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EC1262 Flowers for Every Yard

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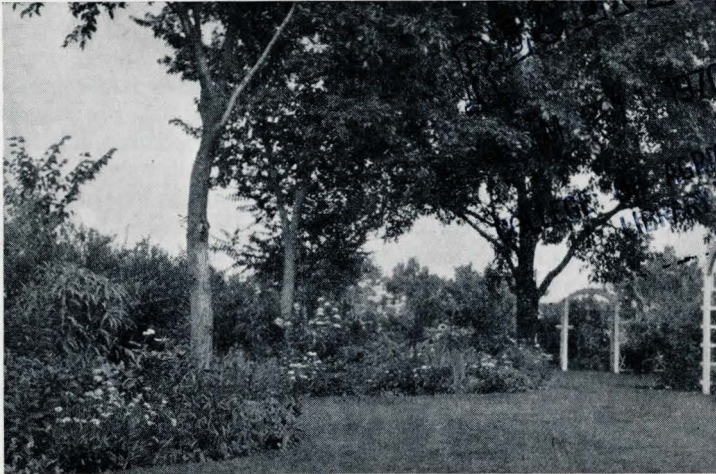
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Flowers for Every Yard



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Flowers for Every Yard

E. H. HOPPERT AND RIZPAH ANNA DOUGLASS

*"I have a little garden plot
Inside a picket fence
Within, the space is very small,
Without, it is immense.*

*And yet this tiny little spot
That's mine, means more to me
Than all the rest of all the world
In its immensity."**

VALUE OF A GARDEN

Every attractive farmstead is an asset to the community. Homes are the foundation of a nation. Clean, attractive, pure homes help to develop the youth into strong, upright honorable citizens. Anything that will make the home a better place to live will tend to improve the citizenship of the future generation and increase the comforts and pleasures of the present.

If a dwelling is to be really a home, it must be more than a place at which one may eat and sleep. It must be a place where one may relax from the strain of earning the living, and for the young, a retreat for the solution of life's problems. Inspiration must be there, an incentive to strive diligently for the highest ideals. To attain these ends not only must the physical needs of the family be supplied moderately well, but the home must be attractive.

The foundation of this attractiveness is love among the members of the family, combined with a right moral, mental, and religious attitude. This attitude is greatly influenced by one's surroundings. Beauty in every form has an influence for good. Different forms of beauty affect people differently, the children probably being affected the most by this influence, which fact is seldom realized at the time the influence is being exerted.

An attractive yard and garden is invaluable for the influence which it exerts upon the family. It will increase the family's pleasure, it is restful for tired eyes, and the work of creating beauty makes a greater joy in the home and draws the family together in a common interest.

Every farmstead presents a picture to the passerby. This picture may be pleasing and inviting, or it may be bleak, barren, or even ugly. Whether the occupants of the farmstead are owners or tenants, this picture expresses something of the character of the family living within. A neat, clean yard, which looks well kept, whether it has much in the way of plantings around it or not, will add materially to the enjoyment of those who pass and thus incidentally will increase the selling value of the farm.

* Taken from the Program of the Eleventh National Flower and Garden Show

Failure to have an attractive yard and garden may be due to several reasons, namely:

- (a) A belief that an adequate improvement will be too expensive.
- (b) A conviction that it will require too much time and work for upkeep.
- (c) Indifference.
- (d) The feeling that it is impossible to have both flowers and chickens.

Landscaping and making a farmstead more attractive need not be expensive, and if the plans are not too extensive, the work involved will not be so much but that one will be repaid in pride in the home and enjoyment from working with flowers.

Even though one is renting, the place is that person's home for the time being, and the surroundings may be exerting an undesirable influence upon the family, unless one puts forth the effort to make it otherwise. The question before the family is this: Should the place where they live be a home, or should it be merely a house used as a place where they eat and sleep?

A small beginning is better than none. Perhaps the first thing to be done is to remove unsightly objects from view. Oftentimes a piece of machinery or a corn crib is the first thing people see as they go by the house or look out of the kitchen window.

A good, thorough raking of the yard, trimming of the trees, cutting out the dead trees and shrubs, and separating the shrubs that are too large may be the first steps in improvement.

It is true that chickens and flowers do not go well together, but if a house is to be made attractive, a fence around a small portion of the yard may be needed. This may be done at a small cost, and what satisfaction is gained from the results of a small garden!

This improvement of the farmstead need not be expensive or extensive. There are so many possibilities of development that one may do as little or as much as he desires. (For further information on landscaping the home, see Ext. Circ. 1250.)

The purpose of this circular is to encourage the beautification of homes by the planting of flowers. It is planned to give some helpful ideas about the placement of flowers and culture suggestions.

PLANTING MATERIALS

There are three main classes of flowers: annuals, biennials, and perennials.

Annuals are those plants whose length of life in the garden extends from approximately the last killing frost in spring until the first one in the fall and whose flowers are borne profusely during the latter part of the summer. They are valuable in any garden for their abundant blooms, variety of colors, and ease of cultivation. They are also useful because one can acquire an attractive garden in a short time with little expense.

Perennials are those plants that lose their leaves and stems after their blooming season, but come up from the crowns or from the roots the following year. They are valuable because they are more or less permanent and will not need replanting until the plants become too large and woody with age. Then they need to be dug up, the roots divided, and reset.

Perennials do not make much of a showing the first year, but usually bloom the second year, neither do many of them bloom over a very long period. Some of them bloom early, some late, and some in mid-season. It is therefore necessary to plan the border carefully in order to have continuous bloom.

Biennials are those plants that require two years to come to maturity and then die. These need to be replanted each year in order to have blooms on successive years.

PLANNING THE FLOWER GARDEN

The adage "A thing worth doing is worth doing well" certainly applies to garden making. The most successful gardeners make a plan, study it, and change it as they work with it. Thus many costly mistakes are avoided and much time is gained by doing the thing right in the first place.

Some of the points to consider while making the plan are location, size, shape, and selection of species.

LOCATION

The flower garden yields the greatest pleasure to the individuals in the family. An outdoor living room will give enjoyable family life, no matter how small or what kind of a flower garden one has. Place it where the family can have easy access to it from the house. Place it where it can be seen and admired from a window and where the men will pass by on their way to and from the barn. Place it so that it may be enjoyed by all members of the family a number of times a day. Busy farm life does not allow much leisure, so that the pleasure received from a garden must need be snatched bit by bit from the general round of duties.

SIZE

The size of the flower garden may be whatever is possible on any particular farmstead. It will depend on the money available, the time one has for taking care of it, and the wishes of the owner. A small garden can be as attractive and yield as much fun and pleasure as a large one. A small well kept garden will give greater satisfaction than a large one which may prove too burdensome and become neglected.

SHAPE

The shape of the garden may be any kind that best suits the individual and the surroundings. Whether it be square, oblong, or oval, it can be made attractive. As a rule, however, the oblong shape is more easily developed. The size will depend upon the amount of time and money one

wants to devote to it. The larger the area the more time it will take to care for it properly and the expense will be greater.

DESIGN

The design of the area may be formal or informal. The architectural features of the house will somewhat determine the choice. A formal garden would hardly be in keeping with a small cottage type of house, but would be suitable with a large brick or stucco house.

A formal garden usually has straight borders around the edge of the garden with a pool and bird bath in the center or at one end. Small geometric flower beds are sometimes placed in the central part of the garden. These balance perfectly from the central axis. These beds should be reserved for the formal garden and not used in the informal garden or in the front lawn area.

An informal garden is probably the easiest to obtain. Usually it has irregular shaped borders around the edge of the garden and the center is left open with grass growing in it. Irregular masses of flowers of varying sizes are more artistic than an equal number of plants of the different kinds. The edges of the informal border might be curved, with the border made wider in some parts than in others.

Straight edged borders may be used with the formal garden or in a small informal area. Borders that are too wide are difficult to cultivate while a flower border consisting of a single row of annuals is not very effective particularly if it is used to face a heavy shrub border. A three to six foot border is about average size and will suit most conditions.

Flower gardens to be effective must be well thought out and planned correctly. Haphazard methods will result in an unsatisfactory garden. Even the rudest sort of a plan drawn on paper will be of some assistance. A plan can be drawn, changed and studied long before any actual digging and planting is done.

SELECTION OF SPECIES

Selection of species is important in having a successful border. The type selected for the different places will depend upon height, color, texture, and season of bloom.

Height. Plant the taller growing varieties at the side of the border away from the area to be beautified. Place the low growing varieties in front near the area beautified. Put the largest of the tallest shrubs at the corners and occasionally place a tall group near the center of the back edge of the border. This will give an informal varying height at the back. See Fig. 1.

The heights of plants used in the border should be governed by its width. Use the tallest plants in the wide borders along with the medium and the dwarf, while in a narrow border, use only the medium and dwarf.

Single specimens lose their identity. Always use enough plants of one variety in a group to make them noticeable.

Color. The color scheme of the garden can be simple or extremely complex. No general scheme will fit all gardens nor suit all personal preferences. All colors can be represented even in small gardens but will require considerable planning for there are certain warring shades which must be carefully handled.

The simplest method of developing a harmonious color scheme is to select one color, use it abundantly and augment it with colors which are harmonious, contrasting, or complementary.

Strong colors should be used sparingly and be placed in the background, as a rule, but they can be used as accents in the foreground, if there are several weak colors that need bolstering up.

Pale colors are generally put in the foreground so one can appreciate their delicacy.

Sharp contrasts, if used carefully, will often prove satisfactory. For example, use such color contrasts as purple petunias and white sweet

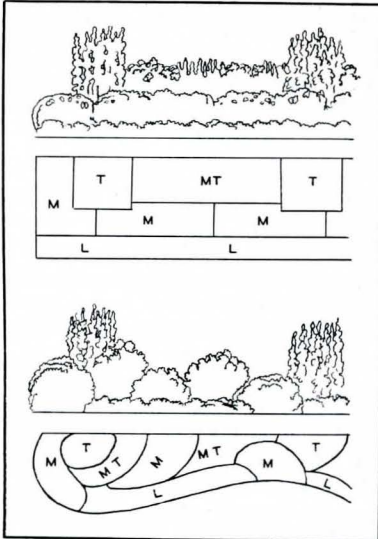


FIG. 1 Use plants of the various heights in the border.

alysium, or orange African marigolds and blue bachelor's buttons, or orange calendulas and blue ageratum. In working out a dominant color scheme, select a color that is a favorite. For instance, blue offers a wide range such as the bright blue of lobelia and browallia, the lavender blue of ageratum and the purple blue of petunias. Place pale yellow and white with these as contrast.

If yellow is selected as the dominant color, there is also a wide range from pale straw, cream, sulphur, lemon, bright yellow, golden orange to brown. Blue, white, and pale shades of purple may be used with these.

Green is the dominant color in nature and should be used freely. White and gray harmonize with all colors, but be careful not to overwork them.

If any color requires the use of the "soft pedal", it is red. A little red goes a long way and should be used sparingly. Avoid placing pink and red next to each other and likewise do not use orange and red together. These colors may be separated by white flowers or plants with green or silver foliage. For example, separate a yellow day lily and a crimson Rambler with dusty miller.

When laying out the garden and studying color composition, it is well to remember that blue is the coldest and most retiring of colors and that its complement, orange, is the warmest and most advancing. In most cases

it would be more pleasing to place the softer, more delicate colors near the house and use the warm colors some distance away in the border. Care must be taken, however, that the color masses are never so large as to become monotonous.

The following list of flowers will prove interesting when grown near one another:

Ageratum and calendula	Annual coneflower, gaillardia, and gypsophila
Tasselflower and browallia	Gilia, striped marigold, and Chinese forget-me-not
Gaillardia, petunia, and verben	Chinese forget-me-not and calendula
Yellow or pink zinnia and ageratum	Forget-me-not and gypsophila
Prickly poppy and French marigolds	Flax and ageratum
Calendula and mealycup sage	Salpiglossis and French marigolds
California poppy, cornflower, and French marigolds	Calliopsis and nasturtiums
Gypsophila, cape marigold, browallia	China pinks edged with ageratum, background of cornflower
Snapdragon, phlox, and spiderflower	Phlox drummondi, larkspur, and African marigolds.
Cosmos, spiderflower, and giant zinnia	
Prickly poppy, perilla, and tobacco	
Clarkia, browallia, and mignonette	
Tasselflower and ageratum	

Texture. Much can be accomplished by consideration of the foliage texture. Coarse foliage should never be used in excess but a few coarse-textured plants often strengthen the entire effect and serve as accent. For example, the coarse foliage of dahlias, helianthemums, and gladioli can be softened with a group of cosmos, or the coarse foliage of stocks will give strength and stability to a border of snapdragons, ageratum, and asters. Plan also to have some variation in the shape of flowers. Several button-shaped flowers together will be improved if a spike-shaped flower is placed among them.

Season of bloom. Succession of bloom is important in all gardens. It is very difficult to have the entire garden in bloom all summer unless some replacement is made. Each species has its own season of bloom which can be prolonged somewhat by preventing seed pod formation. By careful placing, so that those in bloom at any season are not all in one place but well distributed, an attractive border can be maintained throughout the summer.

Locate and select the varieties best suited to the conditions, giving consideration to the sun, shade, and moisture requirements. (See tables for requirements.)

Plant requirements. Thorough tillage of the soil is essential for best results. There is no substitute operation that will take the place of the initial preparation. It must be remembered that the work is being accomplished not for one season, but for several.

It will be noted in the tables of this circular that different plants require different soil conditions and some will stand more sun or shade than others. In planning a flower border, it is well to take these facts into consideration. However, most plants will grow in a good soil. Different

parts of the state have different soil conditions, so it might be said that good corn soil will be suitable for raising flowers. See Figures 2, 3, and 4 for suggested combinations.

ANNUALS AND THEIR USE

Since the study of flowers and their culture is so extensive, the rest of the circular will be devoted primarily to annuals and their use in the flower garden.

There are three classes of annuals. The first, called by the misleading name of hardy, are hardy in the sense that the seeds produced are quite resistant to cold and reseed themselves. This means that they may be sown with safety either in the fall or early spring. Such annuals are usually sown directly in the beds and transplanted farther apart as they need more space or are thinned out when too many come up for a given space. In the event that the seed germinates in the fall, it is advisable to mulch the young plants to protect them from the rigors of winter.

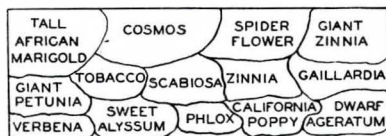


FIG. 2. A border of Annuals which will provide blossoms throughout the summer.

The second class of annuals is sometimes called half-hardy. These species require a long growing season, therefore to get them to blooming in the garden early, it is necessary to plant them indoors in flats early in the spring.

The third class are called tender annuals. They are those which can stand no cold either in spring or fall, in neither the seed nor the plant stages. They are never sown in the cold soil, but put in the ground only when the trees are in leaf. These annuals may be sown in March in a flat indoors to make them bloom earlier, or they may be sown in the garden after all danger of frost is over.

See list for classes of annuals which will govern the method used for their culture.

Annuals play a definite part in making a successful garden. They may be used in the following ways:

1. In front of foundation plantings of shrubs.
2. Alone in front of the shrub border around the outdoor living room.
3. With perennials to produce flowers during the slack blooming season.
4. As filler in a shrub border where some shrubs have died out.
5. As a background for the flower border or as a screen to hide an unsightly view.
6. To provide cut flowers for bouquets.

Annuals in the Perennial Flower Border. Annuals have a definite place in the perennial flower garden. There are times during the summer when

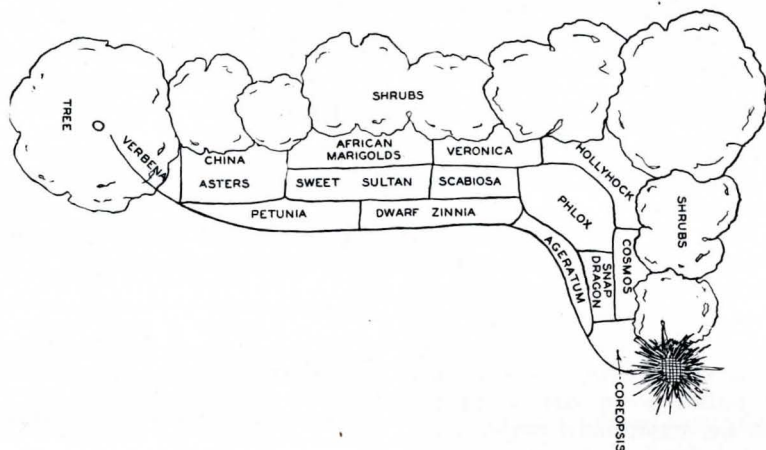


FIG. 3. An informal border using annuals only.

perennial bloom is light, and annuals will fill in during such a period. A need for annuals is also found in the perennial border to cover places left by those that disappear after flowering. Plants such as bleeding heart, Oriental poppies, foxglove, Virginia bluebell, and others that die down may be supplanted with dwarf ageratum, snapdragon, zinnias, and petunias. If the season is particularly hot and dry, some annuals such as petunias, verbenas, portulaca, and phlox are about all that will be blooming. If these are used in the perennial border, it will not be without some bloom. See Figure 4.

Annuals may also be planted as ground cover among lilies to keep the soil cool. Borders of tulips, daffodils, hyacinths, and other bulbs are unsightly after the bulbs are through blooming. Petunias, snapdragons, browallia, California poppies and many other annuals can be grown successfully between the bulbs. Iris is another plant that adds little to the beauty of the border after it blooms. Four o'clocks planted in with the iris will eliminate this difficulty.

Annuals in the Vegetable Garden. Farm families who allow the chickens to run over the place will need to have the vegetable garden fenced. In the event that the yard is not fenced, it will be necessary to raise flowers in the vegetable garden. In many ways, this is the ideal place to raise flowers for the house and for friends, but it does not provide a beauty spot for leisure hours. However, it is better to raise flowers in the vegetable garden than to raise none at all. Hollyhocks bordering the side of the garden next to the house will make it a thing of beauty and bordering the paths about the garden with various low-growing annuals will make the necessary garden work a joy.

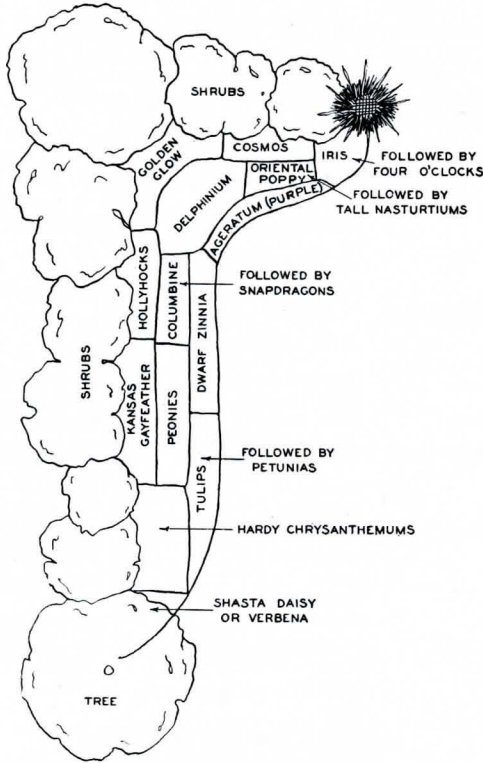


FIG. 4. An informal border using annual and perennial flowers.

ANNUALS ACCORDING TO HEIGHT

For edging

Ageratum (dwarf)	Marigold, French and Mexican	Phlox, annual
Alyssum, sweet (dwarf)	Nasturtiums (dwarf)	Portulaca—Sunrose
Candytuft	Pansy	Snapdragon (dwarf)
Dusty miller	Petunia	Verbena
Lobelia erimus (dwarf)		Viola

Low growing annuals—10 to 15 inches

Aster	Candytuft	Poppy
Begonia (tuber)	Gypsophila	Sweet William
Calendula	Madagascar periwinkle	Zinnia
	Phlox drummondii	

Annuals—18 to 24 inches

Ageratum	Coreopsis	Sage
Asters	Dahlia (dwarf)	Salpiglossis
Balsam	Gaillardia	Snapdragons
Browallia	Godetia	Stocks
Calliopsis	Laceflower	Zinnia
Cape marigold	Lupine	

Medium height—2 to 3 feet. Suitable for middle part of border

Canterbury bells	Cornflower	Sweet sultan
Chrysanthemum	Larkspur	Zinnia
	Scabiosa	

Tall

Althea—hollyhock	Elephant's ear	Pennisetum—Fountain
Cannas	Hibiscus manihot—Sunset	grass
Castor bean	hibiscus	Princesfeather—Amaranthus
Cosmos	Marigold, African	Sunflower

Temporary hedges

Balsam	Four o'clock (ideal for	Kochia—Burning bush—
Fountain grass—Pennisetum	hedges)	Summer cypress

Annual vines

Balloon vine	Hyacinth bean	Morning glory
Cardinal climber	Mock cucumber	Ornamental gourds
Climbing nasturtium	Moon flower	Sweet peas

ANNUALS FOR CUT FLOWERS AND BOUQUETS

African daisy	Cosmos	Poppy
Ageratum	Gaillardia	Salpiglossis
Annual chrysanthemum	Godetia	Salvia
Babysbreath	Larkspur	Scabiosa
Browallia	Lupine	Snapdragon
Calendula	Marigold	Stocks
Calliopsis	Mignonette	Sweet peas
Cape marigold	Nasturtium	Sweet sultan
China-aster	Pansy	Verbena
Cornflower	Phlox	Zinnia
	Pinks	

ANNUALS FOR SHADY PLACES

Balsam	Forget-me-not	Petunia
California poppy	Godetia	Snapdragon
Candytuft	Larkspur	Sweet alyssum
China-aster	Lupine	Verbena
Cornflower	Pansy	Zinnia

ANNUALS FOR POOR SOIL

Alyssum, sweet	Calliopsis	Poppy
Amaranthus	Coxcomb	Portulaca
Balsam	Gaillardia	Spiderflower
Browallia	Marigold, pot	Summer cypress
California poppy	Nasturtium	Sweet sultan
	Petunia	

ANNUALS ACCORDING TO COLOR**White**

Babysbreath	Four o'clock	Statice
California poppy	Larkspur	Stocks
Candytuft	Madagascar periwinkle	Sweet alyssum
China-aster	Petunia	Sweet peas
Chrysanthemum	Phlox	Sweet William
Cornflower	Scabiosa	Zinnia
Cosmos	Snapdragon	

Pink or red

Candytuft	Gilia	Salvia
China-aster	Globe amaranth	Scabiosa
Coxcomb	Hollyhock	Snapdragon
Cornflower	Larkspur	Spiderflower
Cosmos	Madagascar periwinkle	Statice
Evening rimrose	Nasturtium	Stocks
Everlasting	Petunia	Sweet sultan
Flax	Phlox	Verbena
Four o'clock	Salpiglossis	

Yellow or orange

Calendula	Everlasting	Scabiosa
California poppy	Four o'clock	Snapdragon
Calliopsis	Gaillardia	Statice
Chrysanthemum	Marigold	Sunflower
Coxcomb	Nasturtium	Sweet sultan
Evening rimrose	Salpiglossis	Zinnia

Blue, lavender, or purple

Browallia	Gilia	Salpiglossis
Candytuft	Laceflower	Salvia
China-aster	Larkspur	Scabiosa
Chinese forget-me-not	Love-in-a-mist	Statice
Cornflower	Petunia	Verbena
Dwarf morning glory	Phlox	Zinnia
Forget-me-not	Poppy	

MAINTENANCE OF ORNAMENTAL PLANTINGS

SOIL PREPARATION

Most flowering plants like a rich soil, one in which plant food is quickly and easily available. For this reason they respond well to fertilizer. The best fertilizer is well rotted manure. A good way to apply the manure is to put it into the furrow and then spade or plow the dirt over it. Spade the soil in the fall after frost and leave the ground rough. The digging should be done to a depth of 1-1½ feet. Deep preparation lessens the need for continuous watering. Fall preparation helps to hold the snow, and kills the insects that live over in the soil. The freezing and thawing will greatly improve the texture.

In the spring the ground should be raked thoroughly, thus making it smooth and fine.

SEEDING

Most of the plants mentioned in this bulletin can be propagated from seed. In some cases, however, they will require special care. Special directions for these are given at the end of the circular. To insure good, sturdy plants, get good seeds from a reliable seed company. If one wishes several species and varieties, seed may be exchanged with the neighbors.

A few species must be sown where they are to mature as they will not stand being transplanted. Those belonging to this group are California poppy, lupine, prickly poppy, mignonette, sweet pea, sweet sultan and most annual vines. The group of annuals called hardy or that reseed

themselves may also be put into the ground where they are to mature. Thoroughly prepare the soil and plant the seed to a depth of four or five times its diameter. Be sure not to plant the seeds too thick. After the plants have come up, they should be thinned, allowing plenty of room for growth according to the size of the plant at maturity.

All the annuals called half-hardy are best planted indoors in flats or outdoors in a cold frame.

A flat is a box 3 inches deep and as large as one can easily handle. Place the bottom boards about one-fourth inch apart, or bore five or six holes in the bottom to afford good drainage. Place some broken pottery over the holes and rough material in the bottom of the flat. Then place over this a mellow soil. A good soil for this purpose may be made by thoroughly mixing equal parts of garden loam, sand, and well-rotted manure or decomposed sod. Press the soil down and make it level, otherwise the water will settle to one side. Sow the seeds in rows four or five to an inch and press the soil around the seed. In covering the seed in flats or cold frames, bury them to twice the depth of their greatest diameter. Covering the seeds with sand to allow the young plant to push through the soil easily is a good practice. Water the seed thoroughly with a fine spray from a sprinkling can so that the soil is not washed. Shade the seeds with a burlap sack or newspaper during the germination period, then place in full light for growth. Plants with different lengths of germination period should not be put into the same flat. For example, petunias and sweet alyssum should not be put together for when one is ready for full sunlight, the other should still be shaded.

A cold frame is simply a frame with a window sash as a cover. The frame is placed upon a bed of fine mellow earth and placed next to the building so it will give it protection from the north and west winds. The heat of the sun warms the soil and the air is confined so that the warmth and moisture cannot escape. Plant the seeds in the cold frame in the same way as is done in the flats.

Damping off is a disease that often attacks young plants. It is a fungus disease that is prevented by good ventilation, and by treating the soil before seeds are planted. This may be done by heating the soil thoroughly or by treating the soil with formaldehyde ($2\frac{1}{2}$ T. mixed with about $1\frac{1}{2}$ c. of water). Mix well into the soil and allow to stand a day before planting the seed. This amount will treat a bushel of dirt.

TRANSPLANTING

The young seedling plants should be transplanted as soon as the first true leaves are formed. Before transplanting, the seed bed should be wetted thoroughly an hour before digging the plants, so that they can be removed without breaking the roots.

These small seedling plants should be transplanted to another flat or to another part of the cold frame where more room may be provided for their growth. This bed should be prepared beforehand so that everything

will be in readiness. Have the soil moist, but not wet. Holes for the plants may be made with a stick one-half inch in diameter and sharpened at one end. Carefully loosen the soil about the plant, disturbing the roots as little as possible. Put the plant into the soil at about the depth it was before and press the earth about the roots. Place them two to six inches apart, according to their size. Water thoroughly but carefully. To avoid disturbing the roots at the second transplanting, these seedling plants may be put into individual paper pots. These pots also give sufficient room for root development. Strips of cardboard may also be used to keep the roots of each plant in its own particular section.

When the plant becomes sturdy with several leaves, it may be transplanted to its permanent place. In the vicinity of Lincoln this second transplanting should not be done until about the 10th or 15th of May. Farther north and west, it would be later, and farther south, earlier.

CULTIVATION AND WATERING

Annual flowers need cultivation similar to any other garden plant. Those sown in the place where they are to grow will need thinning as soon as the plants have their true leaves formed. All flowers will need to be kept free of weeds in order to insure good growth.

Frequent stirring of the soil with a small hand weeder will keep the weeds down, and thus conserve the moisture. Weeds use moisture from the subsoil, robbing the flowering plants. Constant stirring of the soil when there are no weeds is a waste of energy and tends to dry out the soil and burn up the humus. Deep hoeing is unnecessary, in fact, it is dangerous because it cuts off the surface feeding roots.

Nearly every year we have one or more drouth periods when artificial watering will prove advantageous. In general the best way to apply water is in ditches between the rows. Apply enough water to wet at least the upper six or eight inches of soil.

Watering with a sprinkling device is effective if properly done, but is dangerous in some cases since it tends to spread disease spores; furthermore, much moisture is lost into the air when sprinkling is resorted to. Roses should always be ditch irrigated as sprinkling provides favorable conditions for the growth and spread of mildew.

Watering should be done in the early mornings or evenings during very dry, hot weather.

Pinching back. Some annuals do not branch as freely as they ought. This may be remedied by pinching out the top bud which causes the plant to spread. Where the plants are very thick, this practice is not recommended. The plants that usually need to be pinched are ageratum, browallia, annual chrysanthemum, perilla, petunia, phlox, salpiglossis, snapdragon, and zinnia.

INSECTS, DISEASES AND THEIR CONTROL

Ornamentals, like most other plants, are subject to insect attack and to diseases. If the gardener is to be successful in growing plants and keeping them healthy, he must have a working knowledge of the way insects and diseases work and common methods to use in their control.

Insects. There are two general classes of injurious insects, the division being based upon the method in which the damage is done.

Insects with chewing mouth parts. Belonging to this class are leaf-eating insects, like currant worm, caterpillars of various sorts, beetles like the blister beetle, potato beetle, rose chafer, and striped cucumber beetle. In general leaf-eating insects are controlled with lead arsenate at the rate of two to three tablespoonsful to each gallon of water. Another convenient method of applying lead arsenate is to mix thoroughly one pound of this material with ten pounds of hydrated lime. This mixture is placed in a burlap sack and the sack shaken several times over each plant. For the striped cucumber beetle calcium arsenate is used with the hydrated lime or better still with gypsum in the same proportions.

The blister beetle is not easily controlled with arsenate, but a new material called barium fluosilicate has been found reliable.

The borers also belong to this class, but they are much more difficult to control. In general the most satisfactory method is to cut them out with a sharp knife. The white grub, while not a borer in the true sense, works much like some borers in the crowns of perennials and it girdles shrubs and young trees below ground. They also injure lawns. Fall spading or plowing and leaving the surface rough is fairly effective for vegetable gardens or those parts of the flower garden devoted to annuals. A new method recommended in some states is to incorporate lead arsenate into the soil around shrubs and perennials at the rate of one pound to 150 square feet of ground.

Insects with sucking mouth parts. Plant lice, scale insects, leaf hoppers, and red mites belong to this class although the latter is not a true insect. Stomach poisons will not control these pests. Contact sprays which kill by merely touching the insect or by suffocating them are used. Plant lice and leaf hoppers are generally controlled with nicotine sulfate either in solution or in the dust form. A teaspoonful of nicotine sulfate is mixed up in a gallon of water in which has been dissolved an ounce of laundry soap. This mixture is used as a spray, being sure to hit the insects rather than merely covering the foliage as is done with arsenical sprays. The dust is made by mixing one part by weight of the nicotine sulfate with 20 parts by weight of hydrated lime, then working it through a sieve. This dust is used when the temperature is above 80° F. and preferably when there is no wind.

Scale insects are frequently found on lilac, Japanese quince, elms, etc. The old-fashioned remedy is liquid lime sulfur at the rate of one part to nine parts of water. Oil sprays are available at present for scale insects and

red spider. Some of these can be used only as dormant sprays. Others can be used as summer sprays. It is well, therefore, to follow the directions given by the manufacturer or damage may result to the plants upon which the spray is used. For red spider and leaf hoppers use sulfur as a dust or spray with a solution made of one-fourth pound laundry soap and five gallons of water, then stirring in one-fourth pound of sulfur dust.

Diseases. Ornamental plants are subject also to attacks of parasites belonging to the plant kingdom. There are two general types of these parasites, namely, fungi and bacteria. A third type is present in the sap of plants producing symptoms that are similar to those produced by the other two. This type is known as a virus.

Fungi have two stages, vegetative and reproductive. In the vegetative stage the fungus produces many thread-like strands which enter the cells of the host plant and consume their contents. In the reproductive stage spores are produced which may be disseminated immediately or they may be of a type that can live over winter on the infected parts and be disseminated the next year. The spores are carried by winds or by splashing rain drops or by insects to healthy plants where they germinate if sufficient moisture is present. The vegetative strands (hyphae) produced enter the host plant through breathing pores or through wounds. Control in general consists of gathering up the diseased parts in the fall and burning them and by making conditions unfavorable for the germination of the spores or for the entry of the hyphae into the host plant.

Bacteria are single-celled organisms that reproduce by dividing. They do not produce spores as do fungi, but are spread easily nevertheless. Some are spread in the tubers, bulbs, or rhizomes. Others may enter the seed, others live over in the soil and enter the host plant through the underground parts. They are also spread from diseased to healthy plants by insects or by means of pruning and cultivation tools. The virus type of disease is likewise spread through planting infected tubers or bulbs and is carried from diseased plants to healthy plants by insects or with pruning tools or cultivating tools. In nearly all cases a certain type of fungus attacks only a certain species of plant. Rose mildew will not attack snowberry nor zinnia and vice versa, neither does the leaf spot, which affects peonies, attack phlox so that there need be no fear about placing these two side by side. Only a few of the common diseases will be discussed in this circular.

Mildew. The name mildew is applied to that type of disease which covers the leaves and stems with a white powdery-like growth. It occurs on roses, lilac, ivy, columbine, golden glow, snowberry, zinnia, delphinium, dahlia, and other ornamentals. It is especially bad in damp humid periods and under crowded conditions or in shady places or where there is poor circulation of air. Too much artificial watering may likewise aggravate the situation. Fairly good control may be secured by dusting with sulfur at weekly intervals during humid periods. Best results are secured when

the dusting is done at temperatures of 75° to 85° F. If leaf-eating insects are also present, use a mixture of 85 per cent of dusting sulfur and 15 per cent of lead arsenate.

Rust. This disease is found on hollyhock, chrysanthemums, iris, aster, rose, snapdragon, ageratum, calendula, pansy, clematis, mallow, and others. The leaves and stems are attacked. On the under side of the leaves there will be orange to brown raised spots which are the spore masses. Rusts are rather difficult to control in wet weather. In the fall the infected plant parts should be gathered up and burned. If the disease is very severe on only a few plants in early summer, these should be pulled up and destroyed. Sulfur dust may be used each week as suggested for mildew.

There are many **leaf spot diseases** in addition to the rusts; for example, black spot of roses, leaf spot on phlox, on peonies, on hollyhock, on iris, on asters. Since these diseases all live over winter on old diseased leaves and stems, these parts should be gathered in the fall and burned.

Twig blight sometimes occurs on the ends of new shoots of lilac and occasionally on other plants. The infected twigs die, the bark turning black. The leaves also turn black and remain attached to the dead twigs. Infected shoots should be removed promptly, being sure to make the cut five or six inches below the point where the bark is black.

Root rots occur with such plants as iris, delphinium, gladiolus, funkia, and others. Poor soil drainage, or too much artificial water and too much decaying vegetable matter in the soil may in some cases be responsible for the inroads by rot organisms. In severe cases the entire plant may have to be dug up and discarded and something else planted. In less severe cases the roots may be dug and badly infected portions cut out. The remainder should be disinfected with sublimate of mercury solution or some other mercury compound and the roots replanted in another more suitable location.

Virus diseases. Yellows of the China-aster is responsible for most of the losses with this garden favorite. The disease also attacks Shasta daisy, pyrethrum, gaillardia, bachelorsbutton, strawflower, coreopsis, scabiosa, sweet alyssum, annual phlox, and others. It probably lives over on weed plants like the sow thistle or wild daisy from which it is brought to the flower garden by leaf hoppers. To control, all the weeds that are suspected of harboring this disease should be destroyed. Young plants that show the yellows should be pulled up and destroyed. The other plants should be sprayed every week or ten days with a nicotine spray to kill the leaf hoppers.

PROPAGATION AND CULTURE OF SOME PLANTS THAT REQUIRE SPECIAL TREATMENT

Cannas are tender herbaceous perennials, but because they lack the ability to tolerate cold, they are treated as an annual. To give them the long growing period that they need, the rhizomes are started in flats in-

doors. Have two inches of good soil in the flat and place the rhizome with the eye up. Cover with sand so that the eye is just below the surface. When the plants are three inches high, transplant into pots. They are put out-of-doors after all danger of frost is over. Cannas want good garden soil, full sun, and plenty of water.

As soon as the frost cuts the plant down in the fall, the tops are cut off to about six inches above the ground. Dig the rhizomes, allowing considerable soil to cling to them. Store in a cool place such as a potato cellar. Put on shelves, not on the floor, and keep them from drying out by watering lightly every ten days or two weeks.

Cannas may be grown from seed if one wishes. Soak the seed 24 hours to soften the hard shell. Sow in February in a flat indoors and keep in a warm place. Transplant the seedlings in pots and when these plants are six or eight inches high and the danger of frost is over, they are planted in their permanent bed.

Cannas are considered a foliage plant, but recently some varieties have been developed that are good blooming sorts. Cannas are best used as a background for the flower border or as a screen. They are not at their best when placed in a bed in the center of the front lawn area.

Dahlias are especially adapted to the western part of Nebraska as they do best in a cool climate and where the nights are cool. They may be raised in eastern Nebraska if they are planted early enough to produce blooms before hot weather or late enough so that they will bloom in late August and in September. Plant in the open ground about April first for early summer blooming, and about June first for fall blooming. If planted in May, the bloom is likely to be disappointing because it will come during the heat of the summer. For the vicinity around Lincoln, they can be planted as late as July 1.

A sandy loam soil is best for dahlias, but they will grow in most any soil if given proper care. The tubers should be divided having one eye each.

As it is rather difficult to distinguish the eye, it is well to place the clumps in a warm, moist place without soil for a short time. As soon as growth is apparent, the clump should be cut apart with a sharp knife in such a way that a piece of the stem with budding "eyes" is attached to each root.

Place the root horizontally in the ground, cover with soil to a depth of about two inches. Dahlias need support, so it is well to set the stake at the same time the root is planted. Never allow more than two stalks to come from the root and start tying them to the stakes after they reach a height of two feet.

After the first killing frost comes in the fall, the plants are cut off six inches above the ground and left standing about a week. Then the roots are carefully dug out and the stalk is trimmed off to only two or three inches from the roots. Place the roots in boxes *upside down* and store in a cellar or cave where the temperature can be kept as low as possible without freezing. The stalks are placed upside down during storage to allow

the acid sap which they contain to run out instead of down into the roots and rotting them. If these roots are kept in too warm a place, they will dry out. They should be looked at every week or so to see that they are not drying too much. If they are, moisture can be applied by sprinkling the clumps. If they do shrivel some, they will grow, provided the eye is fresh and clear. Place shrivelled roots in water at least 24 hours before planting.

Gladioli are one of the most popular of all garden flowers. They grow from corms, which are a kind of hard, round bulb. They may be planted outdoors in northern gardens as soon as the frost is out of the ground. Quick-maturing, or early varieties, and late varieties have been developed, so that by planting the various kinds at different periods, an almost continuous succession of handsome cut flowers may be kept up through the season.

The gladiolus is primarily a cut flower. Its color effect in the gardens is disappointingly brief, and its stiff foliage and rather awkward habit makes it hard to fit into a well-considered garden picture. For that reason it is usually best to grow gladioli in rows in the cutting garden or in the vegetable garden where they may be treated as producers of cut flowers only.

Plant the bulbs in trenches, make the bottom of the trench level and about six times as deep as the diameter of the bulb. This depth varies with the soil; in heavy loam three inches deep is enough, while in sandy soil about five inches is needed. Do not allow a crust to form on the surface of the soil. When the plants appear, mulch with straw, sawdust, or peat moss to keep it moist on top. Water, if possible, while the flower stalks and buds are forming and while the plant is flowering. In cutting the flowers, leave at least four leaves on the plant so that the bulb can mature properly.

To harvest the bulbs, dig down well under the bulbs and lift the soil. Pull the bulb out of the soil by the stem, shake off the soil and cut the stem on the larger ones a little above the bulb. Remove the soil, clean, and rub off the bulblets. Pull apart the bulbs and throw away the shrivelled old bulb and roots. Store the bulblets in a glass jar in damp, not moist, sand. The bulbs are stored in a dry, cool place. Place the bulbs in large heavy paper sacks, then put in a handful of lime. Hang the sacks up to keep them off the ground.

If the bulbs are diseased they may be treated with formaldehyde. Make a solution of one-half cup formaldehyde and five gallons of water. Place the bulbs in a bag and immerse in the solution for six hours. Plant them immediately.

Peonies, strictly speaking, are a perennial. Because of their ease in growing and little care needed, they are included in this circular. Peonies are at home in almost any position in any garden. They do best in a heavy loam soil. As they are heavy feeders the soil should be spaded deep and mixed with well-rotted manure. Each plant should have three feet in

diameter for its development. Set the root in the soil so that the top eye is not more than $1\frac{1}{2}$ or 2 inches below the surface of the soil. Work manure into the soil early in the spring. Never allow it to be too close to the crowns. Neither should water be allowed to stand on peonies during the winter and spring.

When once planted, peonies should be left alone for a number of years except for dividing and replanting, which should be done every eight or ten years. The best time to do this is during September or October. Dig up the root mass, cut the roots apart, and reset each piece.

Iris is one of the oldest of garden flowers and one of the easiest plants to grow. It will flourish in a variety of soils, but shows the effect of good treatment. Plant them in the fall, cut down the foliage to about six inches long, and place the rhizomes close to the surface. The plants are propagated by division and should be divided and replanted when the plants become too thick. Each piece will grow, even if allowed to lie about the garden for a week or more.

PROPAGATION OF ANNUALS FROM CUTTINGS

Some annuals such as geraniums, fuchsias, begonias, verbenas, vinca, and coleus are most easily propagated by cuttings. These plants may be taken from the garden and potted in the fall. Cuttings or slips may be taken from these plants at various times of the year. They are set in clean sand which is always kept moist. The best cuttings are made from brittle stalks and should be only about three or four inches long. The attempts to root larger cuttings is not satisfactory.

Flowers and flower buds should be removed from cuttings, and the leaf surface should be reduced by cutting back or removing most of the leaves. Do not remove all of the leaves, however, as some foliage is necessary for the production of plant food.

Best results are obtained when a flat of well-drained, clean, rather coarse sand which has been treated with an acid is used. Use one-half teaspoon of vinegar in one quart of water. Pour this solution over the sand and allow it to drain off before the cuttings are put in place. Keep the cuttings shaded for several days to prevent their wilting. If bottom heat can be provided, like placing the flat over a radiator, they will produce roots more quickly. Care must be taken, however, not to allow the sand to dry out.

When the roots are about half an inch long, the plant should be lifted out and potted, using soil consisting of one part humus, two parts garden loam, and one part sand.

Cuttings of geraniums may be taken in the late fall just before frost. By spring these will develop into good plants. Fuchsias should be slipped in February and the newest wood used. House plants which are slipped are usually trimmed back severely in the early winter and the new growth used as cutting material. Verbenas are slipped in January and February, while snapdragon, vinca, and lantana are slipped in February and March.

*"God made the flowers to beautify
The earth, and cheer man's careful mood;
And he is happiest who has power .
To gather wisdom from a flower,
And wake his heart in every hour
To pleasant gratitude."*—WORDSWORTH.

PRONUNCIATION TABLE

Ageratum—A jēr'a tum or A jer ā'tum	Gilia—Gīl'i a
Alyssum—A līs'um	Gladiolus—Gla dī'o lus or Glad i ō'lus
Amaranthus—Am a rān'thus	Godetia—Go dē'shi a
Anchusa—An kū'sa	Gomphrena—Gom frē'na
Antirrhinum—An tir rī'num	Gypsophila—Jip sōf'i la
Begonia—Be gō'ni a	Kochia—Kōk'i a
Browallia—Brōw āl'li a	Lantana—Lān tā'na or Lān tā'nā
Calendula—Kal ēnd'u la	Linum—Lī'num
Calliopsis—Cal lī op'sis	Lobelia—Lō be'li a
Centaurea—Sen tâu're a	Lupine—Lū'pīne
Chrysanthemum—Chry san'thē mum	Mignonette—Mign ō net'
Cleome—Klē ō'me	Myosotis—My ō sō'tis
Coleus—Kō'lē ūs	Nigella—Nī gēl'la
Dahlia—Dahl'i a	Oenothera—Ē no thē'ra
Delphinium—Del fīn'i um	Perilla—Pē ril'lā
Dianthus—Dī an'thus	Peony—Pē'ō ny
Digitalis—Dīg i tā'lis	Portulaca—Pōr tu lā'ka or Pōr tu lāk'a
Dolichos—Dol'i kos	Salpiglossis—Sal pi glos'sis
Eschscholtzia—Ē sholtz'i a or Ē skoltz'i a	Scabiosa—Skā bi ō'sa
Fuchsia—Fū'shi a	Viola—Vī'o la
Gaillardia—Gail lar'di a	Zinnia—Zīn'ī ā

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* Circulars 1250 and 1261 may be secured free of charge from your Agricultural or Home Agent.