MAPLE, *Acer palmatum*

This large shrub or small tree is planted for its interesting foliage. There are many varieties available, but the ones with red leaves and those with finely cut foliage are the most popular. Japanese maple can be grown in coastal northern New England. A rich, well-drained soil high in organic matter is needed for best growth. Japanese maple will not grow on poorly drained or dry soils. Although some varieties grow 25 feet tall, most of the varieties commonly grown as ornamentals will not get over 10 feet tall. Most of the varieties are very slow growing. (6 to 25 foot height; 6 to 25 foot spread)

NORWAY MAPLE, *Acer platanoides*

Although the Norway maple is a native of Europe, it has been widely planted over the eastern United States. Most of the varieties of maple with unusual shape or foliage color have been derived from this species. They include such popular varieties as: 'Schwedler,' with purple leaves in early spring that change to dark green color; 'Crimson King,' with purple leaves that retain their color all summer; 'Columnare,' one of several varieties with a narrow, columnar habit of growth; 'Globosum', a low-growing, round-headed tree that can be crown under utility wires; and 'Summershade,' a rapidly growing, heat-resistant variety with an upright growth habit. Many other varieties of Norway maple have been selected and named. Because a name does not appear in the above list does not mean that it is not as good as the ones listed. Ask your nursery manager for advice on varieties not listed.

The dense shade and shallow root system make it almost impossible to grow anything under a Norway maple. Its yellow flowers in early spring are interesting, but not especially ornamental. It certainly has merit for planting in areas where you don't care whether or not you can grow anything in its shade. Norway maple's tend to aggressively out compete our native forest trees. To avoid future problems, use Norway maples with discretion (40 to 50 ft. height; spread may equal height)

RED MAPLE, *Acer rubrum*

One of the first signs of spring is the flowers of the red maple. The profusion of tiny, red flowers with the background of smooth, gray bark is a beautiful sight. Red maple is also one of the first trees to change color in the fall. Some trees develop a red fall color, but many of them do not. Several improved varieties of red maple have been developed that produce outstanding fall color such as 'Red Sunset,' 'October Glory,' and 'Autumn Flame.' There are also varieties available with a narrow crown. Red maple is easy to transplant, grows rapidly and tolerates moist soils. (40 to 60 ft. height; spread may equal height)

SUGAR MAPLE, *Acer saccharum*

The fire-red to yellow fall color of the sugar maple is one of the most beautiful sights in northern New England. The sap of this tree can be boiled down to produce maple syrup and sugar. Mature sugar maples show a wide variation in form but tend to have a broad, rounded head. Susceptibility to gas and smoke damage makes sugar maple less suitable for city conditions than Norway and red maples. Improved varieties of sugar maple include a dwarf, globe-shaped form; a very narrow, columnar form; and a cut-leaved form. (60 to 75 ft. height; spread may be 2/3 of height)

SILVER MAPLE, *Acer saccharinum*

Silver maple is a fast-growing, but relatively short-lived tree. Its brittle wood is too subject to storm damage for it to be recommended for general landscape use. The tree is also notorious for plugging sewer lines and lifting sidewalks. It should only be used where falling branches will not be a hazard and where the roots cannot interfere with sewers or sidewalks. The silvery undersides of the leaves are exposed when the wind blows; giving it some additional ornamental value. (50 to 70 ft. height; spread may be 2/3 of height)

HORSE CHESTNUT, *Aesculus hippocastanum*

The horse chestnut is a magnificent tree in the spring when its foot-long panicles of showy flowers cover the tree, resembling candles on a Christmas tree. It is definitely not a tree for the small yard. Its coarse texture and large size make it look out of place except in a very large area. The horse chestnut has earned a bad reputation in many areas. Its branches are relatively weak and subject to storm damage.

The large nuts are produced profusely. They have no economic or ornamental value and are a nuisance wherever they fall, in addition to being poisonous.

The 'Baumannii' horse chestnut, a double-flowered variety, should be planted in preference to the standard varieties because it does not produce seed. There is also a red-flowered form available that is more showy than the standard types. (50 to 75 ft. height; 40 to 70 ft. spread)

SERVICEBERRY, *Amelanchier arborea*

Upright in youth, and oval to spreading with age, this native plant has a slow to moderate growth rate, depending upon the site. Its mature height may exceed 40 feet in the best locations. Masses of small, white flowers in nodding clusters appear in early spring, followed by maroon-purple, edible berries which are quickly eaten by birds. The fall foliage is yellow, golden, or red. Used as a specimen or lawn tree, in border masses or in naturalistic groups, it prefers well-drained sites. It is occasionally damaged by an assortment of leaf eating insects. Many new cultivars exist. 'Princess Diana' and 'Prince Charles', both 25' tall are excellent.

PAPER BIRCH, *Betula papyrifera*

This native tree is a popular landscape specimen in northern New England, either as a single trunk or as a clump. The bark becomes chalky white with age, and peels in paper-like layers. It does best in well-drained, acid, cool soil. Paper birch's graceful catkins in spring, yellow foliage in fall and white bark all year give it multi season interest. (50 to 70 ft. height; 25 to 50 spread)

RIVER BIRCH, *Betula nigra*

The most interesting characteristic of the native river birch is its salmon-colored bark that peels off in paper-thin layers. The tree is noted for its ability to grow in wet soils, but it will grow in drier situations as well. The river birch has been greatly ignored in favor of the showier white birches, but it is a fine ornamental and should be planted more. It is far more resistant to insects than the white birches. 'Heritage' is a highly recommended cultivar. (40 to 70 ft. height; 40 to 60 ft. spread)

Selected Shade and Flowering Trees continued

EUROPEAN WHITE BIRCH, *Betula pendula*

The European white birch is a very graceful, but relatively short-lived tree, grown for its striking white bark. The tree is extremely susceptible to the bronze birch borer, an insect that can destroy a large specimen tree in a single season. Birch borer can be a serious problem, particularly on trees weakened by leaf miner damage. Fortunately, northern New England provides an excellent habitat, and both problems are rarely serious. (40 to 50 ft. height; spread may be 2/3 of height)

EUROPEAN HORNBEAM, *Carpinus betulus*

Hornbeam is a slow growing, pyramidal tree while young; rounded at maturity. Light gray bark covers its smoothly ridged or flattened trunk. Delicate, elm-like leaves and a dense branching habit characterize the tree. The seeds are borne in hanging clusters of leaf-like structures. Several improved cultivars of hornbeam have been developed, of which Columnaris, a narrow, pyramidal tree with dense branches, is the most popular, being useful as a screen and plant. Hornbeam is difficult to transplant, so it should be moved while small. It is a relatively pest free tree. (40-60 ft. height; 30-40 ft. spread)

CHINESE CHESTNUT, *Castanea mollissima*

Chinese chestnut is resistant to the destructive chestnut blight disease which has almost entirely destroyed the native American chestnut. Several government agencies have promoted planting this tree for both ornamental use and nut production. The flowers are produced in long, showy catkins in early summer; nuts, which are excellent for eating, are produced in large, prickly burs that are a nuisance in the lawn where they have fallen. Therefore, it should only be planted in areas where the burs will not be a problem. Tolerates hot, dry areas well. (40-60 ft. height; 40-60 ft. spread)

KATSURA TREE, *Cercidiphyllum japonicum*

This is a large, rounded-to-spreading tree often with more than one trunk. The leaves, about the same size and shape as redbud leaves but with a serrate or toothed rather than smooth leaf margin, develop scarlet to yellow fall color. Katsura trees are essentially pest free. Though somewhat difficult to transplant, they make outstanding shade trees and should be more widely planted. (40-60 ft. height; variable 20-60 ft. spread)

EASTERN REDBUD, *Cercis canadensis*

An understory tree native to areas south of New Hampshire, it is noted for early, abundant rosy pink flowers and graceful, upright habit. The large, heart-shaped leaves emerge as reddish purple and gradually change to a lustrous dark green. The foliage turns a mediocre yellow in the fall and usually drops quickly. Clusters of dark-brown pods may persist through fall and winter. The tree is used as a specimen, planted in masses, or naturalized at the edge of woods. It is generally hardy in central and southern New Hampshire and tolerant of a wide range of soils. Be sure to buy plants propagated from northern seed sources and avoid the frequently less hardy cultivars, which are available in white and true-pink. (10-20 ft. height; 15-20 ft. spread)

AMERICAN YELLOWWOOD, *Cladrastis kentukea (lutea)*

Named for the color of its heartwood, the yellowwood is a medium-sized tree with very showy, long panicles of fragrant, white pea-like flowers in late spring. Its bright green summer foliage and often good yellow-gold fall color make it a desirable shade and specimen tree. Its thin, gray bark is similar to beech, and its lack of major pest problems makes it an excellent tree for relatively small landscapes. Prefers moist soil and full sun to partial shade. (30-50 ft. height; 40-55 ft. spread)

KOUSA DOGWOOD, *Cornus kousa*

A dogwood fairly tolerant of full sun and dry, compacted soil, this tree has a rounded shape with horizontal branching, reaching about 20 feet at maturity. The Kousa dogwood flowers after it leafs out and has large, pin-wheel like, white bracts with pointed tips. In the fall, the foliage turns a variable reddish purple to scarlet. The fruit is 1/2' in diameter, reddish-pink, raspberry-like, and attractive to birds. This tree makes a beautiful small specimen in the limited parts of southern New Hampshire where it is reasonably hardy.

CORNELIAN CHERRY, *Cornus mas*

Rounded with dense, ascending branches, this shrub-like but vigorous tree eventually reaches 20 feet in height. Clusters of small, yellow flowers appear before the lustrous foliage, which turns red in fall. The fruit is medium to large, maroon-red, cherry-like, edible, and attractive to birds. White- and yellow-fruited selections are available. Use as a specimen or in groups or borders. It prefers excellent soil, is hardy, and relatively pest-free.

TURKISH FILBERT (HAZELNUT),*Corylus colurna*

Turkish filbert is a well shaped ornamental tree with a regular, pyramidal habit of growth. The rough, corky bark and heavy crop of catkins, produced in April, make this a worthwhile ornamental tree. It is especially adapted for planting in hot, dry areas. No major insect or disease problems. (40-50 ft. height; 15-40 ft. spread)

HAWTHORN, *Crataegus* spp.

There are many species and varieties of hawthorn. They are valued for their profuse flowers, fruits, and picturesque growth habit. They are dense and thorny plants, with white flowers and red fruits, though exceptions to these characteristics exist. Many are native to North America. They grow well in all but the wettest and poorest soils and are used as specimens, naturalized at the edge of woods, or in large formal plantings. The fruit is highly attractive to birds. Hawthorn is subject to borers, cedar-hawthorn rust, fire blight, and leaf-eating insects. It is somewhat difficult to transplant. Annual maintenance is beneficial. Winter King hawthorn (*C. Viridis* 'Winter King') and the Washington hawthorn (*C. phaenopurum*) are two of the most outstanding hawthorns for landscape use.

RUSSIAN OLIVE, *Elaeagnus angustifolia*

The unique silver or grey foliage of Russian-olive is its most striking feature. The flowers are inconspicuous but very fragrant. The brown, shredded bark of its crooked trunk may be very picturesque. Russian-olive will grow in many types of soil, but it is especially adapted to hot, dry areas. Several diseases, including verticillium, can be devastating. It will grow in places where few other trees will survive, and its salt tolerance make it a good seaside tree. (12 to 15 ft. height; spread may equal height)

EUROPEAN BEECH, *Fagus sylvatica*

The European beech is a better adapted landscape specimen than the native American beech. The dark green, glossy foliage and smooth, light gray bark make it a very handsome tree. Many unusual cultivars have been selected from this species. They include cultivars with unusual form, variable leaf shape, or unusual colored foliage. Beech is difficult to establish. (50-60 ft. height; 35-45 ft. spread)

WHITE ASH, *Fraxinus americana*

White ash does not grow as fast as green ash, but it will eventually become a larger tree. It develops a purple fall color that is rather unique. White ash has the same borer problems as green ash. The new seedless varieties of white ash such as 'Rose Hill' or 'Autumn Purple' should be planted in preference to the standard varieties. (50 to 80 ft. height; spread may equal height)

GREEN ASH, *Fraxinus pennsylvanica*

Green ash is a vigorous tree while young. It develops a broad crown at maturity. The leaves turn a bright-yellow in fall but do not remain on the tree long enough to be effective. It is drought resistant and will grow on a wide variety of soil types. A borer insect can be a serious pest of green ash while it is becoming established. Seedlings of green ash can be a problem in flower beds and untended areas; it is advisable to plant the new seedless varieties such as 'Marshall's Seedless' instead of the standard ones. (50 to 60 ft. height; spread may be 1/2 of height)

GINKGO, *Ginkgo biloba*

Geological evidence indicates that the ginkgo has been growing on the earth for 150 million years. Although it is one of the most primitive trees known, it is one of the best adapted to city conditions. The ginkgo has no known insect or disease pests and, hence, never needs spraying. The interesting fan-shaped leaves of the ginkgo turn a clear yellow in fall. Only grafted nonfruiting (male) varieties should be planted; the round, plum-like fruits of the female trees have an obnoxious odor. Ginkgo will eventually become a large tree, but it is slow growing and will take at least 50 years to develop. (50 to 80 ft. height; 30 to 40 ft. spread)

HONEY LOCUST,*Gleditsia triacanthos* var. *inermis*

Native honey locust trees are best known for their long, stiff, branched thorns that are a constant hazard. They also produce long, flat seed pods that may be a nuisance. The improved thornless (var. *Inermis*) and usually podless varieties of honey locust, such as 'Sunburst', 'Shademaster', 'Skyline', and 'Majestic' are some of the best for landscape use. Their lacy foliage gives a loose, open shade that is ideal for patios and shade-loving plants. In the fall, the small leaflets filter into the grass as they fall and require little raking. (30 to 70 ft. height; spread may equal height)

Selected Shade and Flowering Trees continued

GOLDENRAINTREE, *Koelreuteria paniculata*

The large, conspicuous, yellow flower clusters of the goldenraintree are produced in late June when few other trees are in bloom. The flowers are followed by showy, bladder-like fruit that hangs like clusters of small Chinese lanterns until late in the fall. It will grow in a wide variety of soils and has no serious insect or disease pests. However, it is a relatively short-lived tree, and is relatively hardy only in southern New Hampshire. (30 to 40 ft. height; spread may equal height).

GOLDENCHAIN TREE, *Laburnum x watereri*

Goldenchain tree is a striking sight in mid-spring when it is covered with foot-long, pendulous clusters of bright yellow flowers. It is a vase-shaped tree that grows fairly rapidly. The goldenchain tree grows best during cool, moist summers. (12-15 ft. height; 9-12 ft. spread)

SWEET GUM, *Liquidambar styraciflua*

The glossy, green, star-shaped leaves of the sweet gum are one of its most ornamental features, especially when they take on fall colors of yellow, orange, red, and purple. Where it is given room to develop, few trees will approach it in symmetrical beauty. The interesting ball-shaped fruit hangs on the tree long after the leaves have fallen; they are a nuisance in the lawn when they finally fall. An additional ornamental feature is the winged or corky bark projections that develop along the branches. Unfortunately, thin acid soils and low temperatures limit the use of Sweet Gum in northern New England. (30 to 50 ft. height; 20 to 30 ft. spread)

TULIPTREE, *Liriodendron tulipifera*

The native tuliptree needs a deep, fertile, moist soil to develop properly. It is often difficult to transplant, but once established it will grow rapidly and develop into a large tree. It is too large for the average-sized yard and should be planted only where it has ample growing space. Pale-yellow, tulip-shaped flowers are produced in May. After the fruit breaks open in the fall to release its seed, a tulip-shaped portion of the fruit remains on the tree to add interest during the winter. The tuliptree has few serious insect or disease problems. Tuliptree is not hardy in the mountainous areas of northern New England. (70 to 90 ft. height; 35 to 50 ft. spread)

AMUR MAACKIA, *Maackia amurensis*

Maackia is moderately fast growing, developing a rounded head at maturity. Its major interest is the small, white, late summer flowers that are arranged in branched clusters 4 to 6 inches long, although its bronze-colored bark can add winter landscape interest. It is widely adapted and can be easily grown. No major pest problems have been reported. (20-30 ft. height; 20-30 ft. spread)

LOEBNER MAGNOLIA, *Magnolia x loebneri*

This tree is a 30 foot rounded tree that produces spectacular white or pink flowers in early spring. 'Leonard Messel' (pink-tinged flowers) and 'Merrill' are both outstanding. They prefer rich, moist, well-drained soil, full sun, and protection from winter wind. They are not hardy in northern New England.

STAR MAGNOLIA, *Magnolia stellata*

One of the hardiest magnolias, the star magnolia forms a dense, mounded, large shrub or small tree reaching 20 feet. The large, white, star-like flowers appear in early April before the foliage emerges, even on young plants. This trouble-free magnolia has effective, dark green foliage that turns to a nondescript leathery brown in the fall. Winter exposes an attractive smooth gray bark. Best used as a specimen or in small groups.

CRABAPPLE, *Malus* spp.

Crabapples are among the most popular flowering trees. Not only are they splendid in bloom but also versatile in tree form and growth habit. Some are also prized for their attractive or persistent fruits, which attract birds. There are more than 200 named varieties of crabapple.

The choice to use crabapples in the landscape should be accompanied by a willingness to attend to their maintenance if their full value as ornamentals is to be realized. Pruning is necessary to maintain the proper growth habit. Apple scab, cedar apple rust, and fire blight can be serious diseases of crab apples which require some control; try to use disease-resistant cultivars. Powdery mildew can be a fall disease problem, and cankers may develop where equipment makes wounds in the trunk. Chewing and scale insects, borers, and even mice (in weedy or brushy areas) will sometimes attack the tree. To avoid the need to control diseases, choose from the many superior resistant cultivars available.

The following cultivars have been selected as among the best, based on their disease resistance and ornamental characteristics.

‘Adams’ has single pink flowers and 5/8" red persistent fruit. It is very disease resistant, has a dense round habit and reaches 24' height.

‘Dolgo’ has pink buds that turn into white flowers. Its 1 1/4" red-purple fruit is good for jelly. It reaches 40' in height.

‘Donald Wyman’ has single pink buds turning to white flowers. Its bright red 3/8" fruit persist into winter. It is disease resistant and reaches 20 in height and 25' in spread.

‘Mary Potter’, with pink buds, single white flowers, and 1/2" red fruit, reaches 10-15' in height and 15-20' in width. It is disease resistant.

‘Red Jewel’ reaches 15' in height and 12' in width. It produces an abundance of white flowers and small red fruit.

‘Sentinel’ has pale pink flowers and small fruit. Its somewhat upright, columnar habit make it useful in narrow spaces.

‘Sugar Tyme’ has pink buds, white flowers and persistent 1/2' red fruit. It reaches 18' in height and is disease resistant.

Malus floribunda — The pink buds change to fragrant, white flowers which produce small, yellow and red fruit. This variety has a rounded growth habit and reaches 30 feet in height. It is moderately disease susceptible.

‘Jackii’ — Single, white, very fragrant flowers are followed by tiny, persistent, bright-red fruit on this upright variety which reaches a compact 20 feet.

‘Katherine’ — The double, light-pink flowers fade to white and produce medium-sized, dull-red fruit. This variety has a loose, open growth habit that reaches 20 feet and exhibits good disease resistance.

‘Liset’ — This variety has the deepest-red flowers of all the crabs and begins flowering at an early age. It has medium sized, bright-red fruit. The new foliage is purple, but changes to green during the growing season. A rounded, densely branched growth habit is characteristic. The tree grows to 15 feet and is slightly disease-susceptible.

‘Pink Spires’ — Light-pink flowers give way to medium, purplish red fruit on this variety. The medium to upright growth habit reaches 20 feet. It is moderately susceptible to scab.

‘Red Jade’ — Clusters of small, single, white flowers are most prolific in alternate years. The medium, bright-red fruit persists into winter and attracts birds. This variety has a characteristic, weeping growth habit that reaches 15 feet. The tree is moderately disease-susceptible.

Malus sargentii — Clusters of small, fragrant, white flowers produce the little, dark-red, persistent fruits on this variety, one of the smallest crabs. Its low, mounded, dense growth habit reaches only 8 feet. It is slightly susceptible to disease. A dwarf Sargent type that is outstanding for the shrub border is ‘Tina’, which reaches only 5' in height.

Malus sieboldii var. *zumi* ‘Calocarpa’ — The pink buds open into fragrant, white flowers (best in alternate years) on this variety. The small, red fruit attracts birds well into the winter. This tree has a dense, pyramidal growth habit and reaches 25 feet. ‘Spring Snow’ is a 25' tall, rounded tree that produces a spectacular show of white flowers. Because it is sterile, it is appropriate for places where fruits are undesirable.

BLACK GUM, *Nyssa sylvatica*

The scarlet to orange fall color of the native black gum is one of the most brilliant of any tree species. It is a dense, pyramidal tree with lustrous, dark green, leathery leaves. It is a difficult tree to transplant and like most hard-to-transplant trees, smaller sizes have a better chance of surviving after they are moved. At the present time, black gum is difficult to find in many nurseries, but it should become more commonly available as more people get to know its merits. It is a slow-growing, pest-free tree. (30 to 50 ft. height; 20 to 35 ft. spread)

AMUR CORKTREE, *Phellodendron amurense*

Corktree is a slow growing, spreading tree. Its massive branches and deeply furrowed, cork-like bark make the tree interesting in winter. Inconspicuous, small, white flowers are produced in early summer. They are followed by clusters of berries that change from glossy green to black. The foliage, which is somewhat coarse, drops soon after turning yellow in the fall. Corktree is best used as a specimen or lawn tree. It is easily transplanted and tolerates a wide range of soils and exposures. It has no serious insect or disease problems. (30-45 ft. height; 30-45 ft. spread)

Selected Shade and Flowering Trees continued

AMERICAN PLANETREE/SYCAMORE, *Platanus occidentalis*

The most striking feature of the sycamore is the flaking bark that peels off to reveal a lighter colored bark underneath. Sycamore is considered a dirty tree; it is continuously dropping bark that needs to be picked up. A twig blight that temporarily disfigures the foliage attacks sycamore almost every spring. It will seldom kill the tree, but it certainly reduces its value as an ornamental. Sycamore is a fast-growing tree that will reach an immense size. It is too large for the average home grounds and should not be used as a street tree due to roots that heave sidewalks and a tall crown that interferes with overhead power lines. It needs a deep, rich soil to develop properly. (75 to 100 ft. height; spread may exceed height). If a sycamore-type tree is desired, London Planetree (*P. x acerifolia*) is a better choice than the native American species. It is resistant to the twig blight and does not reach as large a size.

FLOWERING CHERRY, *Prunus* spp.

Among the many flowering cherries, only a few are good landscape specimens. They serve as specimens, accents, borders, or in groups. Most are slow growing. They respond well to good soil or soil improvement and tend to decline in vigor on poor or heavy soils. Cherries will not tolerate wet soils. The fruits of most flowering cherries are hardly considered ornamental but are very attractive to birds. Attention must be given to pruning, fertilization, and borer control.

Double-Flowered Mazzard Cherry — This dense, pyramidal tree grows to 40 feet and is hardy. The double, white flowers last for 7-10 days, and the medium-sized, edible fruit is attractive to birds.

Higan Cherry — A dense, rounded tree, this variety reaches 30 feet in height. The light-pink flowers may be single or double and produce small, black, inconspicuous fruits. A pendulous, weeping variety is the most popular.

'Kwanzan' Cherry — The hardiest and most reliable form of Oriental Cherry, this variety has double, pink flowers and an upright growth habit that stays under 30 feet.

Sargent Cherry (*P. sargentii*) — One of the largest and hardiest of the cherries, this medium-sized shade tree reaches 40 feet and features showy, deep pink blooms followed by lustrous green

foliage. The round headed crown sports bronze to reddish fall foliage, and the trunk has a polished, chestnut brown bark. A narrow, columnar variety, 'Columnaris,' is also available. Sargent Cherry is one of the better *Prunus* species for New Hampshire where the choice of cherries is often limited.

FLOWERING PLUM, *Prunus* spp.

The most popular plums are those which have reddish-purple foliage. Trees are rounded to upright, densely branching, with double or single flowers. The varieties with brightly colored foliage include 'Newport' and 'Thundercloud.' 'Atropurpurea' and 'Nigra' (Black Myrobalan Plum) have darker foliage colors. Fruit, when present, is edible but not ornamental. The plums require regular maintenance—pruning, fertilization, and occasional spraying—to maintain vigor. Sunscald is often destructive to unshaded or unprotected trunks, and many insects can cause problems. Dark leaved plums should be used sparingly in the landscape.

CALLERY PEAR, *Pyrus calleryana*

This species grows to 30 feet and is native to China. It is fast growing and pyramidal when young, but with age, becomes upright or rounded. Before the foliage appears, the branches are laden with fragrant, white flowers. The glossy foliage becomes orange to scarlet to deep crimson in fall. It is an excellent lawn, specimen, or street tree. Avoid using it in narrow areas, if possible. It is tolerant of all but wet or very poor soils and is somewhat resistant to fire blight. The smaller sizes are best for transplanting. Good cultivars to consider for different forms include 'Aristocrat,' 'Whitehouse,' 'Capitol,' 'Chanticleer,' and 'Redspire.' Avoid planting the cultivar 'Bradford' due to graft incompatibility and severe splitting.

WHITE OAK, *Quercus alba*

A mature white oak is one of the most majestic trees. They are rounded in outline with thick, sturdy, horizontal branches. The native white oak is slower-growing and more difficult to transplant than most other oaks. However, it is not as susceptible to insects and diseases, and it grows on a wider range of soil types. It is a difficult species to transplant and is best moved only in the spring. (100 ft. height; 50 to 80 ft. spread)

RED OAK, *Quercus rubra*

Red Oak is one of the fastest-growing oaks. It develops into a large, broad, round-topped tree with a deep-red fall color. It withstands city conditions, has a clean habit of growth, and makes one of the best street and shade trees. (65 to 75 ft. height; 40 to 50 ft. spread)

PIN OAK, *Quercus palustris*

The branching habit of the native pin oak is truly unique. The upper branches are ascending, the middle ones horizontal, and the lower ones drooping. This makes the pin oak a generally poor choice as a shade or street tree. One exception is the cultivar 'Sovereign' cultivar; whose lower branches do not droop. However, 'Sovereign' is no longer recommended due to graft incompatibility. As the drooping lower branches are removed to allow for traffic beneath the tree, the horizontal branches begin to droop; some branches always seem to be interfering with traffic. Pin oak should be planted where it has room to assume its natural shape. It will grow poorly in soil with a high pH - the leaves will turn yellow due in part to iron chlorosis, and extensive soil treatment will be necessary to return the tree to a healthy condition. (60 to 70 ft. height; 25 to 40 ft. spread)

JAPANESE PAGODATREE, *Sophora japonica*

This tree gets its common name from the fact that it was planted around Buddhist temples in the Orient. It is also known as the scholar tree or simply as Sophora. Its large clusters of pea-like flowers are relatively showy and appear in mid-summer after most other trees have already flowered forming a creamy carpet under the tree as they fall. A good tree for city conditions and poor soils, it could be considered messy since its petals, fruits, leaves, and pods drop at different times. (50 to 75 ft. height; spread may equal height)

KOREAN MOUNTAIN ASH, *Sorbus alnifolia*

Generally superior to its commonly planted European cousin, this medium-sized, pyramidal to broad-oval shade tree offers white flowers and glossy green, beech-like foliage which turns yellow, orange and golden brown in the fall. The persistent brilliant red fruits offer food for birds and add to the fall foliage display. A better park than street tree, this plant is definitely one of the best mountainash.

EUROPEAN MOUNTAINASH,***Sorbus aucuparia***

Upright when young and spreading at maturity, this vigorous, rapidly growing tree reaches 45 feet on the best sites. Flat clusters of fragrant, white flowers appear in late spring and clusters of small, orange-red berries, attractive to birds, in the fall. The loose, compound foliage turns reddish in fall. The tree is best used as a specimen. It is subject to sunscald, borers, and fire blight. Varieties available include cutleaf, weeping, upright, and yellow-fruited types. Mountainash, being best adapted to cooler climates, performs well in northern New England.

JAPANESE STEWARTIA***(Stewartia pseudocamellia)***

Not well known or widely available, this small to medium-sized upright oval tree is possibly one of the best small trees for the garden. Surprisingly hardy, the showy white flowers are accented by orange anthers and occur over a three week period in July. The dark green leaves may turn yellow to dark reddish purple in the fall. The bark is first rate for winter effect, developing a mottled, peeling character.

JAPANESE TREE LILAC, *Syringa reticulata*

The Japanese tree lilac is a tough, adaptable, small tree with rounded to spreading growth habit. It is noted for its large, showy, creamy white clusters of flowers which appear in mid-June, about four to six weeks after common lilac has bloomed. The dark green foliage which may turn a translucent yellow in the fall is not overwhelming, but is generally superior to most lilacs. The shiny, reddish brown, cherry-like bark develops on the trunk and larger branches, adding interest in winter. It tolerates a wide range of growing conditions. (20-30 ft. height; 15-25 ft. spread)

BALD CYPRESS, *Taxodium distichum*

This fast-growing, pyramidal tree becomes rounded with age. The light-green, fernlike leaves turn a rust color before they are shed in the fall. This tree has relatively few insect or disease problems and will grow on a wide variety of soil types and moisture conditions. It is especially suited to wet or swampy conditions and is hardy to south New Hampshire only. (50 to 70 ft. height; 20 to 30 ft. spread)

Selected Shade and Flowering Trees continued

LINDEN, *Tilia* spp.

The lindens are some of the best shade trees. Their small flowers which are produced in early summer, are not especially ornamental, but are highly fragrant. The small, round seed is borne on an interesting leafy bract that hangs on the tree well into the winter. Of the seven species of linden grown in this country, the littleleaf linden (*Tilia cordata*) is the most commonly available and best-suited for home situations. The leaves remain green on the tree long after other trees have shed. Lindens have few insect or disease pests.

Two improved cultivars of littleleaf linden are 'Greenspire,' a straight-trunked tree that rapidly grows into a narrow, oval form, and 'Chancellor,' with a narrow, compact, upright form. (60 to 70 ft. height; spread may be 1/2 to 2/3 of height)

SILVER LINDEN, *Tilia tomentosa*

This is a beautiful specimen tree that tolerates heat and drought better than other lindens. The upper leaf surface is dark green, but the undersides are densely covered with hairs, which give them a silver color. When the leaves are blown in the wind, the silver under surfaces can be seen, giving a beautiful effect. This tree should not be planted in areas where there is a large amount of dust or soot present as it will collect on the hairy leaves and make them unsightly. Flowers of this species have been reported to be poisonous to bees. (50-70 ft. height; 25-40 ft. spread)

LACEBARK ELM, *Ulmus parviflora*

A superior landscape elm, not to be confused with the inferior Siberian elm (*U. pumila*). Small, dark green leaves that may turn yellow in fall. Profuse clusters of small samaras (winged dry fruit) present in the fall. Magnificent mottled, somewhat exfoliating bark in light gray, green, orange, and brown. Very environmentally durable plant with high resistance to Dutch elm disease and elm leaf beetle. (40-60 ft. height; 40 ft. spread)

JAPANESE ZELKOVA, *Zelkova serrata*

Zelkova is a fast-growing, vase-shaped to spreading tree. Its leaves resemble those of the elm; it is a close relative, but unlike the elms, it has smooth, gray bark. Young Zelkova trees are often crooked and need corrective pruning to develop into a desirable tree. Zelkova is susceptible to several pests that attack elm trees, but it is relatively resistant to Dutch Elm Disease. (50 to 80 ft. height; 50 to 80 ft. spread)

Conifers

Conifers, or cone bearing plants, generally have narrow-leaved or needle-type evergreen foliage. Noted for the attractiveness of their evergreen foliage, conifers are available in a variety of sizes, shapes, and colors. The deciduous conifers are an unusual group of trees. Their foliage is needle-like, similar to narrow leaved evergreens, but it is shed in the fall of the year. Two examples include the larches and dawn redwood.

Conifers range in size from prostrate plants, growing only a few inches tall, to large trees. Shapes include flat ground covers; horizontal spreaders; upright, pyramidal forms; and even weeping and contorted forms. Foliage color ranges from a gold and cream variegation to all shades of green, gray-green, and blue-green.

The most common causes of damage or death of needled evergreens are poorly drained soil, planting too deeply, and winter drying. Most are easily killed by water standing around their roots; therefore, they should be planted in well-drained soil. A raised bed may be the solution for planting on excessively wet sites.

Winter drying can be a problem with nearly all evergreens. The foliage may be damaged when cold or frozen soils make it difficult for roots to replace moisture as fast as it is lost by the foliage. If the summer or fall has been dry, thoroughly soak the area around the plants in October, so the plants go into the winter with an adequate moisture supply. Less winter-hardy evergreens should be planted in areas protected from winter sun and wind to prevent damage and ensure their survival.

Evergreens are sold either balled-and-burlapped or in containers. The burlap may be left on the ball for planting unless it is treated or plastic, in which case it should be slit in several places. Loosen the burlap from around the trunk and tuck it under the sides of the ball. Be careful to remove any string or wire wrapped around the plant. Remove metal or plastic containers before planting.

Fertilizing at planting time with a liquid, fertilizer can help with plant establishment. Established plants that have good color and are making satisfactory growth usually don't need additional fertilizer. However, if fertilizer is required, low rates are recommended.

Dwarf and Slow-Growing Conifers

Contemporary, residential landscapes frequently require the use of low maintenance plants which must fit within the scale of small suburban environments. Dwarf conifers can be effectively used in such small scale landscapes to add diversity of form, texture, and coloration. Since the dwarf conifers are evergreen, these features are manifested throughout the year and tend to dominate the winter scene.

Landscape Use

The wide diversity of plant growth habits enables one to use dwarf conifers effectively in foundation plantings, in shrub borders, or as patio plants. The particularly interesting shapes and growth characteristics of many dwarf conifers serve as ideal accent or focal points, and caution should be exercised not to overuse species with exceptionally strong features. In rock gardens or in landscapes with an alpine theme, dwarf conifers are unexcelled. Textures vary from coarse to very fine, and colors range from yellowish-green through all shades of green, all the way to pale-blue.

Culture

As a general rule, the dwarf and slow-growing conifers are adaptable to a wide range of soil conditions. Most are fairly drought tolerant, extremely cold hardy, and relatively insensitive to soil fertility. However, optimal growth is obtained when plants are grown in well-drained, moist soils of medium fertility. Since most plants are purchased container-grown, the root ball should be gently loosened around the outside during planting, with special care being taken to avoid planting the root system below the original level. Established plants would be fertilized in the spring with a general purpose tree and shrub fertilizer (such as a 10-6-4 analysis or equivalent) at 1 to 2 pounds per 100 square feet. Pruning is not generally required to maintain the size or form of the plant. Dwarf conifers are notably insect and disease free, although spider mites might present problems on the dense-foliaged types if left uncontrolled. Mulching prevents weed infestations, eliminates the necessity for mowing close to the plant (thereby reducing the potential for mechanical damage), and serves to highlight the plant's exceptional features.

One good example of a dwarf conifer is *Picea abies* 'Nidiformis,' the birdnest spruce. This plant may attain a height of 4 feet and a width of 5 to 6 feet. It is globose in shape, often somewhat depressed in the top, reminding one of a bird's nest. The foliage is a good, dark-green color of medium to fine texture. Birdnest spruce is best used in foundation or border plantings, or in a container.

FIR, *Abies* species

The flat needles of firs leave a round but flat scar when they fall from the twig. The cones of firs are borne in an erect position, while those of most other conifers hang downward. Concolor fir, described below, is the most common one grown as a landscape plant.

BALSAM FIR, *Abies balsamea*

The native balsam fir is a popular Christmas tree because of its fragrant needles. It is not a good plant for the refined landscape, and its use should be limited to native plantings.

CONCOLOR/WHITE FIR, *Abies concolor*

The concolor fir is similar to blue spruce in foliage color and general form, but has a softer look and is less stiff. Because of its greater insect and disease resistance, it may be preferable to blue spruce. White fir tolerates city conditions, and is fairly resistant to heat and drought. (30 to 50 ft. height; 15 to 30 ft. spread)

VEITCH FIR, *Abies veitchii*

The needles of this stiffly pyramidal evergreen are a dark green above and a whitish color below. This is one of the hardiest of the firs. It is a relatively slow-growing tree with horizontal branches. Veitch fir prefers moist, acid soils. (50-75 ft. height; 25-35 ft. spread)

FALSE CYPRESS, *Chamaecyparis* spp.

Chamaecyparis, or false cypress, is a variable evergreen. Both tree and shrub forms are available in a wide variety of foliage colors. The foliage is similar to that of *Thuja*, but has white lines on the undersides. Falsecypress is adapted to a cool, moist climate and tends to be scorched and discolored by drought and drying winter winds. Falsecypress comprise a group of slow growing, dense, pyramidal evergreens with a wide variety of foliage colors and textures. Many cultivars of Hinoki Falsecypress (*C. obtusa*) are available. 'Erecta' forms a slender column,

"Filicoides" has twisting frond-like foliage and "Gracilis" is a slender tree with weeping branchlets. The varieties of Sawara falsecypress (*C. pisifera*) offer great diversity in foliage and tree form. (40-75 ft. height; 10-20 ft. spread)

JUNIPER, *Juniperus* spp.

Junipers have sharp, pointed, needle and scale-like foliage. Their fruit is a fleshy, blue berry. The sexes are separate, and only female plants produce berries. Junipers are adaptable, and hence commonly grown evergreens. They withstand dry, poor soils better than other evergreens. Junipers need full sun for best development. None of the junipers will grow on wet, poorly drained soil or heavy shade.

There are hundreds of varieties of juniper from which to choose; they come in all sizes and shapes. The color varies from yellow-green to green, blue-green, gray-green, or silver. Because so many varieties of juniper have been grown, many of the names have become confused. For landscape purposes we can divide them into three major groups: prostrate, spreading, and upright.

The prostrate (creeping) junipers are low growing plants used primarily as ground covers. They seldom grow over 18 inches high and will spread over a large area. The foliage of many prostrate junipers changes color in winter. Some examples include: *J. horizontalis*, *J. procumbens*

Spreading junipers can be divided into two groups. The first group has a horizontal growth habit which gives the plant a flat-topped appearance. Branches on the second group have an arching pattern of growth that makes a more vase-shaped plant. Most spreading junipers retain the same foliage color year round. Examples include: *J. chinensis* and *J. sabina*.

Most upright junipers are actually tree types which are grown as shrubs. Unless they are heavily sheared, they will quickly outgrow their intended use. To develop their natural beauty, they need to be planted where they have plenty of room to grow. The foliage color of most upright junipers does not change with the seasons. Examples include: *J. scopulorum* and *J. virginiana*.

One newer cultivar for New Hampshire gardens is listed below:

Blue Star Juniper (*Juniperus squamata* 'Blue Star').

A brilliant blue green, this tough little shrub is well adapted for sunny, well-drained areas. Maturing at a height of about 2 ½ feet by about 4 feet in width, 'Blue Star' is a compact juniper that is ideal for foundation planting.

EUROPEAN LARCH, *Larix decidua*

The spring needles of the European Larch are fresh apple-green and soft. They turn deeper green in summer and spectacular golden yellow in fall before deciduating. A large tree (75 feet tall, 30 feet wide), it prefers sunny locations, in moist to wet acid soil. *Larix kaempferi*, the Japanese Larch, has more graceful, pendulous branches, and is a better landscape specimen. Both are related to *Larix laricina*, our native tamarack.

DAWN REDWOOD,
Metasequoia glyptostroboides

Dawn redwood was believed to be extinct until 1941 when a Chinese botanist discovered it growing in a remote valley of central China. Three years later a botanical expedition obtained seeds from these and distributed them to botanical gardens and arboreta throughout the world. It is a fast-growing, pyramidal tree with a tendency to grow late in the season which results in some twig dieback. The loose, feathery, needle-like foliage drops quickly in the fall. Deep, well-drained, moist soils are preferred. Avoid planting in frost pockets. No serious pests are known. (70-100 ft. height; 25 ft. spread)

SPRUCE, *Picea* species

The needle-like foliage of the spruces has four angles when seen in cross section; the needles are not flat as with most conifers that produce their needles singly. Spruces can be recognized by the persistent leaf bases that remain on the twigs after the needles have fallen.

Spruces are native to cool climates and are excellent landscape plants for northern New England. They should be planted only in well-drained soils. Young trees with dense foliage and a symmetrical growth habit are the most attractive. The four spruces described in the following section are the ones most commonly available in the nursery trade.

NORWAY SPRUCE, *Picea abies*

Because Norway spruce is one of the fastest growing of all the spruces, it is perhaps overplanted. As the tree grows older, the side branches become horizontal with a slight upturn at the tip. Secondary branches hang downward from the main branches, giving the tree a graceful appearance. The large cones (4 to 6 inches long), largest of any of the spruces, are an added attraction. (40 to 60 ft. height; 25 to 30 ft. spread)

BLACK HILLS SPRUCE,
Picea glauca 'Densata'

Black Hills spruce, a slow-growing, compact variety of the native white spruce, is one of the hardiest of the spruces. Its dense, green to bluish-green foliage is its most ornamental characteristic. Its mature size of 20-25 feet makes it useful in the small landscape.

DWARF ALBERTA SPRUCE,
Picea glauca 'Conica'

The dwarf Alberta spruce is slow growing, cone-shaped tree which seldom needs pruning. The bright-green, dense foliage makes it attractive. Although capable of growing larger, its maximum size seldom exceeds 12 feet. Alberta spruce is often used as a novelty specimen plant and also as a container plant.

SERBIAN SPRUCE, *Picea omorika*

A great choice for a limited space, this densely narrow evergreen is noted for its distinctive fishhook branching and refined habit. Although fairly adaptable as to site, this spruce does best on deep, well drained—yet moist—soils with winter protection from strong winds. (50-60 ft. height; 20-25 ft. spread)

COLORADO BLUE SPRUCE,
Picea pungens var. *glauca*

The Colorado blue spruce is a very strong accent plant due to its stiff growth habit and unusual color, it stands out wherever it is planted. Placing this tree in a landscape is difficult because it is so dominant. It is best used as a single specimen for accent. A blue spruce grows slower than green types and usually commands a higher price. (90 to 135 ft. height; 20 to 30 ft. spread)

PINE, *Pinus* species

The pines can be easily distinguished from other evergreens because their leaves are produced in bundles of two, three, or five needles. Pines are used for screens, windbreaks and mass plantings, or are planted as specimen trees. They need full sunlight to develop properly.

Many species of pine can be grown in northern New England. The five species described in the following section are the ones most commonly grown as ornamentals. Four of these species grow to be large trees; mugo pine is a shrub.

BRISTLECONE PINE, *Pinus aristata*

One of the oldest living plants in the world, living specimen bristlecone pines growing in Arizona and Nevada are over 4,000 years old. It is becoming popular in landscape plantings primarily because of its dense, short needles and its picturesque growth habit. Probably never destined to be a mainstream commodity, this surprisingly hardy and tough plant can make a picturesque, bonsai-like focal point for a private patio or meditative garden. It is very slow growing and endures a hot, dry exposure, but does not tolerate shade. (8-20 ft. height; spread: irregular)

LACEBARK PINE, *Pinus bungeana*

Lacebark pine is a relatively slow growing tree and often develops with more than one trunk. The needles are about 3 inches long and are grouped three to a bundle. Needles are retained on the tree several years longer than on most pines, making the tree especially dense. The bark peels off the trunk and branches in irregular patches, producing a beautiful mottled effect. (30-50 ft. height; 20-35 ft. spread)

SWISS STONE PINE, *Pinus cembra*

This is a slow-growing pine with a dense, pyramidal habit of growth. It is very similar to white pine in foliage color and texture. It will grow on a wide variety of soils and exposures. (30-40 ft. height, 15-25 ft. spread)

JAPANESE RED PINE, *Pinus densiflora*

A picturesque tree with a distinct, flat-topped growth habit, often used for bonsai. The cones are produced in dense clusters. Orange-red bark is interesting throughout the year. A dwarf, flat-topped cultivar, Tanyosho pine, is commonly grown as a shrub. It will grow to about 6 feet in height. (40-60 ft. height; 40-60 ft. spread)

WHITE PINE, *Pinus strobus*

The delicate, soft, light bluish-green foliage of the native white pine makes it an attractive evergreen tree. It is one of the few commonly grown five-needled pine. Easily transplanted and fast growing, it will become a large tree and needs adequate room to develop properly.

On favorable sites, white pine sometimes grows too fast to retain its dense foliage. This can be avoided by pruning the tree to increase its density. However, in pruning white pine, note that needles are not produced evenly along the stem but are clustered near the tip. When the tip is cut back, some needles must be left on the remaining portion or the twig will die back to last year's growth. White pine is sensitive to air pollution and road salt and is not a good choice for planting in city conditions. (50 to 80 ft. height; 20 to 40 ft. spread)

AUSTRIAN PINE, *Pinus nigra*

The long, stiff needles of Austrian pine are produced in bundles of two. They are a deep, dark-green color, which makes the plant excellent for use as a background for small trees with colorful flowers or ornamental fruit. Austrian pine develops into a large tree and needs adequate room for growth. It is relatively resistant to air pollutants and will grow on a wide range of soil types. (50 to 60 ft. height; 20 to 40 ft. spread)

JAPANESE BLACK PINE, *Pinus thunbergiana*

Japanese black pine produces its stiff, dark green, 3 to 5 inch long needles in bundles of two. Its large, grayish-white terminal buds help distinguish it from most other pines. Popularity of Japanese black pine has increased during the past few years, primarily because of its informal growth habit. This irregular growth habit makes it a good accent or specimen plant for use in informal landscapes, but it is not well-suited for mass plantings. Salt tolerant; spreading, compact forms are valued in the shrub border. (20 to 80 ft. height; spread 20 to 40 ft.)

SCOTCH PINE, *Pinus sylvestris*

Scotch pines, commonly grown for Christmas trees, can be recognized by their short, twisted needles that are produced in bundles of two. Young scotch pines have a symmetrical, pyramidal shape but develop an open growth habit as they mature. Mature specimens develop a reddish-orange, flaking bark on upper branches. (30 to 60 ft. height; 30 to 40 ft. spread)

MUGO PINE, *Pinus mugo*

Sometimes called Swiss mountain pine, mugo pine is an excellent, small, evergreen shrub with a dense, rounded growth habit. Plants of mugo pine show a wide variation in shape and vigor. The compact types such as the variety *P. mugo mugo* are the most desirable. Because of its variability, it is more desirable when grown as a single plant rather than in masses. Pruning may be necessary to maintain a desirable growth habit. (15 to 20 ft. height; 30 to 40 ft. spread)

UMBRELLA PINE, *Sciadopitys verticillata*

Although not a true pine, the Umbrella pine is a very slow growing (perhaps one-half foot per year), dense evergreen with large, lustrous, flattened needles arranged in whorls around the stems. It is best used as a specimen because of its unique beauty and dense pyramidal shape. Avoid hot, dry locations and maintain a constant mulch under the plant. Little other maintenance is required. Best for southern New Hampshire landscapes. (20-30 ft. height; 15-20 ft. spread)

HEMLOCK, *Tsuga* species

Hemlock can be recognized by its short, flat needles with narrow, white stripes on the underside. Its small cones are only about 1/2 inch long.

CANADA HEMLOCK, *Tsuga canadensis*

Hemlock is one of the most graceful and beautiful of the native needled evergreen trees, but it needs moist, well-drained soil to develop properly. It prefers partial shade and should be protected from the wind. It is easy to transplant but requires a good soil. Hemlock will withstand close shearing and is one of the better needled evergreens for growing as a hedge. (40 to 70 ft. height; 25 to 35 ft. spread)

CAROLINA HEMLOCK, *Tsuga caroliniana*

Less well known than our native Canadian hemlock, this somewhat less graceful tree is more tolerant of city conditions. More compact, deeper green, and slower growing than our native species, this evergreen is offered as an alternative to, but not as a substitute for, our Canadian hemlock.

YEW, *Taxus* sp.

Yews' fleshy, red fruit; ability to grow in shade; and lack of serious insect or disease pests also contribute to their popularity.

The sexes are separate in yews. Male flowers are produced on one plant and the female flowers on another. Only female plants produce the attractive berries, but both sexes need to be present to ensure fruit production. One male plant is generally sufficient to pollinate six to eight female plants. The seed within the female fruit is poisonous, as are most other parts of the plant.

Yews prefer a shaded or partially shaded planting site with a moist—not wet—well-drained soil. Direct sunlight and strong winds may injure the foliage in winter as will the summer heat.

Among the yews grown as ornamentals, the Japanese yew (*Taxus cuspidata*) and the intermediate yew (*Taxus x media*), are the most common forms. *Taxus canadensis*, the Canada yew, is the hardiest. Although not as dark green as the others, it should be considered in northern New England as well as *Taxus cuspidata* 'Nana', a slow growing form that is greatly resistant to winter burn.

The many varieties of yew can be divided into three major groups: upright, globe-shaped, and spreading. Upright yews are usually less than half as wide as they are tall. Globe-shaped or rounded ones have about the same width and height. Spreading yews are two to three times as wide as they are tall. (English - 35 to 60 ft. height; 15 to 25 ft. spread. Japanese - 10 to 40 ft. height; equal spread)

One variety, described below, is especially well adapted for residential landscapes throughout New Hampshire.

Taunton Yew, *Taxus x media* 'Tauntonii'

A smaller, more compact *Taxus* that grows to a height of about 3 ½ feet and a width of 6-8 feet, it is extremely resistant to winter burn and responds well to regular clipping.

EASTERN ARBORVITAE, *Thuja occidentalis*

Also called American arborvitae or white cedar, is native throughout the northern half of eastern North America, especially in moist areas. This plant has long been established in American gardens, and according to some, is overused by building contractors. Arborvitae propagates readily from cuttings, is relatively easy to produce in a short time, and is relatively inexpensive, thus it is a favorite of building contractors.

At maturity, arborvitae are usually dense, pyramidal, 40 to 50 foot trees, but cultivars range from dwarf to rounded or globe shapes, with foliage colors of yellow, blue, and various shades of green. Arborvitae are small, evergreen trees and shrubs with needle-like juvenile leaves and scale-like mature foliage and branchlets flattened in one plane. Branches are erect and spreading with thin, scaly bark. Its seed is produced in small cones. It is an easily propagated, fast-growing plant. (40 to 60 ft. height; 10 to 15 ft. spread)

Deciduous Shrubs

Deciduous shrubs, those that lose their leaves in fall, give seasonal color and texture changes to the landscape. The flowers, foliage, fruit, and bark provide color and landscape interest. A properly selected group of shrubs will give interest to the landscape throughout the year.

Deciduous shrubs usually tolerate difficult growing conditions better than most other ornamentals. Many grow rapidly and may require some annual pruning. Cutting older, heavier shoots back to ground level is one accepted practice for multi-stemmed shrubs, especially if the plant is overgrown. One third to one fourth of the stems should be removed each year. Many deciduous shrubs have few serious insect or disease problems. Aphids or mites are occasional problems, but they are relatively easy to control.

Many deciduous shrubs are sold bare root while some must be balled and burlapped or container-grown to be successfully transplanted. Bare root plants are planted in the spring before growth starts. Balled and burlapped and container shrubs may be planted almost anytime if properly cared for.

The species and varieties described in the following section are hardy and most commonly grown. The expected maximum height and width of each shrub are listed after the common name.

Selected Deciduous Shrubs

JAPANESE BARBERRY, *Berberis thunbergii*

Barberry is a rugged plant that adapts to many situations. It has been widely used as a hedge or barrier plant because of its thorny twigs. It is an easy plant to prune and can be clipped into tight hedges. The small, yellow flowers are not especially showy but the bright-red berries are attractive in the fall. Barberry leaves normally have a good, red fall color. The variety *atropurpurea* has red foliage throughout the growing season. "Crimson Pygmy," a dwarf red-leaved cultivar, is also available. (3 to 6 foot height; 4 to 7 foot spread)

BEAUTYBUSH, *Kolkwitzia amabilis*

A tall, vigorous, upright shrub with an arching branching habit, the plant is covered with pink flowers in May or June. The brown, bristly seeds of beautybush are also interesting. This shrub is easy to grow and requires little attention if it is given enough room to develop. (6 to 15 foot height; 4 to 8 foot spread)

RED CHOKEBERRY, *Aronia arbutifolia*

A dependable shrub on almost any soil, it produces small white to reddish flowers in late May. Chokeberry is planted primarily for the bright-red berries that are produced in late summer. There is also a Black chokeberry, *Aronia melanocarpa*. (6 to 10 foot height; 3 to 5 foot spread)

DWARF FLOWERING ALMOND,***Prunus glandulosa***

Flowering almond is a small, delicate shrub. Its branches are covered with small flowers in early May. The flowers may be pink or white, single or double. This shrub makes a nice accent plant in a foundation planting. (4 to 5 foot height; 3 to 4 foot spread)

PURPLELEAF SAND CHERRY,***Prunus x cistena***

This small shrub is valued for its purple-colored foliage which persists throughout the growing season. It produces small, pinkish flowers in May and small, colorful cherries in fall. (7 to 10 foot height; 5 to 8 foot spread)

SPREADING COTONEASTER,***Cotoneaster divaricatus***

An interesting plant, spreading cotoneaster has an upright growth habit and arching, spreading branches. Red berries cover the branches during early fall adding considerable interest to the landscape. Cotoneaster is susceptible to fire blight disease and is occasionally attacked by spider mites. (5 to 6 foot height; 6 to 8 foot spread)

SLENDER DEUTZIA, *Deutzia gracilis*

Deutzias are a group of shrubs grown for the showy, white or pinkish flowers produced in May. Slender deutzia is desirable because of its small size and slender, graceful, arching, growth habit. This plant is useful in a large shrub border, but is limited in use due to its ratty appearance when not in flower. (2 to 6 foot height; 3 to 4 foot spread)

**REDOSIER DOGWOOD,
*Cornus sericea (stolonifera)***

Redosier is a shrub-type dogwood adaptable to most soils but does best in moist situations. It spreads by underground stems and increases in diameter as new stems arise from the ground. It does not have interesting flowers or fruit but is grown primarily for its colorful stems. Both red-stemmed and yellow-stemmed varieties are available. A dwarf cultivar, 'Kelseyi,' seldom grows over 2 feet high and is useful as a ground cover in large areas. This is an excellent wetland plant. (7 to 9 foot height; 10 to 12 foot spread)

WINGED EUONYMUS, *Euonymus alatus*

Winged euonymus, a large shrub, can be used as a hedge because its neat, uniform appearance requires little or no pruning. Twigs of this shrub have corky ridges and are especially interesting in winter after catching a soft snow. This plant has excellent, scarlet color in the fall. The compact variety, *E. alatus* 'Compactus,' grows to only 4 feet tall and is more commonly planted than the standard variety, but is not hardy in the mountainous parts of northern New England. Euonymus must be transplanted with earth around its roots. Once established, they require little care. (15 to 20 foot height; 15 to 20 foot spread)

BORDER FORSYTHIA, *Forsythia x intermedia*

The profuse, yellow flowers of forsythia are considered by many people to be the first sure sign of spring. They are easily grown on almost any soil but prefer full sun. There are many cultivars of forsythia available, including some dwarf forms. Cultivars of Border forsythia, such as 'Beatrix Farrand', 'Karl Sax' and 'Lynwood' perform well in coastal areas. Further north, their flower buds survive winter infrequently, and hybrids like 'Vermont Sun', 'Meadowlark' and 'Northern Sun' should be planted. (8 to 10 foot height; 10 to 12 foot spread)

EUROPEAN FLY HONEYSUCKLE,***Lonicera xylosteum***

This is one of the few honeysuckles refined enough to be used in the landscape. The gray-green foliage forms a mound 8-10 feet tall and 8-10 feet wide. It produces white flowers in spring and red fruit in midsummer. Two cultivars, 'Claveyi' and 'Emerald Mound', are more compact, have bluish foliage, and are excellent hedge plants.

AMUR HONEYSUCKLE, *Lonicera maackii*

Amur honeysuckle is the largest and fastest growing of all the shrub honeysuckles. Fragrant, white flowers are produced in late May. Bright-red berries remain on the plant from September to November. Amur honeysuckle holds its leaves late in the fall, and it is not unusual for the plant to have green leaves and red berries at Thanksgiving time. Amur honeysuckle makes a fast growing screen, but it needs plenty of room to develop. (8 to 15 foot height; 8 to 12 foot spread)

HYDRANGEA, *Hydrangea arborescens*
'Annabelle'

This hydrangea is a small shrub that produces large, white flower clusters almost 6 inches in diameter. It is usually killed back to the ground in winter. Hydrangea does not require any special soil but prefers a light shade location. (3 to 5 foot height; 3 to 6 foot spread)

COMMON LILAC, *Syringa vulgaris*.

Lilac is one of the best known and most commonly planted of all the flowering shrubs. It is grown primarily for its late spring flowers. Of the hundreds of varieties of lilacs that have been named, the so-called French hybrids are among the most popular. They are dense, upright shrubs that can be grown almost anywhere. Lilac flowers range in color from white to pink to lilac to bluish to purple. Both single- and double-flowered forms are commonly available. The flowers of most varieties are very fragrant.

Proper pruning is necessary to keep the plants attractive and to promote heavy flower production. After the plant becomes established, about one third of the old stems should be removed each year. Older lilac stems may be attacked by borers, and powdery mildew is a common summer disease. Proper pruning helps to minimize this problem. (8 to 12 foot height; 6 to 15 foot spread) Another good lilac is *Syringa patula* 'Miss Kim'. It reaches 3-4 feet in height and produces blue flowers a bit later than most lilacs.

LATE LILAC, *Syringa villosa*

This very hardy lilac produces lilac to white flowers a bit later than most lilacs. It reaches 10 feet in height and width, and is a good addition to the shrub border.

SWEET MOCKORANGE, *Philadelphus coronarius*

Mockorange is a vigorous, upright shrub grown primarily for its white flowers which are borne in late spring. There are many varieties of mockorange from which to choose. Some varieties produce very fragrant flowers while others are not fragrant. Both single- and double-flowered varieties are available, and flower size varies from ½ inch to almost 2 ½ inches in diameter. Some varieties never get over 4 feet in height while others may grow to 12 feet.

Mockorange has no serious insect or disease problems. Removal of a few older stems from the base each year will keep the plants vigorous and flowering. They have little ornamental value other than their flowers, and easily out grow their space if not pruned regularly. (4 to 12 foot height; 4 to 12 foot spread)

PRIVET, *Ligustrum spp.*

Privets are automatically considered hedge plants because they have been so widely grown for this purpose. Unsheared specimens produce pyramidal clusters of small, white flowers followed by similar clusters of black berries. Fruit remains on the plant most of the winter and provides considerable food for birds.

Privets are vigorous plants that will adapt to most types of soil, under most conditions. There are several varieties of privet available. They range from 4 to 12 feet in height. Some of the more popular varieties include:

'Amur' - one of the hardiest varieties.

'Regel' - a low cultivar with almost horizontal branches.

'Golden Vicary' - with bright-yellow foliage throughout the growing season.

ROSEGOLD PUSSY WILLOW, *Salix gracilistyla***GOAT WILLOW, *Salix caprea*****BLACK PUSSY WILLOW, *Salix melanostachys***

PURPLE OSIER WILLOW, *Salix purpurea*

Pussy willow is grown for its interesting and attractive catkins (flowers). The sexes in willow are separate with the male having large, gray, fluffy catkins with bright-yellow stamens. The female flower is not as attractive. The catkins on pussy willow appear in very early spring. It is an easily transplanted, vigorous shrub. However, it has many problems and needs to be kept vigorously growing to look attractive. Pussy willow has been overplanted in many areas. Purple osier willow is the hardiest of those listed. (Rosegold Pussy Willow 6 to 10 foot height, 6 to 10 foot spread; Goat Willow 15 to 25 foot height, 12 to 15 foot spread; Black Pussy Willow 6 to 10 foot height, 6 to 10 foot spread; Purpleosier Willow 8 to 10 foot height, 6 to 8 foot spread)

FLOWERING QUINCE,***Chaenomeles speciosa***

Quince shrubs usually have deep-red flowers. However, new varieties with white, pink, and various shades of red flower colors are now available. Lustrous, green foliage appears soon after the flowers have opened. The large, yellow-green, apple-like fruits are not particularly attractive but can be used to make jellies. The Japanese quince (*C. japonica*), a smaller plant only 3 feet high, is similar to flowering quince. (6 to 10 foot height; 6 to 12 foot spread)

ROSE-OF-SHARON, *Hibiscus syriacus*

A large shrub, Rose-of-Sharon flowers in August, a time when few other shrubs are in bloom. Flowers may be single or double and range in color from white to pink to red to violet, with all the variations in between. Unless the older portions of the plant are pruned out regularly, the flowers will become smaller. If handled properly, the plant is bushy enough to be used as a hedge or screen. It is hardy in coastal northern New England. (6 to 12 foot height; 6 to 10 foot spread)

SMOKEBUSH, *Cotinus coggygria*

The plumose, fruiting panicles of smokebush are attractive for several weeks in summer. The foliage is blue-green throughout the growing season. This shrub is often used as an accent point in the landscape because of the showy panicles. The yellow to orange autumn color is also attractive. Smokebush will grow in any soil and any location in the garden. Insects and disease are of little concern. The cultivar 'Purpureus' has purple leaves and fruiting panicles that are much showier than the species. (15 foot height).

SPIRAEA, *Spiraea spp.*

Spiraeas are as easy to grow as any group of flowering shrubs. They adapt to a wide range of soil types. A good deal of sunshine is required for flowering, but they will grow in moderate shade. Most spiraeas have white flowers, but there are a few with pink or red flowers. They range in height from 1 1/2 to 7 feet. Vanhoutte spiraea is the most well known, and still popular because of its heavy set of white flowers and graceful, arching growth habit. Bridalwreath spiraea is attractive with its double, white flowers; lustrous, green foliage; and orange fall color. 'Anthony Waterer' is the most popular small spiraea, around 2 feet high. The red flowers of this species are borne in large 5 to 6 inch clusters. Many new, white-flowered, dwarf cultivars are being used as foundation plants. Spiraeas are relatively free of insect or disease pests. Occasionally a heavy spring infestation of aphids will occur. (1 1/2 to 12 foot height; 1 1/2 to 12 foot spread)

STAGHORN SUMAC, *Rhus typhina*

Sumacs are easily grown shrubs and do particularly well in a dry soil. The staghorn sumac can eventually become a rather large shrub, perhaps 35 feet high; however, as a multiple-stemmed plant, it seldom reaches that height. There are plants with male flowers only, female flowers only, or plants with both male and female flowers. Female flowers develop into bright-red fruit spikelets in fall and are quite interesting. The brilliant, red fall color of sumac foliage is outstanding. Staghorn Sumac has fuzzy twigs from which it derived its common name. The plant can be used as a mass planting, but in modern landscapes it is often used as a specimen because of its interesting growth habit. Attractive, cutleaf cultivars are available. Sumacs have no serious insect or disease problems. Though related to poison ivy, it is not a poisonous plant. (15 to 25 foot height; 15 to 30 foot spread)

BUCKTHORN, *Rhamnus frangula*

Buckthorn was developed and is used almost solely as a hedge. A columnar cultivar will spread only about 4 feet wide and maintains its shape with little or no pruning. The foliage is a dense, dark, lustrous green. It is densely twiggy and stiff, but is useful where a columnar tall hedge is needed. (10 to 12 foot height; 8 to 12 foot spread)

VIBURNUM, *Viburnum* spp.

As a group of shrubs, viburnums have much to offer. They have beautiful spring flowers; attractive summer foliage; excellent fall color; and attractive, bright-colored fruits in fall and winter. The fruits may be red, yellow, blue, or black and in a given species may change color several times as they mature. In some species the flowers are quite fragrant, adding materially to their value as ornamental plants. Viburnums are usually sold balled and burlapped or in containers. (2 to 30 foot height; 2 to 30 foot spread).

HOBBLEBUSH (*Viburnum alnifolium*).

Despite being a native plant best used for naturalizing, hobblebush does have several ornamental qualities of merit. The large, white, flat topped flower clusters are a one of the showiest of any native woody plant. The clean green foliage emerges becoming an effective deep red to maroon in the fall. This leggy, and somewhat open, plant appears to be hobbling around on its knees and elbows and is best used when faced with greenery or a stone wall. Hobblebush does best in light shade on the edge of moist, deciduous woods.

KOREANSPICE VIBURNUM, *V. carlesii*

A small shrub growing to 6 feet, the flower buds are pink, opening to white flowers that are quite fragrant. The cultivar 'Compactum' is a preferred selection that matures at about 3 ½ feet and is attractive year round. Like the species, the early, semi-snowball type white flower clusters are pink in bud and are very pleasantly fragrant. The attractive green foliage turns a more consistent red to maroon bronze in the fall than the species and then drops to reveal a clean winter habit.

WITHEROD VIBURNUM (*Viburnum cassinoides*).

Another native viburnum, this plant fits in well with our natural New Hampshire landscape. The creamy white flower clusters produce a fruiting display that passes through a sequential ripening process, changing in color from green to nearly white and then to pink, rose, blue, and finally becoming black. Often all stages are present together on the same fruiting cluster. As unusual as this trait is, the fruits are quickly enjoyed by birds. Foliage is a shiny rich green followed by a brilliant and dependable red. Like most viburnums, its clean winter habit is an asset in the winter landscape.

ARROWWOOD VIBURNUM, *V. dentatum*

A large shrub, 6 to 16 feet, arrowwood will grow in sun or shade and is adaptable to any soil. Arrowwood is a rapid grower and may have good, glossy, yellow to red fall color.

WAYFARINGTREE VIBURNUM, *V. lantana*

Another large shrub, 10 to 15 foot, this viburnum is especially good for dry soil situations. The fall color is a good red; the fruit changes from red to black and provides a source of food for birds.

BLACKHAW VIBURNUM, *V. prunifolium*

A large shrub, 12 to 15 feet in height, can grow 20 to 30 feet high. During May this shrub is covered with white flowers in flat clusters, later followed by blue-black berries that are among the largest fruits in the viburnums. Blackhaw has an excellent, shining, red fall color.

DOUBLEFILE VIBURNUM,***V. plicatum tomentosum***

A medium-sized shrub, up to 9 feet high. During May this plant has creamy-white flowers borne in flat clusters followed by bright-red berries in fall. The fall color is a consistent reddish purple. The plant's most interesting features are its horizontal branching and wide-spreading growth habit. This interesting form gives the plant added interest in the landscape.

Other important landscape viburnums include the Burkwood viburnum (*V. x burkwoodii* and cultivars) and American cranberrybush viburnum (*V. triloba*).

WEIGELA, *Weigela florida*

Most of the weigelas available in the nursery trade are hybrids developed to produce superior flowers. The funnel-shaped flowers are borne in clusters of three to five. They range in color from white to deep red. The stems are usually covered with flowers for a short period of time in the spring. Weigela is easy to grow and has no serious insect or disease problems. (6 to 9 foot height; 9 to 12 foot spread)

WINTERBERRY, *Ilex verticillata*

Winterberry is grown primarily for its bright-red berries that appear while the leaves are still green and remain on the plant long after the leaves have fallen. The inconspicuous flowers are borne on separate plants; some plants have all male flowers and others have all female flowers. Only female plants produce the berries, but both sexes need to be present to ensure fruit production. One male plant is enough to pollinate six to eight females. Winterberry will grow in any good garden soil. Many cultivars, including 'Red Sprite' with superior winter fruit are available. (6 to 10 foot height; 6 to 10 foot spread)

Broad-Leaved Evergreens

Among the most highly prized landscape plants are broad-leaved evergreens. They are the true aristocrats of our gardens. However, many of them require special attention if they are to develop into attractive, long-lived plants.

Wide fluctuations in temperature, prolonged dry periods, drying winds, and bright sunshine are not ideal conditions for most broad-leaved evergreens. Good soil preparation and a carefully selected location will help ensure the success of these plants. However, the year-round beauty and special effect that they give to the landscape make them well worth the extra care needed to grow them.

The broad-leaved evergreens are valued chiefly for their evergreen foliage, but many of them possess other desirable ornamental traits. They are generally clean plants, dropping few leaves at any one time. They offer a range of foliage colors and textures for landscape interest.

Broad-leaved evergreens prefer a rich, well-drained, slightly acid soil. Increasing organic matter content and improving drainage can modify an existing poor soil to one in which they will grow successfully.

Locate those broad-leaved evergreens subject to winter injury in areas where they receive protection from the wind and afternoon sun, especially in winter. North and east sides of buildings are ideal. Wind and sun protection provided by fences or large plants will also help prevent injury. Protection from the hot summer sun of southern and western exposures, may be needed.

Broad-leaved evergreens are best fertilized in the spring. Summer or fall fertilization may induce late season growth that is highly susceptible to winter injury. Winter scorch of foliage can also develop if plants dry out during the winter. To prevent this, water plants in late summer and fall if rainfall has been deficient.

Plant size is also important for the winter hardiness of some species. A small, young plant may be easily killed while the same species may be quite hardy when larger-sized plants are used. Poor culture, attacks by insects or disease, or any other factor that weakens a plant makes it more subject to winter injury.

Selected Broad-leaved Evergreens

The plants described in the following section are generally hardy in all parts of the state. When broad-leaved evergreens are planted and located properly, they can add year-round interest to the landscape and provide a pleasant contrast to needle-leaved evergreens in both winter and summer.

AZALEA AND RHODODENDRON, *Rhododendron* spp.

The plants commonly called azaleas and those called rhododendron belong to the botanical genus, *Rhododendron*. It is the largest group of woody ornamental plants. Over 4,000 species, varieties, and hybrids have been recognized. Most azaleas are deciduous, and most rhododendrons are evergreen. Both require acid, moist, organic soils, cool temperatures, high humidity, and protection from harsh winter winds. They are valued for their very colorful flowers in the spring and summer, and the evergreen types are additionally valued for the foliage color they add to the winter landscape. New cultivars of azaleas and rhododendron are added to nursery lists every year. Check with a local nursery for those best adapted to your location.

Selection and Culture of Azaleas and Rhododendrons

Although all azaleas and rhododendrons belong to the genus *Rhododendron* by plant taxonomists, the name azalea” is commonly used for North American deciduous species and many evergreen hybrid types. Generally “*Rhododendron*” is used for those species that have large, evergreen, leathery leaves and flowers distinctly clustered in terminal groups. When a sharp division cannot be made, it is always correct to call any of them rhododendrons. Whatever name is used, the culture required for all these plants is very similar. The same cultural practices as described below may also be applied to blueberries, pieris, heather, holly, and other ericaceous plants that prefer acid, organic soils.

Location

Most azaleas and rhododendrons are at their best in fairly mild, humid climates. Selecting a good site is very important, as is selecting good quality plants. A site sloping to the north or east is usually best, because it is protected from drying south and west winds. Thus, plants are less subjected to rapid temperature changes in late fall or early spring.

Always plant azaleas and rhododendrons where they get protection from strong winds. Buildings and slopes provide good barriers. Evergreen shrubs or trees such as pine, juniper, or spruce planted to the south or west of rhododendrons protect them and make good backgrounds for showing off the flowers. Plants not given protection from the wind often develop leaf scorch or splitting of the bark on the stems. Avoid siting at the corners of buildings where wind tends to be stronger and on southwest building faces where late winter sun and heat can promote foliar damage.

Light

Filtered sunlight is ideal for many rhododendrons, but morning sunlight with shade after 1 p.m. may be satisfactory and desirable. Plants may survive continuous shade if trees have branches pruned high. Protection from afternoon sun may also be given by fences, shrubbery, or screens. Some deciduous azaleas are less sensitive to sun, and should be used if the location receives full afternoon sun. Many small-leaved types may not only thrive, but prefer full sun. However, in full sun delicate flower colors will bleach quickly even though the plants may grow well,

Drainage

Because the delicate roots of azaleas and rhododendrons are easily destroyed, excellent drainage is important. To test drainage, dig a hole six inches deep in the bed and fill it with water. If the water has not drained from the hole in four hours, install drainage tile to carry away excess water, or build raised beds.

Starting the Bed

Planting azaleas and rhododendrons in groups rather than individually permits more efficient use of prepared soil. Don't place the bed close to shallow rooted trees such as maple, ash, or elm. Feeder roots rapidly move into improved soil and compete for water and plant food. For best results, dig out the bed to loosen the soil. Plants should be spaced 3 to 4 feet apart, and at least 18 inches from the edge of the bed.

Soil Considerations

Proper placement alone is not enough. Azaleas and rhododendrons must have soil that is prepared carefully and thoroughly. Roots of azaleas and rhododendrons are very delicate and unable to penetrate heavy or rocky soils.

Azaleas and rhododendrons required an acid soil. Most of them thrive best at a soil pH between 4.5 and 6.0. Many northern New England

soils have a native acid reaction. However, alluvial or river bottom soils may have a more alkaline reaction and need to be made more acid to grow azaleas and rhododendrons well. Soils previously limed heavily for a lawn or garden may need the pH lowered. Mortar or similar building materials mixed into the soil close to foundations may increase pH. When the pH is unknown, it can be determined by conducting a soil test.

If the pH is too high, the soil may be made more acid by incorporating agricultural sulfur, aluminum sulfate, or iron sulfate into the soil at an appropriate rate. Although a soil test is the best way to determine the amount required, in general, about two to three pounds of agricultural sulfur per 100 square feet will lower the pH one unit, depending on soil texture and organic matter content. This rate should be multiplied by 6.9 for aluminum sulfate and by 9.0 for iron sulfate. Raising soil pH by the addition of liming agents, such as ground limestone, is rarely necessary for rhododendron and azaleas.

The best soil in which to grow azaleas is good quality, loamy topsoil which contains plenty of organic matter. In areas with heavy clay or excess sand, good quality topsoil can be added or used to replace the poorer soil only if the entire soil area is treated that way. Amendments should not be added just in individual planting holes because water movement will be impeded. If topsoil is added to the planting bed, be sure to check the pH and make any adjustments that may be necessary.

Mulch

Most azaleas and rhododendrons are shallow rooted and need a mulch to conserve moisture around the roots, to minimize winter injury, and to prevent injury from cultivation. Coarse materials such as partly decomposed oak leaves or pine needles are ideal. Oak shavings, hardwood chips, and aged sawdust or peat moss mixed with coarser materials may also be used satisfactorily. A two to three inch depth of mulch is satisfactory. Avoid piling up mulch too close to the base of the plant stem. As the old mulch decomposes, add new mulch. Given the abundance of materials, late fall can be a good time to apply additional mulch.

Fertilization

After planting, an application of liquid fertilizer formulated for acid-loving plants may aid in establishment. Follow the directions on the package. In subsequent years, a granular fertilizer for acid-loving plants may be broadcast

evenly around plants, as required. Use only those products specially formulated for rhododendrons and azaleas and follow directions. Rhododendrons and azaleas grow well naturally at relatively low nutrient levels and little additional fertilizer is required. Ideally, fertilizing should be done in April or May; don't apply fertilizer after July 1. Late summer fertilization may force out tender fall growth or delay hardening off of new growth and may result in increased winter damage.

Maintaining The Planting

Rhododendrons and azaleas require little care once they are properly established. Mulch will keep down weeds and conserve moisture. Cultivation should be done carefully, if at all, because the shallow, fine roots are easily damaged.

Watering

Although rhododendrons have been killed by over watering, more often than not newer plantings often suffer from a lack of water. The shallow fibrous root system of rhododendrons and azaleas makes them susceptible to drought. As a general rule, one inch of water, either from rainfall or artificial irrigation, should be available per week during the growing season.

Pruning

Usually there is little need to prune azaleas and rhododendrons. If growth becomes excessive, reduce the size can be kept in check with light, periodic pruning after bloom. Amazingly, many types will break bud readily from old wood and respond well to heavy pruning, if necessary.

Azaleas sometimes branch poorly and form a loose, open shrub. The plants' form can be improved by pinching out the soft, new shoots of vigorous growing plants. Do not pinch after July because flower buds will not have time to develop for the following year.

Winter Protection

In New Hampshire, winter damage to evergreen rhododendrons and azaleas is a common problem. To avoid winter damage, proper siting is important. As a general rule, avoid site exposed to winter wind and sun. Most damage shows up as split bark, dried leaves, or dead or damaged flower buds. If hardy types are selected and proper locations are chosen, little or no winter protection is needed. If existing varieties show winter damage, provide some protection. It is normal for leaves to curl and droop on cold days.

Discarded Christmas trees may be used to protect plants. Branches can be anchored in the ground to shield the rhododendron from wind

and sun. Screens may be built of burlap or other materials to provide shade and windbreak. Temporary fences made of lath or snow fencing are effective in providing necessary windbreak and light shade.

Protection must remain loose and airy throughout the winter. Small plants should not be covered with large mounds of leaves. Masses of leaves may begin to decay and smother the plant beneath them. Leaves may be pulled up around the stems in late fall but should not cover the entire plant.

Also, several types of aerosol, anti-transpirants may be applied to evergreen foliage to protect it from winter time water loss. As a rule, these materials should be applied when the temperature is no lower than 40°F. Often these materials are not effective throughout an entire winter, and may need to be reapplied during a January thaw. The practice of using anti-transpirants can be expensive and time consuming. However, for newly planted rhododendrons, anti-transpirants can be very effective in minimizing winter injury.

Problems

Sunscald, scorch

Large-leaved evergreen rhododendrons are sometimes subject to sunscald during winter. This is most likely to happen if the plant did not receive ample moisture before freezing in fall. The exposed portions of the leaf (usually the central portion when the leaf was curled) may become brown. This browning may also appear on the edges of some leaves. To prevent scorch, plants should be well watered in the fall if rainfall has been sparse, protected from drying winds, mulched well, and given some shade.

Iron Chlorosis

If leaves turn yellow in the sections between the veins, but the veins remain green, iron deficiency may be the cause. If the entire leaf turns yellow with some browning, other problems are suggested, for example, calcium deficiency. Chlorosis may also result from soil that is not acid enough, poor drainage, nematodes, or other conditions that cause root or stem injury. Iron chlorosis can usually be temporarily controlled by spraying the foliage with an iron (ferrous) sulfate solution, chelated iron, or a liquid fertilizer formulated for acid-loving plants. Conditions leading to chlorosis, such as poor drainage or alkaline soil, must also be corrected. In acid soils, iron chlorosis rarely occurs.

Insects and Diseases

There are several insects and diseases that commonly bother azaleas and rhododendrons. The most common insect problems are root weevils, azalea bark scale and rhododendron borer. The most common diseases are Phytophthora root and crown rot, Ovipositor petal blight and fungal leaf spots.

Stem Bark Splitting

This problem results from rapid temperature changes and freezing. The bark above ground splits and may peel off. The stems do not usually heal, and the branch dies above the injury. Death may not occur for one or two years. Winter protection may help, but generally the best remedy is to plant reliably hardy varieties or prune out affected branches of injured plants. When checking a reference for hardiness of a particular rhododendron or azalea, keep in mind that northern New England has cold winters, which stress plants and may predispose them to other problems.

Evergreen Rhododendron Varieties

There are many beautiful rhododendrons. However, many are not reliably cold hardy in New Hampshire. Generally more varieties may be grown in the milder climate of the coast. The following selected varieties are some of the most reliable.

Of the many hybrids available, those derived from *Rhododendron catawbiense*, called Catawba hybrids, have the greatest hardiness. New varieties may be superior to those listed, but establishing their true adaptability takes many years. The collector may be willing to take risks with tender plants, but the beginner should always select varieties well adapted to the local growing environment.

‘Album Elegans’- Soft lilac fading to white, late flowering, a *R. maximum* hybrid.

‘America’ - Dark red with a ball-shaped flower cluster. Broad, bushy plant.

‘Atrosanguineum’- Red with purple markings. Hardy.

‘Boule de Neige’- White, early. Slow growing, but develops into a compact, large plant.

‘Boursault’ - Compact grower, buds purple, turning rosy-lilac.

Catawbiense Album - White flowers in round trusses. Narrow leaves, tall, vigorous.

‘English Roseum’- Lilac pink, large foliage,

vigorous upright growth.

‘Everestianum’ - Purplish-pink with green markings. Hardy.

‘Ignatius Sargent’ - Purplish red with brown markings.

‘Lord Roberts’ - Medium height, red flowers with black blotch.

‘Mrs. Chas S. Sargent’ - Deep rose spotted with yellow. Cold hardy.

‘Nova Zembla’ - Red flowers similar to ‘America.’ Cold and heat tolerant.

‘P.J.M.’ - Early flowering, purple, dark foliage. This is a reliable rhododendron for central and northern New Hampshire. Many of the newer introductions have been selected for improved flower color.

‘Purple Splendor’ - Very deep violet purple with darker blotch.

‘Ramapo’ - Small, violet blue flowers. Low, spreading plant. Tolerates sun and shade.

‘Roseum Elegans’ - Lavender-pink with green markings. Endures temperature extremes. Good for the beginner.

Deciduous Rhododendron Varieties

Deciduous azaleas and rhododendrons are fairly cold hardy and provide a mass of color in spring as well as often providing effective fall foliage, ranging from shades of yellow to oranges and reds. Different species vary widely in hardiness, however. Normally, those found in nurseries will be the ones best suited to the area. Choose only vigorous plants of good varieties. Beginners should choose some of the old standards and later try some of the newer introductions.

Flame Azalea (*R. calendulaceum*) - The showiest of the deciduous American azaleas, retaining their flowers for nearly two weeks. Available in yellows, apricot, salmon, pinks, oranges, and reds. Excellent for mass planting and to create naturalistic plantings. For central and southern New Hampshire only.

Exbury (Knap Hill) Hybrids - A very popular group due to their showiness and hardiness. Available in pastel shades ranging from cream, through pink to yellow and orange.

Mollis Hybrids (*R. x kosteranum*) - slightly more tender and smaller than Exbury, but much varietal variation. Colors mainly in yellow, apricot, orange, red.

Cornell Pink Rhododendron (*Rhododendron mucronulatum* ‘Cornell Pink’). One of the first rhododendrons to bloom, its true pink flowers held on naked stems are a welcome harbinger of spring. This medium-sized, compact shrub is nearly rounded in outline and has soft green summer foliage which changes to shades of yellow and bronzy crimson in the fall. Winter habit is clean and neat.

Northern Lights Hybrid Azaleas (*Rhododendron* ‘Northern Lights’) - Hardy to nearly -40° F, this group of deciduous rhododendrons blooms early in a variety of colors. Flowering in white, yellow, orange, rosy pink, or lilac, these plants are medium-sized and compact. Reported to not be especially resistant to powdery mildew, attention to site selection and cultural conditions—good air circulation, low humidity, and proper sanitation—is important. However, this group of especially hardy shrubs might be a good choice where the selection of rhododendrons is limited.

Royal Azalea (*R. schlippenbachii*) - An azalea hardy in coastal areas with large, fragrant, rose-pink flowers. Foliage has good autumn color although may sometimes be burned by late summer heat.

BOXWOOD, *Buxus* spp.

Boxwood has been a popular, broad-leaved evergreen for many years, and very old specimens can be found. Boxwoods make excellent specimen plants or hedges. They can be easily pruned to any desired shape. Of the available boxwood types, the Korean or littleleaf box is most hardy and easily grown. The leaves tend to lose color in winter; in shade, winter discoloring is less severe. Because boxwood foliage is desiccated every winter, its use is limited to moist, protected coastal regions. (3 to 4 foot height; 3 to 4 foot spread)

DROOPING LEUCOTHOE,

Leucothoe fontanesiana

A slow-growing plant with spreading, arching branches and lustrous, dark-green leaves, it produces fragrant, bell-shaped flowers in early spring. It needs shade for best growth and is most suitable beneath large evergreens. It is related to pieris and requires the same growing conditions. Best used in southern New Hampshire (3 to 6 foot height; 3 to 6 foot spread)

WINTERCREEPER EUONYMUS,

Euonymus fortunei

Most varieties of wintercreeper euonymus are vines or groundcovers. Sarcoxie's euonymus, developed at Sarcoxie, Missouri, is an erect form that makes an excellent, broad-leaved, evergreen shrub. It grows in full sun but will retain its green winter color better when grown in shade. Many cultivars exist with different leaf colors and variegation patterns. Euonymus scale, a white-covered scale insect, may attack the stem and leaves of euonymus. It is not hardy in mountainous areas of northern New England. Winter damage is common. (4 inches to 4 foot height; indefinite spread)

JAPANESE HOLLY, *Ilex crenata*

Most Japanese hollies produce small, spineless leaves and black fruit. They are popular, small, compact, evergreen shrubs further south, but are limited to coastal areas of northern New England.

INKBERRY, *Ilex glabra*

The inkberry, a black-fruited holly native to eastern North America, is not as showy an ornamental as the other hollies, but it is one of the most hardy of the group and makes a good hedge or screen. Leaf size, shape, and glossiness vary considerably. The selection 'Compacta' should be used in the landscape. Occasional pruning will keep the plant from developing a loose, open type of growth. (6 to 8 foot height; 8 to 10 foot spread)

AMERICAN HOLLY, *Ilex opaca*

The spiny, evergreen leaves and bright-red berries of American holly are familiar to most people. It is native and is slow-growing, eventually developing into a small tree.

The sexes of holly are on separate plants. Some plants produce only male flowers and others produce only female flowers. Only the female plants produce berries, but both sexes must be present to ensure fruiting. One male plant is enough to pollinate the flowers of six to eight female plants. Acid soils high in organic matter and with good drainage are essential for growing hollies. Limited to use in southern New Hampshire only. (40 to 50 foot height; 18 to 40 foot spread)

JAPANESE PIERIS, *Pieris japonica*

Formerly called andromeda, pieris is an attractive, broad-leaved evergreen. The new foliage is bronze in color in spring, soon turning a lustrous medium-green. The flowers, borne in April, are creamy-white and hang in long, drooping clusters. The plant needs protection from winter sun and wind to prevent leaf scorch and flower bud damage. A light, well-drained, acid soil high in organic matter will produce the best plants. It is hardy in coastal areas, but suffers foliage desiccation in winter in many parts of northern New England. (9 to 12 foot height; 6 to 8 foot spread)

OREGON GRAPEHOLLY,

Mahonia aquifolium

Oregon grapeholly is a fairly coarse, stiff shrub that reaches 3-6 feet. In April, the plant is covered with bright-yellow flowers. In the summer, the bluish-black, grape-like fruits develop. The foliage is dark, lustrous, and holly-like. In winter, the leaves turn a bronze-purple color. This shrub is usually semi-evergreen and much of the foliage dies in the winter. Protection from winter sun and wind will help it remain more attractive. It is useful in coastal areas of northern New England, but suffers winter leaf desiccation. (3 to 9 foot height; 3 to 5 foot spread)

PYRACANTHA/FIRETHORN,

Pyracantha coccinea

Pyracantha is an evergreen to semi-evergreen shrub. It produces showy, small, white flowers in the spring, but the clusters of bright-orange berries produced in the fall, hanging on the plant until mid-winter, are its main attraction. Pyracantha can be grown as an individual specimen plant, hedge, or barrier. It can be trained flat against a wall or on a trellis to look like a vine or espalier. It normally grows 6 to 7 feet tall and can spread to almost twice as wide, so ample space must be given for the plant to develop fully. Dwarf varieties are available for smaller areas, as are varieties with brighter-red fruit. Pyracantha is one of the few plants that seems to do best on poor soil. Good soil and high fertility produce rampant growth susceptible to disease (fire blight) and low in berry production. The plant has several insect problems to watch for, including lacebug and spider mite. It is best grown in coastal areas, and often suffers leaf desiccation. (2 to 10 foot height; 2 to 10 foot spread)

MOUNTAIN LAUREL, *Kalmia latifolia*

This beautiful shrub, with buds and flowers in many pink, rose, and red colors, is one of the prettiest shrubs available for both sun and shade locations. A moist, well-drained, acid soil is necessary. It suffers winter desiccation in all but coastal areas. (3 to 15 foot height; 3 to 15 foot spread)

NORTHERN BAYBERRY,

Myrica pennsylvanica

Bayberry is grown for its aromatic, semi-evergreen leaves and its waxy, gray berries. Because of their fragrance, the berries are frequently used in making candles. The sexes of bayberry are usually separate so both male and female plants need to be planted together to ensure production of the ornamental berries. Bayberry grows vigorously on good soil but will generally fruit more heavily when grown on poor soil. It is a fine ornamental, for its foliage as well as its fruit. It is very salt tolerant. (5 to 12 foot height; 5 to 10 foot spread)

Ornamental Vines

Vines serve many useful landscaping purposes. Where space is limited, vines may be used as dividers or barriers. They can screen unsightly views or provide privacy for the patio or porch. The monotony of a long fence or blank wall may be broken with vines. They can soften harsh structural lines and blend the structure with other plantings. On steep banks and in other areas where grass is difficult to establish and maintain, vines may be used as ground covers. They can be established on trellises against buildings to provide shade, thereby improving energy efficiency for cooling.

Selection of a suitable vine depends on its intended use, location, soil adaptability, and type of support. Dense, coarse foliage is desirable if a screen is needed. A fine-textured, slow-growing vine should be selected to add pattern and interest to a stone or brick wall. A decorative vine should possess desirable flowers, fruit, or foliage for seasonal interest.

Types

Vines can be classified according to their method of climbing: by tendrils, twining, or clinging. The kind of support required is determined by the growth habit of the vine selected.

Tendrils are slim, flexible, leafless stem appendages that wrap themselves about anything they contact. The grape is probably the best known vine which climbs by means of tendrils. Twining vines, such as bittersweet and clematis, wind their stems around any available support. Clinging vines climb by means of either tendrils with disk-like adhesive tips that attach themselves to any surface, such as Boston Ivy, or by means of small aerial rootlets along the stems that attach themselves into crevices of a rough-textured surface, such as Wintercreeper euonymus or climbing hydrangea.

Vine Supports

Twining and tendril-type vines climb best on wires, trellises, and arbors. They can be grown on solid vertical surfaces only if proper supports are provided. Although clinging vines can be used on brick or masonry walls, they can erode cement between bricks and weaken the wall. They should never be used on walls of frame buildings as their method of climbing, can cause damage. These vines cling so closely to the wall that moisture is likely to collect under them and cause the wood to rot.

Grow clinging vines on trellises far enough from the siding of wood structures to allow free air circulation behind the vines. The trellis should be movable to permit painting the siding without damaging the vine. Clinging vines are particularly valuable on concrete exposures such as along highways or commercial buildings.

Vine supports should be constructed with sturdy, durable materials. Wire, tubing, or wood may be used to make suitable support. Copper or aluminum wire or tubing is preferred over other metals, because these materials will not rust. Use pressure-treated wood or treat wood with a preservative that is not toxic to plants to make it last longer.

Culture

Plant bare-rooted vines in the spring before new growth starts. Plants growing in containers may be planted to early summer. Young vines should be trained to provide the desired growth pattern. New stems may need to be fastened into position by tying with a soft cloth. Some vines grow rampant and appear overgrown unless severely pruned at frequent intervals. Only when a naturalistic effect is desired, and there is adequate space, should vines be allowed to grow freely. Vines may develop sparse foliage low on the trellis and develop a mass of foliage at the top. To prevent this, pinch back the terminal growth of the stems as they develop. Pinching forces lower branching and more uniform distribution of foliage on the trellis. Vines growing poorly should be fertilized in early spring or late fall according to soil test recommendations.

Selected Vines

BITTERSWEET, *Celastrus* spp.

Two types of bittersweet commonly grown for ornamental use in the garden are: American bittersweet, *C. scandens*, a native plant, and Oriental bittersweet, *C. orbiculata*. The American bittersweet is a vigorous vine that grows 10 to 20 feet tall and climbs by means of twining stems. It will thrive in almost any soil or exposure except a wet, boggy situation. Bittersweet is planted for its attractive fruit, a favorite for dried arrangements. Reddish-yellow fruit capsules split open in early autumn to expose red-orange berries. The fruits are grouped in terminal clusters which make them conspicuous both before and after the leaves fall.

Bittersweet produces male and female flowers on separate plants. Male and female plants must be grown to ensure fruit set. Male plants are more vigorous growers and usually must be pruned harder than female plants to prevent the berry producing plants from being crowded out. One male plant should be used for each five female plants. Bittersweet is not easily transplanted due to the spreading root system; therefore, small, young plants should be used. Plants grow rapidly once established and can become a serious pest if not pruned back to keep them under control. The vines should not be permitted to climb trees or shrubs, as they have the ability to choke them out. Bittersweet occasionally may be infested with euonymus scale, but has few other insect or disease pests.

BOSTON IVY, *Parthenocissus tricuspidata*

Boston ivy is one of the best vines for covering structures or supports quickly. It is a fast-growing, close-clinging vine which climbs by means of adhesive disks that have the potential to damage masonry walls and buildings. The vine is tolerant of many soil types and grows in full sunlight or in shade. Boston ivy grows to a height of 50 to 60 feet. Its bright-green leaves stand out and overlap on long stalks. Leaves turn rich tones of scarlet, orange, or purple in the fall. The new growth in spring is reddish-bronze.

The flowers are inconspicuous but attract a large number of bees. Fruit is fairly showy in the fall after the leaves are gone. The bluish-black berries are attached to the vine in grape-like clusters and persist after the leaves have fallen. The vine is well-adapted to city conditions. When given free rein, the vine will cover windows, doors, or anything in its path; it needs annual pruning. Easily transplanted; start with 2-year plants.

CLEMATIS, *Clematis* spp.

Clematis are among the most decorative and spectacular of all the flowering vines. A wide range of color and flower shape may be found in the many varieties and species offered for sale. The large-flowered clematis hybrids are the most widely used. These hybrids are deciduous vines that climb by twining stems, which act as tendrils. They attain a height of 8 to 10 feet. Flowering time varies according to variety but may be from late spring until frost. The Sweet Autumn Clematis, *Clematis dioscoreifolia robusta* (C. paniculata), is a more vigorous species that grows to 20 or 30 feet. It is an easy vine to grow and is popular for the masses of fragrant, white flowers produced in late August and September.

Clematis prefer a light, loamy, well-drained soil with a pH between 6.5 and 7. Lime should be added if soil pH is below pH 6.5. They require constant soil moisture. Clematis grow well in full sun or partial shade. Preferably, the foliage should be exposed to full sun and the soil kept cool and shaded by low ground-cover plants or mulch. Vines grow well on the east side of a wall, but not on the north. Protection from strong winds is also desirable. Proper pruning time depends upon variety. Those which bloom on previous year's wood should be pruned immediately after flowering. Many types grown in northern New England bloom on growth made during the current year and should be pruned in early spring before new growth appears.

When planting, the crown of the plant should be set at ground level and mulched. Support, such as a bamboo stake, must be provided immediately to prevent breakage of the brittle stems. A light lattice trellis is one of the best supports for clematis. The landscape uses of clematis are many. They are excellent accent vines when trained on arbors, light wires, or delicate trellises but are also effective when allowed to trail over rocks, stone walls, or fences.

ENGLISH IVY, *Hedera helix*

English ivy is a handsome evergreen vine, climbing by attaching itself to rough surfaces by very short aerial rootlets. It may attain a height of 20 to 50 feet further south, but in northern New England it generally winter kills on branch tips, a process which prevents it from reaching maximum size. The rich, leathery, dark, shiny leaves hold their color all winter if protected from winter sun and wind. North or east facing walls are the most satisfactory locations. English ivy prefers a shady location with a fairly moist soil, well-supplied with organic matter.

Flowers are only produced on old vines that have reached a mature condition. They are greenish and small, followed by ½ inch, blue-black fruit in large clusters that persist for several months. The landscape uses of English ivy are many, both indoors and outdoors. As a ground cover in the shade or under trees and shrubs, it is an excellent broad-leafed evergreen. On vertical, flat surfaces, interesting patterns are formed during its first few years of growth. It is not suitable for covering walls with a southern exposure because of the intense summer heat and winter sun. 'Baltica' and 'Bulgaria' English Ivy are a hardier varieties recommended for use in New Hampshire.

HONEYSUCKLE, *Lonicera* spp.

A few climbing honeysuckles are suitable for landscape use in northern New England. Most frequently found are the Hall's Japanese Honeysuckle, *L. japonica* 'Halliana,' Goldflame Honeysuckle, *L. heckrottii*, and Trumpet Honeysuckle, *L. sempervirens*. Hall's Japanese honeysuckle is a semi-evergreen vine with wiry stems. It climbs 20 to 30 feet by twining, or forms a ground cover by rooting at the joints. It is a rampant vine that easily grows out of bounds and becomes a pest unless carefully controlled. Flowers open white and turn pale yellow. They are produced from June to September. Black berries produced in the fall are of little ornamental value. It should not be placed where it can climb on other plants or trees. It needs annual pruning to keep it in bounds. Goldflame Honeysuckle is the best of the climbing honeysuckles. Pink buds open to yellow, and then age to pink, from early to midsummer. It climbs 10 to 20 feet.

The Trumpet Honeysuckle is a loose-growing vine with twining stems and semi-evergreen, bluish-green leaves. Scarlet trumpet-shaped flowers are produced from May to August at the ends of the branches. Red fruits attract the birds in early fall. It will grow 15 to 20 feet high.

The climbing honeysuckles are among the easiest plants to grow in the garden. They will thrive either in sun or shade. Although they perform best in good, well-drained garden soil, they will tolerate poor soils. However, they do not tolerate wet, boggy conditions. Honeysuckles stand severe pruning and can be cut back to 6 to 8 inches if they have grown out of bounds or need rejuvenation. Although a few insects and diseases may attack honeysuckles, they usually are not serious problems.

CHINA FLEECE VINE/SILVER-LACE VINE, *Polygonum aubertii*

This vine, sometimes called a silver-lace vine, produces clusters of small, white to greenish-white flowers in August and September, which turn pinkish at maturity and remain effective for a long time. The dense foliage is bright-green. The vine is a rank grower and can be used for a quick screen. Once established, it may grow as much as 20 feet in a single season. It will require severe pruning each spring to keep it within bounds, and can become a nuisance. It is adaptable to many soil types and is suitable for city conditions. It needs a sunny location.

TRUMPET CREEPER/TRUMPET VINE,
Campsis radicans

Common trumpet creeper is a deciduous, robust vine that climbs by both aerial rootlets and twining stems. Growing to a height of 25 to 30 feet, this vine is useful for rustic effects on fence posts, walls, poles, or rock work. Brilliant orange and scarlet, 2 to 3 ½ inches long, the trumpet-shaped flowers are very showy from July through September. The dark-green leaves present a bold, tropical appearance. Long, cigar-like fruits on bright-tan stems may be considered decorative during the winter months. Common trumpet-creeper grows well in partial shade. However, a full-sun exposure is required for maximum flower production. It will tolerate both wet and dry soils.

Additional support is sometimes required for this vigorous vine. Tying the heavy branches to a sturdy support and thinning the vine in early spring will prevent strong winds from tearing it down. Pinch back the tips during the growing season to eliminate excessive top growth and promote bushiness. Common trumpet-creeper transplants readily. It is a prolific seed producer and may become a pest if not kept under control. A hybrid variety, 'Madame Galen,' has larger, more showy flowers than the common type. Color is salmon-red rather than orange-scarlet.

VIRGINIA CREEPER/WOODBINE,
Parthenocissus quinquefolia

Virginia creeper is a native, deciduous vine which climbs by tendrils with adhesive disks that adhere to brick, stone, or tree trunks. It grows 30 to 50 feet tall and has a loose, open growth pattern. The leaves of Virginia creeper are five-parted and stand out on slender, drooping side branches. They open purplish in the spring, remain a dull, deep green throughout the summer, and turn brilliant scarlet or crimson before dropping in the fall. It is one of the first of all woody plants to display fall color. Inconspicuous, greenish flowers develop into clusters of bluish black, pea-sized berries in September and October. The berries either fall before winter or are eaten by birds after the leaves drop.

Virginia creeper will grow in a variety of soils and is considered to be a very drought-resistant plant. Thriving either in a sun or shade exposure, Virginia creeper is valued for producing a pleasing pattern on large blank walls, for covering rustic structures, and for covering ground or bank in rocky areas.

WINTERCREEPER EUONYMUS,
Euonymus fortunei

Wintercreeper euonymus is a handsome, ever-green vine growing to 15 to 20 feet. This shrubby vine climbs by means of aerial rootlets. It attaches to any upright support or roots on the soil surface to form a near mat. The species seldom flowers or produces fruit. However, several varieties available are valued for their pink capsuled fruits which split open to expose orange seeds. The rich, dark-green, leathery leaves of some types turn a bronzy-green in the fall.

Wintercreeper grows slowly in the shade but prefer protection from the winter sun to prevent desiccation. The plant is tolerant to many soil conditions but prefers soil that is moist and well supplied with organic matter. Wintercreeper is useful for training against walls, as ground covers, and for climbing over low walls and on tree trunks. The vine may be allowed to completely cover a wall or may be thinned out to give a tailored tracery. Varieties of varying leaf form and fruiting ability are available. Growth habits and cultural requirements of these are essentially the same. Euonymus scale is their most serious pest. This plant often winterburns and dies back from winter damage.

JAPANESE WISTERIA, *Wisteria floribunda*

The wisterias are vigorous, twining vines that grow to 25 or 30 feet. These vines are most valued for their long, pendant clusters of violet-blue flowers. Varieties are available which produce flowers of varying colors (from white to pink to deep reddish and bluish-violet). Bean-like, velvety pods remain after the leaves fall, but are not particularly ornamental. All wisterias will bloom, but some vines take as long as 7 to 15 years to produce their first flowers. Excessive nitrogen fertilizer may stimulate leaf and stem growth at the expense of flower production. The following practices may help induce flowering: (1) an application of superphosphate in early spring, (2) severe pruning of the new growth in late spring or early summer, and (3) root pruning by cutting some of the roots with a spade a few feet from the trunk in late fall. Grafted plants or plants that have flowered in the nursery are recommended to ensure earlier bloom.

Wisterias are excellent vines for training on stoutly constructed arbors and pergolas but are

hardy only in the milder areas of northern New England. They are best when trained horizontally on a wire or structure 10 to 20 feet above the ground. The vines are excellent for use on open-structured roofs over patios and terraces.

Japanese wisteria is a rapid-growing vine. It climbs by stems twining from right to left. A twisted, heavy main stem or trunk several inches in diameter is often developed. The shiny, bright-green leaves turn yellow in autumn. The fragrant, pea-like flowers are arranged in clusters 8 to 36 inches long. The flowers open gradually from base to tip of the cluster when the leaves appear. The flower clusters are longer but more open than those of the Chinese wisteria, which is not hardy in the north.

CLIMBING HYDRANGEA,

Hydrangea anomla subsp. *petiolaris*

An excellent landscape vine with very showy, flat-topped flower clusters in summer; glossy, dark-green leaves; and exfoliating winter bark, it is slow to establish but once well-rooted grows rapidly with clinging roots that will attach to structures and supports. It may grow 60 to 80 feet, so use a sturdy support. It is generally hardy in central and southern New Hampshire.

DUTCHMAN'S PIPE, *Aristolochia durior*

This vigorous vine graces many New England porches with its 4-10 inch dark green, heart-shaped leaves and unusual yellowish flowers. It grows 10-20 feet in a single season and tolerates any moist, well-drained soil in a sunny or partly shaded location.

Groundcovers

Groundcovers are low-growing plants that spread quickly to form a dense cover. They add beauty to the landscape and at the same time help prevent soil erosion. Many types of plants, including shrubs, vines, and perennials, can be used as excellent groundcovers.

Grass is the best known groundcover, but grass is not suited to all locations. Other groundcover plants should be used where grass is difficult to grow or maintain. Unlike grass, most groundcovers cannot be walked on. They can be used effectively to reduce maintenance work and to put the finishing touch on any landscaping project.

Location

Ground covers can be found to fit many conditions, but they are used most frequently for the following locations:

- Steep banks or slopes

- Shady areas under trees and next to buildings

- Underplanting in shrub borders and beds

- Where tree roots grow close to the surface and prevent grass from growing.

- Very wet or very dry locations

When planted under trees, ground covers reduce the possibility of mower damage to the base of the tree. Some ground covers may be used to protect the roots of shallow-rooted trees. They shade the soil and keep it from drying out rapidly. Some ground covers don't require as much moisture and nutrients as grass. Therefore, they are in less competition with trees and shrubs.

Selection

Selection of a suitable plant for ground cover depends on the area where it will be grown. Some ground cover plants prefer partial shade; others thrive in deep shade or full sun; and a few grow well in either sun or shade. The selected ground cover plants listed here grow well in a wide variety of soil types. Some, however, prefer moist soil, while others need dry or well drained soil. Select types best suited to the conditions existing where the ground cover is needed. From these selected types, choose one that ornamentally blends best with surrounding plantings.

Culture

A well-prepared planting bed is necessary to develop a dense, healthy ground cover planting. The soil should be worked to a depth of 6 to 8 inches. Take care to eliminate perennial weeds and grass that might compete with the ground cover during establishment. Organic materials such as peat moss, leaf mold, compost, or well rotted manure lighten clay soils and improve the water-holding capacity of sandy soils. Eight to ten bushels of organic materials per 100 square feet incorporated to a depth of 6 to 8 inches may be necessary in very poor or heavy soils. If you need to add a soil amendment, add it to the entire planting bed, not just to individual planting holes.

A soil test provides the best guidance for fertilizer usage. Mix the fertilizer into the soil to a depth of 6 to 8 inches. Most ground cover plants can be planted from spring to midsummer, but spring is preferred. The arrangement and spacing of plants in the planting bed depends on the growth characteristics of the plant.

Space plants so they will develop a uniformly covered area in a relatively short period of time. Plant in staggered rows, not straight lines, in both directions to get faster coverage.

Plants that spread rapidly may be spaced much wider than slowly spreading types. Spacing also depends on funds available and how quickly a complete cover is wanted. Spacings from 6 inches to 2 feet are most frequently used. If plants are spaced 4 inches apart, 100 plants will cover about 11 square feet.

Watering, weeding, mulching, and feeding will be the main requirements of the new ground cover planting. Water during dry periods. An occasional thorough soil soaking is better than frequent light watering. Occasional hand weeding with a minimum disturbance of the soil may be necessary. A 1 to 2 inch mulch layer of leaf mold, compost, or similar organic material will conserve soil moisture and reduce weed growth.

Selected Groundcovers

AJUGA/CARPET BUGLEWEED, *Ajuga reptans*

Ajuga is a good ground cover, forming a dense carpet of foliage over the soil. This semi-evergreen plant grows rapidly by producing mats of foliage in rosettes. Runners develop from the mother plants, take root and produce new plants. The foliage grows about 4 inches high with upright clusters of blue flowers reaching 6 to 8 inches. The plant flowers in early May to mid-June. Ajuga will flourish in almost any soil with good drainage. It grows best in sun or light to medium shade.

The foliage is deep-green in color and partly evergreen, turning brown after severe freezing weather. Bronze and variegated varieties are also available. The extensive root system prevents soil erosion. If established plants are set 12 to 15 inches apart in the spring, they will cover the soil in one growing season. Do not set the plants too deep. The crown should never be covered. In the spring or early fall, rooted "runner plants" can be dug from established plantings and replanted elsewhere.

CREEPING JUNIPER, *Juniperus horizontalis*

Although not the only juniper species commonly used as a groundcover, creeping juniper is an excellent, woody, evergreen plant cover that grows 1 to 2 feet tall depending on the variety. It is a vigorous grower capable of covering a large area. The leaves are needle-shaped and green or blue-green in color. The foliage frequently turns a purple or slate color in the winter.

Creeping juniper withstands hot, dry situations, prefers full sun and excellent drainage, and grows well on slopes and banks. The plants may be improved by clipping the ends of main branches for two or three seasons after planting to induce a dense branching system. Plants should be spaced 2 to 4 feet apart. Some common varieties are listed below:

Andorra juniper (*J. h.* 'Plumosa') is a flat-topped variety with a compact habit of growth, reaching a height of approximately 18 inches. The foliage is a light grey-green, becoming a purplish-plum color in the winter.

'Bar Harbor' is a low, vigorous-growing plant usually no more than 8 inches tall. The foliage is grey-green in summer, turning a slate color in winter.

'Wiltoni' (Blue Rug) grows flat on the ground. The foliage is an outstanding blue color which is retained all winter.

MOSS PINK, *Phlox subulata*

Creeping phlox is commonly used as a rock garden plant but forms an effective ground cover on poor, bare soils where there is little competition. It forms a dense mat of moss-like foliage, which is covered in spring with masses of flowers in either pink, purple, or white. In rocky areas, it will persist in the existing soil and drape itself over the stones. It is a plant for full sun and relatively dry soils. As plants age, they may tend to develop occasional dead spots. Periodic division to fill such spots may be necessary. In coastal areas the plants are evergreen, but where winters are cold and plants are exposed, browning may occur.

CROWN VETCH, *Coronilla varia*

Crown vetch is a perennial legume sometimes used to cover dry, steep, rocky slopes. The plant grows 1 to 2 feet tall and bears small pink flowers from July to September. The plant spreads by underground stems, and one plant can cover an area up to 6 feet in diameter. It tolerates shade but thrives in full sun. The foliage dies to the ground by December. Crown vetch is most valued for its ability to prevent soil erosion. It is often used for this purpose on highway slopes. The plant is suited for covering large areas and is too vigorous and invasive for small sections of the landscape.

The plant is propagated either from crowns or by seed. Crowns planted 2 feet apart will provide coverage in about 2 years. One crown per square foot is recommended for quick cover. It can be seeded further south with good results, but in northern New England crowns produce quicker effect.

ENGLISH IVY, *Hedera helix*

English ivy is an evergreen, creeping vine forming a dense mat of dark-green foliage 6 to 8 inches tall. The plant grows best in shade or semi-shaded locations. It is most useful on north and east facing banks, under trees where grass will not grow, or under planted between shrubs. If exposed to full sun or sweeping winds, the foliage "burns" in the winter. Although it can be planted 1 foot apart for cover in 1 year, it is more economical to transplant growing plants from pots or flats in the spring at a spacing of 18 to 24 inches. Vines may grow about 3 feet the first season.

When used next to buildings or walls, English ivy will climb, clinging by means of aerial rootlets. This may be an asset or fault depending upon the situation and personal preference. Its aerial roots have the ability to damage mortar between benches. 'Baltica' and 'Bulgaria' English ivy are hardy selections recommended for coastal and northern New England.

HALL'S JAPANESE HONEYSUCKLE, *Lonicera japonica* 'Halliana'

Hall's honeysuckle is a branched, dense, semi-evergreen, woody vine which covers the ground and roots at the nodes. It is best used on large banks or other difficult situations where large areas must be covered. The plant is too vigorous and rangy for small areas. It should never be planted near trees or shrubs as it will climb them and eventually choke them out. The dark-green leaves appear early in the spring, turn bronze in the fall, and usually hang on most of the winter.

The fragrant flowers are white, turning a pale yellow with age. The plant flowers continuously in midsummer. The plant grows slowly until well established, then very robustly, attaining a height of 18 to 24 inches. It does well in sun or partial shade. The plant is tolerant of all soil conditions, including very dry soils.

HOSTA/PLANTAIN LILY, *Hosta* spp.

For partially shaded areas, hostas make effective ground covers. They appear most often in perennial borders as accent plants or edgings, but their large leaves provide a lush covering for the soil. Hosta species vary in size and foliage color. Some have deep-green, yellow-green, blue-green, or grey-green foliage while others are edged or variegated with white or cream. Hostas may also produce lily-shaped flowers in white or lavender. Flower stems may be 6 to 24 inches tall, and plants range from dwarf (3 to 4 inches) to tall (2 feet) forms.

As a ground cover, hostas are best where the soil remains slightly moist. Excessively dry soil may cause the foliage to burn around the margins or partially die back. In full sun, leaf color is pale and leaf die-back may be more severe, especially during dry periods. In winter the foliage of hostas dies back leaving the ground exposed. However, new foliage develops quickly in spring and lasts well into the fall.

PACHYSANDRA/JAPANESE SPURGE,*Pachysandra terminalis*

Pachysandra is a popular ground cover suitable for shady landscape situations. This evergreen plant spreads by underground stems and attains a height of 1 foot. The foliage is tinged purple in spring, becoming bright-green in summer and yellow-green in winter. Clusters of tiny, off-white blossoms appear above the leaves in May, but they have little ornamental value.

The plant is adapted to full or partial shade. When planted in full sun, growth is poor. It is one of the few plants that will grow under evergreens and in dense shade. The evergreen leaves commonly "burn" and turn brown in exposed places during the winter. Established plants are usually planted 1 foot apart in the spring. Clipping the tips of vigorous growing shoots in the spring will induce the plant to become more dense. The plants should not be cut all the way to the ground. The plant prefers a moist, highly organic, well-drained soil for best establishment. A planting of this ground cover is usually a uniform height throughout.

COMMON PERIWINKLE/MYRTLE/VINCA,*Vinca minor*

Periwinkle or myrtle is an excellent, evergreen ground cover with dark-green foliage and purple, blue, or white flowers, depending on the variety. It blooms in April-May. The plant grows about 6 inches tall, spreading in all directions by sending out long trailing and rooting shoots which make new plants. It prefers shade. The foliage color is richer in mid shade, but more flowers are produced in light shade.

This ground cover is most commonly used for under planting trees and shrubs, on shaded slopes, or on the north side of buildings. Rooted cuttings or established plants are normally spaced from 12 to 18 inches apart. At a 6-inch spacing, a complete cover will be produced in 1 year. Plant in the spring in areas with severe winters. Spring flowering bulbs interplanted with periwinkle will lend color and interest to the ground cover planting. Daffodils are particularly well-suited since they bloom with periwinkle and do not require frequent division.

PURPLELEAF WINTERCREEPER,*Euonymus fortunei coloratus*

Purpleleaf Wintercreeper is an excellent evergreen plant for covering relatively large areas, banks, slopes, and shaded areas under trees. The plant sends out prostrate stems which root where they contact moist soil. It will cling to vertical walls and surfaces it contacts and has the potential to do some damage. When established, this ground cover forms a loose, somewhat irregular network of stems to a height of 8 to 12 inches. Its deep-rooting habit makes it a good soil binder.

The medium-green evergreen foliage turns purplish-red in early fall, retaining this color throughout the winter. The plant does not produce flowers or fruit. Established plants are usually planted in the spring at a distance of 18 to 24 inches apart. One plant per square yard will make a cover in two or three growing seasons. Some pruning of upright shoots helps to keep the ground cover lower and more compact. The plant grows well in full sun or shade. It is suitable for most of northern New England, but winter kills in the far north or on sites exposed to winter wind and sun. In addition to the purpleleaf variety, there are numerous cultivars of wintercreeper that make excellent groundcovers.

YUCCA, *Yucca filamentosa*

Yucca is a rugged plant able to take almost any situation. The plant is normally around 2 feet high with all the leaves arising from a central point at ground level in a rosette fashion. The leaves are long, pointed and rigid. In summer the plant produces a flower stalk about 4 feet high with a large head of pendulous, creamy-white flowers. Yucca is used as an accent plant and is frequently used in modern ground plantings. The plant is suited best to hot dry situations.

RUSSIAN ARBORVITAE,*Microbiota decussata*

This 12" tall evergreen groundcover resembles eastern white cedar in texture. With time, it can spread to a diameter of 12 to 15 feet. It performs best in full sun to partial shade, and moist well-drained soil. It is green in summer and purplish in winter.

SEDUM/STONECROP, *Sedum* spp.

Over 300 species and 500 cultivars of sedums exist, ranging from tiny mats only a few inches high to plants 2 feet high. They are used as mass ground covers, in rock gardens, on slopes, between stepping stones, and even in containers. Most of the sedums are spreading or creeping plants that will root from broken branches or fallen leaves. Related to the cacti, their thick, waxy, generally evergreen leaves mean that they do not require large amounts of water. Most sedums are very drought tolerant, and will rot if kept too moist or if air circulation is poor. They are best used in full sun, where they produce flowers ranging from tiny yellow-green stars to large masses of small, pink to wine-colored flowers. Foliage color will also vary, from various shades of green to blues and bronzes.

ORNAMENTAL GRASSES, numerous genera, species, and cultivars

The group of ground covers increasing most rapidly in popularity at present is the ornamental grasses. With heights ranging from under 1 foot (blue fescue) to over 5 feet (zebra grass), the ornamental grasses will generally have a member that can fit any landscape situation. Often used strictly as ground covers and for erosion control on slopes, ornamental grasses also make outstanding specimen plants when used as individual plants in the landscape. In addition to a wide range of heights and spread, there is tremendous variation in leaf size and color. Leaf colors range from pale greens to bright power blues and blood reds, with many types of both vertical and horizontal stripe patterns.

Most of the ornamental grasses require full sun and will produce a wide variety of flowers, ranging from small, bottlebrush arrangements to large, showy plumes. Flower colors range from pale yellows and pinks to deep maroons. Many of the flower spikes persist well into the winter giving added landscape interest, though the leaf clumps will generally die to the ground and regrow each spring.

Additional ground covers to consider include bearberry, hypericum, candytuft, goutweed, santolina, ferns, many plants often classified as perennials (such as daylilies), and various woody shrubs (Japanese holly, cotoneasters, etc.)

List of Plants for Specific Purposes

Trees Resistant to Gypsy Moth

Species rarely fed upon:

ash	<i>Fraxinus</i> species
red cedar	<i>Juniperus virginiana</i>
honey locust	<i>Gleditsia triacanthos</i>
sycamore	<i>Platanus occidentalis</i>
tulip tree	<i>Liriodendron tulifera</i>
white cedar	<i>Thuja occidentalis</i>
black walnut	<i>Juglans nigra</i>
black locust	<i>Robinia pseudoacacia</i>

Species fed upon when other foliage is gone:

hickory	<i>Carya</i> species
black gum	<i>Nyssa sylvatica</i>
hornbeam	<i>Carpinus caroliniana</i>
red maple	<i>Acer rubrum</i>
Norway maple	<i>Acer platanoides</i>
sassafras	<i>Sassafras albidum</i>
beech	<i>Fagus grandifolia</i>

Thorned and prickly plants useful as barriers:

barberry	<i>Berberis</i> species
hawthorn	<i>Crataegus</i> species
flowering quince	<i>Chaenomeles</i> species
roses	<i>Rosa</i> species
red cedar	<i>Juniperus virginiana</i>
holly	<i>Ilex</i> species
mahonia	<i>Mahonia</i> species

Plants to Attract Wildlife

Birds and other animals seek food, shelter, water, and safe areas for reproduction. The plants listed help meet these requirements.

Trees:

beech	<i>Fagus</i> species
oak	<i>Quercus</i> species
pine	<i>Pinus</i> species
red cedar	<i>Juniperus virginiana</i>
ash	<i>Fraxinus</i> species
birch	<i>Betula</i> species
cherry	<i>Prunus</i> species
dogwood	<i>Cornus</i> species
blackgum	<i>Nyssa sylvatica</i>
hickory	<i>Carya</i> species
holly	<i>Ilex</i> species
magnolia	<i>Magnolia</i> species
maple	<i>Acer</i> species
persimmon	<i>Diospyros virginiana</i>
tulip tree	<i>Liriodendron tulipifera</i>
service berry	<i>Amelanchier</i> species
sassafras	<i>Sassafras albidum</i>
crabapple	<i>Malus</i> species

Shrubs:

sumac	<i>Rhus</i> species
spice bush	<i>Lindera benzoin</i>
viburnum	<i>Viburnum</i> species
yew	<i>Taxus</i> species
elderberry	<i>Sambucus</i> species
rhododendron	<i>Rhododendron</i> species
hawthorn	<i>Crataegus</i> species
Russian olive	<i>Elaeagnus angustifolius</i>
Oregon grape holly	<i>Mahonia</i> species
pyracantha	<i>Pyracantha</i> species

Vines and other plants:

blackberry
raspberry
teaberry
partridge berry
honeysuckle
Virginia creeper
bittersweet
pokeberry
blueberry

Plants Tolerant of Dry, Poor Soil

Get the plants listed here off to a good start by preparing the soil they are to be planted in and by watering until they are established.

Trees:

graybirch	<i>Betula populifolia</i>
hackberry	<i>Celtis occidentalis</i>
junipers	<i>Juniperus</i> species
golden rain tree	<i>Koelreutaria paniculata</i>
osage orange	<i>Maclura pomifera</i>
Virginia pine	<i>Pinus virginiana</i>
red pine	<i>Pinus resinosa</i>
chestnut oak	<i>Quercus prinus</i>
locust	<i>Robinia pseudoacacia</i>
sassafras	<i>Sassafras albidum</i>

Shrubs:

amur maple	<i>Acer ginnala</i>
Japanese barberry	<i>Berberis thunbergii</i>
quince	<i>Chaenomeles</i> species
smoketree	<i>Cotinus coggygia</i>
broom	<i>Cytisus</i> species
Russian olive	<i>Elaeagnus angustifolia</i>
witch hazel	<i>Hamamelis virginiana</i>
St. Johnswort	<i>Hypericum</i> species
privet	<i>Ligustrum</i> species
buckthorn	<i>Rhamnus</i> species
sumac	<i>Rhus</i> species

Groundcovers:

yarrow	<i>Achillea</i> species
sweet William	<i>Dianthus</i> species
daylilies	<i>Hemerocallis</i> species
cinquefoil	<i>Potentilla</i> species
creeping phlox	<i>Phlox subulata</i>
St. Johnswort	<i>Hypericum</i> species

Plants Tolerant of Shade

The degree of shade tolerance varies from plant to plant. Most will do well with some sun, especially those that flower.

Trees:

red bud	<i>Cercis canadensis</i>
arborvitae	<i>Thuja occidentalis</i>
hemlock	<i>Tsuga</i> species

Shrubs:

abelia	<i>Abelia</i> species
alders	<i>Alnus</i> species
chokeberry	<i>Aronia</i> species
aucuba	<i>Aucuba japonica</i>
barberry	<i>Berberis</i> species
Hinoki cypress	<i>Chamaecyparis</i> species
hollies	<i>Ilex</i> species
mountain laurel	<i>Kalmia latifolia</i>
leucothoe	<i>Leucothoe fontanesiana</i>
mahonia	<i>Mahonia</i> species
heavenly bamboo	<i>Nandina domestica</i>
pieris	<i>Pieris</i> species
rhododendron	<i>Rhododendron</i> species
yew	<i>Taxus</i> species
viburnum	<i>Viburnum</i> species

Ground covers:

spurge	<i>Pachysandra terminalis</i>
periwinkle	<i>Vinca minor</i>
bugle weed	<i>Ajuga</i> species
lily-of-the-valley	<i>Convallaria majalis</i>
ferns	several
daylilies	<i>Hemerocallis</i> species
plantain lily	<i>Hosta</i> species
Virginia bluebells	<i>Mertensia virginica</i>
primrose	<i>Primula</i> species
violets	<i>Viola</i> species

Plants Tolerant of Salt

autumn olive	<i>Elaeagnus angustifolia</i>
honey locust	<i>Gleditsia triacanthos</i>
mulberry	<i>Morus</i> species
black locust	<i>Robinia pseudoacacia</i>
buffalo berry	<i>Shepherdia argentea</i>
tamarix	<i>Tamarix gallica</i>
white oak	<i>Quercus alba</i>
red oak	<i>Quercus borealis</i>
English oak	<i>Quercus robur</i>
white willow	<i>Salix alba</i>

Plants with Colorful Autumn Foliage

Shrubs:

Botanical Name	Common Name	Color Range	Height
<i>Acer ginnala</i>	Amur Maple	Scarlet	8 feet
<i>Cornus alba</i> 'sibirica'	Siberian Dogwood	Red	9 feet
<i>Euonymus alatus</i>	Winged Euonymus	Scarlet	7 feet
<i>Nandina domestica</i>	Nandina	Scarlet	6 feet
<i>Rhus aromatica</i>	Fragrant Sumac	Yellow -scarlet	4 feet
<i>Rhus copallina</i>	Shining Sumac	Scarlet	25 feet
<i>Rhus glabra</i>	Smooth Sumac	Bright red	25 feet
<i>Rhus typhina</i>	Staghorn Sumac	Red	30 feet
<i>Rosa rugosa</i>	Rugosa Rose	Red -yellow	6 feet
<i>Vaccinium</i> species	Blueberries	Scarlet	3-25 feet
<i>Viburnum</i> species	Arrowwood	Red to burgandy	6-20 feet

Trees:

Botanical Name	Common Name	Color Range	Height
<i>Acer saccharum</i>	Sugar Maple	Red-yellow	Tall
<i>Acer rubrum</i>	Red or Swamp Maple	Red	Tall
<i>Amelanchier laevis</i> virginicus	<i>Chionanthus</i> Fringetree	Yellow	Medium
<i>Cornus mas</i>	Cornelian Cherry	Red	Small
<i>Cornus kousa</i>	Japanese Dogwood	Bronze to red	Small
<i>Crataegus phaenopyrum</i>	Washington Hawthorn	Scarlet /orange	Medium
<i>Ginkgo biloba</i>	Ginkgo	Yellow	Tall
<i>Liquidambar styraciflua</i>	Sweet Gum	Scarlet	Tall
<i>Oxydendrum arboreum</i>	Sourwood or Sorrel Tree	Scarlet	Medium
<i>Pyrus calleryana</i> 'Bradford'	Bradford Pear	Dark red	Medium
<i>Quercus rubra</i>	Red Oak	Red	Tall
<i>Quercus coccinea</i>	Scarlet Oak	Scarlet	Tall
<i>Sassafras albidum</i>	Sassafras	Orange /scarlet	Medium

Plants with Attractive Fruit

Shrubs:

Botanical Name	Common Name	Fruit Color	Season	Height
<i>Aronia arbutifolia</i>	Red Chokeberry	Red	Fall	8 feet
<i>Berberis thunbergii</i>	Japanese Barberry	Red	Fall-Winter	5 feet
<i>Callicarpa japonica</i>	Japanese Beautyberry	Purple	Fall	6 feet
<i>Cotoneaster species</i>	Cotoneaster	Red	Fall	1-15 feet
<i>Elaeagnus multiflora</i>	Cherry Elaeagnus	Red	Mid Spring	9 feet
<i>Euonymus alatus</i>	Winged Euonymus	Scarlet	Fall	7 feet
<i>Ilex verticillata</i>	Winterberry	Red	Fall-Winter	7 feet
<i>Ligustrum lucidum</i>	Evergreen privet	Blue-black	Fall-Winter	10 feet
<i>Lonicera species</i>	Bush Honeysuckle	Red	Spring-Fall	8-15 feet
<i>Mahonia aquifolium</i>	Oregon Holly Grape	Bluish-black	Spring	6 feet
<i>Nandina domestica</i>	Nandina	Red & white	Fall-Winter	6 feet
<i>Pyracantha coccinea lalandei</i>	Pyracantha or Firethorn	Orange	Fall-Winter	6-20 feet
<i>Rhus glabra</i>	Smooth Sumac	Scarlet	Fall-Winter	15-20 feet
<i>Rhus typhina</i>	Staghorn Sumac	Crimson	Fall-Winter	15 feet
<i>Rosa species</i>	Rose	Red	Fall	6 feet
<i>Symphoricarpos albus</i>	Snowberry	White	Fall	3 feet
<i>Viburnum dilatatum</i>	Linden Viburnum	Red	Fall	10 feet
<i>Viburnum opulus</i> Viburnum	European Cranberry bush		Red	Fall-Winter 10 feet

Trees

Botanical Name	Common Name	Fruit Color	Season	Height
<i>Acer ginnala</i>	Amur Maple	Red	Summer	20 feet
<i>Crataegus species</i>	Hawthorn	Red	Fall	15-30 feet
<i>Ilex opaca</i>	American Holly	Red	Fall-Winter	45 feet(marginal)
<i>Juniperus virginiana</i>	Red Cedar	Bluish	Fall-Winter	75 feet
<i>Liquidambar styraciflua</i>	Sweet Gum	Brown	Fall	100 feet
<i>Malus species</i>	Crab Apple	Red to yellow	Fall	20-40 feet
<i>Melia azedarach</i>	Chinaberry	Yellow	Fall-Winter	40 feet
<i>Oxydendrum arboreum</i>	Sourwood or Sorrel Tree	Grayish	Fall-Winter	75 feet
<i>Sorbus species</i>	Mountain Ash	Red	Fall	30 feet
Evergreens with cones		Brown	Fall-Winter	75-100 feet

Vines

Botanical Name	Common Name	Fruit Color	Season	Height
<i>Ampelopsis brevipedunculata</i>	Porcelain Ampelopsis	Lilac-blue	Fall	25 feet
<i>Celastrus scandens</i>	American Bittersweet	Yellow-red	Fall-Winter	30 feet
<i>Euonymus fortunei</i>	Wintercreeper	Orange	Fall	30 feet

New Hampshire Plant Hardiness Zone Map

Average Winter Minimum Temperatures

U.S. Dept. of Agriculture

Zone	Degrees (F)	Zone	Degrees (F)
3A	-35 to -40	3	-20 to -35
3B	-30 to -35	4	-10 to -20
4A	-25 to -30	5	-5 to -10
4B	-20 to -25	6	-5 to -5
5A	-15 to -20		
5B	-10 to -15		
6A	-5 to -10		
6B	-0 to -5		

Adapted from the latest U.S.D.A. hardiness range map by Charles H. Williams, UNH Extension Specialist-Ornamentals. 1991

