

CHAPTER 14

Herbaceous Landscape Plants

Planning the Flower Border	2
Annuals	4
Culture and Maintenance of Annuals	4
Controlling Insects and Diseases	7
Biennials	8
Perennials	8
Culture and Maintenance of Perennials	9
Controlling Insects and Diseases	11
Asexual propagation of perennials	11
Bulbs	12
Culture and Maintenance of Bulbs	12
Annuals for Special Uses	14
Annuals for Special Environments	16
Annuals Tolerant of Cool Weather	16
Tender Annuals	16
Heat-resistant Annuals	16
Annuals for Partial Shade	16
Annuals That Tolerate Heat, Drought and Sandy Soils	16
Annuals by Color and Height	17
Perennials for Special Use	18
Perennials for Borders of Ponds And Streams	18
Perennials for Background Planting	18
Perennials for Edging	18
Perennials for Ground Cover, Banks, and Terraces	18
Perennials for Bold or Sub-tropical Effects	18
Perennials for Naturalizing	18
Perennials for Old-fashioned Gardens	19
Fragrant Perennials	19
Perennials Having Especially Long Blooming Seasons	19
Perennials Suitable for Cut Flowers	19
Perennials for Special Environments	20
Perennials for Shade	20
Perennials for Semi-shade	20
Perennials for Wet Soils	20
Perennials Which May Be Grown in Water	20
Perennials for Poor Soil	20
Perennials Requiring Well-drained Soil	20
Perennials for Dry, Sandy Soil	20
Bloom Calendar	20
Perennials for Early Spring	20
Perennials for Spring	21
Perennials for Early Summer	22
Perennials for Mid Summer	22
Perennials for Late Summer and Early Fall	23

CHAPTER 14

Herbaceous Landscape Plants

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Flower gardening is a rewarding pastime for millions of home gardeners. Flowers from herbaceous plants and bulbs provide a range of color to supplement the predominant green of lawns and other landscape plantings. The variety of foliage, shapes and sizes available add accent and contrast that can make a landscape lively and interesting. They can add depth, dimension, form, texture and fragrance to the visual environment. Flowers can also be useful outside the garden providing some culinary herbs for the table and cut flowers for fresh and preserved arrangements, etc.

Flower gardening has evolved to meet the trends and fashions of contemporary society. As with most aspects of horticulture, there is no singular or absolute best way to utilize flowers in public or private landscapes. The text of this manual essentially reviews some of the basic principles and practices involved with the selection, production, maintenance and utilization of herbaceous flowering plants.

Many of today's aspiring flower gardeners live in apartments or condominiums where space is limited. Others have a family life style that may preclude or curtail the establishment or maintenance time required for elaborate and extensive flower beds. While it is still desirable to plan for a sequence of bloom and group plants with a consideration for height and color, compromises may have to be made. If the site precludes a traditional flower border perhaps a flower "island" with taller plants in the center is in order. Flowers can be incorporated into foundation plantings, vegetable gardens, or almost any site on the property; however, small beds in the middle of lawn open space may be disruptive and add to maintenance time.

Certain home gardeners may also be interested in developing some sort of a specialty garden that reflects their interests or hobby. Others may opt for plantings that are in tune to environmental needs or ecological site requirements. Thus, there are an infinite number of combinations of: native plant or "naturalistic" gardens, butterfly or hummingbird gardens, all blue or white gardens, all rose or iris gardens, Alpine gardens, rock gardens, container gardens, seaside gardens, shady gardens, etc.

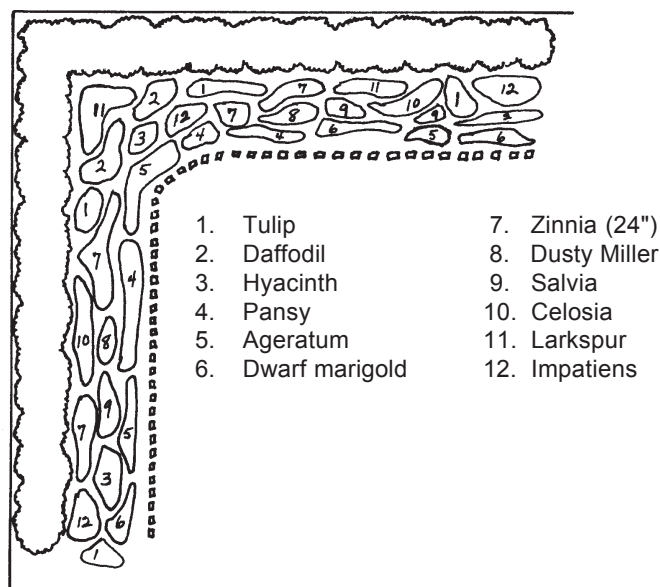
This manual chapter and the period of class instruction for Master Gardeners and other interested participants cannot begin to cover all of the details and ramifications of the broad topic of flowering herbaceous plants. Individual backgrounds, experience, and education will vary. If one is interested in particular aspects of flower gardening, a wide range of books and magazines are available on the market.

Planning the Flower Border

Much of the excitement of creating an herbaceous border lies in its great flexibility of design. In form, placement, and selection of plants, the contemporary border follows few rigid rules and allows fullest expression of the gardener's taste.

The first step in planning the material for an all-season, mixed perennial border is to select key plants for line, mass, color, and dependability. Line is the silhouette or outline of a plant, mass is its shape or denseness, and dependability refers to its ability to remain attractive with a minimum of problems. Garden books and catalogues can be very useful for reference.

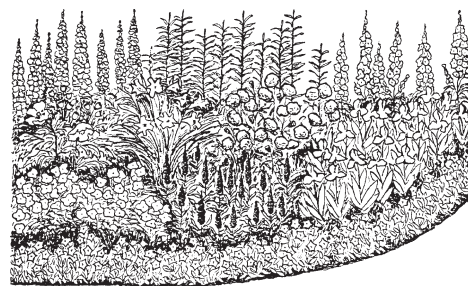
The most attractive flower borders are those which are located in front of a suitable background such as a fence, shrubbery, or a building. In some cases, tall flowers such as hollyhocks or sunflower may serve a dual purpose as flowers in the border and as background plants. Annual or perennial flowers of medium height may serve as background plants for a short border planting.



A general rule, unless the garden is very spacious or formal, is to avoid a ruler-straight front edge. A gentle to boldly sweeping curve, easily laid out with a garden hose, is best even along a fence, and the border can taper as it recedes from the main viewing point if an effect of distance is desired. The deeper the curve the slower the eye moves and the greater will be the visual enjoyment. A border outlined with bricks or flat stones set flush with the soil is better than a steeply cut lawn edge which must be trimmed after mowing.

Even the advanced gardener finds it advantageous to plan a border to scale on graph paper. The hardest task, organizing the selection of plants, will be simplified if only two main mass forms are considered: drifts and clumps. Drifts are elongated groupings of a plant that flow through sections of the border. Clumps consist of circular groupings of a variety, or a single large plant such as a peony. The length of drifts and the diameter of clumps, as well as their heights, should be varied for best effect, and the dimensions should always be in proportion to the overall size of the border.

Establish plants in groups large enough to form masses of color or texture. As a rule, five to seven plants will create the desired effect. A large delphinium or peony will be of sufficient size to be attractive, but a random collection of different small- to medium-sized plants will present a disorganized, checkerboard appearance. Each group of flowers should have an irregular shape. These masses of color and texture should blend into a pleasing pattern of color harmony. Dwarf flowers may be used as a continuous edging or border along the front of the bed.



Flower borders may be of any depth, depending on the space available. In a small yard the bed may be only 2 or 3 feet deep. In a spacious location, the border planting may have a depth of 6 or 8 feet. If the border is quite deep, a pathway of stepping stones may be helpful as a means of working among the flowers without compacting the soil.

Tall flowers should be selected for the back part of the bed, with medium-height species in the middle, and dwarf varieties along the front as edging plants. This is very easily done because the height of most flowers is stated in catalogs. Plants along the front edge of the flower bed should be located back far enough to allow easy mowing of the lawn.

Plant height is best limited to 2/3 the depth of the border, e.g., no plants taller than 4 feet in a border 6 feet deep. Height lines should be broken up by letting some tall plants extend into the medium height groups, with a few recessed clumps or drifts

leading the eye back into the border. This gives a more natural effect than a step profile. Try to vary heights, but in general, keep taller plants in the back and shorter ones toward the front.

The distance between plants in a flower border depends on the form of the individual plants and the effect which is desired in the landscape. Allow adequate space between plants. Many gardeners crowd their plants too much.

As a rule, the tall, spired-type flowers such as hollyhock, gladiolus, and tall snapdragons which are trained to a very few stems, should be planted in small clumps, to preserve their vertical effect. Bushy plants may be massed together or planted further apart, depending on the effect desired. Creeping, ground cover-type plants should be spaced just far enough apart to form a continuous mat or edging.

The enormous color range in perennials, plus their easy relocation if disharmony occurs, give the gardener great latitude in choosing and combining colors. A border in tones of the same color can be effective, or several closely related colors may be used, or the border may be made wildly exuberant with a variety of hues in one or more seasons. Hues are modifications of color such as orangish-red. The objective is a balanced composition in every season, with no section being at any time too heavily weighted with one color, and the bloom so distributed that it always makes a pleasing pattern through the bed.

Many gardening books give excellent lists of compatible colors; these plus a garden notebook and camera are invaluable for planning and revising color schemes. For real floral artistry, it is as important to consider intensity, which is the vividness of a color, as hue. For example, light tones placed near dark ones, or contrasting palest tones with the most intense, can give new interest and life to the border. Also consider location and color. Near patios, white is especially good because it shows up well in the evening or dusk hours when patios are often in use. Some colors are suitable only as dramatic accents: deep, pure red clashes with almost anything (unless softened by dark green foliage), yet properly used it confers strength and depth. White flowers and gray foliage are indispensable as separators of conflicting colors.

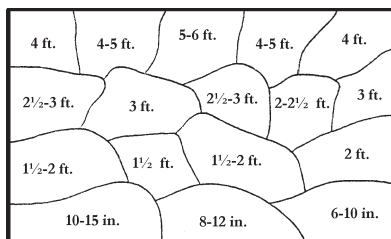
Red, orange, and yellow are warm colors. Blue, green, and violet are cool colors. The use of warm colors in the flower border of a small yard will give the illusion of little space. Conversely, the use of cool colors gives the impression of openness and space. In general, the smaller the area, the fewer warm colors should be used. A border planted with warm colors in front and cool colors in the back causes the front to appear closer, and the back to appear further away. This tricks the eye into believing the garden is deeper than it really is.

A gardener who becomes adept at producing constant color harmony in the border becomes more aware of the roles played by plant forms and foliage. Good foliage is obviously vital in plants with short blooming periods. Consider how much of the plant foliage will be usable and whether it is a positive or negative attribute. Some plants practically disappear when their blooming season is over (i.e., oriental poppy and bleeding heart), but others stay presentable even when not in flower. Plants with distinctive forms, color, and foliage -- airy and delicate, or strong and solid -- are wonderfully useful for creating interest. Ornamental grasses, and even handsome-foliaged vegetables like broccoli and asparagus can be used for effect.

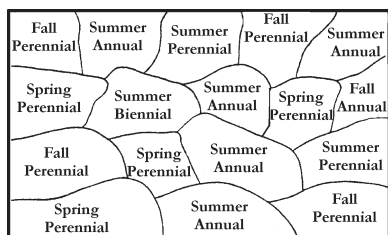
The most logical way to choose plants is first by location, second by period of bloom, then by height and width, and finally, by color. Location takes into account environmental factors, such as the amount of sun or shade and water required. This information is easy to find in books on flowers and in catalogs.

The only restrictions on any given plant will be environmental; a lack of ability to tolerate winter or summer temperature extremes; special soil, moisture or light needs; and any limits the gardener must place on time available for maintenance.

Even in a small border, single plants of different varieties should not be used. This gives a jumbled look. Do not set in precise rows, but in groups, as plants might grow in nature. Allow enough space for each group to grow comfortably. Decide which flowers you like best, and let these be the basis of your planting. Place them in several spots, if you like, down the length of the border, but don't overdo any one plant.



Divide a flower border into bold plant groupings according to height. Background: large groups of tall plants. Foreground: shallower, wide groupings of small plants.



Selection of garden groups as to season of flowering and whether annual, biennial, or perennial.

The longer the border has flowers in bloom, the more you will enjoy it. Consider the months when each plant will be at its best. Do not confine yourself to material that blooms all at one time. Aim for a steady succession of color.

A last bit of advice: don't be afraid to be bold, even if it results in some mistakes. Flowers are easy to move, change, or take out altogether. There is no need to be conservative or confined. Flowers are fast growers and can be transplanted quite easily to help create the desired effect.

Annuals

Annual flowers live only one growing season, during which they grow, flower, and produce seed, thereby completing their life cycle. Annuals must be set out or seeded every year since they don't persist. Some varieties will self-sow, or naturally reseed themselves. This may be undesirable in most flowers because the parents of this seed are unknown and hybrid characteristics will be lost. Plants will scatter everywhere instead of their designated spot. Examples are alyssum, petunia, and impatiens. Some perennials, plants that live from year to year, are classed with annuals because they are not winter-hardy and must be set out every year; begonias and geraniums are examples. Annuals have many positive features. They are versatile, sturdy, and relatively cheap. Plant breeders have produced many new and improved varieties. Annuals are easy to grow, produce instant color, and most important, they bloom for most of the growing season.

There are a few disadvantages to annuals. They must be set out as plants or sowed from seed every year, which involves some effort and expense. With some species, old flower heads should be removed on a weekly basis to ensure continuous bloom. If they are not removed, the plants will produce seed, complete their life cycle, and die. Some annuals deteriorate by late summer and need to be cut back for regrowth or replaced.

Annuals offer the gardener a chance to experiment with color, height, texture, and form. If a mistake is made, it's only for one growing season. Annuals are useful for filling in spaces until permanent plants are installed, to extend perennial beds and fill in holes where an earlier perennial is gone or the next one has yet to bloom; to cover areas where spring bulbs have bloomed and died back; and to fill planters, window boxes, and hanging baskets.

Culture and Maintenance of Annuals

Site Selection

Consider aspects of the site that affect plant growth such as light, soil characteristics, and topography. Various annuals perform well in full sun, light shade, or heavy shade. The slope of the site will affect temperature and drainage. Soil texture, drainage, fertility, and pH influence plant performance.

Site Preparation

Preparation is best done in the fall. Proper preparation of soil will enhance success in growing annuals. First, have the soil tested and adjust the pH if needed. Check and adjust drainage. To do this, dig a hole about 10 inches deep and fill with water. The next day, fill with water again and see how long it remains (should not exceed 8 hours). If drainage is poor, plan to plant in raised beds, or take the time to improve the drainage of the soil by adding organic matter. The next step is to dig the bed. Add 4 to 6 inches organic matter to heavy clay to improve soil texture. Rototill or dig to a depth of 12 inches and leave "rough" in fall. Finally, in spring, add fertilizer, spade again, and rake the surface smooth.

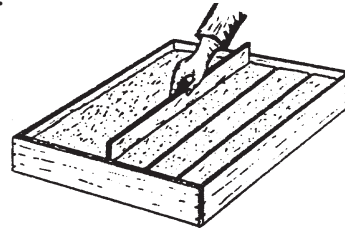
Seed Selection

If you can not find the variety of plants you need or you want to grow your own, try seeds. To get a good start toward raising vigorous plants, buy good seed packaged for the current year. Seed saved from previous years may have lost its vigor. It tends to germinate slowly and erratically and produce poor seedlings. Keep seed dry and cool until planted. If seed must be stored, place in an air-tight container, and refrigerate or place in a cool dry place. When buying seed, look for new cultivars listed as hybrids. Plants from hybrid seed are more uniform in size and more vigorous than plants of open-pollinated cultivars. They usually produce more flowers with better substance and may offer better disease resistance or insect tolerance.

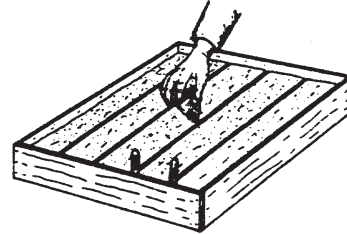
Starting Plants Indoors

The best media for starting seeds is loose, well-drained, fine-textured, low in nutrients, and free of disease-causing fungi, bacteria, and unwanted seeds. Many soil-less commercial products meet these requirements. Fill clean containers with potting medium. Level the medium. It should be damp but not soggy. Make a shallow furrow. Sow large seed directly in the bottom of the furrow. Very small seed should be sown on the surface, without first making a furrow. Some seed should not be covered. Seed may be sown in flats following seed package directions or directly in individual peat pots or pellets, two seeds to the pot. After seed is sown, cover all furrows with a thin layer of mix or vermiculite, then water with a fine mist. You may want to place a sheet of glass or plastic over seeded containers, to keep them moist. Set them in an

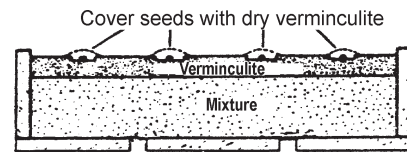
area away from sunlight where the temperature is between 60 and 75 degrees F. Bottom heat is helpful.



Make shallow depressions in the medium to facilitate uniform seeding.



Sow the seeds thinly and evenly, then label each variety. By sowing in rows, the spread of some diseases is curtailed.



Cover seeds with dry vermiculite and water carefully.

As soon as seeds have germinated, remove plastic sheeting and place seedlings in good light. If natural light is poor, fluorescent tubes can be used. Place seedlings 6 to 10 inches below the tubes. After the plastic is removed from the container, the new plants need watering and fertilizing, since most planting material contains little or no nutrients. Use a half-strength fertilizer solution after plants have been watered. When seedlings develop two true leaves, thin plants in individual pots or packs to one seedling per cell. Transplant those in flats to packs or other flats, spacing a few inches apart, or to individual pots. Do not start seeds too early indoors. Early germinations and growth times will vary with species. Generally, start most plants 4 to 8 weeks prior to the expected frost free outdoor planting time in your area.

Planting Times

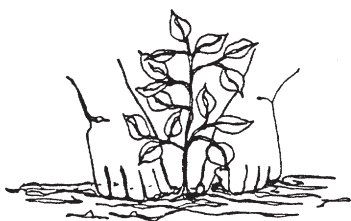
Do not be in a rush to start seeds outdoors or to set out started plants. As a general rule, delay sowing seed of warm-weather annuals outdoors or setting out started plants until after the last frost date. Most such seeds will not germinate well in soils below 60 degrees F. If soil is too cold when seed is sown, seeds will remain dormant until soil warms, and may rot instead of germinating.

Sowing Seed Outdoors

Annuals seeded in the garden frequently fail to germinate properly because the surface of the soil cakes and prevents entry of water. To avoid this, sow seed in vermiculite-filled furrows. Make furrows in soil about one half inch deep. If soil is dry, water the furrow, then fill it with fine vermiculite and sprinkle with water. Then make another shallow furrow in the vermiculite and sow the seed in this furrow. Sow at the rate recommended on the package. Cover the seed with a layer of vermiculite, and using a nozzle adjusted for a fine mist, water the seeded area thoroughly. Keep the seed bed well-watered or cover with a sheet of clear plastic to prevent excess evaporation of water. Remove plastic promptly after germination starts.

Setting Out Transplants

By setting started plants in the garden you can have a display of flowers several weeks earlier than if you sow seeds of the plants. This is especially useful for annuals which germinate slowly or need several months to bloom. You can buy plants of these or other annuals or you can start your own. Buy only healthy plants, free of pests and diseases. Before setting out transplants, harden them off by exposing them to outside conditions during the day which will provide more light and cooler temperatures than they received inside. After the last frost date, annual plants may be set out. Dig a hole for each plant large enough to accept its root system comfortably. Lift out each plant from its flat or pack with a block of medium surrounding its roots. Put the block in a planting hole and backfill it so the plant is set at its original level. Planting in holes punched into a black plastic mulch with a bulb planter promotes early growth and reduces the need for future weeding and irrigation.



When setting out plants in peat pots, either tear off the peat pot, or at least remove the upper edges of the pot so that all of the peat pot is covered when soil is firmed around the transplant. If a lip of the peat pot is exposed above the soil level, it may produce a wick effect, pulling water away from the plant and into the air.

After setting the plants, water them with a starter solution of high phosphate fertilizer which is water-soluble. Follow package directions. Provide protection against excessive sun, wind, or cold while the plants are getting settled in their new locations. Inverted pots, plastic or fabric tunnels, or cloches can be used.

Thinning

When most outdoor-grown annuals develop the first pair of true leaves, they should be thinned to the recommended spacing. This spacing allows plants enough light, water, nutrients, and space for them to develop fully above and below the ground. If they have been seeded in vermiculite-filled furrows, excess seedlings can be transplanted to another spot without injury. Thin the remaining plants to the recommended 8 to 12 inch spacing. An exception to the rule for thinning is sweet alyssum. This annual is particularly susceptible to damping-off. To insure a good stand of plants, sow the seed in hills and do not bother to thin the seedlings; the clump of seedlings will develop into a colorful mound.

Watering

Do not rely on summer rainfall to keep flower beds watered. Plan to irrigate them from the beginning. When watering, moisten the entire bed thoroughly, but do not water so heavily that the soil becomes soggy. After watering, allow the soil to dry moderately before watering again. A soaker hose is excellent for watering beds. Water from the soaker hose seeps directly into the soil without waste and without splashing leaves and flowers. The slow-moving water does not disturb the soil or reduce its capacity to absorb water. Water wands and drip systems are also good. Sprinklers are not as effective as soaker hoses. Water from sprinklers wets the flowers and foliage, making them susceptible to diseases. Structure of the soil may be destroyed by impact of water drops falling on its surface; the soil may puddle or crust, preventing free entry of water and air. The least effective method for watering is with a hand-held nozzle. Watering with a nozzle has all the objections of watering with a sprinkler. In addition, gardeners seldom are patient enough to do a thorough job of watering with a nozzle; not enough water is applied, and the water that is applied is usually poorly distributed over the bed. If you water with a sprinkler or hand-held nozzle, water in early morning so the foliage can dry quickly; this will prevent many foliar diseases from developing.

Mulching

Mulches help keep the soil surface from drying or crusting and aid in preventing growth of weeds. Organic mulches can add humus to the soil. Sheet plastics or fabric weed barriers used in the flower garden may be covered with a thin layer of bark or other organic mulches for a better appearance until the plants are large enough to cover it.

Weeding(cultivating)

After plants are set out or thinned, cultivate only to break crusts on the surface of the soil. When the plants begin to grow, stop cultivating and pull weeds by hand. As annual plants grow, feeder roots spread between the plants; cultivation is likely to injure these roots. In addition, cultivation stirs the soil and uncovers weed seeds that then germinate.

Deadheading (removing old flowers)

To maintain vigorous growth of some plants and assure neatness, remove spent flowers and seed pods. Flowers that respond particularly well to this practice include some ageratum, calendula, cosmos, marigold, pansy, scabiosa, and zinnia.

Staking

Tall-growing annuals like larkspur, or tall varieties of marigold or cosmos, may need support to protect them from strong winds and rain. Tall plants are supported by stakes of wood, bamboo, or reed large enough to hold the plants upright but not large enough to be conspicuous. Stakes should be about 6 inches shorter than the mature plant so their presence will not interfere with the beauty of the bloom. Begin staking when plants are about 1/3 their mature size. Place stakes close to the plant, but take care not to damage the root system. Secure the stems of the plants to stakes in several places with paper-covered wire or other materials that will not cut into the stem. Plants with delicate stems (like cosmos) can be supported by a framework of stakes and strings in criss-crossing patterns. Tall annuals planted in full sun, where they can develop into strong mature plants, often do not require staking.

Fertilizing

When preparing beds for annuals, organic or chemical fertilizer should be added according to recommendations given by soil sample analysis, or derived from observation of plants that have

grown on the site. Lime may also be needed if the soil test results indicate a pH below 6.5. Use dolomitic limestone that contains both calcium and magnesium rather than hydrated lime. Ideally, lime should be added in the fall and worked into the soil so it will have time to change the pH. Fertilizer should be added in the spring so it will not leach out before plants can benefit from it.

Once annuals have germinated and begin to grow, additional fertilizers may be needed. This is especially true if certain raw organic mulches are added to a new garden area, because microorganisms decomposing the mulch take up available nitrogen. Thus a fertilizer high in nitrogen should be used in these situations. Be sure to work the fertilizer in around the plants in such a way as to avoid direct contact between the stems and the fertilizer. Apply fertilizers to damp soil and water afterward. Liquid fertilization is also an option.

Controlling Insects and Diseases

Insects and Related Pests

Do not apply an insecticide unless it is necessary to prevent damage to flowers or shrubs. Most insect pests in the garden will not cause appreciable damage if their predators and parasites are available and protected. However, if there is a pest that usually causes serious damage unless an insecticide is used, apply the insecticide as soon as the infestation appears and begins to increase.

Watch for such pests as spider mites, aphids, Japanese beetles and other beetles, lacebugs, and thrips; these are some of the insects most likely to need prompt treatment with insecticides. Do not treat for soil insects unless you find numbers of cutworms, white grubs, or wireworms when preparing the soil for planting.

When using a pesticide, be certain that both the pest and the flower are indicated on the label. Read and follow all directions for use, including precautions, shown on the label.

Diseases

Since annuals only grow in the garden for one season, diseases are not as serious a problem as they are for perennials. However, some wilt and root rot diseases may persist in the soil. Select varieties of plants that are resistant to disease, follow recommended practices for planting and maintaining annuals, and you will avoid most disease problems. However, there are times

when weather conditions are highly favorable for diseases. If this happens, determine what disease is affecting the plants, then use a cultural control, rogue out the affected plant or, where necessary, apply an appropriate pesticide according to label directions.

Damping-off causes seeds to rot and seedlings to collapse and die. The disease is carried in soil and may be present on planting containers and tools. Soil moisture and temperature necessary for germination of seeds are also ideal for development of damping-off. Once the disease appears in a seed flat, it may travel quickly through the flat and kill all seedlings planted there. This can be prevented. Before planting, treat the seed with a fungicide, pasteurize the soil, and use sterile containers. Treat the seed by tearing off the corner of the seed packet, and through the hole in the packet, insert about as much fungicide dust as you can pick up on the tip of the small blade of a penknife. Close the hole by folding over the corner of the packet, then shake the seed thoroughly to coat it with the fungicide dust.

For best results, use a soilless mix. If you must use a soil-based mix, pasteurize it in an oven. Fill a metal tray with moist, but not wet, soil. Hold it at 180 degrees F for 30 minutes. Do not overheat. This will produce an unpleasant smell.

To avoid introducing the damping-off organisms on containers, use fiber seed flats or peat pots. These containers are sterile, inexpensive, and easily obtained from garden shops. Fiber flats are light and strong. Peat pots can be set out in the garden along with the plants they contain; roots of the plants grow through the walls of the pots. Plants grown in peat pots suffer little or no setback when they are transplanted to the garden. Larkspur and poppy, which ordinarily do not tolerate transplanting, can be grown in peat pots satisfactorily. If wooden boxes or clay flower pots are used for soil containers, clean them well. Soak clay pots in water and scrub them to remove all the white fertilizer crust from the outside. Sterilize clay pots by swabbing them with a solution of 1 part chlorine bleach to 9 parts water. Allow containers to dry thoroughly before filling them with soil. If, despite precautions, damping-off appears in seedlings, discard the containers and soil and start again.

Biennials

Biennials are plants that complete their life cycle in 2 years. During the first growing season they produce leaves, usually a rosette; then in the second growing season, preceded by a cold period, they produce blooms and die. For the flower gardener, biennials present the obvious disadvantage of producing only foliage the first year and no blooms. For this reason, new varieties have been developed that produce early bloom. "Foxy" is a variety of foxglove that will bloom the first year. Biennial seeds can be sown in midsummer to produce plants that develop in the fall, forcing the plant to bloom the next year. Many gardeners maintain biennials in clumps, and encourage the plants to self-sow. At any given time, a clump contains both first and second year plants. This practice produces flowers each year, and promotes a "perennial clump of biennial plants".

Perennials

Perennials are plants that live year after year. Trees and shrubs are perennial. Most garden flowers are herbaceous perennials. This means the tops of the plants -- the leaves, stems, and flowers die back to the ground each fall with the first frost or freeze. The roots persist through the winter and every spring, new plant tops arise. Any plant that lives through the winter is said to be hardy. Select plants suited to your particular hardiness zone, however micro climates and snow cover can alter survival.

There are advantages to perennials, the most obvious being that they do not have to be set out, like annuals, every year. Some perennials, such as delphiniums, have to be replaced every few years. Another advantage is that with careful planning, a perennial flower bed will change colors through the season, as one type of plant finishes and another variety begins to bloom. Also, since many perennials have a limited blooming period of about 2 to 3 weeks, deadheading, or removal of old blooms, is not as frequently necessary to keep them blooming. However, they do require pruning and maintenance to keep them attractive. Their relatively short bloom period is a disadvantage, but by combining them with annuals, a continuous colorful show can be provided. Many require transplanting every 3 to 5 years.

Culture and Maintenance of Perennials

Site Location

You need to consider many of the same aspects of site selection for perennials as you do for annuals; sunlight (full sun to heavy shade), slope of the site (affects temperature and drainage), soil type, and the role the plants selected will play in the garden. This is especially important with perennials, as they usually are left in the site for several years. In general, it is best to plant clumps of perennials rather than one plant. Large plantings may be made if space allows. An ideal location would provide a background such as a wall or hedge against which perennials will stand out while in bloom. In island beds, perennials can provide their own background if tall ones are planted in the center and low ones toward the edges.

Soil Preparation

Preparing the soil is extremely important to perennials. Many annuals can grow and flower in poorly prepared soil, but few perennials survive more than one year if the soil is not properly prepared.

For new beds, begin preparing soil in the fall before planting time. Have the soil tested first. Results will indicate how much lime or acidifier needs to be added during preparation and how much fertilizer needs to be added in the spring. Materials to adjust pH need time to work. Before preparing new beds, check the soil to see that it is well-drained, yet has some water-holding capacity. Test for drainage as described in the section on annuals. If drainage is inadequate, dig furrows along the sides of the bed and add soil from the furrows to the bed. This raises the level of the bed above the general level of the soil. Excess water can then seep from the bed into the furrows. Raised beds may wash during heavy rains. This can be prevented by surrounding the beds with wooden or masonry walls. Since raised beds dry out more quickly than flat beds, water beds frequently during the summer. After forming the beds, spade the soil to a depth of 8 or 10 inches. Turn soil over completely, incorporating 2 to 4 inches of organic material and add lime if required. Remove debris and leave rough during the winter.

In the spring, just before planting, spade again. At this spading, add recommended levels of fertilizers. Be sure to work any phosphorous deeply into the soil, where plant roots can get it. Rake the soil surface smooth. After raking, the soil is ready for seeding or planting.

Selecting Plants

It is best to select plants with a purpose in mind, such as edging plants, accents for evergreens, masses of color, rock garden specimens, etc. With specific purposes in mind, you can choose perennials by considering their characteristics and deciding which plants best meet your requirements.

For a good display from a limited number of plants in a limited space, select named varieties. Observe the flowering times of perennials in your neighborhood. That way you will be able to choose plants that will flower together and plants that will be showy when little else is in bloom. The flowering time may vary as much as 6 weeks from year to year, but plants of the same kind and their cultivars usually flower at the same time. To obtain details on particular plants or groups of plants, consult plant societies, specialty books, nurseries which specialize in herbaceous perennials, and local botanical gardens.

Plants of many perennials can be bought at a local greenhouse or nursery. If these plants are in bloom when they are offered for sale or have picture tags, you can select the colors you want. Buy perennial plants that are compact and dark green. Plants held in warm shopping areas too long are seldom vigorous and generally have thin, pale, yellow stems and leaves. Avoid buying these plants. Buy named varieties of plants for known characteristics of disease resistance, heat and cold resistance, growth habits and colors.

Many perennials do not grow true to type if grown from seed saved from old plants. If you plant seed you have saved, many off-types of color, flower form, and plant habit are produced. Purchased seed, whether hybrid or strains, usually give uniform results. You can sow perennial seeds directly in the beds where the plants are to bloom, or you can start early plants indoors or in a cold frame and set them out in beds after the weather warms. Some perennials will bloom the first year from seed, however, most species take two years to flower.

Planting Times

In northern New England, it is best to plant most perennials in spring. This allows the plants to develop excellent root systems. Exceptions are peony and bearded iris, which should be planted from mid-August to mid-September. Container-grown perennials can be planted from spring through early fall, if watered well. The later in the season perennials are planted, the more likely they are to require a top mulch to survive their first winter.

Planting Seed Outdoors

Perennials seeded in the garden frequently fail to germinate properly because the surface of the soil cakes and prevents entry of water. To avoid this, sow the seed in vermiculite-filled furrows. For planting directions, see the previous section on annuals.

Setting Out Plants

Whether you buy plants from a nursery, mail-order source, or start your own indoors, set them out the same way. When the time comes to set plants out in the garden, remove them from the pots, packs, or flats. Lift out each plant with the medium surrounding its roots and set the soil block in a planting hole. If the plants are bare root, spread out the root mass and set the plant in a prepared planting hole. When setting out plants in peat pots, remove the top edge of the pot to prevent it from drying out and limiting the root development of the plant. Thoroughly moisten the pot and its contents to help the roots develop properly. Drench the soil around the planting hole with a liquid fertilizer (16-12-10 or 20-20-20 mixed 1 tablespoon per gallon of water) to stimulate root growth. Set the moistened pot in the planting hole and press the soil up around the plant. Allow plenty of space between plants, because perennials need room to develop. Perennials usually show up best when planted in clumps or groups of plants of the same variety.

Watering

Since herbaceous perennials grow back from the roots every year, it is important to encourage healthy, deep roots. Proper watering promotes good root development. Make sure when watering that all the roots are reached. Follow directions on watering in the section on annuals. Avoid over watering and insure adequate drainage, especially in the late winter and early spring.

Mulching

Any type of mulch gives an orderly look to the garden and cuts down on weeding. Mulches are very useful for maintaining uniform moisture conditions in the garden. Soil temperatures are modified by mulches to various degrees. Organic mulches keep the soil cooler in early spring. Most organic mulches should be applied after plants are well-established and when there is reasonably good soil moisture. Bark, pine needles, and shredded leaves are common organic mulches used in perennial beds. Organic mulches decom-

pose over time, adding nutrients and organic matter to the soil. For uniform appearance, replenish the 1 to 2 inch layer every 1 to 2 years.

Perennials should be top mulched during the winter months to protect them from the heaving that results from repeated freezing and thawing of the soil. However, you must be careful with winter mulching, as it can do more harm than good. Be careful not to pile mulch heavily over the crowns, as this would encourage rotting. Boughs of evergreens give ample protection but allow air circulation. Apply mulch around the plants only after the soil temperature has decreased after several killing frosts. If winter mulch is applied too early, mice may move in and eat the plants. Severe damage to the plant can result from new growth not being acclimated and frozen back. Remove winter mulch as soon as growth starts in the spring. If you don't, new growth will develop abnormally with long, gangly stems and insufficient chlorophyll.

Weeding

Follow weeding directions in the section on annuals. A few pre-emergent herbicides are now registered for use in perennial flowers. For most gardens, mulch plus hand weeding or cultivation provide excellent weed management.

Fertilizing

On most native soils, regular fertilization is necessary. However, do not fertilize perennials heavily. A light fertilization program gives a continuous supply of nutrients to produce healthy plants. Use 5-10-5 fertilizer or similar complete fertilizer. Place fertilizer in small rings around each plant in March or April. Repeat in 6 weeks. This should be enough to carry plants through the summer. Apply another treatment of fertilizer to late-blooming plants in late summer. Always water the bed after applying fertilizer. This will wash the fertilizer off the foliage and prevent burn. It will also make fertilizer available to the plants immediately. The use of lower analysis slower release organic type fertilizers is also an alternative.

Deadheading

After perennials have bloomed, spent flowers may be removed. This will keep the beds looking neat and will prevent plants from wasting energy setting seed. Some perennials like Delphiniums can be forced to reblossom if cut back severely after the first bloom.

Pinching

Some perennials and annuals respond to having the main growing point removed by developing multiple stems or more lateral branches.

Disbudding

To gain large blooms from certain annuals and perennials, as opposed to more numerous but smaller blooms, disbud them. In disbudding, small side buds are removed, which allows the plant to concentrate its energy to produce one or a few large blooms. Peonies and chrysanthemums are examples of plants which are often disbudded.

Staking

Some erect perennials are top-heavy and need staking. If plants fall over, the stem will function poorly where it has been bent. If the stem is cracked, disease organisms can penetrate the break. Stake plants when you set them out so they will grow to cover the stakes. Once staked, tall perennials can better withstand hard, driving rain and wind.

Use stakes made of any material. Select stakes that will be 6 to 12 inches shorter than the height of the grown plant. Place stakes behind the plants and sink them into the ground far enough to be firm. Loosely tie plants to the stakes, using paper covered wire, plastic, or other soft material. Tie the plant by making a double loop of the wire with, one loop around the plant and the other around the stake. Never loop the tie around both stake and plant. The plant will hang to one side and the wire may girdle the stem. Add ties as the stem lengthens.

Fall Care

In the fall, after the foliage of perennials has died down, remove dead leaves, stems, and spent flowers. These materials often harbor insects and disease-causing organisms. Apply winter mulch after the temperature has dropped and the soil is frozen. Do not smother those types that retain a rosette of green foliage at their base. Many hardy perennials do not need any mulch at all.

Controlling Insects and Diseases

Proper plant selection and care reduce pest problems. Select resistant varieties. Plant perennials in conditions of light, wind, spacing, and soil textures which are suited to them. Remove spent flowers, dead leaves, and other plant litter, as these serve as

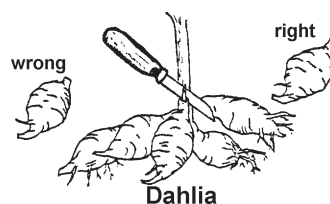
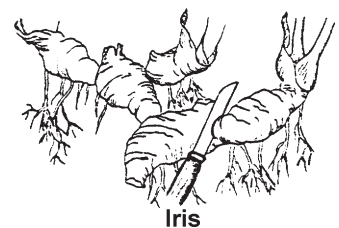
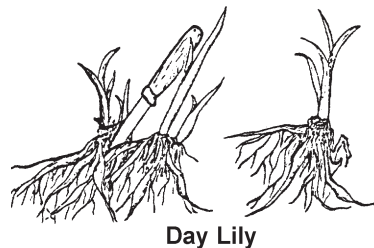
a source of reinfestation. Learn the major insect and disease pests (if any) of each specific plant type grown, so that problems can be correctly diagnosed and treated as they arise.

Asexual propagation of perennials

Division

Most perennials left in the same place for more than 3 years are likely to be overgrown, overcrowded, have dead or unsightly centers, and in need of basic feeding and soil amendment. The center of the clump will grow poorly, if at all, and the flowers will be sparse. The clump will deplete the fertility of the soil as the plant crowds itself. To divide mature clumps of perennials, select only vigorous side shoots from the outer part of the clump. Discard the center of the clump. Divide the plant into clumps of three to five shoots each. Be careful not to over-divide; too small a clump will not give much color the first year after replanting. Divide perennials when the plants are dormant, just before a new season of growth, or in late summer so they can become established before the ground freezes.

Stagger plant divisions so the whole garden will not be redone at the same time; good rotation will yield a display of flowers each year. Do not put all the divisions back into the same space that contained the original plant. That would place too many plants in a given area. Give extra plants to friends, plant them elsewhere in the yard, or discard them.



Cuttings

Many plants can be propagated from either tip or root cuttings. Generally, tip cuttings are easier to propagate than root cuttings.

To propagate most perennials, take tip cuttings from the flush of growth in June. Make tip cuttings 3 to 6 inches long. Treat the base of the cutting with a root stimulant. Leave all foliage on the cutting except the part that will be below the soil line. Insert one cutting per peat pot. Place peat pots of tip cuttings in a lightly shaded place. Cover with a sheet of clear plastic. Check regularly to make sure the cuttings do not dry out.

When cuttings do not pull easily out of the soil, they have begun to root. Make holes in the plastic sheet to increase the exposure of the cuttings to the air. This will harden the cuttings. Every few days make new holes, or enlarge the holes.

Make root cuttings of phlox, babys-breath, and oriental poppy. Dig the plants in late summer after they have bloomed. Select pencil-sized roots; cut them into 4-inch sections. Put each piece in a peat pot. Prepare a tray of peat pots as for seeds, except the soil mix should be 2 parts sand, 1 part soil, and 1 part peat moss. Water thoroughly.

Bulbs

This is a term loosely used to include corms, tubers, tuberous roots, and rhizomes as well as true bulbs. This section of the chapter will refer to all of the above as bulbs. However, a true bulb is a complete or nearly complete miniature of a plant encased in fleshy modified leaves called scales which contain reserves of food. Corms are the base of a stem that becomes swollen and solid with nutrients. It has no fleshy scales. The tuber, which is an underground stem that stores food, differs from the true bulb or corm in that it has no covering of dry leaves and no basal plant from which the roots grow. Usually short, fat and rounded, it has a knobby surface with growth buds, or eyes, from which the shoots of the new plant emerge. Tuberous roots are the only ones from this group that are real roots; their food supply is kept in root tissue, not in stem or leaf tissue as in other bulbs. Rhizomes, which are sometimes called rootstocks, are thickened stems that grow horizontally, weaving their way along or below the surface of the soil and at intervals sending stems above ground.

Bulbs are broadly grouped into spring-flowering (April-May) and summer-flowering (June-September). Spring bulbs provide early color before most annuals and perennials. One of the most popular spring bulbs is tulip. These are sold by type and variety. Tulips come in all colors except blue. Some of the most common types are:

Single early:	Flower at same time as daffodils
Darwin/Darwin hybrid:	Tall, blocky flowers
Lily flowered:	Petals recurve - bell-shape
Parrot:	Twisted, ruffled petals
Double:	2 or more rows of petals

Narcissus and daffodils are classed by length of corolla ("trumpet") in relation to perianth segments. They come in the colors of white, yellow, and peach. Many naturalize well. Hyacinths produce a large single spike of many small, fragrant flowers, and come in a complete color range. Crocus and other minor bulbs are usually grown for early bloom. They are usually short, but are the earliest-flowering bulbs in northern New England and are well suited for "naturalizing".

Selecting quality spring bulbs is very important, because the flower bud has already developed before the bulb is sold. Size is also important; look for plump, firm bulbs. Select on a basis of color, and size for intended purposes; for example, small ones for naturalizing and large ones to stand out as specimen plants.

The summer-flowering bulbs include tuberous begonia, caladium, dahlia, gladiolus, and lily.

Culture and Maintenance of Bulbs

Storage

Plant bulbs as soon after obtaining them as possible. In the mean time, keep them in a cool, dry place (60 to 65 degrees F). Temperatures higher than 70 degrees F will damage the flower inside spring-flowering bulbs. Rhizomes, tubers, and tuberous roots are more easily desiccated than bulbs and corms, and should be stored in peat, perlite, or vermiculite, if held for more than several days.

Site Selection

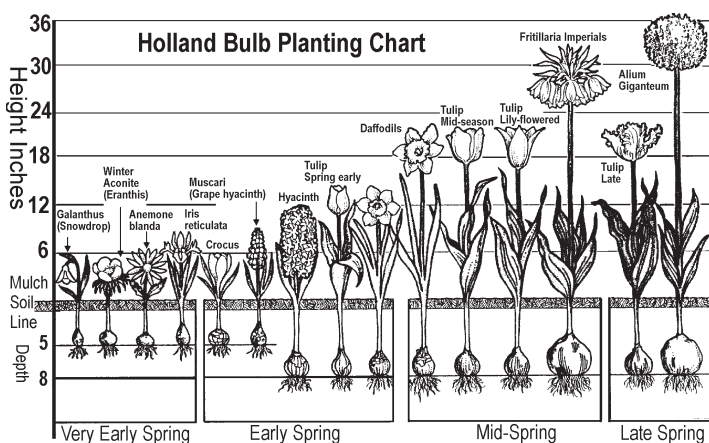
In selecting a site for planting, consider light, temperature, soil texture, and function. Most bulbs need full sun to light shade. Select a planting site that will provide at least 5 to 6 hours of direct sunlight a day. Bulbs left in the ground year after year should have 8 to 10 hours of daily sunlight for good flowering. Bulbs planted in a southern exposure near a building or wall will bloom earlier than bulbs planted in a northern exposure. Adequate drainage is an important consideration. Most bulbs and bulb-like plants will not tolerate poor drainage, and rot easily if planted in wet areas. Function must also be kept in mind. If bulbs are being used to naturalize an area, toss the bulbs then plant them where they fall to create a scattered effect.

Site Preparation

Good drainage is the most important single factor for successful bulb growing. Bulb beds should be dug when the soil is fairly dry. Wet soil packs tightly and retards plant growth. Prepare the soil 8 to 12 inches deep. Add limestone and organic matter if needed and incorporate a complete fertilizer. Use 1 pound of 5-10-10 fertilizer or similar analysis for a 5 by 10 foot area. Thoroughly mix the lime, fertilizer and organic matter with the soil. For individual planting holes, loosen the soil below the depth the bulb is to be planted. Add fertilizer and cover with a layer of soil (bulbs should not contact fertilizers directly). Set bulb upright in planting hole and cover.

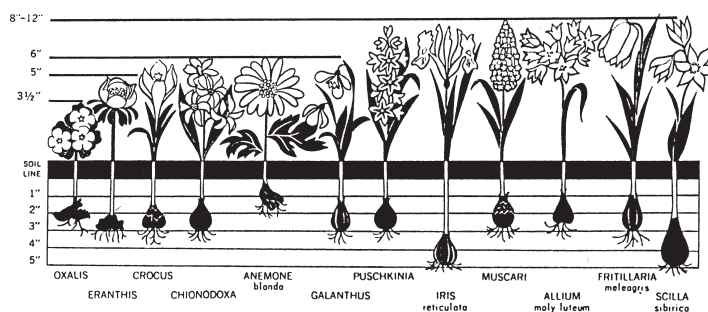
Time of Planting

Hardy, spring-flowering bulbs are planted in early fall. Hardy, fall-flowering bulbs, such as colchicum, are planted in August or September. Tender, summer-flowering bulbs are planted in the spring after danger of frost. Lilies are best planted in late fall.



Depth of Planting

As a general rule of thumb, bulbs should be planted $2\frac{1}{2}$ to 3 times the diameter of the bulb in depth. An alternative rule is to plant large bulbs (tulips, daffodils, hyacinths) 8 to 10 inches deep, and small bulbs (scilla, crocus, grape hyacinth) 5 inches deep. It is important not to plant bulbs too shallowly, as this will encourage frost heaving. If desired, after planting mulch with a 2 to 3 inch layer of organic material such as bark chips when the ground has frozen.



Watering

Normal rainfall usually provides enough moisture for bulbs. But during dry weather, water plants at weekly intervals, soaking the ground thoroughly. Be especially careful not to neglect bulbs after blooming.

Fertilizing

After plants bloom, again fertilize them lightly with something like a 5-10-10 fertilizer. Avoid high-nitrogen fertilizer. To avoid possible burning, keep fertilizers off of the leaves. In addition to 5-10-10 fertilizer, you can use bonemeal as an extra source of phosphorus.

Staking

A few tall, heavy-flowered bulbs may require staking. Stake plants when they are emerging, but be careful not to damage the bulb with the stake. Avoid the need for staking by selecting lower-growing bulbs, planting them where they are shielded from the wind.

Deadheading

When flowers fade, cut them off to prevent seed formation. Seeds take stored food from the bulbs.

Moving

If leaving bulbs in place for bloom next year, do not cut the leaves after flowering until they start to wither. Green leaves produce food for plant growth next year. After leaves turn yellow, cut and destroy the stems and foliage of the plants. Dead foliage left on the ground may carry disease to new growth the next year. If moving bulbs from one place to another, or if a planting has become crowded and ceased blooming, move only after the foliage has faded. Bulbs dug and moved before foliage fades are useless.

Digging and Storing

Many summer-flowering bulbs should be dug and stored, as they are tender. This is done when the leaves on the plants turn yellow. Use a spading fork to lift the bulbs from the ground. Wash off any soil that clings to most bulbs. Spread the washed bulbs in a shaded place to dry. When dry, store them away from sunlight in a cool, dry place. Avoid temperatures below 50 or above 70 degrees F. Be sure that air circulates around stored bulbs. Never store bulbs more than two or three layers deep, as they generate heat and cause decay. Leave the soil on achimenes, begonia, canna, caladium, dahlia, and ismene bulbs. Store these bulbs in clumps on a slightly moistened layer of peat moss or sawdust in a cool place. Rinse, clean, and separate them just before planting the following year.

Annuals for Special Uses

Annuals for Bedding

(Masses and Drifts)

Wax begonia
Browallia, Amethyst flower
Celosia, Cockscomb
Dusty miller
Coleus
Seed dahlia
Dianthus, China pinks
Heliotrope
Impatiens
Lobelia
Marigold
Nicotiana, Flowering tobacco
Petunia
Annual phlox
Salvia
Scabiosa, Pincushion flower

Annuals for Edging

Ageratum
Sweet alyssum
Wax begonia
Dianthus, China pinks
Daisy, Dahlberg
Lobelia
French marigold
Myosotis, Forget-me-not
Nierembergia, Cup flower
Petunia
Annual phlox
Portulaca, Moss rose
Verbena
Annual vinca

Annuals for Ground Covers

Creeping Zinnia, Sanvitalia
Myosotis, Forget-me-not
Nasturtium
Portulaca, Moss rose
Sweet Alyssum
Verbena
Annual vinca

Annuals for Foliage

Amaranthus
Basil
Castor Bean
Coleus
Dusty Miller
Kochia

Annuals for Fragrance

Sweet alyssum
Dianthus, China pinks
Heliotrope
Nasturtium
Nicotiana, Flowering tobacco
Stock
Petunia
Annual phlox
Sweet pea

Annuals for Fences and Trellises

Canary Creeper
Cobaea, Cup-and-saucer vine
Gourds
Morning Glory
Scarlet Runner Bean
Sweet pea
Thunbergia

Annuals for Low Borders

Dwarf Celosia
Dwarf Bedding Dahlias
French Marigold
Scotch marigold
Petunia
Dwarf zinnia

Annuals for Screen Plants

Cleome
Kochia (evergreen)
Tall Marigold
Tithonia, Mexican sunflower
Tall Zinnia
Castor bean

Annuals for Window Boxes, Hanging Baskets, Urns, or Tubs

Sweet alyssum
Wax begonia
Coleus
Lobelia
Nierembergia, Cup flower
Cascade Petunia
Thunbergia
Impatiens
German Ivy
Fuchsia
Ivy geranium

Annuals for the Seaside

Sweet Alyssum
Dusty Miller
Statice
Petunia

Annuals for the Rock Garden

Ageratum
Sweet Alyssum
Wax Begonia
Dwarf Celosia, Cockscomb
Coleus
Gazania
Lobelia
French Marigold
Nasturtium
Pansy
Petunia
Annual Phlox
Portulaca
Verbena
Dwarf Zinnia

Annuals for Cut Flowers

China Asters
Bells of Ireland (also dried)
Carnation
Celosia (also dried)
Bachelor Buttons
Pink Cosmos
Cynoglossum
Seed Dahlia
Gaillardia, Blanket Flower
Gerbera
Gomphrena, Globe Amaranth (also dried)
Gypsophila, Annual baby's breath
Larkspur
Love-in-a-Mist (also dried)
Marigold
Nasturtium
Petunia
Rudbeckia, Black-eyed Susan
Blue Salvia (also dried)
Scabiosa, Pincushion Flower
Snapdragon
Annual Statice (also dried)
Tithonia, Mexican Sunflower
Zinnia

Annuals for Special Environments

Annuals Tolerant of Cool Weather

Plant after danger of heavy frost is over in the spring, except sweet peas, which should be planted just as soon as the soil is workable. Some varieties can also be sown, with risk, late in fall, just before the ground freezes, so seed will not germinate until spring.

Sweet Alyssum
China Aster
Bells of Ireland
Calendula, Pot Marigold (can sow in fall)
Annual Candytuft
Annual Chrysanthemum
Clarkia
Cleome, Spider Flower (can sow in fall)
Bachelors Buttons, Cornflower (can sow in fall)
Cosmos
Cynoglossum (can sow in fall)
Dianthus, China pinks
Didiscus, Lace Flower
Dimorphotheca, African Daisy
Annual Gaillardia, Blanket Flower
Larkspur
Lobelia
Nigella, (Love-in-a-Mist)
Pansy
Annual Phlox
Poppy, Shirley & California
Salpiglossis (painted tongue)
Blue Salvia
Scabiosa, Pincushion Flower
Snapdragon
Stock
Sweet Pea

Tender Annuals

Plant when all danger of frost is over in the spring.

Ageratum
Garden Balsam
Wax Begonia
Celosia, Cockscomb
Coleus
Globe Amaranth
Gourds
Impatiens
Marigold
Morning Glory
Nasturtium
Nicotiana, Flowering tobacco
Petunia
Red Salvia
Verbena
Annual Vinca
Zinnia

Heat-resistant Annuals

Celosia
Cleome, Spider Flower
Cosmos
Four O'Clock
Gaillardia, Blanket-flower
Geranium
Globe Amaranth
Helichrysum, Strawflower
Larkspur
Marigold
Morning Glory
Nicotiana, Flowering tobacco
Nierembergia, Cup Flower
Petunia
Annual Phlox
Portulaca, Moss Rose
Red Salvia
Scabiosa, Pincushion Flower
Sunflower
Verbena
Zinnia
Ornamental Pepper

Annuals for Partial Shade

Alyssum
Aster
Balsam
Begonia
Browallia
Calendula
Coleus
Cornflower
Impatiens
Lobelia
Myosotis
Nasturtium
Nicotiana
Pansy
Petunia
Snapdragon
Torenia
Wallflower

Annuals That Tolerate Heat, Drought and Sandy Soils

Cleome
Gaillardia, Blanket Flower
Marigold
Petunia
Annual Phlox
Portulaca, Moss Rose
Red Salvia
Sunflower
Verbena
Zinnia

Annuals by Color and Height

Variety	Color of Bloom	Height (Inches)
African Daisy	white, yellow, salmon	6-12
Ageratum	blue, white, pink	4-24
Amaranthus	red, green, purple (foliage)	24-48
China Aster	yellow, pink red, blue, white, lavender	12-24
Garden Balsam	rose, purple, white	12-18
Basil, red	red-purple (foliage)	15
Browallia, Amethyst Flower	blue, violet, white	12-18
Calendula, Pot Marigold	yellow, gold	12-24
California Poppy	red to yellow	12
Cabbage, flowering	red, white, green, purple (foliage)	8-14
Annual Candytuft	pink, lilac, white	10-12
Annual Chrysanthemum	yellow, purple, orange	24-36
Castor Bean	green, maroon (foliage)	48-72
Clarkia	white, pink, red, pink & red	18
Celosia, Cockscomb	yellow, red, pink	6-36
Cornflower, Bachelor's Buttons	pink, blue, white	12-36
Coleus	variegated (foliage)	8-20
Pink Cosmos	pink, lilac, red, white	36-60
Dusty-miller	silver (foliage)	8-16
Forget-Me-Not	blue, pink	12
Four O'Clock	pink, white, yellow	24
Annual Gaillardia, Blanket Flower	yellow, red	15-24
Gloriosa Daisy	yellow, orange, red	24-30
Gomphrena, Globe Amaranth	white, pink, purple	16-24
Heliotrope	purple, white	12-24

Variety	Color of Bloom	Height (Inches)
Impatiens	red, pink, white, orange	6-24
Larkspur	blue, pink, white, purple	18-48
Lobelia	blue, violet, white	4-12
Marigold	yellow, orange to red-brown	6-48
Nicotiana	red, white, pink, green	24-36
Nigella	white, blue, violet, pink	12-15
Pansy	blue, purple, white, yellow, pink	8-12
Petunia	white, rose, purple, red, blue	12-18
Annual Phlox	white, rose, purple	6-10
Portulaca, Moss Rose	yellow, white, rose, orange	8
Blue Salvia	blue, white	24-36
Red Salvia	red, pink, purple	18-36
Scabiosa, Pincushion Flower	purple, pink, white	24-36
Snapdragon	white, yellow, orange, red	6-24
Annual Statice	yellow, rose, violet, white, blue	18-24
Strawflower	white, red, yellow	24-36
Sunflower	yellow to red-brown	12-72
Sweet Alyssum	white	3-10
Sweet Pea	orange, yellow, rose, purple, white	8+(vine)
Verbena	white, pink, blue, red	18-24
Annual Vinca	white, pink	12-18
Zinnia	red, pink, yellow, orange	6-36

Perennials for Special Use

Perennials for Borders of Ponds And Streams

(Well-drained soil)

Sunny Locations:

Cimicifuga racemosa (Cohosh Bugbane)*
Grasses (Ornamental Grasses)
Iris, in variety
Myosotis scorpioides semperflorens (Dwarf Perpetual Forget-me-not)
Tradescantia virginiana (Spiderwort)*
Trollius europaeus (Globeflower)

Semi-shady Locations:

Anemone hepatica or *A. x hybrida* (Japanese Anemone)
Eupatorium purpureum (Joe-Pye-weed)

*also do well in semi-shade

Perennials for Background Planting

Althaea rosea (Hollyhock) (actually biennial)
Aster novae-angliae (New England Aster)
Campanula persicifolia (Peach-leaved Bellflower)
Cimicifuga racemosa (Cohosh Bugbane)
Delphinium hybrids (Delphinium)
Helenium autumnale (Sneezeweed)
Rudbeckia laciniata (Goldenglow) 'hortensia'
Valeriana officinalis (Common Valerian)
Yucca filamentosa (Common Yucca)

Perennials for Edging

Achillea tomentosa (Woolly Yarrow)
Ajuga reptans (Carpet Bugle)
Armaria species (Thrift)
Arabis caucasica (Wallcress)
Aubrietia deltoidea (Purple Rockcress)
Aurinia saxatilis 'Compacta' (Dwarf Goldentuft)
Bellis perennis (English Daisy)
Campanula carpatia (Carpathian Bellflower)
Cerastium tomentosum (Snow-in-summer)
Dianthus deltoides (Maiden Pink)
Dianthus plumarius (Grass Pink)
Iberis sempervirens (Edging Candytuft)
Papaver nudicaule (Iceland Poppy)
Phlox subulata (Moss Phlox)
Primula hybrids (Primrose)
Sedum stoloniferum (Running Stonecrop)
Veronica latifolia (Rock Speedwell)
Viola, in variety (Violet)

Perennials for Ground Cover, Banks, and Terraces

Sunny Locations:

Cerastium tomentosum (Snow-in-summer)
Ceratostigma plumbaginoides (Larpen Plumbago)
Iberis sempervirens (Edging candytuft)
Nepeta mussini (Mussini Mint)
Phlox subulata (Moss Phlox)
Sedum spurium (Running Stonecrop)
Thymus praecox subspecies articus (Mother-of-thyme)
Veronica latifolia (Rock Speedwell)
Vinca minor (Periwinkle)

Shady Locations:

Ajuga reptans (Bugle)
Asperula odoratum (Sweet Woodruff)
Convallaria majalis (Lily-of-the-valley)
Hedera helix (English Ivy)
Pachysandra terminalis (Japanese Pachysandra)

Perennials for Bold or Sub-tropical Effects

Aruncus dioicus (Spirea)
Acanthus mollis (Artist's Acanthus)
Dipsacus fullonum (Teasel)
Echinops ritro and *exaltatus* (Globe Thistles)
Elymus arenarius (Sea Lyme grass)
Heracleum laciniatum (Cow-parsnip)
Kniphofia uvaria (Torchlily, Red-hot-poker plant)
Yucca filamentosa (Yucca)

Perennials for Naturalizing

Asclepias tuberosa (Butterfly weed)
Aster (various)(Aster)
Cimicifuga racemosa (Cohosh Bugbane)
Convallaria majalis (Lily-of-the-valley)
Hepatica (Roundlobe Hepatica)
Lobelia cardinalis (Cardinal Flower)
Mertensia virginica (Virginia Bluebells)
Monarda didyma (Bee Balm)
Physostegia virginiana (False Dragonhead, Obedience)
Polemonium reptans (Creeping Polemonium)
Sanguinaria canadensis (Bloodroot)
Smilacina racemosa (Solomon's zig-zag, False spikenard)
Solidago canadensis (Canada Goldenrod)
Trillium grandiflorum (Trillium)

Perennials for Old-fashioned Gardens

Aconitum, in variety (Monkshood)
Althaea rosea (Hollyhock) (biennial)
Asters, old varieties
Campanula, in variety (Bellflower)
Delphinium x Belladonna (Delphinium)
Dianthus barbatus (Sweet William)
Dianthus plumarius (Grass or Garden Pink)
Dicentra spectabilis (Bleeding-heart)
Dictamnus alba (Dittany or Gas Plant)
Digitalis, in variety (Foxglove)
Hemerocallis lilio asphodelus (Lemon Lily)
Hesperis matronalis (Sweet Rocket)
Lilium candidum (Madonna Lily)
Lunaria (Honesty)(Biennial)
Mertensia (Mertensia or Blue Bells)
Myosotis, in variety (Forget-me-not)
Paeonia officinalis types (Peony)
Viola odorata (Sweet Violet)

Fragrant Perennials

Artemisia abrotanum (Southernwood)
Convallaria majalis (Lily-of-the-Valley)
Dianthus plumarius (Grass Pink)
Dictamnus albus (Dittany or Gas Plant)
Galium odoratum (Sweet woodruff)
Hesperis matronalis (Sweet Rocket)
Hosta plantaginea grandiflora (Funkia or Big Plantain Lily)
Monarda didyma (Bee Balm)
Paeonia, in variety (Peony)
Phlox paniculata (Phlox)
Rosa species (Heritage Roses)
Valeriana officinalis (Common Valerian)
Viola cornuta (Tufted Pansy, Horned violet)
Viola odorata (Sweet Violet)
Thymus, in variety (Thyme)
Lavandula angustifolia (True Lavender)

Perennials Having Especially Long Blooming Seasons

Anchusa azurea (Bugloss)
Campanula carpatica (Tussock Bellflower)
Delphinium, if cut back
Heuchera sanguinea (Coral Bells)
Lathyrus latifolius (Perennial Pea)
Lysimachia (Gooseneck Loosestrife)
Viola tricolor (Johnny-Jump-Up)

Perennials Suitable for Cut Flowers

Achillea millefolium (Yarrow)
Anemone japonica (Japanese Anemone)
Aster (various)(Aster)
Chrysanthemum coccineum (Painted Lady)
Delphinium hybrids (Delphinium)
Dianthus barbatus (Sweet William)
Dicentra (Bleeding Heart)
Gaillardia x grandifolia (Blanket Flower)
Gypsophila paniculata 'Flore Pleno' (Babysbreath)
Heuchera sanguinea (Coral Bells)
Iris (various)(Iris)
Lysimachia (Gooseneck Loosestrife)
Mertensia virginica (Blue Bells)
Paeonia (various)(Peony)
Rudbeckia (various)(Cone Flower)
Salvia azurea grandiflora (Azure Sage)

Perennials for Special Environments

Perennials for Shade

Ajuga (Bugle)
 Anemone japonica (Japanese Anemone)
 Asperula (Woodruff)
 Convallaria majalis (Lily-of-the-Valley)
 Dicentra spectabilis (Bleeding-Heart)
 Heuchera sanguinea (Coral Bells)
 Hosta, in variety (Plantain Lily)
 Mertensia virginica (Virginia Bluebells)
 Phlox divaricata Primula, in variety (Primrose)
 Trillium grandiflorum (Trillium)
 Trollius europeus (Globeflower)

Perennials for Semi-shade

Anchusa azurea (Bugloss)
 Aquilegia hybrids (Columbine)
 Campanula rotundifolia (Harebell)
 Chelone lyonii (Pink Turtlehead)
 Cimicifuga racemosa (Cohosh Bugbane)
 Digitalis purpurea (Foxglove)
 Doronicum cordatum (Leopard's bane)
 Monarda didyma (Bee-balm)
 Physostegia Virginiana (False Dragonhead, Obedience)
 Polemonium
 Pulmonaria saccharata (Bethlehem Sage)
 Pyrethrum (Chrysanthemum coccineum, Pink Daisy)

Perennials for Wet Soils

Boltonia asteroides (White Boltonia)
 Caltha palustris (Marsh Marigold)
 Eupatorium purpureum (Joe-Pye-weed)
 Hibiscus Moscheutos (Swamp Rose-Mallow)
 Iris Pseudacorus (Yellowflag)
 Lobelia cardinalis (Cardinal Flower)
 Lysimachia clethroides (Clethra Loosestrife, Gooseneck Loosestrife)
 Miscanthus sinensis (Eulalia, Ornamental Grass)
 Monarda didyma (Bee-balm)
 Myosotis scorpioides (True Forget-me-not)
 Onoclea sensibilis (Sensitive Fern)
 Osmunda cinnamomea (Cinnamon Fern)
 Osmunda regalis (Royal Fern)

Perennials Which May Be Grown in Water

Caltha palustris (Marsh Marigold)
 Iris Pseudacorus (Yellowflag)
 Osmunda regalis (Royal Fern)

Perennials for Poor Soil

Achillea millefolium (Milfoil or Yarrow)
 Aurinia saxatilis (Goldentuft)
 Cerastium tomentosum (Snow-in-summer)
 Gypsophila paniculata (Baby's breath)
 Helianthus scaberrimus (Edging Candytuft)
 Linaria vulgaris (Toadflax)
 Phlox subulata (Moss Phlox)
 Sedum stoloniferum (Running Sedum)
 Sempervivum (Roof Houseleek)
 Verbascum Thapsus (Mullen)
 Veronica rupestris (Creeping Speedwell)

Perennials Requiring Well-drained Soil

Arabis alpina (Alpine Rockcress)
 Asclepias tuberosa (Butterflyweed)
 Aubrietia deltoidea (Purple Rockcress)
 Coreopsis grandiflora (Tickseed)
 Dianthus barbatus (Sweet William)
 Digitalis purpurea (Common Foxglove)
 Echinops Ritro (Steel Globe Thistle)
 Eryngium maritimum (Sea-holly)
 Iris hybrids (Bearded Iris)
 Liatris pycnostachya (Cattail Gayfeather)
 Papaver nudicaule (Iceland Poppy)

Perennials for Dry, Sandy Soil

Achillea Ptarmica (Sneezewort)
 Anthemis tinctoria (Golden marguerite)
 Asclepias tuberosa (Butterflyweed)
 Aster novae-angliae (New England Aster)
 Coreopsis grandiflora (Tickseed)
 Dianthus plumarius (Grass Pink)
 Echinops Ritro (Steel Globe Thistle)
 Limonium latifolium (Statice)
 Papaver nudicaule (Iceland Poppy)
 Rudbeckia laciniata (Goldenglow)
 Yucca filamentosa (Common Yucca)

Bloom Calendar

Perennials for Early Spring

Scientific Name	Common Name	Height (inches)	Color
Iberis sempervirens	Edging Candytuft	12	White
Sanguinaria canadensis	Bloodroot	8	White
Galanthus nivalis	Common Snowdrop	6	White
Scilla siberica	Siberian Squill	6	Blue
Chionodoxa Luciliae	Glory-of-the-snow	4	Blue
Claytonia virginica	Spring beauty	4	Blue
Crocus vernus	Dutch Crocus	4	Various
Eranthis hyemalis	Winter Aconite	3	Yellow

Perennials for Spring

Scientific Name	Common Name	Height (inches)	Color
<i>Aquilegia canadensis</i>	American Columbine	18	Red-Yellow
<i>Bergenia cardifolia</i>	Heartleaf Saxifrage	12	Pink
<i>Pulmonaria angustifolia</i>	Cowslip Lungwort	12	Blue
<i>Arabis alpina</i>	Alpine Rock-cress	12	White
<i>Tulipa</i> (early)	Tulip	12	Various
<i>Narcissus</i> (various)	Narcissus	12	Yellow
<i>Leucojum vernum</i>	Spring Snowflake	12	White
<i>Dicentra Cucullaria</i>	Dutchman's Breeches	10	White
<i>Primula</i> hybrids	Cowslip	9	Various
<i>Anemone Pulsatilla</i>	Pasqueflower	9	Purple
<i>Viola cornuta</i>	Horned Violet	8	Various
<i>Viola odorata</i>	Sweet Violet	8	Violet
<i>Muscari botryoides</i>	Common Grape Hyacinth	8	Blue
<i>Hyacinthus orientalis</i>	Hyacinth	8	Various
<i>Hepatica americana</i>	Roundleaf Hepatica	6	Blue
<i>Aubrietia deltoidea</i>	Common Aubrietia	6	Purple
<i>Trollius europaeus</i>	Globe Flower	24	Yellow
<i>Dicentra spectabilis</i>	Bleedingheart	36	Pink
<i>Iris germanica</i>	Iris	18-36	Various
<i>Thalictrum aquilegifolium</i>	Columbine Meadowrue	36	Purple
<i>Hemerocallis</i>	Lemon Daylily	36	Yellow
<i>Paeonia officinalis</i>	Common Peony	30	Various
<i>Aquilegia chrysantha</i>	Golden Columbine	24	Yellow
<i>Doronicum cordatum</i>	Caucasian Leopardbane	24	Yellow

Scientific Name	Common Name	Height (inches)	Color
<i>Euphorbia epithymoides</i>	Cushion Spurge	24	Yellow
<i>Chrysanthemum coccineum</i>	Painted Lady	24	Various
<i>Trollius europaeus</i>	Common Globeflower	24	Yellow
<i>Aurinia saxatilis</i>	Goldentuft	18	Yellow
<i>Tulipa Gesnerana</i>	Darwin Tulip	18	Various
<i>Gaillardia aristata</i>	Common Peren. Gaillardia	15	Red-Orange
<i>Brunnera macrophylla</i>	Siberian Bugloss	12	Blue
<i>Convallaria majalis</i>	Lily-of-the-valley	12	White
<i>Nepeta Mussinii</i>	Mussini Mint	12	Blue
<i>Phlox divaricata</i>	Blue Phlox	12	Lavender
<i>Galium odoratum</i>	Sweet Woodruff	8	Yellow
<i>Ajuga reptans</i>	Carpet Bugle	6	Purple
<i>Phlox subulata</i>	Moss Phlox	6	Pink
<i>Primula</i>	Primrose	6	Various
<i>Polemonium reptans</i>	Creeping Polemonium	6	Blue
<i>Ranunculus repens</i>	Creeping Buttercup	6	Yellow
<i>Silene quadrifida</i>	Alpine Catchfly	6	White
<i>Cerastium tomentosum</i>	Snow-in-summer	6	White
<i>Veronica prostrata</i>	Rock Speedwell	4	Blue
<i>Pulmonaria officinalis</i>	Pulmonaria	6-12	Purple

Perennials for Early Summer

Scientific Name	Common Name	Height (inches)	Color
<i>Althea rosea</i> (biennial)	Hollyhock	72	Various
<i>Delphinium hybrids</i>	Larkspur	24-60	Various
<i>Digitalis purpurea</i>	Common Foxglove	48	Purple
<i>Anchusa azurea</i>	Italian Bugloss	36	Blue
<i>Lupinus polyphyllus</i>	Washington Lupinus	36	Various
<i>Papaver orientale</i>	Oriental Poppy	36	Red-Pink
<i>Hererocalis</i>	Daylily	36	Yellow
<i>Iris hybrids</i>	Bearded Iris	36	Various
<i>Paeonia officinalis</i>	Common Peony	18-36	Pink, white
<i>Lilium candidum</i>	Madonna Lily	36	White
<i>Aconitum Napellus</i>	Aconite	24	Blue-White
<i>Baptisia australis</i>	Blue Wild-indigo	24	Blue
<i>Campanula medium</i> (biennial)	Canterbury bells	24	Blue
<i>Chrysanthemum x superbum</i>	Shasta Daisy	24	White
<i>Achillea Ptarmica</i>	Sneezewort	24	White
<i>Lilium pumilum</i>	Coral Lily	23	Red
<i>Dianthus barbatus</i>	Sweet William	18	Various
<i>Linum perenne</i>	Perennial Flax	18	Blue
<i>Oenothera fruticosa</i>	Common Sundrops	18	Yellow
<i>Dianthus plumarius</i>	Grass Pink	12	Various
<i>Lychnis viscaria</i>	German catchfly	12	Purple
<i>Papaver nudicaule</i>	Iceland Poppy	12	Various
<i>Veronica spicata</i>	Spike Speedwell	12	Purple
<i>Dianthus deltoides</i>	Maiden Pink	9	Pink
<i>Campanula carpatica</i>	Tussock Bellflower	8	Blue

Perennials for Mid Summer

Scientific Name	Common Name	Height (inches)	Color
<i>Macleaya cordata</i>	Pink Plum Poppy	72-96	Cream
<i>Lilium tigrinum</i>	Tiger Lily	24-60	Orange
<i>Cimicifuga racemosa</i>	Cohosh Bugbane	48	White
<i>Hemerocallis</i>	Daylily	48	Yellow
<i>Heliopsis helianthoides</i>	Pitcher Heliopsis	36	Orange
<i>Physostegia virginiana</i>	Obedience	36	Pink
<i>Monarda didyma</i>	Oswego Beebalm	36	Scarlet
<i>Echinops Ritro</i>	Steel Globe Thistle	36	Blue
<i>Phlox paniculata</i>	Perennial Phlox	24	Various
<i>Asclepias tuberosa</i>	Butterflyweed	24	Orange
<i>Lychnis chalcedonica</i>	Maltese Cross	24	Scarlet
<i>Lychnis x Haageana</i>	Haage Campion	12	Orange-Scarlet
<i>Heuchera sanguinea</i>	Coralbells	18	Crimson
<i>Veronica incana</i>	Woolly Speedwell	12	Rosy-purple
<i>Platycodon grandiflorus</i>	Balloon Flower	24	Blue, white
<i>Achillea millefolium</i>	Common Yarrow	18	Rose, white
<i>Astilbe x arendsii</i>	Astilbe	24	Pinks, white

Perennials for Late Summer and Early Fall

Scientific Name	Common Name	Height (inches)	Color
<i>Eupatorium purpureum</i>	Joe-Pye-weed	72	Purple
<i>Lilium Henryi</i>	Henry Lily	60-72	Orange
<i>Artemisia vulgaris</i>	White Mugwort	48	White
<i>Liatris pycnostachya</i>	Cattail Gayfeather	48	Purple
<i>Lilium speciosum</i>	Speciosum Lily	24-48	Pink
<i>Solidago canadensis</i>	Canada Goldenrod	36	Yellow
<i>Rudbeckia fulgida</i>	Showy Coneflower	36	Golden
<i>Lilium superbum</i>	American Turk's Cap Lily	24-36	Orange- Red
<i>Veronica longifolia subsessilis</i>	Clump Speedwell	24-36	Blue- Purple
<i>Liatris spicata</i>	Spike Gayfeather	24	Purple
<i>Limonium latifolium</i>	Bigleaf Sea-lavender	20	Laven der
<i>Colchicum autumnale</i>	Common Autumn Crocus	3-4	Purple
<i>Aconitum carmichaelii</i>	Violet Monkshood	48-60	Blue
<i>Aster novibelgii</i>	New York Aster	36-60	Blue
<i>Aster novae-angliae</i>	New England Aster	36-48	Various
<i>Helenium autumnale</i>	Common Sneezeweed	36-48	Yellow
<i>Echinacea purpurea</i>	Purple Coneflower	36	Purple- Rose
<i>Anemone x hybrida</i>	Japanese Anemone	24-36	Various
<i>Chelone Lyonii</i>	Pink Turtlehead	24-36	Pink
<i>Aconitum Fischeri</i>	Azure Monkshood	24-36	Blue
<i>Sedum spectabile</i>	Showy Stonecrop	18	Crimson
<i>Anemone hupehensis</i>	Japanese Anemone	12	Rose

CHAPTER 14

Herbaceous Landscape Plants

Planning the Flower Border	2
Annuals	4
Culture and Maintenance of Annuals	4
Controlling Insects and Diseases	7
Biennials	8
Perennials	8
Culture and Maintenance of Perennials	9
Controlling Insects and Diseases	11
Asexual propagation of perennials	11
Bulbs	12
Culture and Maintenance of Bulbs	12
Annuals for Special Uses	14
Annuals for Special Environments	16
Annuals Tolerant of Cool Weather	16
Tender Annuals	16
Heat-resistant Annuals	16
Annuals for Partial Shade	16
Annuals That Tolerate Heat, Drought and Sandy Soils	16
Annuals by Color and Height	17
Perennials for Special Use	18
Perennials for Borders of Ponds And Streams	18
Perennials for Background Planting	18
Perennials for Edging	18
Perennials for Ground Cover, Banks, and Terraces	18
Perennials for Bold or Sub-tropical Effects	18
Perennials for Naturalizing	18
Perennials for Old-fashioned Gardens	19
Fragrant Perennials	19
Perennials Having Especially Long Blooming Seasons	19
Perennials Suitable for Cut Flowers	19
Perennials for Special Environments	20
Perennials for Shade	20
Perennials for Semi-shade	20
Perennials for Wet Soils	20
Perennials Which May Be Grown in Water	20
Perennials for Poor Soil	20
Perennials Requiring Well-drained Soil	20
Perennials for Dry, Sandy Soil	20
Bloom Calendar	20
Perennials for Early Spring	20
Perennials for Spring	21
Perennials for Early Summer	22
Perennials for Mid Summer	22
Perennials for Late Summer and Early Fall	23