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GARDENER'S HANDBOOK

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GARDENER'S HANDBOOK

Successor to The Gardener

BRIEF INDICATIONS FOR THE GROWING OF COMMON FLOWERS, VEGETABLES AND FRUITS IN THE GARDEN AND ABOUT THE HOME

By
L. H. BAILEY

GRAMASEVAKS TRAINING CENTRE
11 MAY 1955
T. KALLUPATTI

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GARDENER'S HANDBOOK

Ann. means annual; bien., biennial; per., perennial;
fls., flowers; lvs., leaves.

ABUTILON. *Mallow Family.* Commendable flowering shrubs, as commonly known, with bright red, yellow or striped pendent flowers, some of them with attractive variegated foliage, tropical or of warm countries; some kinds are known as Flowering Maple, from the shape of leaves. They are commonly not sold under recognized botanical names.

Common kinds of abutilon are grown from seed or from cuttings of young wood. The seed should be sown in February or March in a temperature of not less than 60°. The seedlings should be potted when four to six leaves have grown, in a rich sandy soil. Frequent pottings should be made to insure a rapid growth, giving plants large enough to flower by autumn. Or, the seedlings may be planted out in the border when danger of frost is over, and taken up in the fall before frost: these plants will bloom all winter. About one-half of the newer growth should be cut off when they are taken up, as they are very likely to spindle up when grown in the house. When grown from cuttings, young wood should be used, which, after being well rooted, may be treated in the same way as the seedlings. They make good bedding plants, often blooming freely in protected situations. Abutilons of the erect kinds are most satisfactory as house plants when they are not much more than a year old, and 2-3 feet high, and treated essentially as woody herbs.

Abutilons, woody plants useful in the house and for planting out in summer. Left, one of the *A. pictum* forms; center, spotted leaf of *A. striatum* var. *Thompsoni* and margined leaf of a garden kind; right, *A. megapotamicum*.

A. hybridum. A class of common cultigens with mostly spotted or varicolored lvs. and hanging strongly veined attractive fls.

A. megapotamicum (*vexillarium*). Drooping, lvs. toothed, sometimes mottled: fls. fuchsia-like, with red calyx and yellow petals. S. Amer. Employed as a basket plant.

A. pictum. Lvs. 3-lobed, middle lobe widest at base: fls. orange or yellow, veined with crimson. S. Amer. Sometimes erroneously known as *A. striatum.*

A. striatum. Lvs. 5-7-lobed, middle lobe narrowed at base: fls. orange veined with dark crimson. Guatemala. Var. *Thompsoni* has variegated lvs.

ACANTHUS: see *Perennials*, page 201.

ACHILLEA. YARROW. *Composite Family.* Durable hardy perennial herbs of the north temperate zone with many small flower-heads in clusters on erect stems mostly 1-2 feet tall and often with finely cut foliage which may be heavily scented; flowers white and sometimes pink, and in some species yellow. Useful for borders and cut-flowers and the smaller species for rock-gardens. In most of the planted kinds the leaves are divided or pinnatisect. Culture is simple in any ordinary soil and exposure.

Propagation is usually by division in spring, although seeds may be employed and bloom expected the following year. Plants may stand 1 foot apart and be thinned as they spread.

A. ageratifolia. 8 in., silvery: white, May-June. Greece.

A. Ageratum. 1-1½ ft.: yellow, July-Aug. Eu.

A. argentea. 6-10 in., silvery: white, June-July. Dalmatia.

A. filipendulina. 3-5 ft.: yellow, June-Sept. Orient.

A. Millefolium is the common yarrow of roadsides and pastures with aromatic finely cut lvs. and white flower-heads, not often planted. Known to hort. mainly in var. *roseum,* 1½-3 ft., pink, June-Sept.

A. Ptarmica. SNEEZEWORT. 2-2½ ft.: lvs. toothed: white, double in several varieties, June-Sept. N. hemisphere.

A. tomentosa. 1-1½ ft., woolly: yellow, June. N. hemisphere.

ACONITUM. MONKSHOOD. WOLFSBANE. *Crowfoot Family.* Hardy herbaceous perennials allied to larkspurs, blooming mostly in midsummer to autumn. They are showy border plants, often flowering the first year from seed if the seed is started early, and bearing panicles of quaint helmet-shaped flowers; native in north temperate zone. The colors in the usual kinds are deep blue to violet-blue. Aconitums are most effective when planted in a mixed border; the flower-stalks being held well up, show the blossoms to good advantage. Heights range from 2-6 feet. Plants may stand 1 or 2 feet apart. The aconites contain powerful poisons. Botanical names of aconitums are likely to be confused.

Seeds may be sown every two years, as the plants in their year-old and two-year-old stage have the largest blossoms. Sow in gentle heat in

March, transplanting to border when the weather is settled. Roots may be divided if desired.

A. autumnale. 3-5 ft.: blue, lilac or whitish. China.

A. Fischeri. 2-6 ft.: blue varying to white. Asia.

A. lycoctonum. 6 ft.: yellow or cream. Eu.

A. Napellus. 3-5 ft.: blue. Eu. Var. *bicolor*, blue and white.

A. uncinatum. 5 ft., partially climbing: blue. E. N. Amer.

A. Wilsonii. 5 ft.: violet-blue. Asia.

Achillea, Aconitum, and Adonis. Left, *Achillea Ptarmica*, double white form; center left, *Aconitum autumnale*; center right, *A. uncinatum*; right, *Adonis vernalis*.

ACROCLINIUM: *Helipterum.*

ACTÆA: see *Perennials*, page 201.

ADAMS-NEEDLE: *Yucca filamentosa.*

ADENOPHORA: see *Campanula.*

ADLUMIA fungosa (*cirrhosa*). MOUNTAIN FRINGE. ALLEGHENY-VINE. *Fumitory Family.* A dainty fine-leaved leaf-climbing herbaceous hardy biennial blooming the second year from seed, but often seeding itself and persisting for years; a single species native in eastern Canada and United States. Useful in thickets and about arbors. It grows 10 to 15 feet and bears many dicentra-like light lilac scentless flowers in summer.

Provide fertile rather moist soil. Seeds are usually sown where the plants are to stand, and they take care of themselves.

ADONIS. PHEASANTS-EYE. *Crowfoot Family.* Low hardy herbs with upward-looking flowers, annual and perennial, native in Europe and Asia, grown for ornament, especially adapted for borders and rock-gardens. Height 1-2 feet, with yellow or red anemone-like not fragrant flowers, making little clumps of very fine attractive foliage.

Propagated by seeds sown early in spring where wanted. The perennial yellow-flowered kinds sometimes bloom the first year from seed. No special care is needed. Roots of perennials may be divided in early spring or in August.

A. æstivalis. 1-1½ ft., ann.: crimson, June-July. Eu.

A. amurensis. 1-1½ ft., per.: golden-yellow varying to white and pink, Mar.-Apr. Manchuria, Japan.

A. annua (*autumnalis*). 1½-2 ft., ann.: deep red with darker center, June-Sept. Eu., Asia.

A. vernalis. 1-1½ ft., per.: yellow, Apr.-May. Eu.

ÆGOPODIUM: see *Perennials*, page 201.

ÆTHIONEMA. STONE-CRESS. *Mustard Family.* The species grown in rock-gardens and borders are small-leaved perennial herbs with pink, lilac or white flowers in terminal racemes, blooming May to June.

Seeds may be sown in spring, cuttings taken in summer, or plants increased by division. They thrive in light sandy soil in a sunny exposure.

A. coridifolium. 4-10 in.: lilac. Mt. Lebanon and Taurus.

A. grandiflorum. 1-1½ ft.: pink or rose. Persia.

A. iberideum. 6 in., tufted: white. S. Eu., Asia Minor.

A. pulchellum. 6 in.: rosy-pink. Asia Minor.

A. schistosum. 2-9 in.: rose. Asia Minor.

AGAPANTHUS africanus (*umbellatus*). AFRICAN-LILY. *Lily Family.* A fleshy-rooted well known conservatory or window plant from South Africa. It lends itself to many conditions and proves satisfactory a large part of the year, the leaves forming a green arch over the pot, covering it entirely in a well grown specimen. The flowers are borne in a large cluster on stems growing 2 to 3 feet high, as many as two or three hundred bright blue flowers often from a single plant. A large well grown plant throws up a number of flower-stalks through the early season. There are dark blue and also white-flowered as well as striped-leaved races.

After flowering, gradually lessen the quantity of water until plants are placed in winter quarters, which should be a position free from frost and moderately dry. The agapanthus, being a heavy feeder, should be grown in strong loam to which is added well-rotted manure and a little sand. The one essential to free growth is an abundance of water and an occasional application of manure water.

Propagation is by division of the offsets, which may be broken from the main plant in early spring.

AGAVE: *Century Plant.*

AGERATUM. *Composite Family.* Half-hardy annuals, used as border plants, for ribbon bedding for mass effect, or in mixed beds of geranium, coleuses and other plants, native in tropical America. Plants are erect and branching, 2-3 feet, but are often sheared back; there are dwarf compact varieties; flowers blue or white, freely produced.

Seeds germinate readily, but as the plant is commonly wanted in flower when planted out, it is usual to sow the seed in boxes placed in hotbeds or windows in March, transplanting the seedlings to small boxes or pots and growing the young plants on until the 1st of May, when they may be planted out. Pieces of young wood root very easily, and the gardener usually increases his stock by cuttings. Plants may be taken up in the fall and set in the house for winter bloom; cut them back severely.

A. Houstonianum (*mexicanum*). 2 ft.: blue or white. Mex. Var. *nanum*, dwarf. *A. Lasseauxii* is a Eupatorium: white changing to rose.

Flower umbel at left of *Agapanthus africanus*; plant and detached cluster of *Ageratum Houstonianum*.

AGROSTEMMA: *Lychnis.*

AJUGA. Bugle-Weed. *Mint Family.* Annuals and perennials useful for rock-gardens, borders and as carpet plants. The blue, white or rose flowers are borne in terminal spikes in May and June.

Propagated by seeds or by division in spring or autumn. Of simple cultivation in ordinary soils and exposures.

A. Brockbanki. A blue-flowered form of *A. reptans* with bronzy metallic foliage.

A. genevensis. 6-14 in., per.: blue. Eu., Orient.

A. reptans. 6-12 in., per.: white. Eu. Var. *atropurpurea*, blue with bronze foliage. Var. *multicolor*, lvs. variegated with yellow, brown and red. Var. *rubra*, dark purple foliage. Var. *variegata*, lvs. variegated creamy-yellow.

ALKANET: *Anchusa.*

ALLEGHENY-VINE: *Adlumia fungosa.*

ALLIUM. *Lily Family.* Bulbous or bulb-like herbs useful for rock- and flower-gardens and several grown for food (see Chive, Garlic, Leek, Onion). Mostly plants of strong odor with narrow basal leaves and small flowers borne in umbels or heads at the ends of slender scapes; blooming commonly in spring.

Seeds may be sown in early spring. Propagation also by offsets and bulbels in spring or fall.

A. cernuum. 1-2 ft.: white or rose. N. Amer.

A. Moly. 1-1½ ft.: bright yellow. S. Eu.

A. neapolitanum. 2 ft.: white with colored stamens. S. Eu.

A. tibeticum. 6 in.: deep blue. Tibet. Plants grown under this name are confused.

ALMOND (*Prunus* or *Amygdalus communis*). *Rose Family.* Peach-like small trees grown for the fruits and somewhat for the ornamental flowers, native in Asia or Europe.

The almond is about as hardy as the peach, but it blooms so early in the year that it is little grown east of the Pacific slope, being injured by late spring frosts. The almonds commonly sold by nurserymen in the east are hard-shell varieties, and the nuts are not good enough for commerce. The almond fruit is a drupe, like the peach, but the flesh is thin and hard and the pit is the "almond" of commerce. Culture the same as for peach.

The "flowering almonds" are very different plants, being little bushes of two or three species, commonly grown in double-flowered forms, blooming in early spring. They are usually grafted on plum stock, and one must take care to keep down the plum sprouts that often spring from the root.

Almond of tropical regions is wholly different, *Terminalia Catappa.*

ALOE: see *Succulents.*

ALPINES are plants of high mountains, particularly those that grow above the tree-line. They are sometimes grown in rock-gardens but true alpine-gardening is a department by itself and is little undertaken in North America outside elevated or tempered regions. In horticultural practice the term alpine is often practically synonymous with rock-garden plants; and plants familiarly known by that name may have none of the attributes of true alpines. See *Rock-Garden.*

ALSTRŒMERIA. *Amaryllis Family.* Several tuberous-rooted plants, having leafy stems terminating in a cluster of 10 to 50 small somewhat lily-shaped flowers of rich colors, native in South America. Height 1-3 feet, according to the species.

Most of the alstrœmerias should be given pot culture. They are easily grown. The culture is nearly that of the amaryllis,—a good fibrous loam with a little sand, potting the tubers in early spring or late fall. Start the plants slowly, giving only water enough to cause root growth; but after growth has become established, a quantity of water may be given. After flowering they may be treated as are amaryllis or agapanthus.

Propagation is by seeds, and also by division.

A. aurantiaca. 3 ft.: bright yellow spotted with brown. Chile; hardy in northeastern states.

A. chilensis. 4 ft.: rose or red. Chile.

Pelegrina. 2 ft.: lilac spotted purple, and a white var. Chile.

ALTHÆA: *Hollyhock.*

ALTHEA, SHRUB-: *Hibiscus syriacus.*

ALYSSUM. *Mustard Family.* Small-leaved perennials adapted to the rock-garden and border and one an old flower-garden favorite. Flowers small, yellow or white, in short terminal clusters. There are weedy annual species, little if at all planted.

The perennial kinds are of simple culture. Propagation is usually by seeds but sometimes by division of the stools.

Sweet alyssum is of the easiest culture in any soil, but thrives best in a garden loam of moderate fertility. Seeds may be sown as early as the ground can be well prepared in spring. If immediate effects are not desired, the plants should be thinned out or transplanted to stand 6 inches or more apart. In the fall, plants may be cut back and put into pots or boxes, and they will bloom in the window. Better results in winter blooming are secured by starting seeds in boxes in August, September or October.

A. alpestre. 3-4 in.: yellow, spring. Eu. Grown mostly as *A. serpyllifolium.*

A. argenteum. YELLOW-TUFT. 15 in.: deep yellow, all summer. Eu.

A. maritimum (properly *Lobularia maritima*). SWEET ALYSSUM. 8-12 in., becoming decumbent, grown as an ann. in the North: white, fragrant, summer and autumn. Eu.

A. montanum. 6-10 in.: yellow, fragrant, Apr.-May. Eu.

A. rostratum is the same as *A. argenteum.*

A. saxatile. GOLDEN-TUFT. BASKET-OF-GOLD. 1 ft., forming a mat: golden-yellow, Apr.-May. Eu. Var. *compactum*, dwarf. Var. *luteum* (*citrinum*), lemon-yellow.

A. spinosum. 6-12 in., woody and spiny: white or pinkish, June-July. Eu., N. Afr.

AMARANTH, GLOBE: *Gomphrena.*

AMARANTHUS. *Amaranth Family.* Coarse and more or less weedy half-hardy annuals, native in warm countries, grown for the showy chaffy spikes and sometimes for brilliant red, blotched and variegated foliage. When well grown they are 2-3 feet high and branched, and often more.

Seeds may be sown in boxes in March or April, to be planted out after all danger of frost is past. They may also be sown where the plants are to stand. Plants may stand 1-3 feet apart. The tall kinds make good screens for unsightly objects. They may also be used against masses of green to add color.

A. caudatus (*cruentus, paniculatus*). LOVE-LIES-BLEEDING. 3-6 ft.: spikes red, in long drooping panicles.

A. hybridus var. *hypochondriacus.* PRINCES-FEATHER. 2-6 ft.: spikes red or brownish-red, in erect panicles.

A. tricolor (*melancholicus*). 1-4 ft.: heads of fls. small, in axils of lvs.: foliage often colored or blotched and then known as JOSEPHS-COAT; *A. gangeticus* is a synonym. Var. *splendens*, rich red with top lvs. red.

AMARYLLIS. *Amaryllis Family.* Popular name of several house or conservatory tender bulbs, but properly applied only to the Belladonna-lily, *Amaryllis Belladonna* and its many varieties. Most of them are Hippeastrums, but the culture of all is similar. The Belladonna-lily blooms normally in the United States in late summer and autumn, the leaves appearing after the flowers. The Hippeastrums are native in tropical America and they bloom in winter, spring and early summer. In all of them the flowers are in umbels terminating the scape, which is 1-2 feet high; the Belladonna-lily has a solid scape and the Hippeastrums a hollow scape. The flowers are large and lily-like, mostly red, rose-red and often striped. All of them are often planted out, but in cold countries the bulbs are lifted in autumn.

The bulbs should be dormant for four or five months in a dry place with a temperature of about 50°. When wanted to be brought into

flower, the bulbs, if to be repotted, should have all the dirt shaken off and potted in soil composed of fibrous loam and leaf-mold, to which should be added a little sand. If the loam is heavy, place the pot in a warm situation; a spent hotbed is a good place. Water as needed, and as the flowers develop liquid manure may be given. If large clumps are well established in 8- or 10-inch pots, they may be top-dressed with new soil containing rotted manure, and as growth increases liquid manure may be given twice a week until the flowers open. After flowering, gradually withhold water until the leaves die.

The plants known as amaryllis belong to several genera, those commonly grown being as follows, together with the related Zephyranthes or zephyr-lilies.

Amaryllis Belladonna. BELLADONNA-LILY. Rose-red, fragrant. S. Afr.

Hippeastrum Johnsoni. Name applied to various hybrids but originally meant for one between *H. Reginæ* and *vittatum* and which is probably not now in cultivation.

Hippeastrum puniceum (*Amaryllis equestre*). Red or salmon-red. Trop. Amer.

Hippeastrum Reginæ. Bright red, throat with whitish star. Trop. Amer. A common type now modified.

Hippeastrum vittatum. Striped red and white. Peru.

Lycoris squamigera (*Amaryllis Hallii*). Rose-lilac or pink, fragrant. Japan.

Nerine sarniensis. GUERNSEY-LILY. Crimson, with long bright red stamens. S. Afr.

Sprekelia formosissima. JACOBEAN-LILY. Crimson, spring and summer. Mex.

Vallota speciosa (*Amaryllis purpurea*). SCARBOROUGH-LILY. 3 ft.: scarlet varying to white. S. Afr.

Zephyranthes Atamasco. ATAMASCO-LILY. White, sometimes tinged purple, spring. E. U. S.

Zephyranthes candida. White or tinged rose, borne singly. S. Amer.

Zephyranthes rosea. Rose-red, borne singly. Cuba.

Amaryllis. True *Amaryllis Belladonna* above; horticultural Hippeastrum (*H. Reginæ* type) below, commonly known as amaryllis.

AMELANCHIER: *Juneberry.*

AMMOBIUM alatum. WINGED EVERLASTING. *Composite Family.* Half-hardy perennial everlasting with white flowers or heads but grown with us as an annual; Australia. It is an erect branching plant 2-3 feet high. See *Everlastings.* The heads are used in dry bouquets, and for this purpose should be cut before full expansion.

It thrives best in a rather sandy soil. Sow seeds where plants are to stand, and if culture is good the plants should give abundant bloom in autumn. Plants may stand 10-18 inches apart.

AMYGDALUS: *Almond; Peach.*

ANCHUSA. ALKANET. BUGLOSS. *Boraye Family.* Hardy hairy perennial herbs, as commonly known in gardens, native in temperate parts of Old World, with blue, violet or white flowers borne in coiled racemes.

Culture is simple. Seed is usually sown in spring and transplanted that summer or early autumn to the permanent places, 1-2 feet apart.

A. azurea (*italica*). 3-5 ft.: bright blue, June-Sept. Medit. region.

A. Barrelieri. 2 ft.: blue with yellow throat and white tube, May-June: lvs. lanceolate or oblong-lanceolate. Eu., Asia Minor. Var. *dilatata* has some of the lvs. very broad (ovate-lanceolate).

A. capensis. 1½ ft., bien.: blue margined red, throat white, summer and autumn. S. Afr.

A. myosotidiflora (properly *Brunnera macrophylla*). 1½ ft.: blue, summer. Siberia.

ANDROSACE. ROCK-JASMINE. *Primrose Family.* Tufted commonly perennial herbs adapted to rock-gardens, having red or white primrose-like small flowers, mostly in clusters at top of scapes.

Rock-jasmines should always have a well-drained soil. They are increased by seed, division or cuttings; some of them spread readily by runners.

A. carnea. 3 in.: rose or whitish with yellow eye, spring. Eu. Var. *Laggeri,* densely tufted.

A. lactea. 8 in.: snow-white, spring. Eu.

A. lanuginosa. 2-6 in., silky: rose, late spring and summer. Himalayas. Var. *Leichtlinii,* whitish with crimson or yellow eye.

A. primuloides. 5 in., silvery: pink, summer. Himalayas.

A. sarmentosa. 5 in., silvery: rose, summer. Himalayas. Var. *Chumbyi,* more tufted and woolly.

ANEMONE. WINDFLOWER. *Crowfoot Family.* Interesting hardy perennial herbs of several classes, with showy white, rose or red flowers, native in the north temperate zone. Several native species are useful for colonizing, but the usual horticultural kinds fall in two groups: (1) The florists, spring, or tuberous anemones, sometimes forced under glass,

native in Europe. They are *A. coronaria*, of which The Bride and St. Brigid are well known, with red, blue or sometimes white flowers, *A. hortensis* with mostly red or purplish flowers, and *A. fulgens* with scarlet or vermilion corollas and black stamens. All are 6-18 inches high. (2) The Japanese or autumn-flowering, *A. japonica*, 2-3 feet high and branched above, white, rose and reddish. This species blooms August to November, and is at that season the finest of border plants. The pure white or colored flowers, with lemon-colored stamens, are held well up on slender stalks; excellent for cutting.

The florists anemones are tuberous-rooted plants. The tubers should be planted in the fall, late in September or early in October, in a well enriched sheltered border, setting the tubers 3 inches deep and from 4-6 inches apart. The surface of the border should be mulched with leaves or strawy manure through the severe winter weather, uncovering the soil in March. The flowers will appear in April or May, and in June or July the tubers should be taken up and placed in a dry place in sand until the following fall. The range of color is very wide. The flowers are often 2 inches across, and are lasting. These tubers may be planted in pots in the same manner as in the border, bringing them into the conservatory or house at intervals through the winter, where they make an excellent showing when in bloom.

The Japanese anemone may be propagated by division of the plants or by seed. The former method should be practiced in the spring; the latter as soon as the seeds are ripe in the fall. Sow the seed in boxes in a warm sheltered situation in the border or under glass. The seed should be covered lightly with soil containing a quantity of sand and not allowed to become dry. A well enriched sheltered position should be given in a border.

A. blanda. 6 in., tuberous: blue, spring. Greece, Asia Minor.

A. canadensis. 1-2 ft.: white, May-Aug. N. Amer.

A. coronaria. 1-1½ ft., tuberous: red, blue, white, poppy-like, early spring to summer. Medit. region.

A. fulgens. 1 ft., tuberous: scarlet with black stamens, May-June. France.

A. hortensis. 10 in., tuberous: red, purplish, white, with brownish-violet stamens, May. S. Eu.

A. hupehensis. 2-3 ft.: rose-pink or mauve, summer. Probably a form of *A. japonica*.

A. japonica. 2-3 ft.: purplish, red, rose, white, autumn. Japan, China. Var. *alba*, white. Var. *rosea superba*, rose. Var. *rubra*, red.

A. Pulsatilla. Pasque Flower. 9-12 in.: blue to reddish-purple, Apr.-May. Eu. Var. *alba*, whitish. Var. *rubra*, red.

A. rivularis. 3 ft.: white or bluish, summer. India, Ceylon.

A. sylvestris. 1½ ft.: white, fragrant, Apr.-June. Eu., Asia.

A. vernalis. 6 in.: purple, white inside, Apr. Eu.

A. vitifolia. 2-3 ft.: white, late summer. Himalayas.

Anemone and Anthemis. Left, flowering part of *Anemone japonica*; right, *Anthemis tinctoria*.

ANISE: *Sweet Herbs.*

ANNUALS are plants that complete their life cycle within one year, as *Phlox Drummondii.* The term is commonly applied, however, to plants that bloom freely the first year from seed and do not strongly survive the winter, as verbena in the North. Plants that are really perennial but that must be grown as annuals in short-season climates are properly *plur-annuals*, as castor-bean, tomato, red pepper. In the present lists, the term *annual* is used in its horticultural sense to comprise those plants grown from seeds for first-year blooming or fruiting. Other first-year plants that are carried over winter by means of lifted tubers or bulbs are *pseud-annuals*, as potato, ixia, canna.

Most horticultural annuals bloom in the northern states if the seeds are sown in the open ground when the weather is thoroughly settled. But there are some kinds, as moonflowers, for which the northern season is commonly too short to give good bloom. These kinds may be started early in the house or in hotbeds; and similar treatment may be given any plants of which it is desired to secure blooms before the normal time.

Prepare the ground thoroughly and deep. Annuals should make a quick growth. See that the soil contains enough humus or vegetable mold to make it rich and to enable it to hold moisture. If the ground is not naturally fertile, spade in well-rotted manure or mold from the

woods. A little commercial fertilizer may help in starting the plants quickly. Prepare the land as early in spring as it is in fit condition, and prevent evaporation by keeping the surface loose by means of raking. Yet the late-blooming strong species, as marigolds and cosmos, may grow too vigorously and fail to yield sufficient bloom before frost if the ground is very fertile.

If the flowers are to be grown about the edges of the lawn, make sure that the grass roots do not run underneath them and rob them of food and moisture. It is well to run a sharp spade deep into the ground about the edges of the bed every two or three weeks for the purpose of cutting off any grass roots that may have run into the bed. If beds are made in the turf, see that they are 3 feet or more wide, so that the grass roots will not undermine them. Against the shrub borders, this precaution may not be necessary. In fact, it is desirable that the flowers fill all the space between the overhanging branches and the sod.

Sow the seeds freely. Many will not germinate. Even if they all germinate, the combined strength of the rising plantlets will break the crust on the hard soils; and in the thinning which follows, only strong and promising plants are allowed to remain. Better effects are also often secured when the colors are in masses, especially if the flowers are thrown into the bays of heavy shrub borders.

Plants continue to bloom for a longer period if they are not allowed to produce seeds. The flowers should be picked, if possible, as soon as they begin to fade. Most annuals should be in good bloom at three months from seed, and many of them at two months.

In the choice of the kinds of annuals, one's personal preference must be the guide. Yet there are some groups considered to be standard or general-purpose plants. They are easily grown almost anywhere, and are sure to give satisfaction. The remaining plants are mostly such as have secondary value, or are adapted to particular purposes or uses. Some of the dwarf compact kinds may be used as fillers in rock-gardens.

Following are groups of general-purpose annuals: Petunias, phloxes, pinks or dianthuses, larkspurs or delphiniums, calliopsis or coreopsis, pot-marigold or calendula, bachelors-button or *Centaurea Cyanus*, clarkias, zinnias, marigolds or tagetes, collinsias, gilias, California-poppies or eschscholzias, verbenas, poppies, China asters, sweet peas, nemophilas, portulacas, silenes, candytufts or iberis, alyssum, stocks or mathiolas, morning-glories, nasturtiums or tropæolums.

Annual flowers possess a great advantage over perennials in the fact that they appeal strongly to the desire for experiment. The seeds are sown every year, and there is sufficient element of uncertainty in the

results to make the effort interesting; and new combinations can be tried each year.

Some persons do not cut all the old stalks down in the fall. They will stand in the snow all through the winter, and remind one of the bursting summer time and the long-ripening fall; and birds may find them in the short days of winter.

Annuals with white flowers

Ageratum Houstonianum
Alyssum maritimum
Antirrhinum majus
Arctotis stœchadifolia
Argemone
Brachycome iberidifolia
Browallia
Centaurea
Chrysanthemum
Clarkia
Cleome spinosa
Cosmos bipinnatus
Delphinium Ajacis
Dianthus chinensis
Gomphrena globosa
Gypsophila elegans
Helichrysum bracteatum
Helipterum
Hibiscus Trionum
Iberis amara
Impatiens
Ionopsidium acaule
Lathyrus odoratus
Lobelia Erinus
Lupinus
Malcomia maritima
Matricaria
Mirabilis Jalapa
Nemesia strumosa
Nemophila insignis
Nicotiana
Nigella damascena
Papaver
Petunia
Phlox Drummondii
Portulaca grandiflora
Reseda odorata
Scabiosa atropurpurea
Schizanthus
Specularia Speculum-Veneris
Thunbergia alata
Verbena
Vinca rosea
Xeranthemum annuum
Zinnia

Annuals with yellow or orange flowers

Antirrhinum majus
Calendula officinalis
Celosia argentea var. cristata
Centaurea moschata
Chrysanthemum
Coreopsis
Cosmos sulphureus
Dimorphotheca aurantiaca
Emilia sagittata
Erysimum Perofskianum
Eschscholzia californica
Gaillardia pulchella
Helianthus
Helichrysum bracteatum
Hibiscus Trionum
Hunnemannia fumariæfolia
Impatiens
Mentzelia Lindleyi
Mirabilis Jalapa
Nemesia strumosa
Papaver
Portulaca grandiflora
Rudbeckia
Salpiglossis sinuata
Sanvitalia procumbens
Schizanthus
Tagetes
Thunbergia alata
Tropæolum majus
Ursinia anthemoides
Venidium
Zinnia

Annuals with pink, rose or red flowers

Adonis
Amaranthus
Antirrhinum majus
Celosia argentea var. cristata
Centaurea
Chrysanthemum
Clarkia
Coreopsis
Cosmos bipinnatus
Crucianella stylosa
Delphinium Ajacis
Dianthus chinensis
Diascia Barberæ
Emilia sagittata
Gilia rubra
Gomphrena globosa
Gypsophila
Helichrysum bracteatum
Helipterum
Iberis umbellata
Impatiens
Ipomœa
Lathyrus odoratus
Lavatera trimestris
Linum grandiflorum
Lupinus
Lychnis Cœli-rosa
Malcomia maritima
Malope trifida
Mirabilis Jalapa
Nemesia strumosa
Nicotiana Sanderæ
Papaver
Petunia
Phlox Drummondii
Polygonum orientale
Portulaca grandiflora
Salpiglossis sinuata
Salvia splendens
Saponaria Vaccaria
Scabiosa atropurpurea
Schizanthus
Silene Armeria
Tropæolum majus
Verbena
Vinca rosea
Xeranthemum annuum
Zinnia

Annuals with blue, lilac or purple flowers

Ageratum Houstonianum
Antirrhinum majus
Asperula orientalis
Brachycome iberidifolia
Browallia
Centaurea
Clarkia
Cleome spinosa
Collinsia bicolor
Convolvulus tricolor
Delphinium Ajacis
Dianthus chinensis
Gilia
Gomphrena globosa
Iberis umbellata
Impatiens
Ionopsidium acaule
Ipomœa
Lathyrus odoratus
Linaria maroccana
Lobelia
Lupinus
Malcomia maritima
Mathiola incana
Nemesia strumosa
Nemophila insignis
Nigella damascena
Papaver
Petunia
Phacelia
Phlox Drummondii
Salpiglossis sinuata
Scabiosa atropurpurea
Schizanthus
Specularia Speculum-Veneris
Torenia Fournieri
Trachymene cærulea
Verbena
Xeranthemum annuum

Annuals that continue to bloom after the first light autumn frosts

Adonis
Argemone grandiflora
Calendula
Callirhoe involucrata
Centaurea Cyanus
Cheiranthus Cheiri
Chrysanthemum
Convolvulus tricolor
Dianthus
Erysimum asperum
Erysimum Perofskianum
Eschscholzia californica
Gaillardia pulchella var. picta
Gilia
Iberis affinis
Lavatera trimestris
Lychnis
Malcomia maritima
Mathiola bicornis
Œnothera
Petunia
Phlox Drummondii
Salvia
Verbena

Annuals adapted to edgings

Ageratum Houstonianum
Alyssum maritimum
Antirrhinum majus (dwarf)
Brachycome iberidifolia
Collinsia bicolor
Coreopsis (dwarf)
Dianthus
Eschscholzia californica
Gypsophila muralis
Iberis
Lobelia Erinus
Nemophila insignis
Nigella damascena
Phlox Drummondii
Portulaca grandiflora
Sanvitalia procumbens
Saponaria ocymoides (perennial)
Tagetes (dwarf)
Verbena
Viola tricolor (pansy)

ANTHEMIS. *Composite Family.* Perennial hardy herbs, as known in cultivation, native in Eurasia, useful in the border for the yellow or white flowers on long stems; 2-3 feet high; foliage strong-scented; blooming in summer and early autumn.

Culture is simple; give sunny exposure; propagation by division, and also by seeds that should give blooming subjects the next year. Plant about 1 to 2 feet apart.

A. montana. 10 in., silky: white. S. Eu.

A. nobilis. CHAMOMILE. 1 ft.: white. Eu.

A. tinctoria. 2-3 ft.: golden-yellow. Eu., Asia. Var. *Kelwayi* is an improved form. See page 12.

ANTHERICUM. *Lily Family.* Tuberous-rooted herbs with narrow basal leaves and small white flowers in terminal racemes; grown in the border. Other plants known as Anthericum are Chlorophytum, greenhouse subjects not treated here.

The cultivation is simple. Propagated by stolons; also by division and seeds.

A. Liliago. St.-Bernard-Lily. 2-3 ft.: fls. short and open. Eu. Var. *major* is larger.

A. Liliastrum (properly *Paradisea Liliastrum*). St. Bruno-Lily. 2 ft.: fls. funnelform, to 2 in. long. Eu.

ANTHRISCUS: *Chervil.*
ANTIRRHINUM: *Snapdragon.*
APIUM: *Celeriac; Celery.*

APPLE (*Pyrus Malus*, in many races). *Rose Family.* Broad-headed familiar trees of small or medium size grown for the fruit and certain forms more or less for ornament; native in the Eurasian region. Crab-apples are small-fruited kinds, produce of other species (as *P. baccata*, *P. ioensis*) or of these species hybridized with the common apple. The "flowering crabs" are oriental species of several kinds, mostly of less stature than the common apple but producing abundantly of showy flowers and also of ornamental little fruits.

Apple, in three stages; bloom, fruit just setting, mature fruit.

The apple thrives over a wider range of territory and under more varied conditions than any other tree fruit. This means that it is easy to grow. In fact, it is so easy to grow that it usually is neglected; and persons wonder why the trees do not bear.

Choice of varieties of apples for home use is, to a large extent, a personal matter; and no one may say what to plant. A variety successfully grown where the winter temperatures are not severe may not be hardy enough to withstand the low temperatures of colder sections. A person should study the locality in which he wishes to plant and choose

varieties most successfully grown there,—choosing those that seem best to meet the purposes for which they are grown. Trees should be procured from a reliable nurseryman. Spring planting gives better results in the North than setting trees in autumn. Orders should be placed early and planting performed as soon as the ground is in good workable condition. Do not allow the roots to become dry.

The land on which an orchard is to be planted should preferably have been in cultivation at least one year previous to setting the trees. Thorough drainage is of the greatest importance. Apple trees seldom if ever produce satisfactory crops when planted on wet ground. Trees should be planted slightly deeper than the depth as grown in the nursery row. The holes should be dug large enough to accommodate the root system as the trees are received from the nurseryman. In planting it is of the greatest importance that the earth be very carefully firmed about the roots. Probably more trees die the year they are set because of lack of packing and filling the earth about and between the roots than from any other cause. Set the trunk in the center of the hole, and sift the good dirt down through the roots, slightly lifting the tree once or twice so that the fine soil may settle under the roots, making congenial soil for the new roots to run through. Fill in over the roots, gradually firming the soil above with the feet. When the hole is full, firm the soil around the trunk to prevent whipping by the wind, leaving the surface level. If the trees are set in autumn a slight earthing up to the trunk may be beneficial in certain soils. Under most conditions two-year-old trees are preferable for home planting.

Proper pruning of the young tree at planting is too often neglected. Main limbs that are to form a permanent part of the tree should make wide angles with the trunk insuring a strong framework capable of holding up under heavy loads of fruit. Limbs that arise from the trunk with narrow or sharp angles or bad crotches should be removed. For most conditions only two, and on some trees three, main limbs with a modified leader may be left after pruning at planting time. Those remaining may be shortened somewhat, leaving the leader longer than the side branches. After a year's growth a second pair of permanent limbs is selected from the leader, giving the tree a well-balanced shape and with main limbs spaced far enough apart to avoid crowding as the tree reaches maturity. There is difference of opinion on the proper length or height of trunk. In midcontinental regions the top is started low to shade the trunk, but in the East a trunk or bole $3\frac{1}{2}$ to $4\frac{1}{2}$ feet high is preferable for home grounds.

The pruning of mature trees consists of a thinning of branches to admit sunlight to all fruiting wood, and this also facilitates effectiveness

and ease of spraying for the control of insect and fungus pests. A healthy leaf area is essential to good production and, in order to obtain healthy normal leaves, sunlight is of vital importance.

Under average conditions permanent standard apple trees should not be planted closer than 40 feet apart in the Northeast. Forty-five feet is a more desirable distance when planted on good orchard land. Filler trees may be set. These should be removed when crowded; this will usually take place by the time the trees are fifteen to eighteen years old. For the home garden it is possible to grow two or more varieties in one tree by grafting in desired kinds.

In the early life of the tree it is desirable that it be kept under cultivation. This, however, is not essential. Liberal applications of stable manure or a fertilizer rich in nitrogen will supply the elements essential to good growth. Nitrate of soda, sulfate of ammonia, or calcium nitrate, at the rate of about $\frac{1}{4}$ pound a year for the age of the tree, will usually supply the fertilizer needs. This would mean that a ten-year-old tree would ordinarily require about $2\frac{1}{2}$ pounds of one of these fertilizers. It should be applied in the spring at about the time the buds are beginning to swell. Stable manure may be applied in late autumn or early spring.

With proper attention apple trees should begin to produce fruit after they have been set four or five years. Some varieties, as Northern Spy, require a longer period. Under favorable conditions the average apple tree in the Northeast should continue to produce fruit for a period of at least forty years.

In the past dwarf trees have been more or less popular for the garden. Due to lack of proper knowledge in pruning and care they have gradually decreased in favor and standard trees have largely taken their place in recent plantings, but there is no essential reason why they may not be grown in the home area. Dwarf apples are obtained by grafting any variety on Paradise or Doucin stocks, which are simply small-growing varieties of apples. They are popular in the Old World. They may be planted 8 to 10 feet apart, and trained in various ways. The body or trunk should not be more than 1 or 2 feet long. The top should be headed-in each year a third or a half of the annual growth. A dwarf in full bearing should produce from a peck to a bushel of apples. Only the finer or dessert varieties of apples should be grown on dwarf trees.

Insect and fungus pests have become so numerous that a careful spraying program must be followed to grow apples of high quality. The first spray should be applied at what is called the "delayed dormant" season. This is at a time when the first leaves are $\frac{1}{4}$ to $\frac{1}{2}$ inch in length. The spray at this time consists of lime-sulfur, arsenate of lead and nicotine sulfate and should control leaf-eating insects, sucking insects,

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and apple-scab. The second spray should be applied when the blossom buds show pink but before the first flowers are open. With this spray the nicotine sulfate is omitted. When most of the petals have fallen, another spray, using the three materials mentioned, is applied. Later sprays are usually necessary for the control of second-brood codlin-moth, apple maggot, and apple-scab.

With experimental work being conducted each year in the search for effective control measures for apple pests, it would be well for the grower to obtain from his state experiment station or college the latest information on materials and time of application of spray, to control the various pests most effectively. The county agent may suggest methods.

Close watch should be kept for borers. Whenever the bark appears to be dead or sunken in patches, remove it and search for the cause. A borer will usually be found underneath the bark. About the base of the tree the most serious injury occurs from borers, since the insect that enters there bores into the hard wood. His presence can be detected by the chips cast from his burrows. The only remedy is to dig out the larvæ. If they have gone far into the wood, they can be killed by shoving a flexible wire into the burrows.

The choice of varieties of apples should be governed by the purpose for which they are grown and local climatic conditions should be considered. Some desirable varieties are not hardy in the colder sections and are likely to be winter-killed, while others do not produce fruit of the best quality when planted where the winters are normally mild.

With the advent of new varieties superior in quality to many of those constituting old plantings it would be to the advantage of the grower to consult his experiment station and obtain advice on varieties suited to his particular need and section.

In general, standard good home-garden varieties in order of season of ripening are as follows for the northeastern country: Early McIntosh, Duchess, Yellow Transparent, Gravenstein, Wealthy, Twenty Ounce, Fameuse, McIntosh, Cortland, Rhode Island Greening, Delicious, Baldwin, Golden Delicious, Tolman Sweet, Rome Beauty, Northern Spy and Yellow Newtown. Other kinds of high quality include New-town, Dyer, Jeffries, Lowell, Fall Pippin, Chenango, Hubbardston, Seek-no-further (Westfield), Mother, Swaar, Spitzenburg, Pearmain, Red Canada, Sweet Bough, Rambo, Grimes (Golden). The home garden will want at least one tree of crab-apple for jellies and preserves.

There may be local varieties of great excellence for the dessert plantation. It should be much satisfaction to the home-maker to top-

graft such varieties, and others not obtainable from dealers, on strong nursery-grown trees.

APRICOT (*Prunus armeniaca*). *Rose Family.* Small somewhat peach-like tree of China (erroneously supposed to come from Armenia), planted for its fruit, which is much like a plum but short-stemmed and pubescent. The Russian apricots are hardy and mostly small-fruited forms of this species. The Japanese apricot is *P. Mume*, and pomological varieties have been grown in this country; it is mostly planted for its flowers, some kinds being double, and in Japan, where it is popular for early spring bloom, it is known as "plum."

The apricot is usually thought to be too tender for the latitude of New York, but has proved as hardy as the peach. Given the right conditions as to soil and exposure, it will yield abundant crops, ripening its fruits about three weeks in advance of early peaches. More attention should be given to its cultivation for home use. The introduction of the Russian varieties added to the list several desirable kinds that have proved hardier and a little later in blooming than the old kinds. The fruits of the Russian varieties, while not as large as the others, fully equal many of them in flavor, and they are very productive.

The soil for apricots should be rather dry; especially should the subsoil be such that no water may stand around the roots. The exposure should be to the north or west to retard the blooming period, as the one great drawback to successful fruiting is the early blooming and subsequent freezing of the flowers or small fruits.

Two serious difficulties in the growing of apricots are the ravages of the curculio and the danger to the flowers from spring frosts. It is usually almost impossible to obtain fruits from one or two isolated apricot trees. It is possible that some of the varieties need cross-pollination. The apricot usually thrives best on strong soil; but otherwise the treatment given the peach suits the apricot very well. Amongst the best kinds of apricots are Montgamet, Jackson, Royal, St. Ambroise, Early Golden, Harris, Roman and Moorpark. In the East, apricots are commonly worked on plums, but they also thrive on the peach.

On the Pacific Coast the apricot is an important commercial orchard fruit.

APTENIA: *Ice-Plant.*

AQUARIUM. An adjunct to a living-room or conservatory is a large glass globe or glass box containing water, in which plants and animals are living and growing. It is the antithesis of a terrarium. A solid glass tank or globe is better than a box with glass sides, because it

does not leak, but the box must be used if one wants a large aquarium. For most persons it is better to buy the aquarium box than to attempt to make it. Four things are important in making and keeping an aquarium:

(1) The equilibrium between plant and animal life must be secured and maintained. Animals do not thrive in water where no plants are growing. (2) The aquarium must be ventilated. Every little fish, snail and insect wants air. A certain quantity of air is mixed with the water, and the creatures must breathe that or come to the surface for their supply. The plants furnish part of the air. The open pond, whose surface is ruffled by every passing breeze, is constantly being provided with fresh air. (3) The temperature should be kept between 40° and 50°. A shady corner is a better place for the aquarium than a sunny window on a warm day. (4) It is well to choose such animals for the aquarium as are well adapted to life in still water. Unless one has an arrangement of water pipes to supply a constant flow of water through the aquarium, it is best not to try to keep creatures that we find in swift streams. It is better to have too few plants or animals than too many of either. A great deal of light, especially bright sunlight, is not good for the aquarium. A pond that is not shaded soon becomes green with a thick growth of slime, or algæ.

The aquatic plants of the neighborhood may be kept in the aquarium, —such things as myriophyllums, charas, eel-grass, duckmeats or lemnas, cabomba or fish-grass, arrow-leafs or sagittaria, and the like; also the parrots-feather, to be bought of florists (a species of Myriophyllum). Of animals, there are fishes (particularly minnows), water insects, tadpoles, clams, snails. If the proper balance is maintained between plant and animal life, it will not be necessary to change the water so frequently.

AQUATICS AND BOG PLANTS. Real aquatics are plants with floating stems or foliage, and sometimes they are wholly free and not attached to the bottom. Other plants commonly known as aquatics are swamp and bog subjects.

Many plants of ponds and swamps are easily grown, and make a good addition to the home garden. The sedges, pickerel-weeds and other bog plants, the cyperus or umbrella plant, the common wild water-lily, and in large grounds the nelumbium or East Indian lotus, all may be grown with ease. For restricted grounds any of these, with the exception of the nelumbium, may be grown in tubs made by sawing an oaken barrel in two, filling each half from one-third to one-half with soil composed of good loam, sand and leaf-mold, setting the plants well into the

soil and filling the tubs with water. These tubs should be sunk to the rim in the border or lawn, both for a good appearance and to prevent too great evaporation. By a little care in supplying water, these plants may be well grown through the hottest weather. Most of the foreign water-lilies are not hardy, but some of them may be grown with ease if the pond is covered in winter.

Native aquatics may be colonized in streams or ponds. If artificial ponds are to be made, do not get them too deep. A foot or 15 inches is sufficient depth of water to stand above the crowns of the plants; and the greatest depth of water should not be more than 2½ feet for all kinds of water-lilies. Half this depth is often sufficient. The soil should be 1 to 2 feet deep, and very rich. Cow manure may be mixed with rich loam. Roots of hardy water-lilies may be planted as soon as the pond is clear of frost, but the tender kinds (which are also to be taken up in the fall) should not be planted till it is time to set out geraniums. Sink the roots into the mud so that they are just buried, and weight them down with a stone or clods. In cold climates, protect the pond of hardy aquatics by throwing boards over the pond and covering with hay, straw or evergreen boughs. It is well to supply an additional depth of water as a further protection. See *Water-Lilies*.

AQUILEGIA. COLUMBINE. *Crowfoot Family.* Attractive hardy early-blooming branching erect perennials of several cultivated species of the north temperature zone, 1½ to 3 feet high, with 5-spurred pendent or erect flowers in white, red, yellow and blue, not fragrant. They are general favorites for the perennial border and for rockwork. New modified races are now introduced and plants passing under Latin specific names may be hybrids or variants.

Columbines require exposure to the sun, but profit by protection from winds; if the soil retains moisture well and the young seed-pods are removed, the season of bloom may be somewhat prolonged. The common wild columbine (often called "honeysuckle") is easily grown and is very attractive. Clumps of columbine should stand 12-18 inches apart.

Propagation of columbines is mostly by seeds, sown often in summer or early autumn. If plants get a good start that year, they should bloom the following season. Division may be practiced of vigorous young stock, but as columbines are usually not long-lived it is better to rely on fresh batches of seedlings.

A. alpina. 6-20 in.: blue. Switzerland.

A. cærulea. 2-3 ft.: blue-purple. Rocky Mts. Var. *Helenæ*, blue and white.

A. canadensis. 2-3 ft.: yellowish and red. E. N. Amer.

A. chrysantha. 3-4 ft.: yellow. W. N. Amer. Var. *alba*, whitish.

A. flabellata. 1½ ft.: lilac. Japan. Var. *nana-alba*, dwarf, white.

A. formosa. 3 ft.: red and yellow. W. N. Amer., Siberia. Var. *hybrida* (*A. californica*), a hybrid race.

A. glandulosa. 1½ ft.: lilac-blue. Siberia.

A. pyrenaica. 10-12 in.: deep blue. Pyrenees.

A. Skinneri. 2-3 ft.: yellowish and red. Mex., Guatemala.

A. vulgaris. 2-3 ft.: blue, purple, white. Eu., Siberia. Var. *nivea*, pure white.

Good plant of a garden race of columbine, derived mostly perhaps from *Aquilegia chrysantha.*

ARABIS. Rock-Cress. *Mustard Family.* Perennial herbs as commonly grown, useful for rock-gardens and borders; the small white, pink or purple flowers are borne in terminal spikes or racemes in spring and early summer.

Rock-cresses thrive in sunny places and do not require much water or any particular attention. If cut back after blooming they will make better plants the next season. Some kinds become weedy.

Propagation of arabis is by seeds, division or cuttings. Seeds may be sown in summer for next year bloom.

A. albida. 8-12 in., whitish: white, fragrant. Caucasus. Var. *rosea* is listed.

A. alpina. 5-6 in.: white. Eu. Plants under this name are usually *A. albida.*

A. aubretioides. 8 in.: purple. Asia Minor.

A. muralis (*rosea*). 10 in.: white or rose. Eu.

A. procurrens. 6-12 in.: white: makes mats of foliage. Eu. Often grown as *A. mollis.*

ARAUCARIA. *Pine Family.* Great trees, sometimes grown in the juvenile state in conservatories and window-gardens for the shapely evergreen decorative character. The common one in pot or tub culture is *A. excelsa*, sometimes called Norfolk-Island-pine from its habitat in the South Pacific. It keeps well in a cool window or in summer on the veranda. Protect from direct sunlight and do not crowd with other

plants. When the plant becomes ragged or begins to fail, discard it or take it to the florist for recuperation; it will probably be more satisfactory to purchase a new fresh plant.

Propagation is by seeds and by cuttings of erect young leader shoots, the latter giving the more compact and satisfactory plants for pot and tub service.

The Monkey-Puzzle tree, *A. araucana* (*imbricata*), is planted in the open in California and Florida for its odd and interesting character, and may stand in particular places farther North. It is native in Chile.

ARBUTUS, TRAILING: see *Ground-Cover.*

ARCHONTOPHŒNIX: *Palms.*

ARCTOTIS. *Composite Family.* Handsome erect branching annuals native in South Africa, bearing heads 2½-3 inches across on long stems; good for cutting, blooming from early summer to autumn. One species is commonly grown.

Seeds may be started indoors for early bloom, and plants set 12 inches or so apart; for the main bloom, seeds may be sown where the plants are to stand, as soon as the weather is warm and settled.

A. stæchadifolia (*grandis*). African Daisy. 2-3 ft.: rays violet or lilac underneath, white above. The plant tends to run wild in mild climates.

ARECA: *Palms.*

ARECASTRUM: *Palms.*

ARENARIA. Sandwort. *Pink Family.* The cultivated kinds are low perennial spring and summer-blooming herbs with small white flowers solitary or in clusters, adapted to rock-gardens, borders and walls.

Propagation by seeds and division or sometimes by cuttings. Cultivation is not special or particular.

A. balearica. 1-3 in. Balearic Isls., Corsica.

A. grandiflora. 4-10 in.: fls. large. Eu.

A. montana. 4 in.: fls. large. Eu.

A. verna. 2-3 in. Eu., Rocky Mts. Var. *cæspitosa,* dense and moss-like.

ARGEMONE. Argemony. Prickly-Poppy. *Poppy Family.* Native large rather rough plants in the western hemisphere, grown as ornamental hardy and half-hardy annuals. Prickly bushy herbs, usually 2-3 feet high and spiny and often silvery foliage: the flowers are poppy-like, 2-3 or more inches across, yellow, cream-white or rose-red. Individual flowers are of short duration, but the crop is continuing.

Propagation is by seeds sown when the ground is warm where plants are to grow, thinning to 12 or 18 inches; bloom midsummer to frost.

A. grandiflora. 2-3 ft.: white. Mex. var. *lutea,* yellow.

A. platyceras. 3-4 ft.: white. N. and S. Amer. Var. *rosea,* brownish-purple.

ARISÆMA: see *Perennials*, page 201.

ARISTOLOCHIA. *Birthwort Family.* One strong woody twiner, forming a dense screen and having peculiar pipe-shaped flowers, is much grown as a porch woody vine because of its long growth and the very large leaves that are not usually attacked by insects and fungi; other species are used in the greenhouse and in warm climates.

It will grow without special treatment and reach a height of 20 or 30 feet if the ground is kept well enriched. Young plants may need some protection in cold winters, but it is usually hardy.

Propagation may be effected by means of cuttings of firm or ripened wood, or by layers, when seeds are not available.

A. durior (*macrophylla, Sipho*). DUTCHMANS-PIPE. Flowers yellowish-green and brownish-purple. E. N. Amer.

ARMERIA: *Statice.*

ARMORACIA: *Horse-Radish.*

ARTEMISIA. WORMWOOD. *Composite Family.* Aromatic and medicinal herbs or little shrubs with small yellow or white flower-heads; useful for wild-gardens and borders. Some of them are components of sweet-herb gardens.

A sunny exposure is best, in any soil. Propagation is by means of division, layers, cuttings and seed.

A. Abrotanum. SOUTHERNWOOD. OLD MAN. 2-5 ft., foliage grayish: heads yellowish-white. Eu.

A. Absinthium. 3-4 ft., foliage silvery: heads yellowish. Eu.

A. Dracunculus. TARRAGON. 2 ft., foliage green: heads whitish-green. Eu. Does not produce seeds: leaves used as seasoning.

A. frigida. 1-1½ ft., foliage silvery: heads yellow. W. N. Amer., Asia.

A. lactiflora. 3-4 ft., foliage grayish-green: heads white. China.

A. sacrorum var. *viride.* SUMMER-FIR. 5-10 ft., rich green foliage. Russia, Siberia.

A. Stelleriana. OLD WOMAN. 2-3 ft., foliage white-woolly: heads yellow. N. Asia, E. N. Amer.

A. vulgaris. MUGWORT. 3-4 ft., foliage white underneath but forms with variegated and golden lvs.: heads yellow. Eu., Asia.

ARTICHOKE. Two plants are known in North America as artichoke. True artichoke is *Cynara Scolymus*, Composite Family, a tall coarse perennial of the thistle tribe, producing edible flower-heads. When once established, it will last in bearing for a number of years, but better results are obtained from frequent renewals. It is probably a modified form of the cardoon, which is native in southern Europe and extensively naturalized on the pampas of South America. The artichoke is a coarse branching plant 3-5 feet high.

Artichokes are usually grown from suckers from the root, but a start can be made by sowing the seeds, although seed does not reproduce the particular strain and yields a more variable and uncertain progeny. Sow in a border or seed-box and transplant to the garden in early summer; and the following year a crop may be had. The fleshy scales of the head and the soft "bottom" of the head are the parts mostly used. Few of these plants are needed for a family, as they produce a number of flower-heads to a plant and a quantity of suckers. The plants should be set 2 to 3 feet apart in the row, the rows being 3 feet apart. This vegetable is not hardy in the North, but a covering of leaves or barnyard litter will protect it in some cases. The crown is often covered with ashes before the mulch is applied, for further protection. The young shoots of artichoke are sometimes eaten, being tied together and blanched.

Girasole or *Jerusalem artichoke* is a very different plant, although also of the Composite Family. It is one of the sunflowers, *Helianthus tuberosus*, native in North America, grown for the potato-like underground tubers. It is a rough coarse erect hardy herb, 4-10 feet high, bearing large yellow flower-heads. It persists when once established and often becomes a weed; propagated from the tubers, planted in spring or autumn. It thrives on any ordinary farm land, but not in wet places.

ASPARAGUS, EDIBLE (*Asparagus officinalis* var. *altilis*). *Lily Family.* Hardy perennial, much grown for the soft edible spring shoots; native along coasts of Europe and Asia.

The culture of this, the finest of early vegetables, has been simplified. The old method of excavating to the depth of 3 feet or more, throwing in 4 to 6 inches of broken stone or bricks for drainage, then filling to within 16 to 18 inches of the surface with well-rotted manure, with 6 inches of soil on which to set the roots, has given place to the simple practice of plowing or digging a trench 8 to 16 inches deep, spreading well-rotted manure in the bottom, when well trodden down covering the manure with 3 or 4 inches of good garden soil, then setting the plants, with the roots well spread out, covering carefully with soil to the level of the garden, then firming the soil with the feet. This will leave the crowns of the plants 4 to 5 inches below the surface; if covered too deep when set, the young plants may smother. In setting, one-year-old plants prove more satisfactory than older ones. Two or three years after setting the crop may be cut, but not sooner if a lasting bed is desired, as the effort to replace the stalks has a tendency to weaken the plant unless the roots are well established. In the cutting season no shoots should be allowed to develop into tops. There are rust-resistant races of asparagus.

The yearly treatment of an asparagus bed consists of cleaning off tops and weeds in autumn and adding a dressing of well-rotted manure to the depth of 3 or 4 inches, this manure to be lightly forked into the bed the following spring; or, the tops may be allowed to stand for winter protection and the mulch left off. A top-dressing of nitrate of soda, at the rate of 200 pounds to the acre, is often beneficial as a spring stimulant, especially in the case of an old bed. Good results also follow an application of bone-meal or superphosphate at the rate of 300 to 500 pounds to the acre. The practice of sowing salt on an asparagus bed is very common. Still, beds that have never received salt are found to be as productive as those having received an annual dressing. Nevertheless, a salt dressing is recommended. In stubborn heavy soil the best method in making a permanent bed is to throw out all the earth from the trench and replace with good fibrous loam. Two rows of asparagus 25 feet long and 3 feet apart supply a large family with an abundance throughout the season, and if well taken care of will last many years. The shoots are often blanched by heaping earth about them, but green asparagus is better in quality. The size of the shoots is a question of rich soil, good tillage, and somewhat of the variety. Asparagus is not propagated by division.

Asparagus beetle is controlled after the cutting season by applications of calcium arsenate. If the beetle appears in the cutting season, see that the plantation is cut clean every few days; no poison should be applied then. Sometimes a row of asparagus is left to grow naturally at one side to act as a trap, on which the insects may be destroyed.

Ornamental asparagus comprises different species of the Asparagus genus, climbing or vine-like plants grown in greenhouses and window-gardens for the fine foliage. *A. plumosus* is the commonest species, often called "asparagus fern," and its varieties *nanus* and *compactus*, with purple-black berries; *A. Sprengeri* is also grown, with bright red berries. They propagate by seeds. Some of the ornamental asparaguses produce root-tubers.

ASPERULA. WOODRUFF. *Madder Family.* Herbs grown in borders and rock-gardens, native in Europe and Asia.

The annual asperula is a flower-garden plant, readily grown from seeds sown in the open, prized for its many small clustered fragrant blue flowers; thin to 6 or 8 inches; plants should bloom in less than three months from seed.

The sweet woodruff and other perennial species are mat-forming hardy plants quickly increased by division. The leaves are fragrant

when dried and are sometimes employed for the scenting of clothing and other articles. They do well in shady places. Seed may also be employed.

A. cynanchica. 8-12 in., per.: white or pink.

A. hexaphylla. 1-2 ft., per.: white.

A. odorata. SWEET WOODRUFF. 8 in., per., fragrant: white.

A. orientalis (*azurea-setosa*). 1 ft., ann.: blue.

ASPIDISTRA elatior (*lurida*). *Lily Family.* Leafy low perennial from China grown for its many durable evergreen long radical leaves, which are either full green or striped; the flowers are borne at the surface of the ground and are not often noticed. Aspidistra is one of the most universal of window, porch, vase and box plants, withstanding difficult conditions and hard usage remarkably well, so much so that it has been called "Cast-iron plant."

Propagated by division and by suckers when the plant is repotted. Wash the foliage to keep it bright, and repot or divide when the pot or tub is overgrown.

ASTER. STARWORT. *Composite Family.* Many hardy perennial herbs of temperate climates, mostly autumn-blooming, yielding abundance of white, blue, pink and purplish flowers, useful in herb-borders and wild-gardens. Some of the species have given rise to developed races that are good flower-garden plants, often known as Michaelmas daisies; these propagate readily by division in autumn.

Wild asters are a glory of the American autumn. They grow almost everywhere in the north and east,—along roadsides, in meadows and swales. From August until winter comes, they are conspicuous features of the landscape, vying with the goldenrods in form and color, but surpassing them in color-range. Most of them are greatly improved when transferred to the border. They become more attractive in general habit, and the flowers are usually more profuse and sometimes larger. They are of the easiest possible culture. They can be removed to house grounds in the fall or spring, and, with little care until they are established, make attractive displays of autumn color.

A. alpinus. 5-10 in.: blue or violet, heads solitary, May-June. Eu., Asia, W. N. Amer. Var. *albus*, white.

A. Amellus. 2-2½ ft.: purple, heads clustered, Aug.-Sept. Eu., Asia. Var. *elegans*, free-flowering.

A. Farreri. 1-1½ ft.: deep blue, heads solitary, May-June. Tibet.

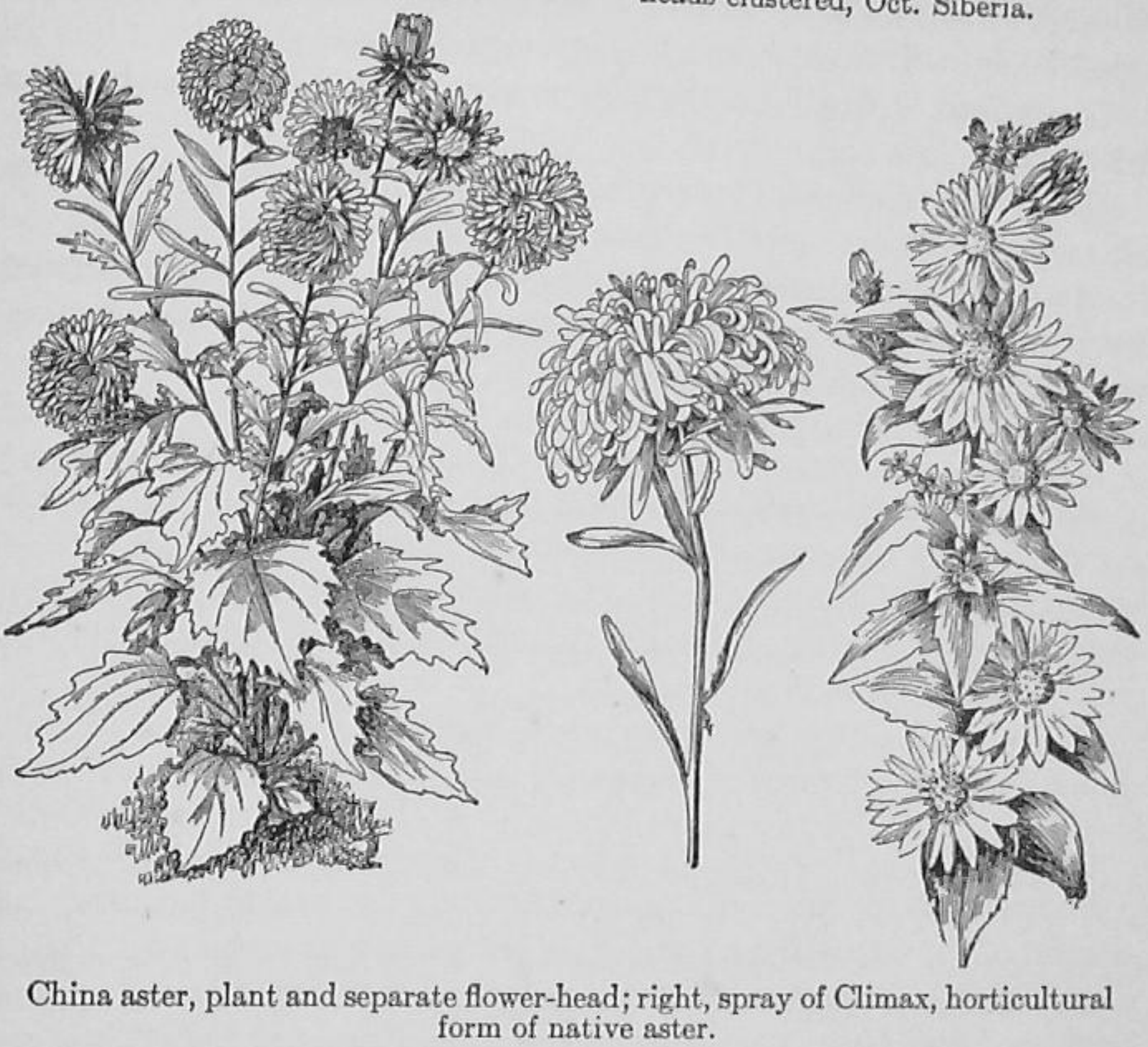
A. lævis. 4 ft.: blue or violet, heads clustered, Oct. E. N. Amer.

A. novæ-angliæ. 4-5 ft.: deep purple, heads clustered, Sept.-Oct. N. Amer. Var. *roseus*, rose.

A. novi-belgii (*floribundus*). 1-3 ft.: blue-violet, heads clustered, Aug.-Oct. E. N. Amer. Runs into many named forms.

A. subcæruleus. 1-1½ ft.: pale blue, heads solitary, May-June. India.

A. tataricus. 5-7 ft.: blue or purple, heads clustered, Oct. Siberia.



China aster, plant and separate flower-head; right, spray of Climax, horticultural form of native aster.

China aster, the "aster" of florists, is properly not an aster but a Callistephus (*C. chinensis*), a related genus. It is an erect branching rough-hairy half-hardy annual, now developed into many diverse races. The late-flowering kinds are 2-3 feet high and widely branched; dwarf kinds may be only a foot or less high and very compact. These plants are universal favorites. Colors run through the cyanic series,—white, rose, pink, purple, lavender, violet-blue, crimson.

The culture of China asters is simple. For early bloom the seeds should be sown in March in boxes of light soil and covered one-quarter of an inch, the earth pressed down or firmed over them and the boxes placed in a hotbed or a sunny window and attention given to watering. When the seedlings are one inch high they should be transplanted to other boxes, setting the plants 3 inches apart or put into 2-inch pots. These should be again placed in a frame and grown along until the ground has become comparatively warm. The soil should be mellow, and if slightly moist under the surface the results will be all that could be wished. Asters grow fairly well on rather light soil, even if not very

rich, and bloom early, but the best results are to be obtained only when the highest culture is given. By successive sowings and particularly by a careful choice of varieties from the catalogues, China asters may be had in bloom from July till frost. They give good results from seeds sown where the plants are to stand.

Rust of China aster is a serious disease but recent experiments show that it can be controlled by dusting with sulfur on both sides the leaves, beginning soon after the plants are set out and continuing every week or ten days throughout the season; wild native asters and golden-rods are also hosts of the fungus.

Stokes aster is *Stokesia lævis*.

AUBRIETA deltoidea and several races or varieties as *Bouganvillei, Eyrei, græca, Hendersonii, Leichtlini*. *Mustard Family*. Attractive trailing or tufted little perennials of southern Europe, with bright pink, violet and purple flowers produced abundantly in early spring. Useful in rock-gardens and on flower-margins.

Propagated easily by seeds, layers, cuttings and division. Plants should be grown in mats or masses for best effect.

AURICULA (*Primula Auricula*). *Primrose Family*. Half-hardy perennial, very popular in Europe, but less grown in this country on account of the hot dry summers. The plant grows 4-10 inches high from a rosette of thickish leaves. The colors are yellow to white and shades of bright red and blue, often with an eye, sometimes fragrant. They are spring bloomers.

In America auriculas are usually propagated by seed, as for cineraria; but special varieties are perpetuated by offsets. Seeds sown in February or March should give blooming plants for the next February or March. Keep the plants cool and moist, and away from the direct sun during the summer. Gardeners usually grow them in frames. In autumn, they are potted into 3-inch or 4-inch pots, and made to bloom either in frames as for violets or in a cool conservatory or greenhouse. In April, after blooming has ceased, repot the plants and treat as the previous year. From the best plants, offsets may be taken and treated the same as seedlings. As with most annual-blooming perennials, best results are to be expected with year-old or two-year-old plants.

AVOCADO (*Persea americana*). *Laurel Family*. Fruit of a tropical American tree, now planted extensively in Florida and southern California and often seen in northern markets; sometimes known by the meaningless name "alligator-pear."

Named varieties of avocado are propagated by budding on seedling stocks. The trees are planted 20 to 25 feet apart either way. The land should be well drained. Transplanting is performed usually in early spring after frost is past, the plant being moved with a ball of earth. Sometimes the trees are grown in pots till transplanting time. The second or third year after transplanting most varieties begin to bear, but other kinds require a somewhat longer period. The tree eventually becomes 30 feet and more high.

AZALEA. *Heath Family.* Well known and attractive spring- and summer-blooming deciduous and evergreen shrubs in temperate regions, planted in the open and some of them favorites under glass. Botanically, the azaleas are hardly separable from the rhododendrons and by many authors they are now named in that genus. There are three common types or classes,—the hardy or Ghent azaleas (*Rhododendron gandavense*), the Indian azaleas (*R. indicum*), and the Kurume types. The last two are not hardy in the North.

Ghent azaleas thrive in the open along the seacoast as far north as southern New England. They require a sandy peaty soil, and are treated as are other shrubs. The large flower-buds are liable to injury from the warm suns of late winter and early spring, and to avoid this injury the plants are often protected by covers or shades of brush. In the interior country, little attempt is made to flower azaleas permanently in the open, although they may be grown if carefully tended and well protected.

Both Ghent and Indian azaleas are excellent pot-plants, for bloom in late winter and spring. The plants are supplied for this purpose by dealers. Pot them up in large-sized pots, keep cool and backward for a time until they are established, then take into a conservatory temperature, in which carnations and roses thrive. They should be potted in a soil made of half peat or well-decayed mold and half rich loam; add a little sand. Pot firmly, and be sure to provide sufficient drainage. Keep off red-spider by syringing. After blooming, the plants may be thinned by pruning out the straggling growth, and repotted. Set them in a frame or in a semi-shaded place during summer, and see that they make a good growth. The wood should be well ripened in the fall. After cold weather sets in, keep the Indian or evergreen kinds half-dormant by setting them in a cool dull-lighted cellar or pit, bringing them in when wanted for bloom. The Ghent or deciduous kinds may be touched with frost without injury; and they may be stored in a cellar until wanted.

The Kurume and similar kinds are low or dwarf plants, products of *Rhododendron obtusum.* They are evergreen, and are now prized as very

floriferous pot-plants in late winter and spring, or they may be carried in frames. Culture is not essentially different from that of the Indicums.

BABY BLUE-EYES: *Nemophila.*

BABYS-BREATH: *Gypsophila paniculata.*

BACHELORS-BUTTON: *Centaurea Cyanus;* also *Gomphrena* and *Ranunculus.*

BALLOON-FLOWER: see *Campanula.*

BALLOON-VINE (*Cardiospermum Halicacabum*). *Soapberry Family.* Annual tender tendril-climber of very rapid growth, native in warm countries, the stems attaining 10 feet or more. A very pretty effect can be had by allowing the vine to run over some coarser vine, or into an evergreen tree. The balloon-like capsules show to good advantage between the leaves. It is also useful for covering piles of brush. Give a warm sunny place.

Seeds may be sown directly where the vines are to grow, or if early results are desired they may be started indoors. It often self-sows after having been grown in a border or along a fence.

BALM: *Monarda; Sweet Herbs.*

BALSAM (*Impatiens Balsamina*). *Balsam Family.* Tender annuals, producing both single and double flowers of many colors, native in the warm parts of Asia. They are erect-growing, 18-36 inches high, branching, bearing the spurred flowers close along the main stems.

Balsams often seed themselves, coming up in unexpected places and flourishing in neglect. They thrive best, however, in rich sandy soil. If the seed is sown in boxes in April and the plants transplanted several times they will be dwarfer and the flowers more double. A stately though very formal and stiff effect may be had by planting a row of balsams in the rear of a low border, pinching off all the side shoots as they start and growing the plant to a single stem. This will become covered with the large blooms, giving it the appearance of a column of flowers. Balsams are injured by the slightest frost.

Seeds germinate quickly. Plants should stand 12-18 inches apart, preferably the latter distance if good individual plants are desired. The colors of improved varieties are white, scarlet, pink, yellowish, variously striped and spotted.

BALSAM-APPLE, BALSAM-PEAR: *Momordica.*

BAMBOO. Many species of woody-stemmed long-lived grasses, often of excelling beauty in foliage and habit. Although abounding in tropical countries, many of the bamboos withstand considerable frost

and a few of them are hardy north of Philadelphia. In good fertile soil well supplied with clean underground water and protected from strong winds, many of the bamboos make most desirable garden and landscape material in mild climates. Propagation is by division of the clumps before the new growth starts.

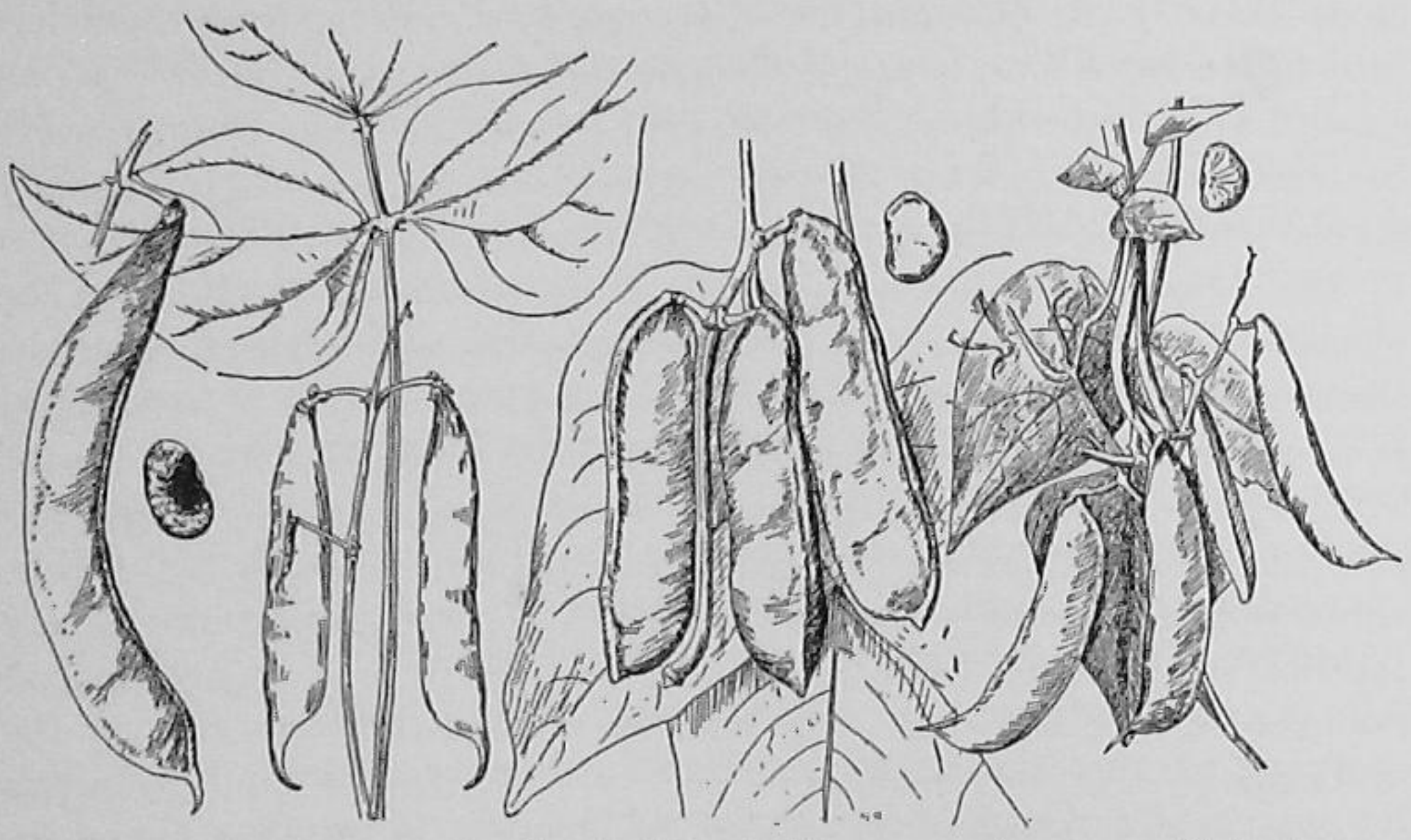
BANEBERRY: see *Perennials*, page 201.
BAPTISIA: see *Perennials*, page 201.
BARBAREA: *Cress.*
BARTONIA of gardens: *Mentzelia.*
BASIL, SWEET: *Sweet Herbs.*
BASKET-FLOWER: *Centaurea americana.*
BASKET-OF-GOLD: *Alyssum saxatile.*

BASKET PLANTS. A good hanging basket depends on provision to prevent too rapid drying of the earth. It is customary, therefore, to line the pot or basket with moss or similar material. Open wire baskets are often lined with moss and used for the purpose. Prepare the soil by mixing well-decayed leaf-mold with rich garden loam, thereby making an earth that will retain moisture. Hang the basket in a light place, but still not in a direct sunlight; and, if possible, avoid putting it where it will be exposed to drying wind. To water the basket, it is often advisable to sink it into a pail or tub of water.

Various plants are well adapted to hanging baskets. Among the drooping or vine-like kinds are the strawberry-geranium, Kenilworth ivy, maurandia, German ivy, canary-bird-flower, *Asparagus Sprengeri*, ivy geranium, trailing fuchsia, wandering Jew, and othonna. Among the erect-growing plants that produce flowers, *Lobelia Erinus*, sweet alyssum, petunias, oxalis, and various geraniums are to be recommended. Among foliage plants such things as coleus, dusty miller, begonia, and certain geraniums are adaptable for ordinary use.

BEAN. *Pea Family.* Under the general name Bean, many kinds of plants are cultivated. They are tender, and the seeds should not be planted until the weather is thoroughly settled; and the soil should be warm and loose. They are all annuals in northern countries, or treated as such. The beans of common cultivation in this country are of four classes: the common garden or kidney bean (*haricot* of the French), *Phaseolus vulgaris*; the sieva or civet bean, *P. lunatus*; lima bean, *P. limensis*; multiflora bean, *P. coccineus* (*multiflorus*), comprising both the ornamental Scarlet Runner and the White Dutch Runner. In all these classes there are dwarf and running forms. The horse, broad or windsor bean is of another genus, *Vicia Faba*, and it is hardy like the pea; it is

little raised for human food in North America and is grown only in the northernmost parts of the country in the East. In respect to their uses, beans may be divided into three categories: those employed as string or snap beans, the entire pod being eaten; those used as shell beans, the full-size but immature beans being shelled from the pod and cooked; dry beans, or those eaten in their dry or winter condition. The same variety of bean may be used for all of these three purposes at different stages of its development; but there are varieties better for one purpose than the other.



Various Beans. Left, pod and seed of Scarlet Runner; next, common String bean; center right, Lima bean; right, Sieva bean.

Other classes of beans are the hyacinth bean, *Dolichos Lablab*, grown for ornament, and other forms of the species for food in some countries, as Bonavist; and the Yard-Long, *Vigna sesquipedalis*, closely allied to the cowpea, which is also a bean. The hyacinth bean is a very rapid-growing twiner, bearing fragrant flowers of purple or white. It is a good screen plant. Plant seeds when the ground is warm where the plants are to grow; or they may be started early in pots; height 10 feet and more.

Beans will grow in most any soil, but the best results may be obtained in ground well enriched and in good physical condition. From the 5th to the 10th of May in the latitude of central New York, it will be safe to plant beans for an early crop. No vegetable seed decays quicker than beans, and the delay caused by waiting for the ground to become warm and free from excessive moisture will be more than made up by the rapidity of growth when finally they are planted. The beans may be dropped 1 or 2 inches deep in shallow drills, the seeds to lie 3 inches

apart. Cover to the surface of the soil, and if the ground is dry, firm it with the foot or the back of the hoe. For the bush varieties, allow 2 feet between the drill-rows, but for the dwarf limas 3 feet is better. Pole limas are usually planted in hills 2-4 feet apart in the rows. Dwarf limas may be sown thinly in drills.

The various strains of the Black Wax and Refugee are the most popular string beans. The bush varieties may be planted at intervals of two weeks from the first planting until the 10th of August. Each planting may be made on ground previously occupied by some early-maturing crop. Thus, the first to third plantings may be on ground from which has been harvested a crop of spinach, early radish or lettuce; after that, on ground where early peas have been grown; and the later sowings where beets or early potatoes have grown. String beans for canning are usually taken from the last crop.

The pole or running beans are used either green or dried, and the limas, both tall and dwarf, are well known for their superior flavor either as shelled or dry beans. The old-fashioned Cranberry or Horticultural Pole is one of the best shell beans, but the trouble of poling makes it less popular. Dwarf limas are more desirable for small gardens than the pole varieties, as they may be planted much closer, the bother of procuring poles and twine is avoided, and the garden will have a more sightly appearance. But the dwarf limas and pole limas require a longer season than the bush varieties, and only one planting is usually made.

Limas are the richest of beans, but they often fail to mature in the northern states. The land should not be very rich in nitrogen (or stable manure), else the plants will run too much to vine and be too late. Choose a fertile sandy or gravelly soil with warm exposure, use some soluble commercial fertilizer to start them off, and give them the best of culture. Aim to have the pods set before the droughts of midsummer come. Good trellises for beans are made by wool twine stretched between two horizontal wires, one of which is drawn a foot above the ground and the other 6 or 7 feet high; but in the end, good chicken-wire screen, stored in winter, is the best.

One quart of seed will plant 100 feet of drill; or 1 quart of limas will plant 100 hills.

Bean plants are not troubled by insects to any extent, but they are sometimes attacked by blight and anthracnose. Long rotation of crops is a standard method of escape from these difficulties and also the procuring of perfectly clean and healthy seed. Anthracnose-resistant strains are now developed. Certain regions are yet free from these diseases and good seed from them is desirable.

BEDDING. This term designates the massing of plants in the open ground for the purpose of making a bold display of color. This color may be obtained with flowers or with strong effects of foliage. Bedding is ordinarily a temporary species of planting; that is, the bed is filled anew each year. However, the term may be used to designate a permanent assemblage of plants heavily massed so as to give one continuous or emphatic display of form or color. Some of the best permanent bedding masses are made of the various hardy ornamental grasses, as eulalias and arundo.

Some kinds of bedding are very temporary in effect. Especially is this true of spring bedding, in which the plants are tulips, hyacinths, crocuses or other early-flowering bulbous kinds. In this case, the ground is usually occupied later in the season by other plants. These latter are commonly annuals, the seeds of which are sown amongst the bulbs as soon as the season is far enough advanced; or the annuals may be started in boxes and the plants transplanted amongst the bulbs as soon as the weather is fit.

Many of the low-growing and compact continuous-flowering annuals are excellent for summer bedding effects.

Summer bedding is often made with perennial plants carried over from the preceding year, or better, propagated for that particular purpose in February and March. Such plants as geranium, coleus, alyssum, scarlet salvia, ageratum and heliotrope may be used for these beds. It is a common practice to use geranium plants which are in bloom during the winter for bedding out in the summer, but such plants are tall and ungainly in form and have expended the greater part of their energies. It is better to propagate new plants by taking cuttings or slips late in the winter and setting out young, fresh, vigorous subjects.

Very bold and subtropical effects can be made by planting in the open such things as palms, bananas, crotons, araucarias, caladiums and cannas. Plants like bananas and palms, which are kept normally in pots, would better be left in the pots and plunged to the rims rather than turned out directly into the ground. In order to attain quick and continuous effects, it is advisable to set the plants rather close. As such plants are likely to be injured by strong winds, it is well to have subtropical beds in a somewhat protected place, and tall subjects may be staked.

Another type of bed attempts to make patterns or designs; it is carpet-bedding. Comparatively few plants are adapted to this purpose, for the plants must be such as will stand shearing and have very strong and constant colors of foliage. The most popular bedding plants are

coleus (particularly the yellow Golden Bedder), achyranthes, alternanthera, *Centaurea gymnocarpa.*

Another class of bedding material is the succulents, which assume and hold formal shapes of their own; these plants are houseleeks (Sempervivum), echeverias, sedums and similar things. Some of the annual flowers may also be used for strong color effects, as *Lobelia Erinus* and sweet alyssum. Ordinarily the making of carpet-beds should be left to trained gardeners, since it requires much skill and care to make and keep the beds in perfect condition; and a ragged or imperfect carpet-bed is worse than no bed at all. Carpet-beds are really curiosities, and they have no more legitimate place in the general pictorial landscape design area than painted stones or sheared evergreens. Therefore, they should be placed by themselves at one side, where they do not interfere with the general design of the place. In public parks they make a very useful attraction when set off by themselves, the same as topiary work or other specialties.

BEE-BALM: *Monarda didyma.*

BEET. *Goosefoot Family.* Indispensable hardy biennial, as known in cultivation, the aboriginal form native on the coasts of Europe; grown for its edible tuberous roots (beet-root of the English), edible tops used as greens, and certain types for ornamental foliage. The root-beets are collectively *Beta vulgaris;* mangels and sugar-beets are races of this species. The leaf-beets, in which the roots are not thickened, are *B. vulgaris* var. *Cicla,* the Swiss chard constituting one of the races. (See Chard, page 68.)

Being one of the hardiest of spring vegetables, the seed of beets may be sown as early in the spring as the ground can be worked. A light sandy soil is best, but any well tilled garden ground will raise satisfactory crops. On heavy land the turnip beet gives the best results, as the growth is nearly all at or above the surface. The long varieties, having tapering roots running deep into the soil, are likely to be misshapen unless the physical condition of the ground is such that the roots meet with little obstruction. A succession of sowings should be made, at intervals of two to three weeks, until late summer, as the beets are much more desirable in their young stage than when they have become old and woody. The "seeds" of beets are really little fruits, and two or more embryos may be contained in each one; this explains why the young plants often stand thicker than expected.

To hasten the season of the extra-early crop of beets, the seeds may be sown in boxes or in the soil of a hotbed in February or March, transplanting the small plants to the open ground at the time the first sowing

of seed is made. As the flat or turnip-rooted varieties grow at the surface, the seed may be sown thickly, and as the more advanced roots are large enough to use they may be pulled, leaving room for the later ones to develop, thus growing a quantity in a small area and having a long season of small beets from one sowing. For winter use the summer-sown seed will give the best roots, growing through the cool months of autumn to a medium size and remaining firm without being tough or stringy. These may be dug after light frosts and before any severe cold weather, and stored in barrels or boxes in the cellar, using enough dry dirt to fill spaces between the roots and cover them to the depth of 6 inches. These roots, thus packed in a cool cellar, will be fit to use through the winter months. When it can be had, florists or sphagnum moss is an excellent medium in which to pack roots for winter.

The early round or turnip varieties are best for early and summer use. The Long Blood beets may be stored in winter, but these require a longer season of growth.

Long-continued dry weather may injure the roots and cause them to be misshapen. Maintaining the moisture-holding capacity of the soil is the only remedy when water supply is not available.

BEGONIA. *Begonia Family.* Many tender bedding and house plants, native in warm and tropical countries, comprising more or less succulent herbs grown for both foliage and flowers. The ease of culture, profusion of bloom or richness of foliage, together with their adaptability to shade, make them very desirable. Begonias may be divided into three main sections: the fibrous-rooted class, which contains the winter-flowering varieties; the tuberous-rooted, those that bloom through the summer, the tuber resting in winter; and the Rex forms, or Beefsteak-Geraniums, having large ornamental leaves. Formerly many species of Begonia were to be seen in window-gardens and greenhouses, but are now represented chiefly by florists varieties of the Semperflorens class and these are not well adapted as house plants. Very few species are now offered except by a few begonia specialists.

The fibrous-rooted begonias may be propagated by seed or cuttings, the latter being the usual method. Cuttings of half-ripened wood root easily, making a rapid growth, the plants flowering in a few months.

The tuberous-rooted begonias are propagated by division of the tuber or from seed, the former being rarely undertaken except to increase the stock of some extra fine variety. The seeds, like those of all begonias, are very small and should be sown with great care. Sprinkle them on the surface of the soil, which should be a mixture of leaf-mold and sand, with the addition of a small amount of fibrous loam. Water by setting the pot

or box in water, allowing the moisture to ascend through it. When the earth has become completely saturated, set the box in a shady situation, covering it with glass or other object until the tiny seedlings appear. Never allow the soil to become dry. The seedlings should be transplanted, as soon as they can be handled, into boxes or pots containing the same mixture of soil, setting each plant down to the seed-leaf. They will need three or four transplantings before they reach the blooming stage, and at each one after the first the amount of fibrous loam may be increased until the soil is composed of one-third each of loam, sand and leaf-mold. The addition of a little well-rotted manure may be made at the last transplanting. These tuberous-rooted begonias make superior bedding plants if given a shady situation and deep soil away from the wind; but for the novice they are perhaps better grown as pot-plants, for one is able to give them better conditions by that method. The flowers are both double and single, ranging in color from pure white and yellow to pink and red. After flowering the plants die down and the tubers, after drying off, may be placed in a dry warm place until spring. Tubers may be purchased of dealers.

The Rex type, having no regular branches, is propagated from the leaves. The large mature leaves are used. The leaf may be cut into sections having at the base a union of two ribs. These pieces of leaves may be inserted in the sand as any other cutting. Or a whole leaf may be used, cutting through the ribs at intervals and laying the leaf flat on the propagating bench or other warm moist place. In a short time young plants having roots of their own will form. These may be potted when large enough to handle, and will soon make good-sized plants. Rex begonias usually grow little in winter. Be sure that the pots are well drained, so that the soil does not become sour. New plants—those a year or so old—are usually most satisfactory. Keep them away from direct sunlight.

BELAMCANDA: see *Perennials*, page 201.

BELLFLOWER: *Campanula.*

BELLIS: *Daisy.*

BERGAMOT: *Monarda fistulosa.*

BERGENIA: *Saxifraga.*

BETA: *Beet.*

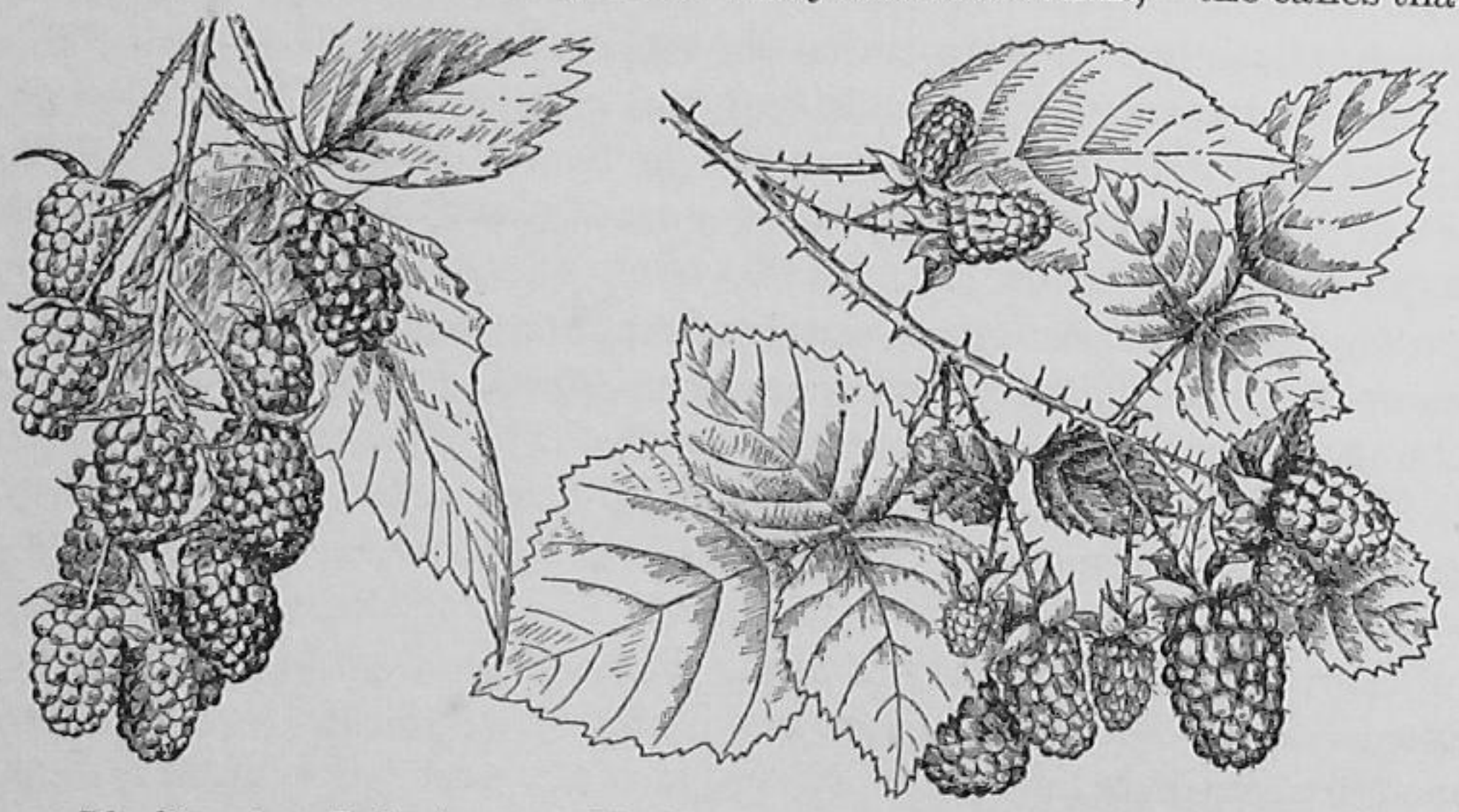
BIENNIALS are plants that live two years. Usually they do not bloom, or at least the bloom is not optimum, until the second year. Seeds are commonly sown one year, therefore, to produce blooming plants the following year. Some of the species blossom the first year if seeds are started in early spring under glass. Cabbage and rutabaga, as well as parsnip, are examples of biennials, the bloom and seeds coming the second

year. Many of the short-lived perennials are better treated as biennials, being replaced by other plants after the second year. Red clover is an example, in general farm practice.

Biennials of several kinds are procurable in autumn from nurserymen, as Canterbury bell, foxglove, hollyhock, and such perennials as English daisy, pansy and violet, sweet william, snapdragon, that are largely treated as biennials. There is no special care to be given biennials, aside from knowing the times and seasons, as distinct from other herbs.

BISHOPS-WEED: see *Perennials*, page 201.

BLACKBERRY (species of *Rubus*). *Rose Family.* The blackberries commonly grown in North America have been developed within a century from native wild species. They are cane-frutis,—the canes that



Blackberries. Left, Agawam blackberry; right, Loganberry; see *Dewberry.*

arise from the root or crown one year bearing the succeeding year and then either dying or becoming so weak as to be useless. In the first year the new shoots are called primocanes; second or bearing year they are floricanes. Running blackberries are known as dewberries (which see).

An essential to the successful growing of blackberries is a moist soil,—not one in which water will stand, but one rich enough in humus to hold sufficient moisture to carry the crop through the hot fruiting season. Early spring planting is preferred to any other season for best results. Under favorable conditions fall planting may be successful.

The new plants are derived from the thrifty suckers that arise about the old plant. For more rapid propagation, 2-inch pieces of root may be employed, the resulting plants being grown in the nursery one or two years; the home gardener will not need to resort to this method.

The distance between blackberry plants should be regulated by the variety. The smaller-growing kinds may be planted 4×7 feet, the rank varies 6×8 feet. Thorough tillage throughout the season will help in a material degree to hold the moisture necessary to perfect a good crop. The soil should be tilled very shallow, however, so as not to disturb the roots, as the breaking of the roots starts a large number of suckers that have to be cut out and destroyed. Provision must be made for canes to produce the next year's crop, as in dewberries and raspberries. Three to six canes are sufficient in each hill. The superfluous ones are thinned out soon after they start from the ground. The old canes should be cut out soon after fruiting.

The primocanes or new shoots that produce fruit the following year should be pinched back when they reach a height of about $2\frac{1}{2}$ feet. At this height only an inch or two of the top of each cane is removed. This induces a strong growth of side branches on which the following year's crop is produced. Too often the new cane growth reaches a height of 3 to 4 feet when a foot or more of the top growth is removed. This results in weak lateral branches that are likely to be winter-killed. Dormant pruning consists of cutting back these side branches of the new canes to 12 or 18 inches. This operation may be performed to best advantage in the spring before growth starts.

Blackberry plants are sometimes laid down in cold climates,—the tops being bent over and held to the ground by earth or sods thrown on their tips.

The life of a blackberry planting depends largely on the care it receives. Under careful management it should remain productive six to eight or more years.

Of the many varieties of blackberries Eldorado is likely to give best satisfaction. The fruit is large and handsome and of good quality. The plant is hardy and productive. Snyder will withstand low temperatures under which Eldorado will not survive. The fruit of this variety is rather small and the quality poor compared with Eldorado. Erie and Ancient Britton are two other good sorts frequent in commercial and home plantings.

The orange-rust of blackberries, conspicuous on the leaves, is eradicated only by burning the plants root and top. Anthracnose on the canes is controlled by spraying (as in raspberries) with lime-sulfur or bordeaux mixture. When purchasing plants they should be obtained from a disease-free source.

BLACK-EYED SUSAN: *Rudbeckia hirta; Thunbergia alata.*
BLEEDING-HEART: *Dicentra spectabilis.*

BLOODROOT: see *Perennials*, page 203.

BLUEBELL: see *Squill;* also *Campanula rotundifolia.*

BLUEBELLS, CALIFORNIA: *Phacelia.* **Virginia:** see *Perennials*, page 203.

BLUEBERRY (species of *Vaccinium*). *Heath Family.* In recent years, blueberry culture has made steady progress, due to the improvement of the native berries by breeding, to better methods of propagation, and to the understanding of the essential soil conditions.

The blueberry is propagated by dividing the clumps or rootstocks, by layering, by cuttings and by seeds, but the seeds do not reproduce the variety or strain. The home gardener, if he attempts blueberries at all, will probably purchase his plants.

An acid soil is essential for blueberry culture, one composed of peat and sand but with good drainage and aeration and not subject to severe drought. If the planting is irrigated, the water should be neutral or slightly acid in chemical reaction. It is not necessary to plant blueberries in swamps; in fact, plants do not thrive when the roots are permanently under water or are in a soggy soil during the period of active growth. The water-table should be at least a foot below the surface in the growing season. Common alkaline or neutral soils do not produce blueberries.

The permanent plantation is set about 8 feet apart each way. Surface tillage is advised. Under good conditions plants begin to bear well in two or three years after setting and they should last a lifetime. They grow to a height of 6 to 8 feet. In home gardens it is advised that plants be set in ample holes or trenches about 1 foot deep in a mixture of 1 part of upland peat or half-rotted oak leaves to 1 part of sand; peat or oak leaves are used as a top-dressing. Chemical fertilizers that leave an acid reaction in the soil may be applied, as sulfate of ammonia, with acid phosphate and sulfate of potash. The United States Department of Agriculture has issued bulletins on blueberry culture.

Good varieties of blueberry, in order of their season of maturity, are June, Cabot, Rancocas, Pioneer, Concord, Stanley, Scammell, Jersey. Probably the most delicious of the varieties are Pioneer, Concord and Stanley. For the home garden can be used also Katharine, a variety of delicious flavor which, however, is difficult to pick and in consequence has so large a scar as to deteriorate rapidly when marketed, and Redskin and Catawba, two delicious albino varieties which on the side exposed to the sun have a color similar to that of a Catawba grape.

BLUETS: see *Perennials*, page 202.

BOCCONIA: see *Perennials*, page 201.

BOLTONIA: see *Perennials*, page 201.

BORDER. The word border designates heavy or continuous planting about the boundaries of a place, or along the walks and drives, or against the buildings, in distinction from planting on the lawn or in the interior spaces. It is marginal planting. A border receives different designations, depending on the kinds of plants grown therein; that is, it may be a shrub border, a flower border, a hardy border for native and other hardy plants, a vine border, and the like. As a rule, the most effective planting is that which is thrown into masses, for one plant reinforces the other, and the flowers have a good setting or background. Very striking displays of foliage and flowers and plant forms can be made when massed together. As a rule, plants are more easily grown in a border, since the whole area can be kept cultivated with ease; and if a plant becomes weak or dies, its place is readily filled by the neighboring plants spreading into it. Planting in masses is often essential to the best arrangement of the yard, since the basis of any landscape is a more or less continuous greensward or at least a dominating open center unless strictly formal gardening is preferred. The house occupies the central part of the area, and the sides are heavily massed or planted so as to make a framework for the whole place. The border may be mixed,—that is, composed of a great variety of plants,—or it may be made up of one species in considerable quantity. In long and very striking borders, it is often best to have the background—that is, the back row—of one general type of plant in order to give continuity and strength to the whole group. In front of this a variety of plants may be set, if one desires.

The land should be fertile. The whole ground should be plowed or spaded and the plants set irregularly in the space; or the back row may be set in a line. If the border is composed of shrubs, and is large, a horse cultivator may be run in and out between the plants for the first two or three years, since the shrubs will be set 2 to 4 feet apart. Ordinarily, however, the cultivating is by hand tools. After the plants are once established and the border is filled, it is best to dig up as little as possible, for the digging disturbs the roots and breaks off the crowns of perennials. It is usually best to pull out the weeds and give the border a top-dressing each autumn of well-rotted manure. If the ground is not very rich, a sprinkling of ashes or commercial fertilizer may be given from time to time. The border should be planted so thick as to allow the plants eventually to run together, thereby giving one continuous effect. Most shrubs should be set 3 feet apart. Those as large as lilacs may go 4 feet and sometimes even more. Common herbaceous perennials, as bleeding-heart, delphiniums, hollyhock, and the like, should go 12 to 18 inches. On the front edge of the border is an excellent place for annual and tender

flowering plants. Here, for example, one may make a fringe of asters, geraniums, coleus, or anything else one may choose.

The border may be used to colonize native or other interesting plants. A person comes across an attractive plant on his tramp and wishes it were in his garden. Whatever the time of year, he may break off the top close to the ground, take up the roots and plant them in the border. If a little attention is given to the plant for the first two or three weeks, as watering or mulching or shading, it should become established and gives satisfactory bloom the following year. Two-thirds of the herbs which one would take up in this way, even in midsummer, should grow. Into the heavy borders about the boundaries of the place the autumn leaves will drift and afford an excellent mulch. If these borders are planted with shrubs, the leaves may be left there to decay, and not be raked off in the spring. The general outline of the border facing the lawn should be more or less wavy or irregular, particularly if it is on the boundary of the place. Alongside a walk or drive, the margins may follow the general directions of the walk or drive.

There are three rules for the choosing of plants for a hardy border. Choose (1) those you like best, (2) those adapted to the climate and soil, (3) those in place or in keeping with that part of the grounds.

BOUNCING BET: *Saponaria officinalis.*

BOX (*Buxus sempervirens* and many varieties). *Box Family.* Broad-leaved slow-growing long-lived evergreen of the Mediterranean region and Asia, long grown for permanent verdant edgings, minor topiary work, as single formal specimens for architectural effect, and for winter greenery. Box withstands shearing, but the natural tree, which reaches 20 to 30 feet, is attractive in habit. For the margining of walks and beds, the dwarf box is usually employed.

Box thrives on any usual well-drained land that retains moisture. Partial shade is advisable. Plants may be set in spring before growth starts, also in August and September; in the southern part of the country, in autumn and winter when the ground is not frozen. It is hardy up to about New York City and in sheltered places northward, and with some protection is satisfactory much farther than its open range. Propagation is by hardwood cuttings in late summer or autumn, but most gardeners will purchase the plants. Old box plantations can be removed and established in new quarters.

BRACHYCOME **iberidifolia.** Swan River Daisy. *Composite Family.* An excellent half-hardy annual border plant, from Australia,

growing to the height of 9 to 15 inches, and bearing quantities of blue or white flower-heads 1 inch across. The flowers last a long time when cut.

The seed should be sown in boxes, hotbed, or windows; or, in warm garden soil, the seed may be sown where the plants are to stand; thin to 6 inches or more.

BRASSICA: *Broccoli; Brussels Sprouts; Cabbage; Cauliflower; Collards; Kale; Kohlrabi; Mustard; Turnip.*

BROCCOLI (*Brassica oleracea* var. *botrytis*). *Mustard Family.* A cauliflower-like plant, and grown for the same purpose. The term is sometimes applied to a long-season cauliflower ripening late in autumn or winter. The special merit of broccoli is its adaptability for late summer planting and its rapid growth in late autumn. Broccoli is employed in

Broccoli, Browallia, Brussels Sprouts. Form of Italian broccoli at left, the irregular head something like cauliflower; *Browallia americana.*

the manufacture of pickles. The culture is the same as for cauliflower,—deep moist soil well enriched, cool weather, and the destruction of the cabbage-worm and avoidance of clubroot. See *Cabbage* and *Cauliflower.*

Of late years the asparagus or sprouting broccoli, much esteemed by Italians, is becoming well known. It differs in producing loose and leafy panicles of thickened edible flower-shoots with small heads or clusters; it is *Brassica oleracea* var. *italica.* Culture in general is like that for the ordinary kind except that plants are often over-wintered and then produce the shoots in spring.

BROWALLIA. *Nightshade Family.* Tropical American tender annuals, or grown as such, prized for the bright blue flowers; some kinds are white-flowered. They usually grow 1-2 feet high, with slender branching stems; bloom in summer and autumn. The blue-flowered kinds are often known as Amethyst.

Seeds are usually started indoors and the plants set about one foot apart. All kinds may be taken up and potted in the fall, cutting the plant well back, and a profusion of bloom may be obtained through the winter months if attention is given to pinching off the seed-pods.

B. americana (*elata*). 1-2 ft.: blue or violet. Var. *alba*, white.

B. speciosa (*major*). 4-5 ft.: purple to blue and white. Colombia.

BRUGMANSIA: *Datura.*

BRUNNERA: *Anchusa myosotidiflora.*

BRUSSELS SPROUTS (*Brassica oleracea* var. *gemmifera*). *Mustard Family.* One of the cabbage tribe, that bears little heads or buttons ("sprouts") in the axils of the leaves along the main stem. The sprouts are usually taken for eating when ½ to 1 inch in diameter. These should be cut off rather than broken. The very small hard sprouts or buttons are the best. The culture is essentially the same as for late cabbage or broccoli. One ounce will sow 100 feet of drill, or make upward of 2,000 plants. Set plants in field 2-3 feet apart. They require the entire season in which to grow. This vegetable may be had at its best after the season for cauliflower has passed. It is the better for being touched by the fall frosts. The lower leaves are usually cut off as the sprouts approach maturity. See *Cabbage.*

BRYOPHYLLUM: see *Succulents.*

BUDDING: page 223.

BUDDLEJA. Butterfly-Bush. *Logania Family.* Shrubs and semi-herbaceous plants, largely Asian, with mostly opposite leaves and four-lobed tubular flowers in spikes, heads or racemes, usually in lilac and lavender shades but some of them white. They grow from cuttings as well as seeds. *B. Davidi* (*variabilis*) from China is the commonest species North; even when the top winter-kills the root usually survives and sends up vigorous nearly herbaceous shoots 4 or 5 feet high and bears long clusters of closely placed bright lilac flowers in late summer; called summer lilac. It is variable, and forms of it are known as *magnifica*, *Veitchiana* and *Wilsoni*. It requires no special treatment, but should be allowed plenty of room against a border or at one side of the garden.

BUGBANE: *Cimicifuga.*

BUGLE-WEED: *Ajuga.*

BUGLOSS: *Anchusa.*

BULBS. In garden parlance, "bulbs" are ornamental flowering plants with bulbs, corms, or thickened roots that may be dried off after the season of growth, if necessary, and stored for the winter. The term

is applied more particularly to spring-flowering plants of this description. As the stock of many of these plants is produced by the Dutch growers, the spring kinds are often known as Holland bulbs, as tulips, hyacinths, daffodils, squills, snowdrops, crocuses. The outdoor culture of bulbs is simple. The plants care for themselves throughout a greater part of the year, many of them flowering very early when no other kinds are able to grow and bloom out-of-doors.

Spray of Butterfly-Bush, flowers lilac with orange eye, form of *Buddleja Davidi*.

Success with bulbs depends to a large degree on good stock to begin with. Not only should the varieties be good and true to name, but the bulbs themselves should be well ripened and firm although it is not necessary to choose the largest ones. While the so-called Holland bulbs thrive in any kind of soil, they all do better in a deep sandy ground enriched with well-rotted manure; but do not let the manure come into direct contact with the bulb. Even heavy clay may be fitted for the growing of bulbs by the addition of sharp sand, either worked into the soil or placed directly under the bulb when planted. To make a bulb bed, choose, if possible, a sandy soil and throw out the top earth to the depth of 6 inches. Put into the bottom of the bed about 2 inches of well-rotted manure and spade it into the soil. Throw back half of the top soil, level it off nicely, set the bulbs firmly on this bed and then cover them with the remainder of the soil; in this way one will have the bulbs from 3 to 4 inches below the surface and of uniform depth. When the weather is cold enough to freeze a hard crust the bed should have its winter covering.

This may be straw, hay, cornstalks or leaves spread over the bed to the depth of 6 inches if the material is coarse; but if leaves are used, 3 inches will be enough, because the leaves lie close together and may smother out the frost that is in the ground and let the bulbs start. If they start too early the hard freezes of March and early April will spoil their beauty if the leaves or flowers are near or above the surface. Early in April, in New York, the covering may be removed gradually, and should all be off the beds before the leaves show above the ground.

If there is no sandy porous place for the beds, make them as directed, leaving stones in the bottom of the bed for drainage. Then, when ready to set the bulb, place a large handful of sand where the bulb is to go and set the bulb on it. This will keep the water from standing under the bulb.

Some of the bulbs may be readily naturalized in grassy and untilled areas, as grape hyacinth, crocus, jonquil, daffodil, lily-of-the-valley, tulip. The plants are usually massed irregularly for pleasing and striking effect. The area may be fertilized in autumn with top-dressing.

The classes and varieties of tulips, hyacinths and narcissi (daffodils) are many. For lists of them, the gardener can keep up to date, and make calculations as to color combinations and seasons, by consulting the catalogues of reliable dealers and the bulletins now and then issued by public institutions.

The growing of flowering bulbs in winter adds to the list of house plants a charming variety. The labor, time and skill required is much less than that of growing many of the larger plants more commonly used for winter decorations. The larger number of bulbs may be left out-of-doors until four to six weeks of the time when they are wanted in flower. Hyacinths, narcissi, tulips, and crocus can be made to flower in the winter without difficulty. Pot the bulbs by the middle or last of October, or if earlier all the better. The soil should be rich sandy loam, if possible; if not, the best one can get, to which add about one-fourth the bulk of sand and mix thoroughly. If ordinary flower-pots are to be used, put in the bottom a few pieces of broken pots, charcoal or small stones for drainage, then fill the pot with earth so that when the bulbs are set on it the top of the bulb is even with the rim of the pot. Fill around it with soil, leaving just the tip of the bulb showing. If the soil is heavy, a good plan is to sprinkle a small handful of sand under the bulb to carry off the water, the same as is in beds outdoors. If one does not have pots, boxes may be used. Starch boxes are a good size, as they are not heavy to handle; and excellent flowers are sometimes obtained from bulbs planted in old tomato cans. If boxes or cans are used, care must be taken to have

Good Spring Bulbs. Left, tulip; hyacinth; one bloom of daffodil, *Narcissus Pseudo-Narcissus*; three flowers of Paper-White narcissus, *N. Tazetta*; top right, poet's narcissus, *N. poeticus*; squill in flower and fruit, *Scilla hispanica*.

holes in the bottoms for drainage. A large size hyacinth bulb will do well in a 5-inch pot. The same size pot will do for three or four narcissi or eight to twelve crocuses.

After the bulbs are planted they should be placed in a cold pit or cellar, or on the shady side of a building, or, better yet, plunged or buried up to the rim of the pot in a shady border. This is to force the roots to grow while the top stands still, as only the bulbs with good roots will give good flowers. When the weather is so cold that a crust is frozen on the soil, the pots should be covered with a little straw, and as the weather becomes colder more straw must be added. In six to eight weeks after planting the bulbs, they should have made roots enough to grow the plant, and they may be taken up and placed in a cool room for a week or so, after which, if they have started into growth, they may be taken into a warmer room where they have plenty of light. They will grow very rapidly now and will want much water. When just coming into bloom the plants may have full sunlight part of the time to help bring out the color of the flowers. After blooming in the house, the bulbs are usually discarded and new ones purchased for the following year, although it is possible to grow them for future blooming.

BUTIA: *Palms.*

BUTTERCUP: *Ranunculus.* **Bermuda:** *Oxalis cernua.*

BUTTERFLY-BUSH: *Buddleja.*

BUTTERFLY-FLOWER: *Schizanthus.*

BUXUS: *Box.*

CABBAGE (*Brassica oleracea* var. *capitata*). *Mustard Family.* Universal hardy garden vegetable producing the edible heads but not the flowers the first year from seed; developed from a species native on the coasts of Europe.

For an early crop of cabbage, the plants must be started from seed in February or March, or the previous September and wintered over in coldframes. This latter method was once a common practice by gardeners near large cities, but the building of greenhouses to replace the usual hotbeds of the market-gardener has changed the practice in many localities, and now most of the early cabbages of the North are grown from seed sown in late winter or early spring. The plants are hardened off in March and April and planted out as early as possible. The private grower, or one with a small garden, may often procure his early plants from the market-gardener much cheaper than he can grow them, as usually only a limited number is wanted; but for the midseason and main crop, the seed may be sown in May or June, setting the plants in July.

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For early planting, the number of varieties is limited to three or four. For an intermediate crop the list is more extended, and the late varieties are very numerous. The early list is headed by the Wakefield types. The Early Summer and Charleston are good varieties to follow it. There are other second-earlies, solid and of good quality. For the midseason, the Succession and All Season are of the best, and for the winter supply Autumn King, Danish Ball and Flat Dutch types are good. One of the best of the cabbages for table use is the Savoy. It is a race with netted leaves, making a large low-growing head, the center of which is very solid and of excellent flavor, especially late in autumn when the heads have had a slight touch of frost.

The seed-bed should be mellow and rich. The seed is sown preferably in rows, thus allowing thinning of the plants and the pulling of any weeds that germinate. Give attention to watering and thinning. The rows should be 3 or 4 inches apart. When the plants are large enough to transplant, they may be planted where early vegetables have been grown. Set the plants 18 to 24 inches apart in the row, the rows being 3 feet apart for the medium-growing kinds. All cabbages require deep and rich soil that holds moisture well. One ounce of seed will furnish two thousand and more good plants.

Flowers and seeds are produced the second year. The stumps saved alive over winter throw up flower-shoots when planted in spring, or if the head has not been removed the whole over-wintered plant may be set out and the head cut open to allow the flower-shoots to come through.

Maggot in the stems of young plants is a serious menace to cabbage, cauliflower and similar plants, as also to radish. If plants are raised in frame seed-beds, the bed may be tightly covered with cheesecloth to keep the parent fly away. A surer way is to poison the soil about the plants with a solution of corrosive sublimate, 1 ounce to 10 gallons of water. The poison solution is poured along the row; applications should be repeated, and 1 gallon will treat about 40 feet of row at first, with heavier applications subsequently. If beetles are present they may injure the plants so that the sublimate solution may destroy them, and in that case calomel may be substituted as described under *Cauliflower*.

Black-rot of cabbage is controlled by using only disease-free seed, avoiding the use of infected manure and cabbage refuse, and by four-year rotation in which kale and cauliflower and mustard are eliminated; seed in a cheesecloth bag may be placed in corrosive sublimate solution (1 ounce to $7\frac{1}{2}$ gallons of water) for twenty or thirty minutes, then rinsed in clean water and thoroughly dried.

Black-leg is combatted by clean four-year rotation and by hot water treatment of the seed; farm bureaus often treat the seed.

Flea-beetles are kept from seed-beds by cheesecloth screens. Fine tobacco dust applied frequently will protect young plants from great injury. All treatments should begin very early.

Cabbage-worms are controlled by spraying with rotenone in home plantations.

Club-root control depends on clean and well-drained soil, long rotations, destruction of mustard family weeds, and also by the treatment of seed-beds with corrosive sublimate; liming the land is supposed to check the disease.

Chinese cabbage, celery cabbage, or *pe-tsai* (*Brassica pekinensis*) is a very different plant, producing usually in this country a loose head something like that of Cos lettuce. It is grown much like lettuce. If wanted for summer, the seed must be sown very early and the plants hastened to maturity, otherwise they will run to flower. It is better treated as an autumn crop with seed sown in summer, or in the South as a winter vegetable. Sometimes it follows lettuce. It withstands considerable frost. It can be stored after the manner of celery. Pe-tsai is an excellent salad vegetable when grown with heads crisp and white inside; it is also cooked for greens or as for cabbage.

CACALIA: *Emilia.*

CACTUS. *Cactus Family.* Thick more or less fleshy plants, usually spiny and without distinct leaves, grown for the odd condensed globular or cylindrical plant bodies and also for the showy white, yellow or red flowers; American. Other plants of similar appearance may be called cacti, particularly some of the euphorbias, but these are distinguished by milky juice. Several kinds of cacti are often seen in collections of house plants.

Cacti are easy to grow, requiring little care and enduring the heat and dryness of a living-room. The requirements are ample drainage and a porous soil. Cactus growers often make a soil by mixing pulverized plaster or lime refuse with garden loam, using about two-thirds of the loam. The very fine parts, or dust, of the plaster are blown out, else the soil is likely to cement. Plants may be rested at any season by simply setting them away in a dry place for two or three months, and bringing them into heat and light when they are wanted. As new growth advances they should have water occasionally, and when in bloom they should be watered freely. Withhold water gradually after blooming until they are to be rested.

The Zygocactus (often but incorrectly called Epiphyllum), known as Crab or Christmas cactus, is one of the best of the family, easy of culture. It bears bright-colored blossoms at the end of each joint. When in

flower, which will be in the winter months, it requires a richer soil than many other cacti. Opuntias, or prickly-pears, are often grown as border plants in summer, being kept indoors at rest in winter. In fact, all the family may be planted out, and if a number of species are set in a bed together they make a striking addition to the garden. Be very careful not to bruise the plants. It is better to plunge them in the pots than to turn them out of the pots. Under the name of night-blooming cereus, several species of cacti are cultivated. The name is sometimes applied to species of Epiphyllum (*Phyllocactus*), the flowers of which, in white and shades of red, sometimes open at nightfall. These are easy to grow. The true night-blooming cereuses, however, are species of the genus Cereus or very closely related genera. These night-blooming cereuses have long rod-like stems, cylindrical or angular. These stems often reach a height of 10 to 30 feet, and they need support. They should be trained along a pillar or tied to a stake. They are uninteresting leafless things during a large part of the year; but in midsummer, after they are three or more years old, they throw out their great tubular flowers, which open at nightfall and wither and die when the light strikes them next morning. They are easily grown, either in pots or planted in the natural soil in the conservatory. The only special care is good drainage, so that the soil will not become soggy.

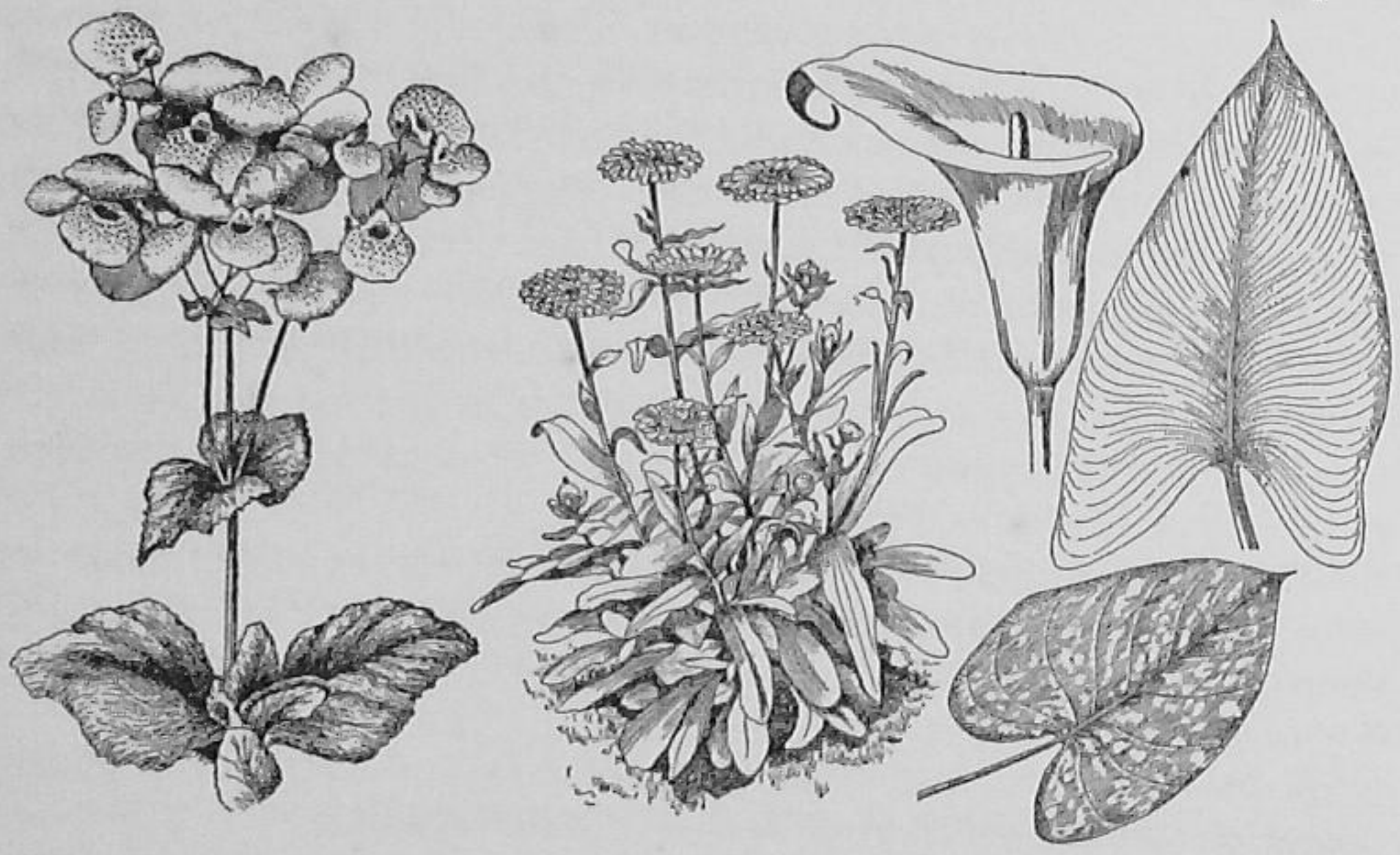
There is now much interest in cacti, although some of the plants so called do not belong to the cactus family. Special books are devoted to the subject, and there is a Cactus and Succulent Society headquartered in Los Angeles and that publishes a journal.

CALADIUM. *Arum Family.* Tuberous-rooted tender perennials used for conservatory decoration and also for subtropical and bold effects in the lawn. The plants commonly known under this name are really colocasias, the true caladiums having usually fancifully-marked foliage and grown mostly under cover. The caladiums are native in the American tropics, but the colocasias are Asian and Polynesian. *Colocasia antiquorum* is the common species planted out as a lawn plant. The dasheen, taro and eddo are the edible tuberous roots of a related species, *C. esculenta.*

Colocasias for lawn planting should be rested in winter, being kept in a warm cellar or under a greenhouse bench, where they are not liable to frost or dampness. The roots are usually covered with earth but are kept dry. Early in spring the roots are put into boxes or pots and are started into growth, so that by the time settled weather comes they will be 1 or 2 feet high and ready to set directly into the ground. When set out-of-doors, they should be given a place protected from strong winds,

and one that does not receive the full glare of direct sunlight. The soil should be rich and deep, and the plants should have an abundance of water. They are excellent for striking effects, especially against a house, high shrubbery or other background. If they are planted by themselves, they should be in clumps rather than scattered as single specimens, as the effect is better. See that they get a good start before they are planted in the open. Take up in autumn and store for winter, dividing the roots before starting again. In the North, the plants seldom bloom in the open.

CALCEOLARIA. *Figwort Family.* Small greenhouse herbs and subshrubs sometimes grown in the window-garden; native in tropical



Calceolaria, Calendula, Calla. Left, one of the many forms of *Calceolaria crenatiflora*; center, pot-marigold, *Calendula officinalis*; right, callas of florists but properly Zantedeschia, the flower and upper leaf being *Z. æthiopica*, lower spotted leaf *Z. Elliottiana*.

America; grown for the saccate or slipper-like flowers of many colors. They are not very satisfactory plants for window treatment, however, since they suffer from dry atmosphere and from sudden changes of temperature. In the window-garden they should be protected from strong direct sunlight. The usual herbaceous calceolaria of windows and conservatories, flowers mostly yellow and spotted and of large size, is *C. crenatiflora.*

Calceolarias are grown from seeds. If seeds are sown in early summer and the young plants transplanted as they need, flowering specimens may be had for the late fall and early winter. In the growing of the young plants, always avoid exposing them to direct sunlight, but they

should be given a place which has an abundance of screened or tempered light. A new crop of plants should be raised each year.

The race of shrubby calceolarias is little known in window collections. This species is grown often from cuttings taken in late summer or autumn or else in late winter from over-wintered plants. The shrubby calceolaria is *C. integrifolia* (*rugosa*); flowers smaller than in the common herbaceous kinds, yellow to brownish-red.

One or two species are annuals which are adaptable to cultivation in the open garden, and their little lady-slipper-like flowers are attractive. However, they are of secondary importance as annual garden flowers.

CALENDULA officinalis. POT-MARIGOLD. *Composite Family.* Flower-garden hardy annual bearing profusely of long-stalked heads in shades of yellow and orange, common in open gardens and now often raised under glass for winter bloom; erect sturdy plants, 1-2 feet high, with many long lower leaves. Excellent in the autumn, continuing to bloom well when most of the annuals are gone; a standard flower-garden subject.

It is grown readily from seeds sown where the plants are to stand; or started indoors for very early bloom, or in late summer and early autumn for winter flowering. The places of short-lived plants may be filled by sowing seed of calendulas in May, scattering them through the border and allowing the plants to grow where they come up. Plants should stand 8-12 inches apart.

A proliferous form sometimes appears in gardens, several heads arising on stems directly from the old or central head.

CALLA. *Arum Family.* Cultivated callas are South African plants of the genus Zantedeschia, but sometimes known as Richardia. The true calla of botanists is a little bog plant of the northern hemisphere, not cultivated except as it is sometimes transferred to wet places. The garden callas are tuberous-rooted plants grown under glass and sometimes in windows, and in California and other mild regions allowed to stand permanently in the open. All of them are grown for the showy colored spathe, "flower," from the inside base of which arises the spadix or tongue bearing the many minute not showy true flowers. In the common calla (*Zantedeschia æthiopica*) the spathe is clear wax-white; fragrant. The golden calla (*Z. Elliotiana*) has rich yellow spathes.

The requirements of the calla are rich soil and an abundance of water, with the roots confined in small space. If a too large pot is used the growth of foliage will be very rank, at the expense of the flowers,

but by using a smaller sized pot and applying liquid manure the flowers will be produced freely. A 6-inch pot will be large enough for all but an exceptionally large bulb. If desired, a number of bulbs may be grown together in a larger pot. The soil should be fibrous—at least one-third well-rotted manure will be none too much, mixed with equal parts of fibrous loam and sharp sand. The tubers should be planted firmly and the pots set in a cool place to make roots. After the roots have partially filled the pot, the plant may be brought into heat and given a sunny position and an abundance of water. An occasional sponging or washing of the leaves will free them from dust. No other treatment will be required until the flowers appear, when liquid manure may be given. The plant thrives all the better at this time if the pot is placed in a saucer of water. In fact, it will grow in an aquarium. The calla may be grown throughout the year, but it proves more satisfactory, both in leaf and flower, if rested part of the summer. This may be accomplished by laying the pots on their sides in a dry shady place under shrubbery, or if in the open slightly covered with straw or other litter to keep the roots from becoming extremely dry. In September or October they may be shaken out, cleaning off the old soil, and repotted. The offsets may be taken off and set in small pots and given a years growth, resting them the second year and having them in flower that winter.

The spotted calla (*Z. albo-maculata*) has variegated foliage and is a good plant for mixed collections. This flowers in spring, which will lengthen the season of calla bloom. The treatment of this is similar to that of the common calla.

CALLIOPSIS: a garden name for *Coreopsis*.

CALLIRHOE: *Mallow*.

CALLISTEPHUS: *Aster*.

CALONYCTION: *Moonflower*.

CAMELLIA. *Tea Family*. Years ago camellias were very popular, but they have been crowded out by the informal flowers of recent times. Their time will come again. They are half-hardy woody plants, blooming in late winter and spring, native in the warmer parts of Asia. In the blooming season keep them cool—not over 50° at night and a little higher by day. When blooming is past they begin to grow, then give more heat and plenty of water. See that the wood is well ripened by winter. Always screen them from direct sunlight. Do not try to force them in early winter, after the growth has ceased. Their summer quarters may be in a protected place in the open air. Propagated by cuttings in winter, which should give blooming plants in two years. Use a porous soil with considerable leaf-mold.

C. japonica. Becoming 40 ft.: lvs. thick and shining: fls. red to white and rose, often double. China, Japan.

C. Sasanqua. Shrub: lvs. hairy on rib above: fls. white, small to medium. China, Japan.

CAMPANULA. BELLFLOWER. *Bellflower Family.* Many attractive hardy perennials, mostly blue-flowered but some of them white and others lilac, a few of the minor cultivated species annual, and one of them (*C. Medium*) a well known biennial.

The bellflowers are mostly native in the north temperate zone. They are popular border plants, and the annuals are grown in flower-garden

Campanulas or Bellflowers. Left, plant and flowers of *Campanula rapunculoides*; upper right, flowers of *C. Trachelium*; lower right, plant and separate bloom of *C. Rainerii*.

beds or as edgings; bloom is mostly in late spring and summer. The species are many. The annual campanulas are little grown. Seeds of all of them may be sown where the plants are to stand. Venus Looking-Glass is sometimes classed with the annual campanulas although it is properly a Specularia (*S. Speculum-Veneris*); 8-12 inches high, diffuse, blue and white.

Canterbury bells, *C. Medium*, is a hardy biennial, loaded with large flowers in June in white, blue and pink. The calycanthema forms have the calyx enlarged and corolla-like, making the flower double; when the calyx or outer corolla is shallow and flaring we have the cup-and-saucer flower, when both corollas are similar we have the hose-in-hose. Seeds

may be sown in spring in the open or indoors; the plants are transplanted 6-8 inches apart in rows or beds, to be set again in autumn in their permanent places, 1-2 feet apart; sometimes the seedlings are transferred directly to permanent quarters. Plants should be somewhat protected in winter by a light mulch or covering; they bloom the second year from seed and then die; sometimes if started very early under glass and grown rapidly they bloom the first year. Plants reach 2½-3 feet or even 4 feet in height.

Perennial campanulas are raised mostly from seeds sown early; it is well to transplant the seedlings once before they are placed in permanent quarters in autumn. One class comprises small plants used in rock-work and alpine gardens; another and better known class includes tall plants which should be given a protected place or staked to prevent injury from winds. Partial shade usually gives more continuous bloom. The soil should be rich. Clumps may be divided, and rare kinds are sometimes increased by means of cuttings. Some kinds make attractive stools of foliage and may require two years or more to become well established. Following species are perennial unless otherwise noted.

C. alliariæfolia. 2 ft.: white, nodding. Asia Minor.

C. barbata. 9-10 in.: pale blue, nodding. Eu.

C. cæspitosa (*pusilla*). 4-6 in.: blue. Eu. Var. *alba*, white.

C. carpatica. 10-18 in.: bright blue. Eu. Var. *alba*, white. Var. *turbinata* (*C. turbinata*), decumbent.

C. garganica. Trailing: blue. Eu.

C. glomerata. 1-2 ft.: blue or white. Eu., Asia.

C. Grossekii. 2-2½ ft.: violet. Eu.

C. isophylla. Trailing: blue, white. Italy. Used for hanging baskets.

C. lactiflora. 2-4 ft.: white or pale blue. Caucasus.

C. latifolia. 3-4 ft.: purplish-blue. Eu., Asia. Var. *macrantha*, fls. larger.

C. macrostyla. 2 ft., ann.: purple. Asia Minor.

C. Medium. Canterbury Bells. 2-4 ft., bien.: violet-blue and white. Eu. Var. *calycanthema*, calyx corolla-like.

C. persicifolia. 2-3 ft.: blue or white. Eu. Var. *alba grandiflora*, white, large. Var. *Moerheimei*, white, double.

C. Portenschlagiana (*muralis*). 4-9 in.: blue-purple. Dalmatia.

C. punctata. 1-2 ft.: whitish-lilac, nodding. Asia.

C. pyramidalis. 4-5 ft.: pale blue. Eu. Var. *alba*, white.

C. Rainerii. 3 in.: dark purplish-blue. Italy.

C. ramosissima (*Loreyi*). 1 ft., ann.: violet and whitish. Eu.

C. rapunculoides. 2-3 ft.: blue, nodding. Eu., Asia.

C. rotundifolia. 1-1½ ft.: bright blue. Eu., Asia, N. Amer.

C. sarmatica. 1½-2 ft.: pale blue, nodding. Caucasus.

C. Trachelium. 2-3 ft.: blue-purple, nodding. Eu., Asia.

Other plants much like campanulas requiring similar treatment are the species of Adenophora and Platycodon, the latter sometimes called

balloon-flower. They are hardy perennials, grown from seeds and blooming the following year, and sometimes by division.

Adenophora Potanini. 2-3 ft.: blue. China.

Platycodon grandiflorum. 1-2½ ft.: deep blue. E. Asia. Var. *album*, white. Var. *Mariesii*, fls. large.

Campanulas. Left and center, Canterbury bells, *C. Medium*, single above, hose-in-hose flower lower corner, cup-and-saucer form in center; upper right, flowers of *C. punctata*; lower right, *C. macrostyla*.

CAMPION: *Lychnis.* **Moss:** *Silene acaulis.*

CANARY-BIRD-FLOWER: see *Nasturtium.*

CANDYTUFT (species of *Iberis*). *Mustard Family.* Well known hardy Mediterranean annuals, in red, purple, and white; easy of culture and excellent for cutting; one of the best edging plants for the front row. The plants grow 6 inches to 1 foot tall.

Sow seeds where the plants are to grow, letting them stand 6-12 inches apart. They do not last the entire season, and successive sowings may be made. They bloom in about two months from seed. In some parts of the country, seeds are sown in autumn for early spring bloom.

Evergreen perennial candytufts are also fairly common. They may be grown from early-sown seeds, bloom being expected the following year; or clumps may be divided. They make low mat-like coverings adaptable to borders and flower-bed edgings.

Rocket Candytuft, *Iberis amara.*

I. affinis (*odorata, pectinata, pinnata* of gardens). 16 in., ann.: white, sometimes fragrant. S. Eu.

I. amara (*coronaria*). ROCKET CANDYTUFT. 1 ft., ann.: white, fragrant. Eu.

I. corifolia (erroneously *cordifolia*) 1 ft., per.: white, clusters somewhat elongating. Probably hybrid.

I. gibraltarica. 1 ft., per.: lilac, clusters broad. Spain.

I. sempervirens. EDGING CANDYTUFT. 1 ft., per.: white, clusters elongating. Eu., Asia.

I. Tenoreana. 6-8 in., per.: whitish or rose. Eu.

I. umbellata. GLOBE CANDYTUFT. 12-16 in., ann.: pink to red and purple. Eu.

CANNA. *Canna Family.* Tall tender perennial bedding herbs employed for bold subtropical effects, and the "flowering cannas" (improved races) for the brilliant bloom; native in tropical regions, mostly in the Americas. Of the showy cannas there are two main types,—the usual dominant races, *C. generalis*, and the orchid-flowered, *C. orchiodes;* the latter kinds have very large soft flowers with flowing outlines, prominently tubular at base, the petals (often regarded as sepals because narrow and not showy) soon becoming reflexed. Cannas are strong erect growers, 2½ to 5 feet or more high, with nearly or quite unbranched leafy stems. Some of them have bronze foliage.

Cannas are propagated by seeds and by division of the branching rhizomes. Grown from seeds they may be in bloom the first year by sowing in February or March, in boxes or pots placed in hotbeds or warmhouse, first soaking the seeds in warm water for a short time. Attention to transplanting as needed and removal to the ground only when it is well warmed are the necessary requirements. They should be removed from the seed-bed when in about the second leaf.

Most cannas, however, are grown from pieces of the "roots" (rhizomes), each piece having a bud. The roots may be divided at any time in winter, and if early flowers and foliage are wanted the pieces may be planted in a hotbed or warmhouse in early April, started into growth and planted out where wanted as soon as the ground has warmed and all danger of frost is over. Hardening of the plants, by leaving the sash

off the hotbeds, or setting the plants in shallow boxes and placing the boxes in a sheltered position in May, not forgetting a liberal supply of water, will fit the plants to take kindly to the final planting out. After frost has injured the tops, the roots may be dug, choosing, if possible, a dry day. The soil is shaken off and the roots stored in a warm dry place through the winter as for potatoes but not piled deep. If the cellar is too dry the roots are liable to shrivel, in which case it is best to cover them with soil or sand, filling in around the roots to exclude the drying air.

Ground for cannas should be deep and rich, and retentive of moisture; it should be spaded thoroughly. For dense mass effects, plant 12-18 inches apart. For individual plants, or for best bloom, give more room. Good clumps may be had by planting out the entire old root, not dividing it, but removing the dead, weak and injured parts.

CANTERBURY BELLS: *Campanula.*

CAPSICUM: *Pepper.*

CARAWAY: *Sweet Herbs.*

CARDINAL-CLIMBER. *Morning-Glory Family.* An annual tender twiner with finely cut foliage and brilliant crimson or cardinal flowers, a hybrid raised by Logan Sloter of Ohio and known as *Quamoclit* (or *Ipomœa*) *Sloteri.* Seeds sown in the open as soon as the ground is thoroughly warm give plants that bloom from late summer till frosty weather; or for earlier results they may be started indoors in pots. The plant grows to 15 feet, and much more in long-season regions. The flowers are salver-shaped, about 1¼ inch long and 1 inch across, with protruding stamens.

The cardinal-climber is a hybrid between the cypress-vine (which see) and *Quamoclit* (or *Mina*) *coccinea.* The latter parent is known in cultivation mostly as *Mina sanguinea*, a large-flowered race.

CARDIOSPERMUM: *Balloon-Vine.*

CARNATION (*Dianthus Caryophyllus*). *Pink Family.* Desirable hardy low herbs native in southern Europe and Asia. Carnations are of two types, the outdoor or garden varieties, and the indoor or forcing kinds. The carnation is a perennial, but the garden kinds, or marguerites, are usually treated as annuals. The forcing kinds are flowered but once, new plants being grown each year from cuttings. Colors are white, pink, scarlet, yellow, striped and barred; height 1-3 feet.

Marguerite carnations bloom the year the seed is sown, and with slight protection bloom freely the second year. They make attractive house plants if potted in autumn. The seeds of these carnations should

be sown in boxes in March and the young plants set out as early as possible, pinching out the center of the plant to make them branch freely. Give the same space as for other garden pinks. See *Dianthus*.

The winter-flowering carnations have become prime favorites with all flower lovers, and a collection of winter house plants seems incomplete without them. Carnations grow readily from cuttings made of the suckers that arise at the base, the side shoots of the flowering stem, or the main shoots before they show flower-buds. The cuttings from the base make the best plants in most cases. These cuttings may be taken at any time in fall or winter, rooted in sand and potted up, to be held in pots until planting out time in spring, usually in April, or any time when the ground is ready to handle. Care should be taken to pinch out the tops of young plants while growing in the pot, and later while in the ground, causing them to grow stocky and send out new growths along the stem. The young plants should be grown cool, a temperature of 45° suiting them well. Attention should be given to syringing the cuttings each day while in the house to keep down red-spider. In summer, the plants are grown in the field, and not in pots. The soil in which they are to be planted should be moderately rich and loose. Clean cultivation should be given throughout the summer. Frequently pinch out the tops. The plants are taken up in September and potted firmly, and well watered; then set in a cool partially shaded situation until root growth has started, spraying the foliage often, and watering the plant only as it shows need of water. They are then taken to the house, on approach of cold weather, to bloom.

The usual living-room conditions as to moisture and heat are not such as the carnation demands, and care must be taken to overcome the dryness by keeping a basin of water on the stove or radiator and by setting the plant where not exposed to direct heat of stove or sun. Pick off most or all the side buds, to add to the size of the leading flowers. After all is said, it is probably advisable in most cases to purchase plants from a florist, and after blooming either throw them away or store them for planting in the spring, when they will bloom in the summer.

A third type is the bedding carnation, less grown in this country than in Europe. It is a hardy pink grown from cuttings or layers, or from seeds which give blooming plants the second year.

CARROT (*Daucus Carota* var. *sativa*). *Parsley Family*. Biennial or sometimes annual, grown for the thick edible root; Eurasia. While essentially a farm crop in this country, carrot is nevertheless a most acceptable garden vegetable.

It is hardy and easily grown in deep friable soil. The extra-early varieties may be forced in a hotbed, or seed may be sown as soon as the ground is fit to work in the spring. The stump-rooted, or half-long varieties, are sown for the early garden crop. Well-enriched mellow loam, deeply dug or plowed, is best suited to the requirements of carrots. The seed for the main crop may be sown as late as July 1. Sow thickly, thinning to 3-4 inches in the row. The rows, if in a garden that is hand-worked, may be 12 inches apart. If the cultivation is by horse, the rows should be 2 to 3 feet apart. One ounce will sow 100 feet of drill. Seeds germinate slowly, and the ground should not be allowed to bake.

CARYA: *Pecan.*

CASSIA: see *Perennials*, page 202.

CASTANEA: *Chestnut.*

CAST-IRON PLANT: *Aspidistra.*

CASTOR-BEAN (*Ricinus communis*). *Spurge Family.* Tropical shrub or even tree-like, probably originally African, grown in northern countries as a majestic tender annual for foliage effect, also as a field crop for the oil procured from the seeds or beans. In the list of quick-growing plants none excels the ricinus for rapidity of growth, grace of foliage and rich effect. Used as a specimen plant, with cannas, caladiums, or for a tropical bed, or as a screen, it gives the most satisfactory results. In good soil it reaches 6-12 feet in a season.

Seeds sown early in the house, and the plants grown in the full light, make stocky plants to set out about the middle of May. With rich soil and plenty of water, plants grow without a check until frost and bloom freely. For screens, plant 3-4 feet apart. There are varieties with differing shades and cut of foliage, often sold under different Latin names.

CATANANCHE: see *Perennials*, page 202.

CATCHFLY: *Silene.* **German:** *Lychnis Viscaria.*

CATNIP: *Sweet Herbs.*

CAULIFLOWER (*Brassica oleracea* var. *botrytis*). *Mustard Family.* Choice garden vegetable grown for the head, which is comprised of the much thickened and modified inflorescence; developed in the Old World.

The general culture of cauliflower is much like that of cabbage, except that, being more tender, it should be more thoroughly hardened off before setting out, and special care should be taken to see that the plants suffer no check from start to finish. Still, it is essential that the plants be set as early as possible for the first or early crop, as the warm weather of June causes them to make imperfect heads unless the soil is

filled with moisture. No garden crop will as well repay the cost and time of thorough irrigation, either by running the water between the rows or applying it directly to the plants. When it is impossible to furnish water, it is a good plan to mulch with straw or some other substance. This mulch, if put on just after a heavy rain, will hold the moisture for a long time. When the heads become hard, the outside leaves may be brought together and tied above the head, excluding the direct sunshine and keeping the head white and tender, but if tied too close the heads may rot. No vegetable responds more quickly to good culture and well-manured soil than the cauliflower, and none proves such an utter failure when neglected. Liming the land is advisable to correct acidity, supply calcium, and check club-root. It is imperative that care be taken to destroy all the cabbage-worms before the leaves are tied in, as after that it will be difficult to see or reach them. Cauliflower prospers best in moist soil and a cool climate. From 1,000 to 1,500 plants may be grown from 1 ounce of seed. Good cauliflower seed is very expensive, but only well-bred seed is of value. Plants may stand 2 by 3 feet.

For winter crop, seeds may be started in June or July, as for late cabbage.

Erfurt, Snowball, Danish, and Paris are popular early varieties. Autumn Giant and Algiers are good late kinds. Broccoli is a special late race of cauliflower. See *Broccoli.*

Cauliflower is subject to diseases of cabbage (which see). Corrosive sublimate soil treatment may injure young cauliflower and broccoli plants and calomel is substituted, the material being kept stirred inasmuch as it does not dissolve in water; proportions may be the same as for sublimate solution, or sometimes stronger.

CELERIAC, Turnip-Rooted Celery (*Apium graveolens* var. *rapaceum*). *Parsley Family.* This tuber has the celery flavor in a pronounced degree, and is used for flavoring soups and for celery salad. It may be served raw, sliced in vinegar and oil, or boiled. The culture is the same as for celery, except that no earthing or blanching is required. About an equal number of plants is obtained from the same weight of seed as from celery seed. Plants may stand 6 to 8 inches apart in rows 15 inches or more apart. The tuber or enlargement forms just under the ground, the leaves and stalks arising from it.

CELERY (*Apium graveolens*). *Parsley Family.* Popular hardy biennial or perennial grown as an annual for the edible aromatic blanched leaf-stalks; native in Europe.

The introduction of the self-blanching varieties has simplified the culture of celery so that the novice, as well as the expert, may have a supply through at least six months. The so-called "new culture" which consists of setting the plants close together and causing them to shade each other, can be recommended for the garden when a supply of well-rotted manure is to be had, and when any amount of water is available. This method is as follows: Fork or spade into the soil a large quantity of manure to the depth of 10-12 inches, pulverize the soil until the ground for the depth of 4-6 inches is in very fine condition. Then set the plants in rows 10 inches apart and the plants but 5 or 6 inches apart in the rows. It will be seen that plants set as close as this soon fill the soil with a mass of roots and must have much food as well as water; and the making of such a bed can be recommended only to those who can supply these needs, as in good kitchen-gardens.

A common practice in home gardens is to plow or dig a shallow trench, setting the plants in the bottom and hoeing in the soil as the plants grow. The distance apart of the rows and plants depends on the varieties. For the dwarf varieties, such as Golden Self-blanching and others of that type, the rows may be as close as 3 feet, and the plants 6 inches in the rows. Many growers prefer the green types. For the large-growing varieties, the rows may be 4½ to 5 feet apart and the plants 7 or 8 inches. An ounce of seed provides 5,000 or more plants; this quantity sows about 200 feet of row in the seed-bed.

The seed for an early crop should be sown in February or early in March in shallow boxes, placed in a hotbed or sunny window, or sown directly in the soil of a hotbed. Cover the seeds thinly and press the soil firmly over them. When the plants are about one inch high they should be transplanted to other boxes or hotbeds, setting the plants 1 inch apart in rows 3 inches apart. At this transplanting, as with the following ones, the tall leaves should be cut or pinched off, leaving only the upright growth, as with the utmost care it is almost impossible to prevent the outside leaf-stalks from wilting down and dying. The roots should also be trimmed back at each transplanting. The plants should be set deep, care being taken, however, not to allow the heart of the plant to be covered up. The varieties usually grown for an early crop are the so-called self-blanching sorts. They may be made fit for the table with much less labor than the late crop, the shade required to blanch the stalks being much less. When only a few short rows are grown in a private garden, screens may be made by driving stakes on each side of the row and tacking lath on, leaving spaces of an inch or more for the light to enter; or each head may be wrapped in paper, or a tile drain pipe may be set over the plant; or wide boards may be placed on edge

on either side of the row. In fact, any material that excludes the light renders the stalks white and brittle.

The seed for the main or fall crop should be sown in April or early May in a seed-bed prepared by forking fine well-rotted manure into a mellow soil, sowing the seed thinly in rows 8 or 10 inches apart, covering the seed lightly and firming over the seed with the feet, hoe or back of a spade. This seed-bed should be kept moist until the seed germinates, either by close attention to watering or by a lath screen. After the plants have grown to the height of 1 or 2 inches they must be thinned out, leaving them so that they do not touch each other, and transplanting those thinned—if wanted—to other ground prepared in the same way as the seed-bed. All these plants may be sheared or cut back to induce stockiness if necessary.

If in a private garden, the ground on which the fall crop is usually set is likely to be land from which an early vegetable has been taken. This land should be again well enriched with well-rotted manure, to which may be added a commercial fertilizer. If the manure or fertilizers are not easily obtained, a small amount may be used by plowing or digging out a furrow 8 or 12 inches deep, scattering the manure and ashes in the bottom of the trench and filling it up almost level with the surface. The plants should be set about the middle of July, preferably just before a rain. The plant-bed should have a thorough soaking shortly before the plants are lifted, and each plant be trimmed, both top and root, before setting. The plants should be set 5 to 6 inches apart in the rows and the earth well firmed around each one.

The after-cultivation consists in thorough tillage until the time of "handling" or earthing up. Handling is accomplished by drawing up the earth with one hand while holding the plant with the other, packing the soil well around the stalks. This process may be continued (in colder part of autumn) until only the leaves are to be seen. For the private grower, it is much easier to blanch the celery with boards or paper, or if the celery is not wanted until winter, the plants may be dug, packed closely in boxes, covering the roots with soil, and placed in a dark cool cellar, where the stalks will blanch themselves. In this way celery may be stored in boxes in the house cellar. Put earth in the bottom of a deep box, and plant the celery in it.

Celery blight is controlled by long rotations, seed-bed soil in which infected plants have not been grown for at least three years and in which there is no refuse to carry the disease. Dusting with copper-lime or spraying with bordeaux mixture 5-5-50 is standard practice, with weekly applications in seed-bed and thereafter in the field as soon as the plants are established.

CELOSIA: *Cockscomb.*

CENTAUREA. *Composite Family.* Showy annual and perennial herbs, largely European, grown in flower-gardens and borders. Many species are in cultivation, but five types or groups represent the usual kinds.

(1) Cornflower or Bachelors-Button, *C. Cyanus*, an old-time favorite hardy annual, grown from seeds sown where the plants are to stand; it commonly volunteers. It is a branching plant 2-3 feet high, producing abundantly of attractive long-stalked heads in white, rose and blue; plants may stand 10-15 inches apart, or farther if large individual blooms are sought.

Centaureas. Left, *Centaurea Cyanus*, cornflower or bachelors-button; right, *C. ruthenica.*

(2) Sweet Sultan, *C. moschata* (*suaveolens*, *odorata*, *imperialis*), hardy annual or plur-annual with long-stalked fragrant heads in yellow, white, rose, and purple. Seeds may be sown where plants are to bloom, or started earlier under glass; plants may stand 1 foot or more apart; height about 2 feet.

(3) Dusty Millers, *C. Cineraria* and *C. gymnocarpa*, perennials but grown as tender annuals for the white-woolly herbage, used as edgings and in design-bedding. They may be raised from seeds started indoors. Other plants known as dusty millers are *Senecio Cineraria*, *Artemisia Stelleriana*, *Lychnis Coronaria.*

(4) Basket-flower, *C. americana*, native in the central-southern part of the United States. It is an erect annual, 2-3 feet high and sometimes more, little branched, bearing terminal lilac heads (sometimes white), 3-4 inches across; the slender rays expand in the morning. The plant is raised readily from seeds sown in the open garden; thin to 1 foot; the bloom is in summer and autumn.

(5) Perennial hardy border plants of several species, as *C. nigra* (rose-purple), *C. montana* (blue), *C. dealbata* (red, rosy or white), *C. macrocephala* (yellow), *C. ruthenica* (pale yellow.) These are grown readily from seeds for bloom the following year, and in some cases plants may be divided. They require no special treatment; late spring and summer bloomers.

CENTRANTHUS: see *Perennials*, page 202.

CENTURY PLANT. *Amaryllis Family.* Name applied to species of Agave on the mistaken notion that they bloom only when a century old. Some kinds of agave bloom but once and then die, but others blossom several or many times; the age at which flowering takes place varies from a few to many years. *A. americana*, or plants passing under that name, is the commonest century plant of tubs and windows. All of them have stiff leaves in a basal rosette or clump, for which the plants are chiefly grown. They are tender.

Century plants are interesting ornamentals for the window-garden or conservatory, requiring little care and growing slowly, thus needing repotting only at long intervals. When the plants have outgrown their usefulness as house plants, they are still valuable as porch decorations, for plunging in summer in rockwork or about rustic nooks. The striped-leaved variety is the most desirable, but the common type, with blue-gray leaves, is highly ornamental. Propagation is by suckers.

CEPHALARIA: see *Perennials*, page 202.

CERASTIUM: see *Perrenials*, page 202.

CEREUS: *Cactus.*

CHÆNOMELES: see *Quince.*

CHÆROPHYLLUM: *Chervil.*

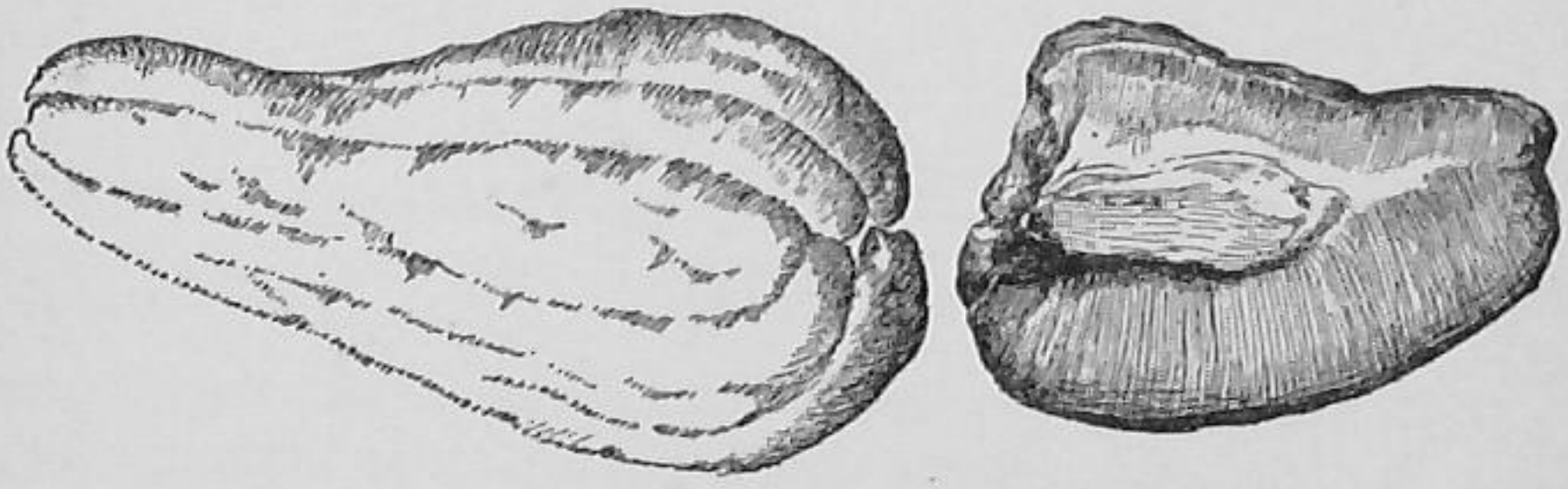
CHAMÆROPS: *Palms.*

CHAMOMILE: *Anthemis; Matricaria.*

CHARD, SWISS CHARD. *Goosefoot Family;* see *Beet.* Hardy biennial (blooming second year) grown as a vegetable-garden annual for the large thick leaves that are cooked for greens or the broad ribs prepared in much the same way as asparagus. Seeds are sown in the open ground as soon as frost is out, and plants thinned 6-8 inches or more. The plant withstands summer heat and may take the place of spinach. Leaves may be gathered by early or middle summer and the plant will constantly produce new foliage till frost if the crown is not stripped too closely. If leaves are allowed to grow they become very large, and rows should be at least 18 inches apart. The white flat mid-ribs are prominent on large leaves; sometimes they are further decolored

or blanched by tying the bunch of foliage together. With a little protection in the North, the crowns survive the winter and produce leaves in spring although they soon run to seed.

CHAYOTE, sometimes known as Christophine (*Sechium edule* or *Chayota edulis*, of the American tropics). *Gourd Family.* An edible fruit borne on a perennial-rooted herbaceous tender tendril-climbing vine, globular, oblong or pear-shaped and 4-6 inches long, somewhat cucumber-like but with one huge seed, grown Florida to southern California and in tropical America and sometimes seen in northern markets. It is cooked as a vegetable. It is propagated by planting the whole



Chayote, *Sechium edule* of the Gourd family; about one-half natural size.

fruit, which is laid on its side and partly covered. The vines are spaced at 8-10 feet or more and allowed to run over a trellis, arbor or fence; in three or four months they begin to bear and continue more or less indefinitely if not stopped by cold.

CHECKERBLOOM: *Sidalcea malvæflora.*

CHEIRANTHUS: *Wallflower.*

CHELONE: see *Perennials*, page 202.

CHERRY. *Rose Family.* Of cherries there are two common types, both Eurasian, the sweet cherries and the sour cherries. The sweet cherries (*Prunus avium*) are large and tall-growing trees; they comprise the varieties known as the Hearts, Bigarreaus and Dukes. The sour cherries (*Prunus Cerasus*) include the various kinds of Morellos and pie cherries, and these usually ripen after the sweet cherries. The sour cherries make low round-headed trees. The fruits are extensively used for canning and in recent years great quantities are pitted and frozen.

Sweet cherries are accounted to thrive best on rather light or gravelly high lands, whereas sour cherries thrive on heavier and flatter lands, being less liable to winter-injury. Cross-pollination is essential with the sweet cherry and one variety should not be planted alone. Sweet cherries are commonly planted 25-30 feet and sour cherries 20-25 feet. They

are usually planted in permanent position when two years old from the bud. Propagation is by budding on cherry seedlings, the Mazzard (a form of *P. avium*) being prevailingly used.

The sweet cherries often prove disappointing from the rotting of the fruit. This may be avoided, however, by proper and timely spraying. Cherries are subject to scale, aphis, fungus diseases, and curculio. They are sprayed with lime-sulfur just before buds expand, with lime-sulfur and arsenate of lead when the petals fall and again when the "shucks" or old calyx-rings drop (when the fruit is about the size of a small pea) for leaf-spot, rot and curculio; in about two weeks, before the fruits turn red, the spray may be repeated. Sometimes the trees are sprayed after the fruit is picked, to control leaf-spot. For the control of fruit-fly a spray is applied a week after the flies have appeared and again in about ten days. Aphis are often a serious pest on sweet cherries. For their control nicotine sulfate should be used in a spray with lime-sulfur and applied when the bud-scales separate and expose the green blossom buds.

Of the sweet cherry varieties, in order of season of ripening, Seneca, Black Tartarian, Schmidt and Windsor are popular for commercial plantings. Other good kinds are Governor Wood, Napoleon, Yellow Spanish, Giant, Lambert and Abundance.

The three standard sour cherries are Early Richmond, Montmorency, and English Morello.

CHERVIL. *Parsley Family.* Two vegetable-garden plants are known as chervil, both native in Europe.

(1) Salad chervil is a hardy annual, *Anthriscus Cerefolium*, of simple culture, the leaves employed in salad and garnishing. It is grown as a spring or autumn crop, not thriving in the heat of summer. Usable leaves are obtained in six or eight weeks after seeds are sown; the autumn sowing is sometimes carried over winter in frames or in mild climates with a protection of mulch. Plants may stand at distances of 8-12 inches; they grow 1½ feet or more tall.

(2) Tuberous chervil is a hardy biennial, *Chærophyllum bulbosum*, producing a carrot-like small gray or blackish edible root. Seed may be sown in August or September (that is, as soon as ripe), but usually it does not germinate till spring and the roots mature in four to six months thereafter; culture otherwise as for carrot. It is the better practice to stratify the seeds in autumn, and they are then regularly sown in spring. If kept in the usual way and allowed to remain dry, they will probably not germinate till the second spring.

CHESTNUT. *Beech Family.* Attractive trees grown for the edible nuts and to some extent for shade and ornament. The native chestnut *Castanea dentata* (*americana*), European chestnut *C. sativa* (*vesca*), and Japanese chestnut *C. crenata* (*japonica*) are good nut-bearing species. The American, or native chestnuts, of which there are several improved varieties, are the hardiest and most desirable, and the nuts are the sweetest, but they are also the smallest. The Japanese varieties are usually injured by the winter in central New York; the trees are small in stature and precocious; there are several good fruit varieties. The European varieties are somewhat hardier, and some of them thrive in the northern states.

Chestnuts are easily grown. They usually bear better when two or more trees are planted near each other. Sprouts in old chestnut clearings are often allowed to remain, and sometimes they are grafted to the improved varieties. The young trees may be grafted in the spring by the whip-graft or cleft-graft method; but the cions should be perfectly dormant, and the operation should be very carefully performed. Even with the best workmanship, a considerable percentage of the grafts are likely to fail or to break off after two or three years. The most popular single variety of chestnut was formerly the Paragon, which bears large and excellent nuts when the tree is very young; it is accounted one of the European group

Chestnut growing has taken on a new face in recent years because of the bark disease or blight which destroys the trees and for which there is no remedy. In the native chestnut regions of the East the raising of the nuts is now practically impossible although hybrids between the American and Asiatic species may be more or less resistant or succumb more slowly. Breeding for blight-resisting stocks may provide a partial way of escape in time. To the west beyond the blight area, the fruit is still grown and new varieties are available.

CHICORY. *Composite Family.* One species, *Cichorium Intybus*, perennial native in Europe, is grown in the United States chiefly in two capacities.

(1) For the thick roots to be used as substitute for coffee. In this capacity it is a field crop, grown in deep well-prepared soil. Seeds are sown in spring in drills about 18 inches apart, good tillage is provided, and the hard parsnip-like roots are garnered in autumn.

(2) For the foliage, used as greens or salad. The best known product is witloof, which is the crown of uncolored leaves forced in winter or spring from stored roots. Seeds of the strain of chicory mostly employed for the production of witloof are sown in drills in spring and thinned to

about 6 inches in the row. At the close of the season the roots are lifted, the tops cut off above the crown, and stored in a cellar, the same as other root-crops. For the production of the crown of leaves known as witloof, the roots are trimmed on the lower end to 8 or 9 inches long, then placed upright in soil or sand in a box and the crowns covered with about 8 inches of sand; temperature is kept at about 60°, and in a fortnight the white salad witloof should be ready, a good "head" being 6 inches long.

Sometimes the leaves of chicory are blanched in the field late in the season by banking as for celery; or the same treatment may be applied in spring to the new leaves arising from roots remaining in the ground over winter. Some persons force the stored roots in darkness in order to obtain the blanched tops. The unblanched leaves are sometimes used as greens.

Chicory is extensively run wild in North America. It is an open-branching plant 3-6 feet high. The showy sky-blue flowers close about noon.

CHINA ASTER: *Aster.*

CHIONODOXA. Glory-of-the-Snow. *Lily Family.* Small hardy bulbous herbs blooming in early spring, with narrow basal foliage and blue or white flowers in racemes at the end of scapes.

Chionodoxas need plenty of moisture and light during the growing season. Bulbs may be planted 3 inches deep and about 1 inch apart, and renewed every three years. Propagation by offsets or seeds.

C. Luciliæ. 8 in.: blue with white center. Asia Minor. Var. *alba*, white.

C. sardensis. Dark blue. Perhaps a form of the preceding.

CHIVE (*Allium Schœnoprasum*). *Lily Family.* Small hardy perennial of the onion tribe but not making distinct bulbs, growing in close grassy tufts; native in Eurasia. The leaves are used for seasoning.

Chives (or cives) propagate readily by division, and also from seeds. They may be set in a permanent place in the border, and will remain for years. The leaves may be cut freely, as new ones grow readily.

CHRISTOPHINE: *Chayote.*

CHRYSALIDOCARPUS: see *Palms.*

CHRYSANTHEMUM. *Composite Family.* Many kinds of annual and perennial herbs, with strong-scented herbage, in temperate regions, grown for the showy flowers. The horticultural chrysanthemums fall mostly into six classes.

(1) The annual flower-garden species, *C. carinatum* (*tricolor* and *Burridgeanum*), *C. coronarium*. These are hardy strong-growing branching plants 1-3 or 4 feet high, with yellow or red or purplish or white rays and often with a colored ring, not fragrant, blooming summer till frost. Seeds may be sown where plants are to stand, thinned to 12-24 inches apart. The corn chrysanthemum, *C. segetum*, a third species, usually does not exceed 15-20 inches high, flowers golden-yellow to whitish.

Chrysanthemums. Left, plant and separate flower of Max daisy, *Chrysanthemum maximum*; center, flower and leaf of the common *C. morifolium* of florists; right, feverfew, *C. Parthenium*.

(2) Feverfew, *C. Parthenium*, an old-fashioned hardy perennial, 1-2 or more feet, closely branched and bushy, bearing abundantly of yellow-disked white-rayed heads in summer. The foliage is attractive, particularly in the yellow-leaved kind known as Golden Feather. Seeds sown in spring give good blooming plants the following year; or clumps may be divided; it often seeds itself.

(3) Pyrethrums, mostly *C. coccineum*, hardy perennials of late spring and early summer bloom, in many varieties, the long-stalked daisy-like heads in white, bright rose, lilac, crimson, and useful for cutting; foliage mostly basal, finely cut and attractive. If the stems are cut down as soon as the flowers pass, a second flowering may be expected in autumn. The stems reach 1½-2½ feet; plants may stand 12 inches apart. Persian insect-powder is made from the dried flower-heads of a related species.

(4) The large hardy border kinds, of several species, as *C. maximum* (one form of which is the Shasta daisy), *C. lacustre*, *C. uliginosum*, *C. arcticum*, *C. Leucanthemum*. These may receive the treatment accorded wild asters. They propagate readily by seeds. *C. maximum* is a short-lived perennial or even almost biennial, but the others are more persistent and may be propagated by division.

(5) The Marguerite or Paris daisy, mostly *C. frutescens*, of the Canary Islands, tender perennial grown in pots and tubs and often planted out for summer bloom. It makes an excellent pot-plant for the window-garden, blooming throughout the winter and spring. It is usually propagated by cuttings, which, if taken in spring, give large blooming plants for the next winter. Gradually transfer to larger pots or boxes, until the plants finally stand in 6-inch or 8-inch pots or in small soap boxes. There is a yellow-flowered variety. The plants grow 2-3 feet tall and branch into large subjects.

(6) The florists chrysanthemum, *C. morifolium* (*sinense*, *hortorum*), hardy perennial of eastern Asia, grown extensively commercially for late autumn and early winter bloom. Certain kinds of this species are also used as permanent border plants for late bloom, giving a wide range of color and flower-form.

The florists chrysanthemum needs little artificial heat to bring it to perfection. The great blooms of the exhibitions are produced by growing only one flower to a plant and by feeding the plant heavily. It is hardly practicable for the novice to grow such specimen flowers, neither is it necessary. A well grown plant with fourteen to twenty flowers is far more satisfactory as a window subject than a long stiff stem with only one immense flower at the apex. The culture is simple, much more so than that of many of the plants commonly grown for house decoration. Although the season of bloom is short, the satisfaction of having a fall display of flowers before the geraniums, begonias and other house plants have recovered from their removal from out-of-doors, repays all efforts. Cuttings taken in March or April, planted out in the border in May, well tended through the summer and lifted before frost will bloom in October or November. The ground in which they are planted should be moderately rich and moist. The plants may be tied to stakes. When the buds show, all but the center one of each cluster on the leading shoots should be picked off, as also the small lateral branches. A thrifty bushy plant thus treated will usually have flowers large enough to show the character of the variety, also enough flowers to make a satisfactory display. As to the receptacle into which to put them when lifted from the border, it need not be a flower-pot. A pail or soap box, with holes bored for drainage, suits the plant as well, and by covering the box with cloth

or paper the difference will not be noticed. If cuttings are not to be had, young plants may be bought of the florist. Buy them in midsummer or earlier. It is best not to attempt to flower the same plant two seasons. After the plant has bloomed, the top may be cut down, and the box set in a cellar and kept moderately dry. In February or March, bring the plant to the sitting-room window and let the shoots start from the root. These shoots are taken for cuttings to grow plants for the succeeding fall bloom.

CICHORIUM: *Chicory; Endive.*

CIGAR-FLOWER: *Cuphea.*

CIMICIFUGA. BUGBANE. *Crowfoot Family.* Tall perennials with compound leaves and small white flowers in racemes; planted at the back of the border.

Bugbanes thrive in partly shaded exposures and rich soil. Propagated by division in early spring or autumn, and by seeds.

C. americana. 2-4 ft.: Aug.-Sept. E. N. Amer.

C. davurica. 3-4 ft.: lvs. heart-shaped: fls. creamy, Sept. Asia.

C. racemosa. BLACK SNAKEROOT. 8 ft.: July-Aug. E. N. Amer.

C. simplex. 3 ft.: autumn, blooming to frost. Kamtschatka.

CINERARIA. *Composite Family.* Showy plant for pots, developed supposedly from a perennial of the Canary Islands, *Senecio cruentus*, now very popular with florists and in conservatories. The plant makes a bushy heavily foliaged specimen 1-2 feet high, with heads single or double, white, pink, lilac, purple-red. The form known as Stellata is a tall open grower, with simple flower-heads of small or medium size and the rays well separated.

The cineraria may be grown as a house plant, although the conditions necessary to the best results are difficult to obtain outside a greenhouse. The conditions are a cool temperature, frequent repotting and guarding against the attacks of the greenfly. Perhaps the last is the most difficult with one having no facilities for fumigating. A living-room usually has too dry air for cinerarias. The seed, which is very small, should be sown in August or September to have plants in bloom in January or February. Sow the seed on the surface of fine soil and water very lightly to settle them into the soil. A piece of glass or a damp cloth may be spread over the pot or box, to remain until the plants are up. Keep the soil damp, but not wet. The seedlings should be potted singly in 2- or 3-inch pots. Before the plants have become pot-bound, they should again be repotted into larger pots, until they are in at least a 6-inch pot in which to bloom. In all this time, they should be grown cool and, if not possible to fumigate them, the pots should stand on

tobacco stems, which should be moist. The general practice, in order to have bushy plants, is to pinch out the center when the flower-buds show, causing the lateral branches to start, which they are slow to do if the central stem is allowed to grow. Plants should bloom only once.

CITRON: *Watermelon.*
CITRULLUS: *Watermelon.*
CITRUS: *Grapefruit; Orange.*

CLARKIA. *Evening-Primrose Family.* Two half-hardy annuals, *C. elegans* and *C. pulchella*, natives in western North America, attractive flower-garden subjects. Flowers are produced freely, purple, rose, lilac, white. *C. pulchella* usually grows 1-1½ feet high, and the other species under favorable conditions is often much taller. They are attractive in edgings, beds and vases, and sometimes are grown under glass. There are good double-flowered kinds.

The seeds may be sown where the plants are wanted, or started in frames for earlier flowers. Thin to 6-12 inches apart. Plant in a warm soil and sunny place.

CLARY: *Salvia Sclarea.*

CLEMATIS. *Crowfoot Family.* Many species, mostly in temperate regions, a good number of which are grown for ornament. Three cultural groups may be recognized.

(1) The herbaceous erect kinds, hardy perennials growing 2-3 feet high, with urn-shaped or tubular small not showy yellowish or blue flowers, as *C. heracleæfolia* var. *Davidiana* and *C. integrifolia*. *C. recta* has white flowers. They are propagated by seeds and division.

(2) The climbing mostly small-flowered woody species, used on porches and over doorways. Of these, the best known is now *C. paniculata*, the Japanese clematis. The panicles of star-shaped white flowers entirely cover the vine in autumn and have a pleasing fragrance. It is one of the best fall-flowering vines, and hardy North; clings well to a chicken-wire trellis. The common wild clematises, *C. virginiana* in the East and *C. ligusticifolia* westward, are good and vigorous white-flowered vines, as also are the European *C. Vitalba* and *C. Flammula*. The scarlet-flowered *C. texensis* (*coccinea*) is a frequent and attractive hardy porch vine although native in Texas. *C. montana* has white flowers and its variety *rubens* rose or pink. *C. Viorna* and *C. Viticella* of Europe and *C. crispa* of North America have purplish flowers. These various kinds of clematis propagate readily from seeds; also usually by means of cuttings and layers. The home gardener will usually purchase the plants of nurserymen.

(3) The large-flowered hybrid clematises, woody vines, mostly hardy North at least in protected places, of great beauty. This class, of which *C. Jackmani*, *C. Lawsoniana* and its variety *Henryi*, are perhaps the best known, is popular for pillar or porch climbers. The flowers are showy, running from pure white, through blue, to scarlet. A deep mellow rich soil, naturally moist, suits the requirements of clematis. In dry times apply water freely. Provide trellis or other support as soon as they begin to run. Clematis of the Jackmani type blooms on the wood of the season: therefore prune in winter or early spring, to secure strong new flowering shoots. They may be cut back to the ground each year; and other kinds may be similarly treated unless they are wanted for permanent bowers. Plants of the *C. florida* and *C. patens* types, however, bloom on the old wood so that they should not be pruned back until after flowering. The clematis root disease is the depredation of a nematode or eel-worm. It is seldom troublesome in ground that thoroughly freezes; under glass, the ground may be sterilized by steam.

CLEOME. *Caper Family.* One tropical American robust annual is sometimes raised for use in shrubbery, rear borders and other places where height and free-flowering are required. The plant is *C. spinosa* (*pungens*, *gigantea*, *grandis*), 3-4 feet high, much branched, carrying long shoots bearing rose-purple or white flowers at the ends with long-protruding stamens and ovary, whence the name Spider-Flower. Sow seeds where plants are to remain, when weather is warm, thinning plants to 2 feet or more. *Polanisia trachysperma*, an unshowy plant, is sometimes grown as a cleome.

CLIMBERS: see *Vines.*

CLOCK-VINE: *Thunbergia.*

COBŒA scandens. *Phlox Family.* A tender tendril-climber from Mexico, often seen in the greenhouse, and one of the best herbaceous tall climbers for porches.

Seeds sown in February or March, and grown in gentle heat, make suitable plants for setting out by June. It may also be grown from cuttings of the young wood, taken in February from greenhouse plants and rooted in brisk heat. The flowers are shaped very much like those of the campanulas, but are larger. They open a greenish-white and deepen to a dark purple in the course of a few days. The vines in full bloom have a gradation of colors as the flowers are in different stages of development. The variegated form should be propagated by cuttings to hold the variegation of the leaves.

COCKSCOMB (*Celosia argentea* var. *cristata*). *Amaranth Family.* Tender flower-garden annuals, probably originally native in tropical Asia, grown for the combs or heads of scarlet, crimson, rose and yellow in many fantastic shapes. The combs are often saved for winter bouquets by cutting them off before thoroughly ripe and drying them. The feathered section comprises tall-growing plants with plumes of various colors which, with the colored leaves of some varieties, make a striking feature in a border. The dwarf very cristate races are often less than 1 foot high and bear combs much broader than the height of the plant. Other kinds reach 2-3 feet.

Cockscombs and Coleus. Left and center, two forms of cockscomb, the cristate and plumose, races of *Celosia argentea* var. *cristata*; right, showy form of *Coleus Blumei* var. *Verschaffeltii*.

Named forms are advertised, as *Childsii*, *plumosa*, *Thompsonii*, and others.

Seeds may be sown where the plants are to grow, but it is preferable to start them indoors for the northern parts of the country. Soil should be "quick," but not over-rich. Plants may stand 1 foot and more apart, ample space being required if the largest combs are desired. The feathered kinds do not produce true combs or crests but are more plumy, and the heads themselves do not require so much room; but all the vigorous-growing kinds should be spaced liberally.

COCONUT: *Palms.*
COCOS: *Palms.*
CODIÆUM: *Croton.*
COHOSH: see *Perennials*, page 201.

COLCHICUM autumnale. AUTUMN CROCUS. *Lily Family.* A hardy cormous ("bulbous") herb to 4-12 inches high with basal foliage and large purple or white flowers in late autumn; the large broad leaves appear the following spring. Eu., Afr.

Bulbs should be planted in August or September 2-3 inches deep in loamy soil in a sunny location. Propagated by separation of the bulbs and by seeds.

COLDFRAME: page 115.

COLEUS. *Mint Family.* Well known foliage plants for pot culture or bedding: native in Old World tropics.

Cuttings root very readily. They may also be grown from seed, although the types have not become fixed and a large number of differently marked plants may be obtained from the same packet. This would not be a drawback in the winter-garden, unless a uniform effect is desired. Sow the seed in gentle heat in March. Make new plants from cuttings each year, and throw the old ones away. For bedding, certain compact kinds are grown; see that they are sun-hardened before planted in the open.

COLLARDS (*Brassica oleracea* var. *acephala*). *Mustard Family.* True collard is grown in the South, where cabbages fail to head so well. It grows to the height of 2 to 6 feet, furnishing a large quantity of leaves, which may be taken off the plant as it grows; the plant is more or less perennial.

The name is also given to a kind of kale, used when young as greens; also to young cabbages used in the same way. The seed of any early cabbage may be sown thickly in rows 18 inches apart, from early spring to late fall. The plants are cut off when 6 or 8 inches high and boiled as are other greens.

COLLINSIA. *Figwort Family.* A hardy annual that should be sown in the fall, where wanted, if early flowers are desired, or in spring for usual purposes. The species commonly grown is *C. bicolor* of California. The flowers are showy, either in masses or planted in a border, the flower violet or rose-purple with white lip. Give them a position near the front, as the plants rarely exceed 18 to 20 inches in height and are usually 1 foot or less; they may stand 6-12 inches apart. Open dryish exposure is best.

COLOCASIA: *Caladium.*
COLUMBINE: *Aquilegia.*
CONEFLOWER: *Echinacea; Rudbeckia.*

CONVALLARIA: *Lily-of-the-Valley.*

CONVOLVULUS: see *Ipomœa.*

CORAL-BELLS: see *Perennials*, page 202.

CORDYLINE: *Dracæna.*

COREOPSIS, or CALLIOPSIS. *Composite Family.* Very showy hardy annuals and perennials, 1 to 4 feet high, and covered throughout the late season with a profusion of bloom. The common horticultural kinds are native in North America.

The annual flower-garden species grow 1-2 feet tall, branching, and bear heads of yellow, red or crimson rays with usually darker base and brownish or purple center. The species in this series are *Coreopsis tinctoria* (*bicolor*, *elegans*), *C. Drummondii* (*picta*), *C. Atkinsoniana*, *C. coronata*, *C.* (*Leptosyne*) *Stillmanii.* Seeds are usually sown directly where the plants are to bloom. They are excellent for cutting, and very effective in mixed borders. They thrive in any garden soil if they have full sunlight. Let the plants stand 8-16 inches apart for mass effects. See page 169.

The perennial kinds are profuse bloomers, with bright yellow flowers on long stems.

The plant known as *Cosmidium Burridgeanum* (properly *Thelesperma*) is native in Texas, formerly supposed to be a hybrid between a Thelesperma and *Coreopsis tinctoria.* It is a slender annual, 12-18 inches high, with brown-purple yellow-margined rays. The culture is the same as for the annual kinds of coreopsis.

CORIANDER: *Sweet Herbs.*

CORNFLOWER: *Centaurea.*

CORN-SALAD (*Valerianella Locusta* var. *olitoria*). *Valerian Family.* This is one of the quickest-growing salad vegetables, coming into condition to use with spinach, and needing the same culture; native in Europe. Sown in autumn, and covered with straw or hay when cold weather sets in, it will start into rapid growth when the covering is removed in March or April. Or the seed may be sown in early spring, and plants will be fit to use in six or eight weeks. Sown the last of summer or early autumn it provides a very late salad. Plants may stand about 6 inches apart in the row. One packet of seed will suffice for a small family.

CORN, SWEET (*Zea Mays* var. *rugosa*). *Grass Family.* Tender annual, much grown in North America for table use when the ears are still unripe. The origin of Indian corn or maize is yet undertermined, but the plant is supposed to be an American product.

The first planting should be made in the home garden as soon as frost is past. It is well to plant early, intermediate and late varieties at the same time, then at intervals of two weeks until midsummer, thus having a succession from the first crop until October. For late crop, corn may be started in pots and transplanted when peas and other crops are off. The soil for corn should be rich, and the coarser manure left from the preparation of the ground for small crops may be used to good advantage. Corn for the garden is better planted in drills, the drills 3 to 4 feet apart, dropping the seed 10 to 12 inches apart in the drills. Some persons prefer to plant in "hills" 2-3 feet apart, of 3-5 stalks each. One quart of seed will plant 200 hills. Give frequent tillage. Golden Bantam, a small eight-rowed ear, is now the leading variety for the home table, but Evergreen is popular and a good market kind.

Pop corn (*Z. Mays* var. *everta*) is grown the same as sweet corn.

Smut of corn, producing great soft misshapen balls, is controlled by picking it off continuously as it appears year after year and before the masses break, neighbors doing the same; the balls should be burned or deeply buried. The disease is not carried in the seeds.

European corn-borer is difficult to control except by destroying the larvæ in cornstalks and big weeds. These should be cut and burned as early as possible in autumn; or in field culture the corn may be cut close to the ground and the short stubble plowed under in autumn, and the stalks destroyed by burning or by placing in silo.

COSMIDIUM: see *Coreopsis*.

COSMOS. *Composit*æ *Family.* Tender tall annuals of Mexico, popular for the choice late summer and autumn bloom. Two species are chiefly concerned in the garden kinds, *C. bipinnatus* yielding white, pink and crimson flowers, *C. sulphureus* with yellow flowers; the flowers are much like single and semi-double dahlias, and on long stems. Both species are long-season plants and in the North they should be started early and grown in land not over-rich. Of the white, pink and crimson kind early-maturing varieties are now available, however. The late blooming varieties often reach 6 feet and more in height, but if the top bud is taken out when the plant is a foot or so high a more bushy and tractable subject will result.

Seeds may be sown in gentle heat in early April, and the young plants transplanted when 2 inches high, setting the plants well down in the soil and giving at least 3 inches between the plants, as they are very likely to spindle up, with weak stems, if crowded. When danger of frost is over, set them in a warm sheltered place at 2-3 feet apart if strong individual plants are desired. Earlier bloom in mass may be secured by setting

them much closer together so that the plants grow practically to single stems, but the blooms are not likely to be so good. If early flowers are not desired, seeds may be sown directly in the ground when danger of frost is past. Self-sown seeds are likely to produce early bloom. If exposed to wind, plants with room to develop will need strong staking.

COSTMARY: *Sweet Herbs.*

COTYLEDON: see *Succulents.*

COWSLIP: *Primula veris.*

CRAMBE: *Sea-Kale.*

CRANBERRY (*Vaccinium macrocarpon*). *Heath Family.* The raising of cranberries in artificial or developed bogs is an American industry. The common large cranberry of markets is also a peculiarly American fruit, since it is unknown in other countries except as the fruit is shipped there. It is a trailing native bog vine, bearing large red berries.

Cranberries, in different varietal forms of fruit.

Cranberries are grown in acid peat bogs, which may be flooded. The area is kept under water during winter, largely to protect the plants from winter injury by the heaving and thawing of the bogs. Flooding is also employed at intervals to drown insects, mitigate drought, and protect against frost and fires. Every good cranberry bog should have facilities for flooding. The ordinary practice is to choose a bog with a creek running through it, or through which a creek or ditch may be diverted. At the lower side of the bog flood-gates are provided, so that when the gates are shut the water backs up and covers the area. It is best that the bog be comparatively flat, so that the water will be of approximately equal depth over the whole area. At the shallowest places the water should stand about a foot above the plants. The water is usually let on

the bog early in December and kept on until April or early May. No flooding is provided at other times unless there is some particular occasion therefor.

All the wild and turfy growth should be taken off the bog before the vines are set. This is accomplished either by digging it off and removing it bodily, or by drowning it out by a year's flooding. The latter method is generally considered to be the better. After the turfy growth is removed, the bog is smoothed and covered 2 or 3 inches deep with clean sand. The vines are now set, the lower ends of them being shoved through the sand into the richer earth. To prevent too rapid and tangled growth, it is customary to re-sand the bog every three or four years to a depth of one-fourth or one-half inch. When sanding is not practicable, the vines may be mown off when they become too luxuriant.

The plants for setting are merely cuttings or branches of the vines. These cuttings may be 5 to 10 inches long. They are inserted into the ground in a hole made by a crowbar or stick. They are usually planted at distances of 12 to 18 inches each way, and the vines allowed to cover the entire ground as with a mat. In three years a good crop should be secured if the weeds and wild growth are kept down. A crop ranges 50 to 100 barrels to the acre.

CRANESBILL: *Geranium.*

CRASSULA: see *Succulents.*

CRESS. *Mustard Family.* Two very unlike plants are cultivated as cress: the Garden cress, *Lepidium sativum*, and Water-cress, a Nasturtium (or Roripa). Both are from the Old World, but are now widely escaped or naturalized as well as cultivated.

Garden cress is a short-lived hardy annual, the early leaves being eaten as salad. Sow early in spring. It makes a rapid growth and can be cut in five to eight weeks. Succession sowings must be made, as it runs quickly to seed. The curled variety is mostly grown, as the leaves may be used for garnishing as well as for salads. One packet of seed will be sufficient for each sowing. Any good soil will do. Sow thickly in drills 12-18 inches apart. In summer it runs to seed quickly, so that it is usually grown in spring, and again in autumn when the seeds are sown in late summer or September or even later in mild climates. Sometimes it is grown indoors for winter use. When in seed, the plant reaches 1-2 feet high.

Water-cress is successfully grown only in moist places, such as edges of shallow slow-running creeks, open channels, or beds excavated near such streams. A few plants for private use may be grown in a frame, provided a retentive soil is available and attention given to watering the

bed often. Water-cress may be propagated from pieces of the stem, used as cuttings. If one is fond of water-cress, it is well to colonize it in a clean creek or pool. It will take care of itself year by year. Seeds may also be used for propagating it.

A third hardy plant is infrequently grown as cress, the Barbarea or Upland cress. It is treated ordinarily as a biennial, the leaf-rosettes being available the next spring from seed.

Stone-cress is *Æthionema*, Rock-cress *Arabis*.

CROCUS. *Iris Family.* Hardy "bulbs," easily grown and giving satisfaction either in the border or scattered through the lawn. They are so cheap and lasting that they may be used in quantity. A border of them along the edges of walks, clumps in the lawn, or masses in a bed, give the first strong touch of color as the spring opens, although some of the species are autumn-blooming. They may be forced with ease in pots or shallow boxes, put away in a cool place and brought into the house at any time in the winter. A low temperature brings them into bloom in perfection in about four weeks from the time they are brought in. They can be had in the window-garden in this way. Crocuses open fully only in sunshine. Colors are yellow, purple, lilac, white, striped. The species are Eurasian. Autumn crocus is *Colchicum*.

A sandy soil suits the crocus. Plant in autumn, in the open, setting them 3 to 4 inches deep. When they show signs of failing, take up the bulbs and reset them. They tend to rise out of the ground, because the new bulb or corm forms on the top of the old one. If best results are desired, it is well to renew the bed occasionally by buying new bulbs. Crocus beds may be filled later in the season with quick-growing annuals, but if good bloom is wanted in succeeding years the foliage must be allowed to grow. See *Bulbs*.

CROSSWORT: *Crucianella stylosa.*

CROTON. *Spurge Family.* Under this misnomer many varieties and so-called species of Codiæum (*Codiæum variegatum* var. *pictum*) are grown for conservatory decoration, and for foliage bedding in the open. They are shrubs or small trees in their native Far Asian and Oceanic tropics as well as in the warm parts of other countries where they have been introduced. The colors and shapes of the leaves are very various and attractive. The crotons make good window-garden subjects, although they are liable to the attack of the mealy-bug.

They are propagated readily by cuttings of half-ripened wood any time in winter or spring. The plants should be given an abundance of light to bring out the fine colors; but it is usually advisable to screen

them from the direct rays of the sun when they are grown under glass. If the red-spider or the mealy-bug attack them, they may be syringed with tobacco water. Plants propagated indoors in winter may be massed in beds out-of-doors in summer, where they make striking effects. Give them rich deep soil, and be sure that they are syringed frequently enough on the under side of the leaves to keep down the red-spider. If the plants have been gradually subjected to strong light before they are taken out-of-doors, they will stand the full sunlight and will develop their rich colors to perfection. In the fall they may be taken up, cut back and used for window-garden or conservatory subjects.

CROWFOOT: *Ranunculus.*

CROWN IMPERIAL: *Fritillaria imperialis.*

CROWN-OF-THORNS: *Euphorbia splendens.*

CRUCIANELLA stylosa. CROSSWORT. *Madder Family.* A prostrate or very diffuse annual from Persia, grown in rock-gardens and elsewhere, the deep rose flowers in globose heads having long styles, leaves whorled. Of simple requirements. Propagation is by division and seeds.

CRYOPHYTUM: *Ice-Plant.*

CUCKOO-FLOWER: *Lychnis Flos-cuculi.*

CUCUMBER (*Cucumis sativus* of southern Asia). *Gourd Family.* Tender vines of the vegetable-garden. For early use, the cucumber is usually started in a hotbed or coldframe by sowing the seed on pieces of sod 4 to 6 inches square, turned grass side down. Three or four seeds are placed on or pushed into each piece of sod and covered with 1 to 2 inches of fine soil. The soil should be well watered and glass or cloth placed over the frame. The roots run through the sod. When the plants are large enough to set out, a flat trowel or a shingle may be slipped under the sod and the plants moved to the hill without check. In place of sod, old quart berry boxes are good; after setting in the hill the roots may force their way through the cracks in the baskets. The baskets also decay rapidly. Flower-pots may be used. These plants from the frames may be set out when danger of frost is over, and should make a very rapid growth, yielding good-sized fruits in two months. They may be started under paper covers or caps as for melons.

The main crop of cucumbers is raised from seeds planted in hills directly in the garden as soon as the ground is permanently warm; and for succession other plantings may be made, or early and late varieties employed. The hills should be made rich by forking in a quantity of well-rotted manure, and given a slight elevation above the garden—not high enough to allow the wind to dry the soil, but slightly raised so that

water will not stand around the roots. One ounce of seed will plant fifty hills. The hills may be 4-6 feet apart each way; when danger of insects has passed, thin to about four plants to each hill.

Leading varieties for main crops are strains of the White Spine. Chicago, Russian and other small sorts are grown for pickling. The Bur cucumber or true Gherkin is *Cucumis Anguria*, native in the warmer parts of America; it bears small prickly fruits; culture as for cucumber.

Striped cucumber beetle is a serious menace, destroying the leaves; the beetles are also carriers of the wilt disease. In small home gardens the cucumber hills may be protected by cheesecloth or mosquito-net screen stretched over low hoops; be sure that the edges of the cloth are uniformly covered with earth. Young plants may be dusted with 3 or 4 percent nicotine-lime applied when temperature is above 70° and plants are dry; apply thoroughly and repeat frequently. For general use a dust of calcium arsenate 1 pound and gypsum 20 pounds, applied frequently, gives good results. See *Melon*.

Wild-cucumber is *Echinocystis lobata*.

CUCUMIS: *Cucumber; Melon.*

CUCURBITA: *Pumpkin.*

CUPHEA. *Loosestrife Family.* Perennials, often subshrubs, of the western hemisphere, raised as window subjects and sometimes planted out. The commonest species in cultivation is *C. platycentra* (*ignea*), called Cigar-Flower from the slender little flowers (about ¾ inch long) which are red but with a dark ring at end and an ash-colored mouth; it is a bushy compact little plant about 1 foot high, blooming freely first year from seed. It is customary to sow the seed indoors and transplant; the plants may stand 6-8 inches apart. Vigorous plants may be lifted in autumn, cut back, and potted for the window.

A few other cupheas are in cultivation, but are not generally known outside of greenhouses.

CUPIDS-DART: see *Perennials*, page 202.

CUP-PLANT: see *Perennials*, page 203.

CURRANT. *Saxifrage Family.* One of the hardiest and most productive fruits and able to live even under neglect; therefore the currant patch is often allowed to become foul with grass, never thinned or trimmed, the worms eating the leaves until, in the course of time, the plants yield only a small and indifferent product. Plant in the open, at least 5 feet from anything that will interfere with cultivation. No fruit crop will respond more readily to good care than the currant. Clean cultivation and a liberal use of manure or fertilizers will be followed by

well-paying crops. One- or two-year-old plants may be set 4 by 6 feet. If the season is dry, a mulch of straw or leaves will assist the plants to establish themselves.

The red and white currants (*Ribes sativum*, native in Europe) bear mostly on two-year-old or older wood. A succession of young shoots should be allowed to grow to take the place of the old bearing wood. The partial shade afforded by a young orchard suits the currant well, and if the ground is in good condition no bad results will follow to the orchard, provided the currants are removed before the trees need the entire feeding space. A currant patch should continue in good bearing for ten to twenty years, if properly handled. One very important point is to keep the old weak canes cut out, and a succession of two to four new ones coming from the root each year. In order of season of ripening, Cherry, Fay, Perfection and Wilder are the best standard varieties. Of these Wilder is most popular. See page 120.

The black currant (*R. nigrum*, also native in Europe) makes a large and stronger plant. It bears mostly on wood of the previous year, and therefore it is important to have new wood constantly coming on. After a few years in neglected plantations that make little new growth the yield becomes very small.

The currant-worm is kept in check by spraying with rotenone just as soon as the holes can be detected in the little leaves.

CUTTINGS: page 219.

CYCLAMEN indicum (*persicum*). *Primrose Family.* Tender greenhouse tuberous low herb, sometimes seen in the window-garden; native in southeastern Europe and adjacent Asia. It is prized for the pink, purple or white fragrant nodding flowers and attractive foliage. Other species of Cyclamen are in cultivation to a limited extent but not as florists plants.

Cyclamens may be grown from seed sown in April or September in soil containing a large proportion of sand and leaf-mould. If sown in September, they should be wintered in a coolhouse. In May they should be potted into larger pots and placed in a shaded frame, and by July will have become large enough for their flowering pot, which should be either 5- or 6-inch. They should be brought into the house before danger of frost, and grown cool until through flowering. A temperature of 55° suits them while in flower. After flowering they will need a rest for a short time, but should not become very dry or the bulb (tuber) will be injured. When they start into growth, they should have the old soil shaken off and be potted into smaller pots. At no time should more than half the tuber be under the soil.

Tubers large enough to flower the first year may be obtained from the seedsmen at moderate prices as well as young growing plants; and unless one has facilities for growing the seedlings for a year, purchase of the tubers or plants will give the best satisfaction. The soil best suited to the cyclamen is one containing 2 parts leaf-mold, 1 part each of sand and loam.

CYDONIA: *Quince.*

CYMBALARIA: *Linaria.*

CYNARA: *Artichoke.*

CYNOGLOSSUM amabile. *Borage Family.* A hairy biennial to 2½ feet high with small bright blue flowers, native in Asia. Sometimes grown in the flower-garden and propagated by seeds, blooming the first year if sown early. No special attention is required.

CYPERUS: *Umbrella-Plant.*

CYPRESS, STANDING-: *Gilia rubra.* **Summer-:** see *Summer-Cypress.*

CYPRESS-VINE (*Quamoclit pennata*). *Morning-Glory Family.* An annual tender climber with beautiful finely divided foliage and many small scarlet flowers; native in the American tropics. It is one of the parents of cardinal-climber, which see. The cypress-vine blooms from seed sown directly in warm ground. To insure prompt germination, soak the seeds a few hours, or file or notch one of the corners to allow moisture to enter. It climbs 10-20 feet.

DAFFODIL: *Narcissus.*

DAHLIA. *Composite Family.* Mexican tender tuberous-rooted herbs grown for the very showy flower-heads in many colors and now also in many shapes. The tree dahlias, *D. excelsa* (*arborea*) and *D. imperialis*, are grown in warm long-season climates. The usual kinds, however, are *D. pinnata* (*rosea*, *variabilis*) and the cactus dahlia, *D. Juarezii;* the very numerous garden hybrids of these make bush-like specimens 4 feet and more high. Dahlias are late summer and autumn bloomers. Many choice named varieties (more than 13,000 varieties have been introduced) are now available from dealers, either as tuberous roots or young growing plants.

Dahlias may be grown from seed, and this is the way new varieties are originated, but the standard named double sorts should be grown from cuttings of young stems or from division of the roots. If cuttings are to be made, it is necessary to start the roots early, either in a hotbed or house. When the growth has reached 4 or 5 inches, the shoots may be cut from the plant and rooted in sand. Care should be taken to cut just

below the joint, as a cutting made between two joints is said not to form tuberous roots. The most rapid method of propagation of named varieties is to grow from cuttings in this way. In growing the plants from roots, the best plan is to place the whole root clump in gentle heat, moistening and covering slightly. When the young growth has started, the roots may be taken up, divided, and planted out 3 to 4 feet apart. This plan ensures a plant from each piece of root, whereas if the roots are divided while dormant, there is danger of not having a bud at the end of each piece, in which case no growth will start. If tuberous roots are planted directly in the open ground, see that the ground is well prepared and the place protected.

Seeds of dahlias should give blooming plants if sown directly in the open, but in the northern parts of the country it is well to start them indoors.

The dahlia flourishes in a deep well-drained loam, although very good results can be secured on sandy soil, provided plant-food and moisture are furnished; if the land is very rich the season of bloom is likely to be delayed. Clay should be avoided. If the plants are to be grown without stakes, the center of each plant may be pinched out after making two or three joints. The lateral branches then start near the ground. If the young dahlias, as they start to grow, begin to make flower-buds, pinch off these buds and keep the plants growing until the proper blooming stature is attained. In most home gardens the plants are allowed to reach their full height, and are tied to stakes if necessary. After the first frost, lift the roots, let them dry in the sun, trim off tops and broken parts, and store in a cellar as for potatoes and cannas. In a cellar with a furnace, the air is commonly too warm and dry for the successful storage of dahlias. In such cases, a copious covering of sand, granulated peat, newspapers, or gunnysacks is helpful.

DAISY. *Composite Family.* Name applied to many plants of the aster or chrysanthemum kind but particularly to the perennial English daisy, *Bellis perennis*, a prime favorite as an edging plant and to colonize in lawns. The cheerful little flowers of the bellis show early in the spring, and with a little care bloom continuously through a long season. They should be given well enriched moist soil, and be mulched through hot weather. Set the plants 3 or 4 inches apart; height 3 to 8 inches. The colors are white, pink and red. Hardy if mulched in winter, but best results are obtained if plants are renewed frequently, and the plant is sometimes classed with biennials.

The usual method of propagation is by division of the crowns, made in cool weather. They may also be grown from seed, but the chances are that many inferior flowers will be produced.

The Shasta daisy is *Chrysanthemum;* Michaelmas daisy *Aster;* South African daisy *Arctotis;* Double Orange daisy *Erigeron aurantiacus;* Swan River daisy *Brachycome;* Turfing daisy *Matricaria Tchihatchewii;* Transvaal daisy *Gerberia Jamesoni;* Globe daisy *Globularia trichosantha;* and other composites are known also as daisies.

DAMES-ROCKET: see *Perennials*, page 202.

DANDELION (*Taraxacum officinale*). *Composite Family.* The wild weedy dandelion is often gathered for greens, and improved large-leaved forms are grown directly as an autumn and spring vegetable. Of these cultivated forms the plants attain a large size and the leaves are more tender. The seed may be selected from the best field-growing plants, but it is better to buy the French seed of the seedsmen.

Sow in spring in well-manured soil, either in drills or in hills 1 foot apart. A cutting of leaves may be had in September or October, and some of the stools may stand until spring. The delicacy of the leaves may be improved by blanching them, either by the use of boards or earth. One trade packet of seed will supply a large number of plants. The plant is destroyed when the crop of leaves is taken.

DATE: see *Palms.*

DATURA. *Nightshade Family.* Strong-growing tender branching annuals and perennials with large trumpet-shaped flowers. Several species are in cultivation. The commonest is probably *D. Metel* (*fastuosa*) from India with erect white flowers violet outside; *D. meteloides* (*Wrightii*) is the American representative with similar flowers. The tree daturas, of the western hemisphere, have pendulous flowers, in some species 1 foot long.

Plants should be set 4 feet apart. They grow 3-4 feet high, bear large leaves, and therefore make good low screens. Sow seed where plants are to grow; or, better, start them in the house three or four weeks before the weather is fit for planting outside. They are late summer and autumn bloomers. The tree or shrubby kinds (*Brugmansia*) are frequently bloomed under glass and sometimes planted out for summer effect.

Annual daturas come quickly from seeds. Perennial species may be grown from seeds and also cuttings of firm stems.

DAUCUS: *Carrot.*

DAWN-FLOWER: *Ipomœa Leari.*

DELPHINIUM. LARKSPUR. *Crowfoot Family.* Popular hardy annuals and perennials of the north temperate zone, abounding in brilliant

blue flowers but also white, pink and scarlet. The usual garden larkspurs are of four groups. Second bloom may be obtained on the perennial kinds by not allowing to go to seed or to be spent.

(1) Annual rocket larkspurs, *D. Ajacis*. They may be grown from seed sown in heat and transplanted to the ground; or seed may be sown where the plants are wanted and the seedlings thinned to 1 foot, or less for the very dwarf kinds and more for the largest kinds. These seedlings bloom early and continue through the summer if the seed-pods are regularly removed. Plants grow 8 to 24 inches high.

(2) Bouquet larkspurs, *D. grandiflorum* (*chinense*), perennial but mostly blooming the first year from seed. They are diffuse branchy growers, the sprays excellent for cutting, and the foliage is narrowly cut and attractive.

(3) Candle larkspurs, *D. elatum* and derivatives. They are among the best hardy plants, being free-flowering and having a good habit. The tall flower-spikes, showing above the cut foliage, give the plant a striking effect. The plants are propagated by division of root or from seed, and sometimes by cuttings. The former method will give good results, although the resulting plants may not be the same as the seed plant. Seeds started very early may give blooming plants the same autumn; started in July and plants put in permanent quarters in autumn should give excellent results the next year. Young plants are now available from dealers. They will come into bloom in late June and continue for a long season, if seed-pods are removed. Plants should be set 2 to 4 feet apart if in rows. Height 3 to 6 feet. As winter approaches, a covering of coarse litter should be thrown over the crowns of all perennial kinds. If the plants begin to crowd after a time, they may be taken up and replanted at greater distances.

(4) Garland larkspurs, *D. cheilanthum* and derivatives, including the horticultural names *azureum*, *Belladonna*, *Bellamosum*, *cœlestinum*, *formosum*. The leaves are deeply cut into narrow divisions, and large open long-spurred flowers carried in a loose or branching inflorescence. Cultivation as for the candle larkspurs.

D. Ajacis. ROCKET LARKSPUR. 1-4 ft., ann.: blue, white, violet, pink. Eu.

D. Belladonna. A light blue garden form.

D. Bellamosum. A dark blue garden form.

D. cardinale. 2-3 ft.: scarlet. Calif.

D. cheilanthum. GARLAND LARKSPUR. 3 ft. or more, branching above: blue varying to whitish. Siberia.

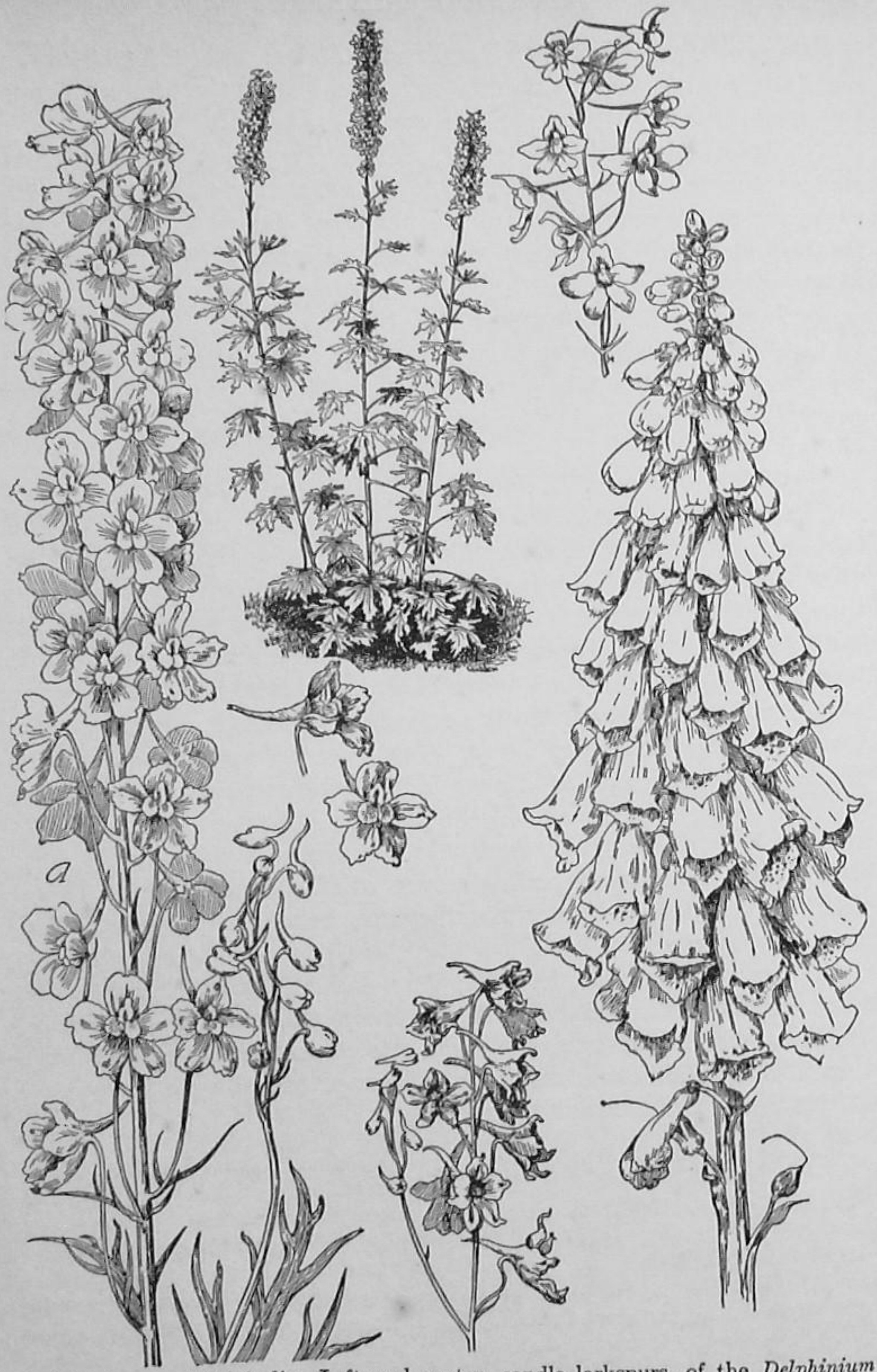
D. elatum. CANDLE LARKSPUR. 6 ft. or more, strict, with long terminal spikes: blue. Eu., Asia.

D. formosum. This name applies to forms of *D. cheilanthum* or *D. elatum*.

D. grandiflorum (*chinense*). BOUQUET LARKSPUR. 2-3 ft.: blue varying to white. Asia.

D. nudicaule. 2 ft.: red. W. N. Amer.

GRAMASEVAKS TRAINING CENTRE
16 APR 1955
T. KALLUPATTI



Delphinium and Digitalis. Left and center, candle larkspurs, of the *Delphinium elatum* type; uppermost right, flowers of bouquet larkspur, *D. grandiflorum*; at right side, foxglove, *Digitalis purpurea*.

DEWBERRY. *Rose Family.* The dewberry is a trailing blackberry. The culture is like that of the blackberry, but support should be given to the canes, as they are very slender and rank growers. A wire trellis or large-meshed fence-wire answers admirably; or (and this is the better general method) they may be tied to stakes. The fruits are large and showy, which, combined with their earliness, make them desirable; but they are usually deficient in flavor. The Lucretia is the leading variety in cultivation.

Lay the canes on the ground in winter in rigorous climates. In spring tie all the canes from each plant to a stake. After fruiting, cut the old canes and burn them (as for blackberries). In the meantime, the young canes (for next year's fruiting) are growing. These may be tied up as they grow, to be out of the way of the cultivator. Dewberries are one to two weeks earlier than blackberries.

Loganberry is a dewberry or trailing blackberry. The berry is red and acid, and is prized for the making of fruit juice, for canning, and is also dried or evaporated. It originated in California, and is much grown in the Pacific Coast country. The plant is propagated by rooting tips. It is grown in rows 6 feet or more apart and usually trained on wires after the manner of dewberries. In the rows the plants are 8 feet or more apart, as it is a long and vigorous grower. Loganberry is not hardy in the northeastern states. See *Blackberry*.

DIAMOND-FLOWER: *Ionopsidium acaule.*

DIANTHUS. Pink. *Pink Family.* For the present treatment the pinks may be considered under five divisions. They are all low hardy perennials but often grown as annuals, native mostly in the north temperate zone. They are known for their bright spicy fragrant flowers.

(1) *Dianthus chinensis* (*Heddewigii*), the common showy flower-garden species and varieties. They flower the first year from seed, and are treated as hardy annuals. They have a wide range of color and markings. Some of them are as double as a rose, and are edged, splashed or lined with other colors. The single ones are very brilliant and are profuse bloomers. Sow seeds where plants are to stand, or if early bloom is desired, start in the house. Set the plants 6-10 inches apart. They grow 8-15 inches high. They bloom until after frost. Of easiest culture in any good soil, and should be even more popular. The petals are often deeply and oddly cut.

(2) *D. barbatus*, Sweet William, an old-fashioned perennial, having flowers of many combinations of color, growing for several years when once planted, but being the better for renewal every two years. Raising new stock from seeds is usually better than dividing old plants; plants

bloom the second season and continue for years. Of late years, the sweet william has been much improved, and a race is available that blooms the first year from seed. All the kinds are known by their many small flowers in a close head or cluster. They usually grow 1-1½ feet high.

(3) *D. plumarius* and others, the perennial border or grass pinks, low-growing in tufts or sods with highly perfumed flowers. They are very useful for permanent edgings, although the grass is likely to run them out unless a clean strip is kept on either side. Divide the old plants when the edging begins to fail; or raise new plants from seed. Seedlings usually do not bloom much the first year. Many named kinds are now in the market. Semperflorens is a more continuous-blooming strain.

Pinks. Left, maiden pink, *Dianthus deltoides*; next, clusters of sweet william, *D. barbatus*; center, slender stalk and compact little head of Carthusian pink, *D. carthusianorum*; flower-garden pink, grown mostly as an annual, *D. chinensis*; right, grass pink, *D. plumarius*.

(4) *D. Caryophyllus*. See *Carnation*.

(5) Border and rock-garden species, of which a good number are now available. *D. deltoides*, maiden pink, makes an enduring enlarging mat of attractive foliage close to the ground and yields many bright small flowers in pink, red and sometimes white; useful for low border and ground-cover. The species of low stature, being northern or montane, are most adaptable to the rock-garden; some of them make attractive foliage tufts.

D. Allwoodii. Hybrids between *D. plumarius* and *D. Caryophyllus*.

D. alpinus. 3 in.: rose to purplish. Eu.

D. arenarius. 6-15 in.: white. Eu.

D. arvernensis. 2-4 in.: pink. France.

D. barbatus. Sweet William. 1½ ft.: red, purple, rose, white. Eu., Asia.

D. cæsius. Cheddar Pink. 3-12 in.: rose, fragrant. Eu.

D. carthusianorum. 12-20 in.: rose, purple, dark red, in heads. Eu.

D. chinensis. 12-18 in.: lilac, red, white. Eu., Asia. Var. *Heddewigii* comprises the flower-garden forms.

D. cruentus. 1-2 ft.: blood-red, in heads. Eu.

D. deltoides. Maiden Pink. 4-15 in.: red or pink with crimson eye. Eu., Asia. Var. *albus*, white.

D. graniticus. 4-7 in.: purple. Pyrenees.

D. Knappii. 1-1½ ft.: light yellow, in heads. Eu.

D. latifolius. 10-16 in.: rose to dark red, in heads. Probably a hybrid.

D. neglectus. 3-4 in.: reddish-purple. Eu.

D. plumarius. Grass Pink. 1-1½ ft.: rose to purple and white, fragrant. Eu. Var. *semperflorens* is a popular strain.

D. superbus. 1½-2 ft.: pale rose or lilac, fragrant. Eu., Asia. Var. *speciosus*, large flowers.

D. sylvestris. 6-16 in.: rose. Eu.

Carnations, forms of pinks, *Dianthus Caryophyllus*. Left, common florist carnation; right, marguerite carnation, for the flower-garden.

DIASCIA Barberæ. Twinspur. *Figwort Family*. A South African annual 6-16 inches high, the two-lipped rose flowers having a yellow spot in throat and borne in short racemes. Grown in flower-gardens or pots and of easy culture. Propagated by seeds.

DICENTRA. *Fumitory Family*. Perennial herbs popular in the flower-garden, having finely cut fern-like soft foliage and racemes of rose, yellow or white pendent more or less heart-shaped flattish flowers.

They thrive in rich light soil. Propagation by division of crowns or roots, and sometimes by seeds.

D. canadensis. Squirrel-Corn. 10-12 in., with small tubers: greenish-white tipped purple. E. N. Amer.

D. chrysantha. Golden-Eardrops. 5 ft.: sulfur-yellow, fls. several or many. Calif.

D. Cucullaria. Dutchmans-Breeches. 5-10 in.: white tipped yellow. E. N. Amer.

D. eximia. 1-2 ft.: rose or pink. E. N. Amer.

D. formosa. 1-1½ ft.: rose-purple. W. N. Amer.

D. oregana (*glauca*). 1 ft.: cream with rose limb. Calif., Ore.

D. spectabilis (*Dielytra spectabilis*). Bleeding-Heart. 1½-2 ft.: rose. Japan. Var. *alba*, white.

DICTAMNUS: see *Perennials*, page 202.

DIDISCUS. *Parsley Family.* The "blue lace-flower," *Trachymene* (or *Didiscus*) *cærulea*, native in Australia, is a very attractive tender annual growing about 18 inches high and bearing umbels or heads of many light blue flowers. It blooms from midsummer till frost from early-sown seeds; thin to 10 or 12 inches. Sown in autumn it is also grown under glass for spring bloom. The heads are on long stems and make excellent cut-flowers.

DIELYTRA: *Dicentra spectabilis.*

DIGITALIS. *Figwort Family.* Erect-growing hardy herbs of Europe and Asia, biennial and short-lived perennial, grown in borders for the odd or showy mostly declined or pendent flowers in long terminal spikes or racemes. *D. lanata* is frequently seen in gardens, making an excellent rear row; it is strict and unbranched, rising 2-3 feet, and bears a hairy closely flowered terminal raceme or spike; flowers odd rather than showy, about 1 inch long, the tubular part with brown reticulations, upper lip practically wanting, lower lip veined white. *D. ambigua* (*grandiflora*) grows to 3 feet, the yellowish flowers marked with brown and 2 inches long.

The best known species is Foxglove, *D. purpurea*, in the highly developed garden kinds usually known as *gloxinæflora* (gloxinia-flowered) and *maculata superba*. It is a stately plant, with spikes that rise 3-5 feet above the ground; the pendulous flowers are purplish and more or less spotted inside, varying to rose-lilac, red and white; early and middle summer. The foxglove is usually perennial but best results are obtained, as a rule, from year-old plants, seeds having been sown the previous year and the seedlings transplanted, the plants having been put in their regular places in autumn, 1-2 feet apart. Sometimes the plants yield two seasons of good bloom, and basal shoots will arise in late summer for continuation of the life of the plant even one or two years longer; these shoots arise from the base of the old stock rather than from the root, and the stock or crown becomes hollow and the resulting crop is weak. Dealers sometimes class the plant with biennials. As soon as the flower-spike becomes ragged, cut it off and save the energy of the plant for the secondary bloom. For best results, see that the plant at no time suffers for lack of water.

DILL: *Sweet Herbs.*

DIMORPHOTHECA. Cape-Marigold. *Composite Family. D. aurantiaca* or its derivatives is now a well known brilliantly orange-flowered annual, or grown as such, adapted to open sunny positions; South African. It grows 12-18 inches high and blooms in late summer and

autumn. Seeds may be sown in the open as soon as the ground is permanently warm, or for earlier results started under glass. The plants may stand 12-15 inches apart. Some dimorphothecas have yellow or nearly white flowers.

DISEASES: *Insects and Diseases.*
DIVISION: page 218.
DODECATHEON: see *Perennials*, page 202.
DOLICHOS: *Bean.*

DORONICUM. LEOPARDS-BANE. *Composite Family.* Perennial herbs with broad leaves and erect long-stalked yellow sunflower-like flower-heads, blooming from spring to summer.

Culture is simple in the border or flower-garden. Propagated by division of plants and by seeds.

D. caucasicum. 1-2 ft.: basal lvs. heart-shaped. Eu., Asia Minor.

D. Clusii. 1-2 ft.: st.-lvs. clasping, basal lvs. not heart-shaped. Eu.

D. plantagineum (*excelsum*). 2-5 ft.: heads to 4 in. across: basal lvs. not heart-shaped. Eu.

DRABA. *Mustard Family.* Dwarf compact little herbs with small leaves in rosettes and terminal racemes of white, yellow, rose or purple flowers, suitable for the rock-garden. The species and their names are confused in cultivation. They are largely boreal, montane and alpine.

Propagation by division and by seed sown a year before bloom is desired.

D. aizoides. 2-3 in., per.: yellow. Eu.

D. borealis. Tufted, to 12 in., per.: white. Arctics. May be grown as *tomentosa* or *rupestris.*

D. bruniifolia. Tufted, to 4 in., per.: orange. Medit. in mts. May be grown as *olympica.*

D. fladnizensis. 2-4 in., per.: greenish-white. Arctics. Plants grown under this name are likely to be *D. hirta.*

D. hirta. 6-10 in., hairy, per.: white. Eurasia. May be grown as *fladnizensis*, *rupestris*, *scandinavica*, in some of its forms.

D. olympica. 2-4 in., per.: orange. Eu.

D. sibrica (*repens*). Prostrate: yellow. Caucasus.

DRACÆNAS of the conservatories (properly mostly Cordylines), *Lily Family*, are sometimes employed as house plants. Protect from direct sunlight, keep an even and fairly high temperature, water freely when they are growing. When the plants begin to fail, return them to the florist for recuperation, where they may have equable conditions, or purchase new plants. They are handsome long-leaved foliage plants, excellent for jardinières. Propagation is mostly by cuttings of canes.

DRACOCEPHALUM: see *Perennials*, page 202.

DRAINAGE: page 149.

DROPWORT: *Filipendula hexapetala.*

DUTCHMANS-BREECHES: *Dicentra Cucullaria.*

DUTCHMANS-PIPE: *Aristolochia.*

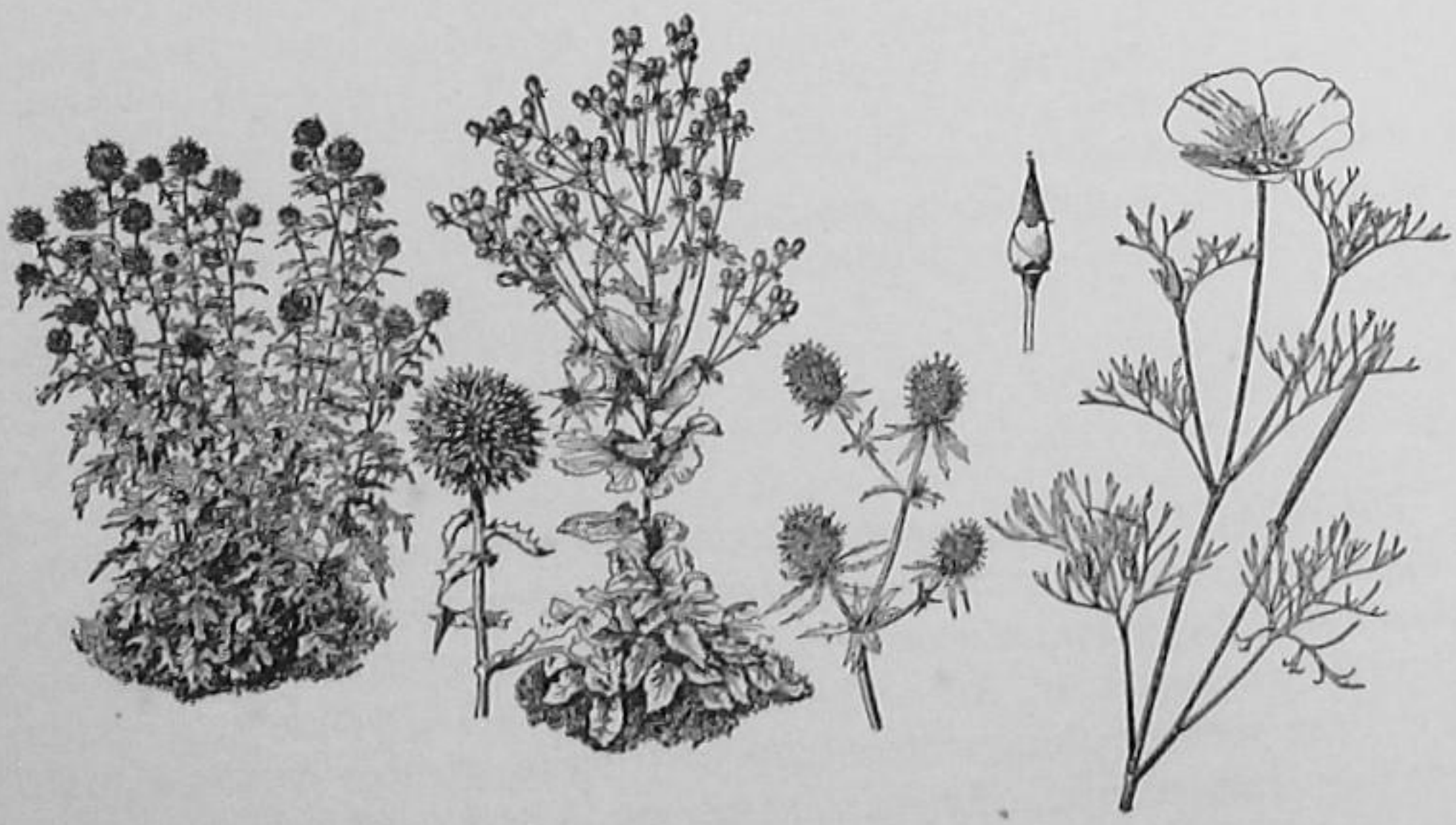
DUSTY MILLER: *Centaurea; Lychnis; Senecio.*

ECHEVERIA: see *Succulents.*

ECHINACEA (*Rudbeckia*) **purpurea.** Purple Coneflower. *Composite Family.* A hardy native perennial 3-5 feet tall with large leaves and purple flower-heads having drooping rays to 3 inches long, making a striking border plant. Propagated by division and by seeds. It does well in any ordinary soil and exposure.

ECHINOCYSTIS lobata. Wild-Cucumber. *Cucumber Family.* A native annual vine climbing by tendrils, useful for covering arbors and fences, having sharply lobed leaves, white or greenish flowers in clusters, and spiny papery fruits 1 or 2 inches long. Propagated readily by seeds sown in spring or autumn.

ECHINOPS. Globe Thistle. *Composite Family.* Large prickly mostly short-lived perennial herbs making striking border subjects; they have deeply cut prickly thistle-like leaves and flowers in dense heads with conspicuous metallic-blue scales.



Echinops, Eryngium, Eschscholzia. Left, *Echinops sphærocephalus*; center, *Eryngium planum*; right, *Eschscholzia californica.*

Of simple culture. Propagation by seeds which should give bloom the following season, by division of clumps and by root-cuttings.

E. Ritro. 1-2 ft., the stems white-woolly: heads mostly under 2 in. Eu., Asia.

E. sphærocephalus. 5-8 ft., less tomentose on stems: heads 2 in. across. Eu., Asia.

EDELWEISS (*Leontopodium alpinum*). *Composite Family.* A little white-woolly tufted perennial 6-12 inches high, native in high mountains of Europe and Asia and adapted to the rock-garden. The individual flowers are inconspicuous but the heads are surrounded by showy woolly bracts.

It does best in partial shade in deep gritty or sandy loam, not too rich. Propagated by division in autumn, wintering in a coldframe, and also by seeds sown indoors in early spring.

EGGPLANT, GUINEA SQUASH (*Solanum Melongena* var. *esculentum*). *Nightshade Family.* Strong large-leaved tender herb, grown in the vegetable-garden for the edible fruits; probably originally Asian.

Unless one has a greenhouse or warm hotbed, the growing of egg-plants in the North should be left to the professional gardener, as the young plants are very tender and should be grown without a check. The seed should be sown in the hotbed or greenhouse a month or more before warm weather, keeping a temperature of 65° to 70°. When the seedlings have made three rough leaves, they may be pricked out into shallow boxes, or, still better, into 3-inch pots. The pots or boxes should be plunged to the rim in soil in a hotbed or coldframe so situated that protection may be given on chilly nights. Do not set in the field until the season is permanently settled. The soil should be "quick" but not of such nature as to keep the plants growing too large or too late. Watch for the potato beetle. The plants are usually set 2-3 feet apart each way. A dozen plants are sufficient for the needs of a family, as each plant should yield two to six large fruits. The fruits are fit to eat at most stages of growth, from those the size of a large egg to their largest development. One ounce of seed will furnish 1,000-2,000 plants.

The New York Improved Purple is a standard variety. Black Pekin (old variety) and Black Beauty are good. For early, or for a short-season climate, the Early Dwarf Purple is excellent.

EMILIA sagittata (*E.* and *Cacalia coccinea, E. flammea*). TASSEL-FLOWER. FLORAS-PAINTBRUSH. *Composite Family.* Erect tropical annual long known in flower-gardens for the small bright heads of scarlet or orange in shape like a paint-brush. It comes early into flower and con-

tinues through the season if the ground is good and well tilled and the faded flowers are promptly removed; sow as soon as weather is warm and thin 10-12 inches; 1-2 feet high, with long slender stems.

ENDIVE (*Cichorium Endivia*, closely allied to chicory). *Composite Family.* Hardy annual or biennial, native somewhere in the Old World, grown in the vegetable-garden for its rosettes of leaves which are used as salad and for greens. It is grown mostly as a late summer, autumn and early winter product, more or less extending the season of lettuce. It withstands summer heat better than lettuce.

For autumn use, seed may be sown June to August, and as the plants become fit to eat about the same time from sowing as does lettuce, a succession may be had until cold weather. The plants need protection from the severe frosts, and this may be given by carefully lifting the plants and transplanting to a frame, where sash or cloth may be used to cover them in freezing weather. The leaves, which constitute practically the whole plant, are blanched before being used, either by tying together with some soft material or by standing boards on each side of the row, allowing the top of the boards to meet over the center of the row; in two to four weeks the interior leaves will be sufficiently blanched. If the foliage keeps wet inside after tying, it is likely to decay. The rows should be 1½ or 2 feet apart, the plants 1 foot apart in the rows. One ounce of seed will sow 150 feet of drill more or less, before thinning or transplanting.

EPIGÆA: see *Ground-Cover.*

EPILOBIUM: see *Perennials*, page 202.

EPIMEDIUM: see *Ground-Cover.*

ERANTHIS: see *Perennials*, page 202.

EREMURUS. *Lily Family.* Striking perennials for bold effects, with narrow basal leaves and terminal long racemes of white, pink or yellow flowers.

These plants need winter protection in the North, and thrive best in rich well-drained soil. Propagated by division and by seeds.

E. himalaicus. 6-8 ft.: white. Himalayas.

E. robustus. 6-9 ft.: bright pink. Asia.

ERIGERON. Fleabane. *Composite Family.* Aster-like herbs, mostly perennial, useful for borders, cut-flowers and rock-gardens; the heads have yellow centers with white, rose or purple rays; summer-blooming.

Cultivation is simple. Propagated by division, cuttings, and by seeds.

E. aurantiacus. DOUBLE ORANGE DAISY. 10 in.: orange-yellow. Turkestan.

E. Coulteri. 1½-2 ft.: white to purplish. W. N. Amer.

E. glabellus. 6-18 in.: violet or purple. W. N. Amer.

E. Karvinskianus. 1½ ft., branches trailing: white or pinkish. Mex. Cultivated mostly under the name *Villadinia.*

E. speciosus. 2 ft.: dark violet. W. N. Amer.

ERINUS: see *Perennials*, page 202.

ERYNGIUM. ERYNGO. *Parsley Family.* Perennial spiny-leaved herbs with white or blue flowers in dense bracted heads; useful in borders and rock-gardens and the heads sometimes dried for winter bouquets.

Light rich soil is best, and a sunny exposure. Seeds may be sown as soon as ripe; also increased by division. See page 98.

E. amethystinum. 1½-2 ft.: blue. Eu.

E. planum. 2-3 ft.: blue. Eu., Asia.

ERYSIMUM. *Mustard Family.* Much like the wallflower (Cheiranthus). One is *E. Perofskianum* of southwestern Asia, a hardy annual, blooming freely if sown early; it is a grayish plant 1-2 feet high, erect, bearing freely of orange or yellow flowers in summer and autumn; plants may stand 8-12 inches apart; plants grown under this name, however, may be perennial species. *E. pulchellum* is a perennial to 2 feet with deep orange flowers. Seeds should be sown a year before bloom is desired.

ESCHSCHOLZIA californica. CALIFORNIA-POPPY. *Poppy Family.* Low perennial poppy-like plant, grown as a hardy annual, blooming through a long season and being at its best in the cool days of autumn; flowers shades of orange or yellow. Once planted they seed themselves, and strong plants often survive the winter and bloom again in spring. Flowers open only in sunshine. Plants stand about 1 foot high, making clumps of fine and attractive foliage. As cut-flowers they are excellent, especially if emphasized by a few larkspurs or bachelors buttons.

Propagated by seed, best sown as soon as the ground is fit, thus giving the plant an early start, and having bloom through the season. Let the plants stand 10-20 inches apart; they do not transplant well. A sandy or light soil and sunny exposure are to be preferred. See page 98.

EUPATORIUM. *Composite Family.* Perennials planted in borders and wild-gardens, with heads of purple, rose and white disk-flowers in late summer and autumn.

The joe-pye weed requires moist situations, and the others mentioned well-drained soil. Propagation by division and seeds.

E. cælestinum. MIST-FLOWER. 2-3 ft.: light blue to violet. E. N. Amer.

E. purpureum. JOE-PYE WEED. 4-10 ft.: pink or purple. E. N. Amer.

E. urticæfolium (*ageratoides, Fraseri*). WHITE SNAKEROOT. 4-5 ft.: white. E. N. Amer.

EUPHORBIA. SPURGE. *Spurge Family.* Many herbs and shrubs in different parts of the world, a few of which are cultivated for ornament. Many of them are spiny and nearly leafless and are called cacti, but they are at once distinguished from cactaceous plants by their milky juice. The showy parts of the flower in the euphorbias are really specialized bracts, often like petals; in some species the floral leaves are highly colored. Perhaps five kinds represent those most adapted to the home garden and conservatory.

(1) *E. marginata* (*variegata*), Snow-on-the-Mountain; branching annual 2-3 feet high, native from Minnesota to Texas, interesting for its showy white-margined leaves, useful for summer bedding. Seeds may be sown directly in the garden in mid-spring; thin to 10 inches or more.

(2) *E. heterophylla*, Mexican Fire-Plant, annual, 2-3 feet, more or less branched, native from Illinois to Peru, grown for its showy colored upper leaves. Grown from seeds sown in the open; thin to 10 inches or more.

(3) *E. corollata;* hardy perennial native in dry open fields in the eastern United States, useful for mixing in borders and for cut-flowers. It produces many clear white flowers; it is a rather diffuse branching plant $1\frac{1}{2}$-3 feet high.

(4) *E. splendens*, Crown-of-Thorns, so called from the slender very spiny branches that are often disposed on a trellis above the pot or wound together; native in Madagascar. It is a somewhat climbing tender perennial of odd appearance due to the absence of leaves from the main growths; it produces bright red flowers most of the year; propagated by cuttings; seen in window-gardens and conservatories.

(5) *E. pulcherrima.* See *Poinsettia.*

Other spurges are frequently grown, as *E. Cyparissias*, the CYPRESS SPURGE, which is a good long-enduring ground-cover often persistent in cemeteries. It grows 10 or 12 inches high and bears many very narrow leaves; propagated by division, and naturally extends itself. *E. epithymoides*, CUSHION SPURGE, is perennial to 1 foot in showy clumps with abundant yellow floral leaves; propagated by seeds and division. *E. Myrsinites*, perennial or biennial, fleshy, decumbent or prostrate at base but rising 10-18 inches, with attractive terminal umbels. The above three are from Europe.

EVENING-PRIMROSE: *Œnothera.*

EVERGREENS are plants that hold their foliage in winter. Ordinarily, however, in this country the word evergreen is understood to mean coniferous trees with persistent leaves, as pines, spruces, firs, cedars, cypresses, junipers, arbor-vitæ, retinisporas, and others are called broad-leaved evergreens. Conifers have always been favorites with plant lovers, as they have very distinctive forms and other characteristics. Many of them are of the easiest culture. It is a common notion that, since spruces and other conifers grow so symmetrically, they will not stand pruning; but this is an error. If they tend to grow too tall the leader may be cut. A new leader may arise, but in the meantime the upward growth of the tree will be somewhat checked, and the effect will be to make the tree dense. The tips of the branches may also be headed in with the same effect. The beauty of an evergreen lies in its natural form; therefore, it should not be sheared into unusual shapes, but a gentle trimming back, as suggested, will tend to prevent the Norway spruce and others from growing open and ragged. After the tree attains some age, 4 or 5 inches may be taken off the ends of the main branches every year or two with good results if the specimen tends to become ragged or unshapely or if its growth must be confined.

There is difference of opinion as to the proper month for the transplanting of evergreens, which means that there is more than one season in which they may be moved. It is ordinarily unsafe to transplant them in autumn in northern climates or bleak situations. The best results are usually obtained when they are transplanted just as new growth is beginning, rather late in the spring. Some persons plant them in August, and the roots secure a hold before winter. In transplanting conifers, it is very important that the roots be not exposed to the sun. They should be moistened and covered with burlaps or other material. The holes should be ready to receive them. If the trees are large, or if it has been necessary to trim in the roots, the top may be cut when the tree is set. Large evergreens (those 10 feet and more high) are usually best transplanted late in winter, at a time when a large ball of earth may be moved with them. A trench is dug around the tree, it being deepened a little day by day so that the frost can work into the earth and hold it in shape. When the ball is thoroughly frozen, it is hoisted on a stone-boat or truck and moved to its new position. Trees properly transplanted and handled in the nursery may be removed more freely.

For low hedges or screens, one of the most serviceable evergreens is the arbor-vitæ in its various forms. Red-cedars are also useful. Perhaps the handsomest for such purposes are the hemlocks, but it is often difficult to move them successfully. Transplanted trees from nurseries are usually safest. If the trees are taken from the wild, they should be chosen from

open and sunny places. For neat and compact effects near porches and along walks, the dwarf retinisporas are very useful. Most of the pines and spruces are too coarse for planting very close to the house. They are better at some distance, where they serve as a background to other planting. If they are wanted for individual specimens, they should be given plenty of room. The lower limbs should not be trimmed up, at least not until the tree has become so old that the lowest branches die. Some species hold their branches much longer than others; oriental spruce (*Picea orientalis*) is one of the best in this respect. The handling of coniferous evergreens and the study of the kinds is a fascinating department of horticulture, and there is special literature on the subject; see the book, "The Cultivated Conifers" (Bailey).

The broad-leaved or "flowering evergreens" are of so many different classes that they cannot be usefully discussed in this entry. Kalmias, rhododendrons, osmanthus, hollies, mahonias, box, laurel, are examples. Nursery catalogues and other publications may be consulted for special directions.

EVERLASTINGS are flowers or plants that retain their shape and usually their color when dried. Many of them are members of the composite family. In order to have them hold shape and color, cut them with very long stems just before they are fully expanded, and hang them in an airy place away from the sun. They are all annuals, or grown as such, and are of very easy culture. Sow seeds where the plants are to stand. Good kinds are Acroclinium, Ammobium, Eryngium, Gomphrena, Rhodanthe (Helipterum), Helichrysum, Honesty, Statice, Xeranthemum. Certain wild composites may be similarly used, particularly Anaphalis and species of Gnaphalium. Some of the grasses make excellent additions to "dry bouquets" (see *Grasses*). Pods and durable parts of many wild plants may be similarly employed.

FARFUGIUM. The name by which *Ligularia* (or *Senecio*) *Kaempferi* is commonly known. *Composite Family.* The usual form, var. *aureomaculata* (*F. grande*), has yellow- or white-spotted leaves and is called "Leopard-plant," grown as a window subject. The large roundish radical leaves suggest begonia.

A shady position suits it best, and the soil must be well supplied with moisture and should be fibrous; the beauty of the plant depends on the vigor and perfection of the foliage. Propagates readily by division. The plant is perennial, from Japan, hardy in the open south of Washington.

FEATHER-FLEECE: see *Perennials*, page 203.

FENNEL. *Parsley Family.* Two plants are grown as fennel in the vegetable-garden, both forms of *Fæniculum vulgare* (*officinale*) of southern Europe. One of them is classed with sweet herbs, the young leaves and aromatic seeds being employed as seasoning. Although perennial, the plant is commonly grown as an annual, seeds being sown in the garden when the ground becomes warm; it is a fine-leaved branching plant, growing 3-5 feet high.

The other is Florence fennel (var. *dulce*), grown for the much enlarged and thickened bases of the leaves which are boiled and also used as salad. The lower joints are close together and the leaf-bases make expanded bodies an inch or two across and three or four inches long. Earth is usually hilled about the plant to blanch the parts. Seeds sown in the open as soon as weather is settled give edible product in summer, and successive sowings may be made; thin to 6 inches or more in the row. The commodity is much prized by Italians.

FENNEL-FLOWER: *Nigella.*

FERNS. Two classes of ferns are commonly grown: the native hardy kinds and the tender species of warm countries raised in windows and conservatories.

The native ferns transplant easily to the garden, and they make an attractive addition to the side of a house, or as an admixture in a hardy border. The Ostrich and Cinnamon ferns are among the best subjects. Give all outdoor ferns a place protected from winds, otherwise they will shrivel and perhaps die. Screen them from the hot sun, or place them on the shady side of a building. See that the soil is uniformly moist and that it does not become too hot. Mulch with leaf-mold in autumn. Many of the kinds may now be purchased from dealers.

As house and porch ferns, the most popular kind at present is the Boston fern and its derivatives, forms of *Nephrolepis exaltata* (propagated by division). The small-leaved maiden-hair, *Adiantum gracillimum* (reckoned as a form of *A. cuneatum*), has long been a favorite, as also *A. Capillus-Veneris*. Several species of Pteris, particularly *P. serrulata*, are valuable house ferns, but require a warmer situation than those mentioned. They also thrive in a shady or ill-lighted corner. Perfect drainage and care in watering have more to do with the successful growing of ferns than any special mixture of soils. If the drainage material in the bottom of the pot or box is sufficient, there is little danger of over-watering; but water-logged soil is always to be avoided. Do not use clay soils. Ferns need protection from the direct sunshine, and also a moist atmosphere. They thrive in a close glass box, or window-garden, if the conditions can be kept equable.

Some of the best hardy ferns are:

Adiantum pedatum
Asplenium platyneuron
" Trichomanes
Athyrium acrostichoides
" angustifolium
" Filix-femina
Camptosorus rhizophyllus
Cystopteris bulbifera
" fragilis
Dennstædtia punctilobula
Dryopteris cristata
Dryopteris Goldiana
" hexagonoptera
" marginalis
" noveboracensis
" Phegopteris
" spinulosa
" Thelypteris
Onoclea sensibilis
Osmunda cinnamomea
" Claytoniana
" regalis
Polypodium vulgare
Polystichum acrostichoides
Pteretis nodulosa
" Struthiopteris
Pteridium aquilinum
Woodsia ilvensis
" obtusa
Woodwardia areolata
" radicans
" virginica

FERTILIZER: page 153.

FEVERFEW: *Chrysanthemum.*

FICUS: *Fig; Rubber-Plant.*

FIG (*Ficus carica*, native in the Mediterranean region). *Mulberry Family.* Small broad-topped soft-wooded tree grown for its fruit in the warmer parts of the country.

The fig is readily propagated by means of hardwood cuttings taken in autumn, much after the way of grapes. In two to four years, bearing plants may be expected. The trees are usually planted about 18 to 25 feet apart. Figs stand considerable frost, and seedling or inferior varieties grow out-of-doors without protection as far north as Virginia and Maryland. Many of the varieties fruit on young sprouts, and, inasmuch as the roots endure cold, these varieties often give a few figs in the northern states. Figs have been fruited in the open ground in Michigan. In cold countries, however, the figs should be laid down in winter, particularly if the temperature is likely to go ten degrees below frost. For such treatment the trees are made to branch close to the ground, and the branches are then bent down and covered with earth and a mound is made over the central or trunk part.

FILIPENDULA. Meadowsweet. *Rose Family.* Perennial herbs, often called spiræas, making attractive border subjects; the showy terminal panicles of small flowers appear in late spring and summer.

They thrive in sun or partial shade. Propagated by division of old plants and by seeds.

F. camtschatica. 5-10 ft.: white. Asia.

F. hexapetala (*Spiræa* and *Ulmaria Filipendula*). Dropwort. 1-3 ft., fern-like: white. Eu., Asia.

F. purpurea (*Spiræa palmata*). 2-4 ft.: pink or purplish. Japan. Var. *elegans*, white with red stamens.

F. rubra. Queen-of-the-Prairie. 6-8 ft.: pink. E. N. Amer.

F. Ulmaria. Queen-of-the-Meadow. 2-6 ft.: white, often double. Eu., Asia.

FIR, SUMMER-: *Artemisia sacrorum* var. *viride.*
FIREPLANT, MEXICAN: *Euphorbia heterophylla.*
FIREWEED: see *Perennials*, page 202.
FLAX, FLOWERING: *Linum.*
FLEABANE: *Erigeron.*
FLEECE-FLOWER, FLEECE-VINE: *Polygonum.*
FLORAS-PAINTBRUSH: *Emilia.*

FLOWER-BEDS are of many kinds and purposes. If one wants a flower-garden in which there is to be a collection of plants grown for the plants sake, the garden should be placed at the rear or one side, and may be laid out in regular fashion like a vegetable-garden. If the flowers are to be a part of the home picture,—that is, a part of the place itself,—then they may be freely distributed amongst the border planting, or as edgings along groups of shrubbery.

It is rarely, if ever, desirable to place formal or design beds in the lawn in home grounds. The place for carpet-bedding is usually in parks or other public areas, in sections set aside and devoted to that particular purpose, as another section may be devoted to a zoölogical collection, play-ground or to other specific use. Flowers grown in the middle of the lawn have little relation to other planting, and they have no back-ground to show them off to good advantage. It is also difficult to grow them in small beds in the grass, since they are exposed to sun and wind, and the grass roots absorb the food and moisture. In the formal bed, every effort must be made to keep it prim, otherwise it becomes displeasing; whereas, if the flowers are planted more or less promiscuously in large irregular borders, or along the edge of shrubbery, the failure of one or even a dozen plants is not a serious matter. Formal plant-growing should ordinarily be left to those who make a business of it or are specially skilful.

In making a flower-bed, see that the ground is well drained; that the subsoil is deep; that the land is in a mellow and friable condition, and that it is rich. Each autumn it may have a mulch of rotted manure or of leaf-mold, which may be spaded under deeply in the spring; or the land may be spaded and left rough in the fall, which is a good practice when the soil has much clay. However, it is easy to make the ground so rich that plants grow too large and late and do not give sufficient bloom.

Make the flower-beds as broad as possible, so that the roots of grass running in from either side will not meet beneath the flowers and rob them of food and moisture. It is well to add a little commercial fertilizer each fall or spring, or both. Good care and attention to tillage are as much needed to bring good results with flowers as with vegetables and fruits.

It is futile to expect satisfactory bloom under trees or in places where the light comes from only one side. The position for a flower-garden should be as good as a plantation for Indian corn, potatoes or cotton; yet one may choose from catalogues plants that thrive in partial shade. See *Shade Plants*.

FLOWER-OF-AN-HOUR: *Hibiscus Trionum*.
FLOWER-OF-JOVE: *Lychnis Flos-Jovis*.
FOAM-FLOWER: see *Perennials*, page 203.
FŒNICULUM: *Fennel*.

FORGET-ME-NOT (*Myosotis*). *Borage Family*. Low hardy mostly perennial herbs but sometimes treated as annuals, prized for their small bright blue and white flowers, in some kinds running into pink. They make mats of herbage; spring and early summer bloomers; height mostly 8-12 inches.

They are easily grown from seeds, blooming the first autumn or second year. They prosper in a moist or retentive soil and usually benefit by shade part of the day. They thrive exceedingly if grown in a frame like pansies. Old clumps may be divided; and seedlings are likely to come up spontaneously. It is well to give them some protection in winter.

M. scorpioides (*palustris*). Decumbent, to 1½ ft.: bright blue with yellow, pink or white center. Eu., Asia. Var. *semperflorens*, dwarf, blooming all summer.

M. sylvatica. 2 ft., ann. or bien.: blue with yellow center. Eu., Asia. Plants grown as *alpestris* and *dissitiflora* belong here.

FOUR-O'CLOCK (*Mirabilis Jalapa*). *Four-O'Clock Family*. Tropical American perennial with thickened root but grown as a tender annual: an erect branching herb 2-3 feet high, bearing many attractive trumpet-shaped flowers in white, yellow, red and striped that open late in the afternoon; sometimes known as "Marvel-of-Peru." The four-o'clock is a plant of old-fashioned gardens, and always interesting. Drop seeds where the plants are to stand, thinning them 12 to 18 inches apart. There are variegated-leaved forms; also dwarfs. These plants are excellent for the back row in a bed of annuals. In warm parts of the country four-o'clocks are spontaneous.

FOXGLOVE: *Digitalis*.
FRAGARIA: *Strawberry*.
FRAXINELLA: see *Perennials*, page 202.

FREESIA refracta. *Iris Family*. One of the best and most easily handled winter-flowering bulbs. The white or yellowish bell-shaped flowers are produced on slender stalks just above the foliage, to the

number of six to eight in a cluster; the plants grow 12 to 18 inches high, and sometimes they need to be staked. Flowers are very fragrant, and last for a considerable time when picked.

The bulbs are small, and look as though they could not produce a growth of foliage and flowers, but even the smallest mature bulb will prove satisfactory. Several bulbs should be planted together in a pot, box or pan, in October, if desired for the holidays, or later if wanted at Easter. The plants bloom ten to twelve weeks from planting, under ordinary care. No special treatment is required; keep the plants cool and moist through the growing season. The soil should contain a little sand mixed with fibrous loam, and the pot should be well drained. After flowering, gradually withhold water and the tops will die down, after which the roots may be shaken out and rested until time to plant in autumn. Care should be taken to keep them perfectly dry. The bulbs increase rapidly from offsets. Plants may also be grown from seed, which should be sown as soon as ripe, giving blooming specimens second or third year. Easy to bloom in the window. The white form (*Freesia refracta alba*) is the favorite; but latterly good colored kinds have come in as *F. Armstrongii*. See *Bulbs*.

FRITILLARIA. Fritillary. *Lily Family*. Bulbous plants, the commoner species hardy. Only the Crown Imperial (*F. imperialis*) is

Fritillaria and Fuchsia. Left, crown imperial, *Fritillaria imperialis*; right, two forms of *Fuchsia hybrida*, a race of horticultural plants.

generally known in this country. This is an old-fashioned plant, which takes care of itself when once planted. It grows 2-4 feet high in a single strong stem, bearing a whorl of hanging purplish or yellow-red flowers just below the top. It blooms in early spring and in two months the foliage is gone; let the big bulb remain. The other hardy fritillarias are treated like tulips. The Checkered-Lily (*F. meleagris*) grows to 1½ feet and has few-flowered racemes of flowers checkered with purplish or maroon.

FRUIT-GARDEN. Peculiar satisfaction attaches to the growing of fruit in the home garden. There is an element of permanency in fruit-trees, especially the pome-fruits and sweet cherries, and in grapes. Good fruit-trees provide a sky-line, afford shade, constitute bird habitations, and establish a protection to the property. Formerly a fruit plantation was considered to be an essential department of the home area of substantial persons. As early as 1851 Patrick Barry published a complete book of some 400 pages called "The Fruit Garden," and it went to several editions. In the days before experiment stations the testing of new and imported varieties was undertaken largely in personal home properties.

With the growth of cities and the subdivision of real estate, the ease with which fruits can be obtained in the market, the habit of spending much of the time away from home, the prevalence of thievery in various closely settled communities, the inability to secure many of the dessert varieties from nurserymen, the greater attention to improved kinds of ornamental plants, as roses, the increase of diseases and insects, the establishing of a home fruit plantation tends to become infrequent. Nevertheless, the old satisfaction remains for those who have sufficient space and possess the inclination to give the plants adequate attention. It cannot be expected that good fruit can be obtained year by year if the trees are merely planted and then allowed to take care of themselves; this attitude would not make an automobile or a flying-machine worth while.

To grow dessert fruits of one's own, and to be able to understand and admire them, is a major attainment in horticulture, of a higher quality than most of the more or less fugitive efforts in gardening. If one does not possess sufficient area for a complete fruit-garden, there may be space for one part of it, as of strawberries, or bush-fruits, grapes, or one or more of the tree-fruits.

FUCHSIA. *Evening-Primrose Family.* Well known window or greenhouse shrubs, often treated as if herbaceous, and in California and

other mild climates making attractive bushes in the open. They are mostly native in the tropical and warm-temperate parts of the western hemisphere. They are prized for the bright hanging flowers in many sizes, shapes and colors; not fragrant. See page 109.

Fuchsias are readily grown from cuttings. Soft green wood should be used, and it will root in about three weeks, when the plants should be potted. Take care not to have them pot-bound while in growth, but do not over-pot when bloom is wanted. Given warmth and good soil, they will make excellent plants in three months or less. In well-protected partially shady places they may be planted out, growing into miniature bushes by fall. Plants may be kept on from year to year; and if the branches are well cut after blooming, abundant new bloom will come. But it is best to make new plants each year from cuttings, since young plants usually bloom most profusely and demand less care as window subjects.

FUMIGATION: page 139.

FUNGI, FUNGICIDES: see *Insects and Diseases.*

FUNKIA: *Hosta.*

GAILLARDIA. *Composite Family.* American hardy annual and perennial herbs, prized for the showy late summer and autumn bloom, either as border plants or for cutting. The flowers are very showy and lasting in bouquets, as well as on the plants. The colors are yellows and yellow-red, orange, crimson, creamy white.

The annuals are excellent for the home garden, and of the easiest culture. The height is 1-2 feet. Sow seeds where the plants are to bloom, thinning to 1 foot apart.

The perennials usually have flowers larger than the annuals; and they bloom freely the first year if seed is started early. They are also propagated by division or cuttings. If from seed, it should be sown under glass in February or March, setting out the young plants where wanted when danger of frost is over. The cuttings may be made of the new growth in autumn and wintered over in the house. Set the plants $1\frac{1}{2}$-2 feet apart; height mostly 2-3 feet. Mulch in winter.

G. aristata (*grandiflora, maxima*). 2-3 ft., per.: yellow, heads 4 in. across. W. N. Amer.

G. pulchella (*Drummondii*). $1\frac{1}{2}$ ft., ann.: yellow with base of rays rose-purple, heads 2 in. across. W. N. Amer. Var. *picta*, large heads of different shades.

GALANTHUS: *Snowdrop.*

GALAX: see *Perennials*, page 202.

GALEGA: see *Perennials*, page 202.

GRAMASEVAKS TRAINING CENTRE
16 APR 1955
T. KALLUPATTI

GARLIC (*Allium sativum*). *Lily Family.* An onion-like plant the bulbs of which are used for flavoring; little grown in this country except amongst those of foreign birth or extraction. It is multiplied the same as multiplier onions—the bulb is broken apart and each bulbule or "clove" makes a new compound bulb in a few weeks. Hardy; plant in early spring, or in the South in autumn. Plant 2 to 3 inches apart in the row.

GAS-PLANT: see *Perennials*, page 202.

GASTERIA: see *Succulents.*

GAURA: see *Perennials*, page 202.

GAYFEATHER: *Liatris.*

GENTIANA. GENTIAN. *Gentian Family.* Attractive plants of many species, those commonly grown being perennials with blue or purple flowers; the low species are much prized in rock-gardens, many of them being montane.

Gentians require cool temperatures and well-drained soil. Propagated by seeds which must be fresh and are slow in germinating.

G. acaulis. 4 in.: dark blue, solitary. Eu.

G. Andrewsii. 1½-2 ft.: purplish-blue, clustered. Eu., N. Amer.

G. crinita. FRINGED GENTIAN. 2 ft. or less, bien.: bright blue, fringed, solitary. E. N. Amer.

G. cruciata. 10 in.: dark blue, clustered. Eu., Asia.

G. Farreri. 4 in.: blue marked white, solitary. China.

G. Lagodechiana. Dwarf or creeping: pale blue.

G. septemfida. 1½ ft.: dark blue, clustered. Asia.

G. sino-ornata. 7-8 in.: yellowish-white marked purple, solitary. China.

GERANIUM. CRANESBILL. *Geranium Family.* The true geraniums are mostly hardy plants, and therefore should not be confounded with the tender Pelargoniums (which are popularly known as geranium). The geraniums are worthy a place in a border. The cultivated kinds are perennials, and may be transplanted early in the spring from the seed-bed, setting them 2 feet apart; they make attractive spring- and summer-blooming clumps, mostly lilac or purple-blue.

G. grandiflorum. 1 ft. lilac veined purple. Asia.

G. ibericum. 1½ ft.: purple. Asia.

G. maculatum. 1-2 ft.: rose-purple. N. Amer.

G. pratense. 2-3 ft.: purple. Eu. Asia.

G. sanguineum. 1-1½ ft.: reddish-purple. Eu., Asia. Var. *album*, white. Var. *prostratum* (*G. lancastriense*), dwarfer with paler fls.

GERANIUM, STRAWBERRY-: *Saxifraga sarmentosa.*

GERARDIA HYBRIDA: see *Penstemon campanulatus.*

GERBERIA: see *Perennials*, page 202.

GEUM. *Rose Family.* Perennial herbs (as cultivated) of temperate and cold regions and adapted to borders and the low ones to rock-gardens; flowers yellow, white or red, through the summer, shape of strawberry blossoms. Readily grown from seeds.

G. Borisii. Hybrid with bright yellow fls.

G. bulgaricum. 1-2 ft.: bright yellow or orange. Bulgaria.

G. chiloense (*atrosanguineum*). 2 ft.: scarlet, often double, 1½ in. and more across. Chile.

G. coccineum. Bright red, 1 in. across. Eu., Asia.

G. Heldreichii. 8 in.: orange-red. Hort. plant.

G. sibiricum. 10 in.: bright red, coppery. Hort. plant.

GILIA. *Phlox Family.* Mostly hardy annuals, native in the western hemisphere, good for front borders or rockwork, growing from seed very quickly and continuing in flower a long season. They grow well in light soil. Sow seed in autumn or early spring where plants are wanted. The gilias run strongly to rose-color, blues and lilacs; height usually 6 inches to 2 feet.

G. capitata. 2-2½ ft.: light blue, in heads. W. N. Amer.

G. rubra (*coronopifolia*). Standing-Cypress. 2-4 ft., bien., foliage cypress-like: scarlet, in panicles. E. N. Amer.

G. tricolor. 2-2½ ft.: yellow, purple and lilac, in loose clusters. Calif.

GILLENIA: see *Perennials*, page 202.

GIRASOLE: *Artichoke.*

GLADIOLUS. *Iris Family.* Popular summer- and autumn-flowering cormous plants from Old World sources, of late years much improved and now constituting one of the leading florists and fanciers flowers. The corms (bulbs) are planted out in spring as soon as the ground is warm.

They thrive best in moist sandy loam, that has had an application of well-rotted manure the previous year. No manure should be used the year of planting, as it has a tendency to injure the bulbs. Plantings may be made from the time the ground is in condition to work in the spring until late in June. The bulbs should be set 3 to 6 inches deep (the lighter the soil the deeper they should be planted) and 3 to 6 inches apart depending on the size of the corm, or farther apart if large blooms are desired, unless they are to be grown in groups when they may be planted five or six in the space of 1 foot. Shallow planting makes it necessary to stake each spike separately; deeper planted corms do not require staking. When in groups, one stake may be used, setting it in the middle of the circle. Many high-class named varieties are now available from dealers.

Gladioli are increased by cormlets formed around the old bulbs or corms, or they may be grown from seed or natural or mechanical division of the corm. The cormlets should be planted in drills in April or May, and will grow to flowering size in one or two years. In the same way, seed sown early in drills, grown through the summer, the little bulbs taken up and stored through the winter and again planted out, will often make bulbs large enough to flower the second year.

Care should be taken to lift all bulbs before freezing weather, as most varieties are tender. The tops are cut off and the bulbs stored in shallow trays in a dry place (fit for potatoes, but drier) until wanted the following spring.

Recently the gladiolus has become afflicted with many diseases and a few insects. The various corm rots are among the most injurious diseases. They increase in magnitude in storage, and proper ventilation and temperature are preventative measures. All diseased corms should be discarded; the remainder should be treated with mercuric chloride 1 part to 1,000 parts of water for two hours just previous to planting. Thrips are the most common insect. Naphthalene scattered over the bulbs in storage will kill these pests. Spraying the plants with a paris green molasses solution is most effective as a control measure in the field.

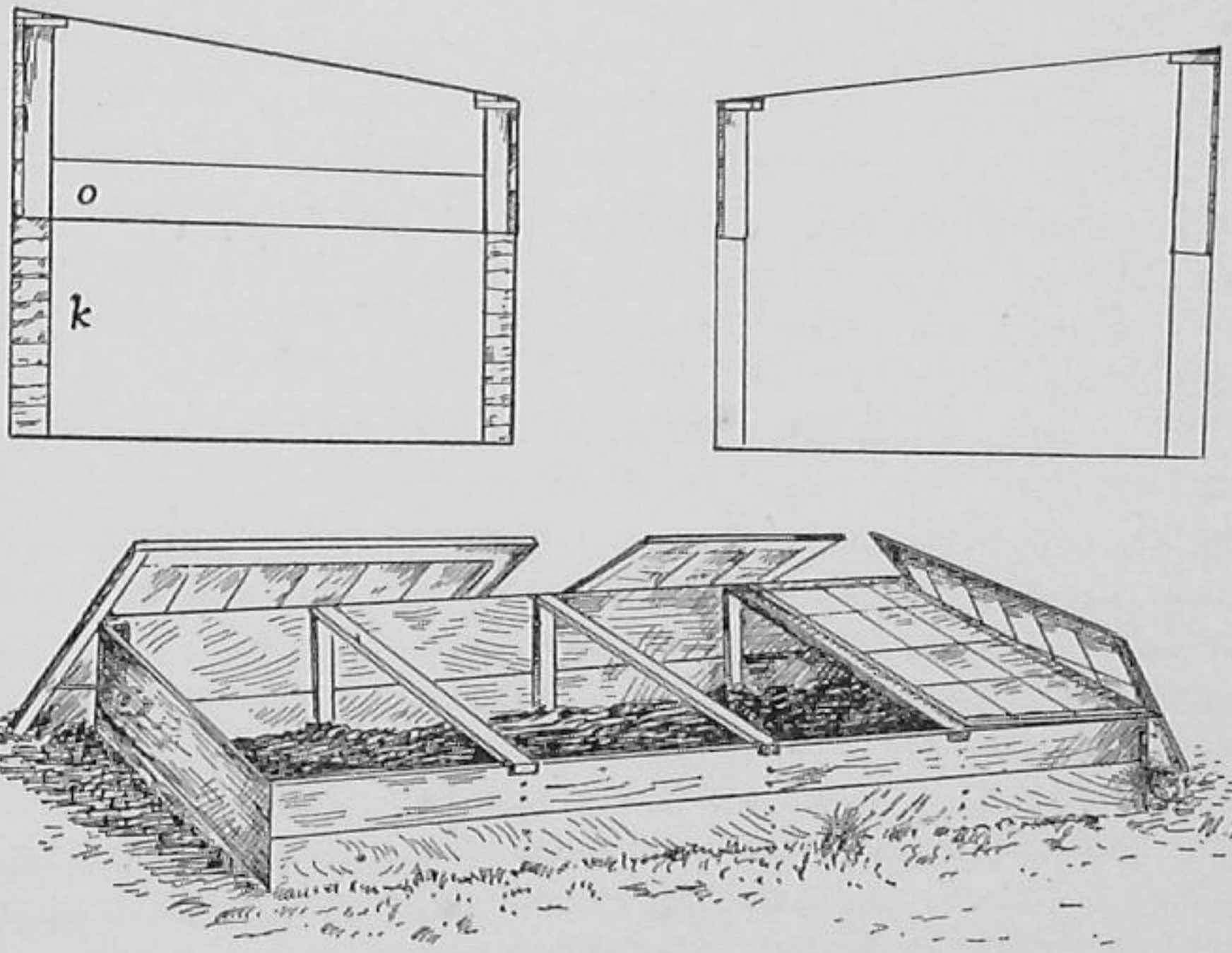
GLASS STRUCTURES. Plants can be started in the residence in boxes or pots or earthen pans, but of course the number is limited. The gardener may wish to have larger facilities, not only for the starting of plants in spring but for prolonging the season in autumn of such subjects as are grown in pots or can be lifted from the field; or he may wish to go still farther and have a regular winter greenhouse.

These glass structures are of two classes: those without artificial heat, that depend on the warmth of the sun and the protection from frosts and winds, capable ordinarily of prolonging the season nearly or about one month at either end and useful also for the over-wintering of semi-hardy subjects; those heated in some way and which may withstand the cold of winter. These two classes of structures may be either frames or houses, although it is only the latter that are ordinarily capable of carrying plants through a northern winter.

A "frame," in garden parlance, is a structure only a foot or two high without bottom and roofed with movable glass sash. It is ordinarily 6 feet wide to accommodate a sash laid lengthwise across it, for a sash is commonly 3 x 6 feet; length of the frame depends on the capacity one desires, but standard dimension is 12 feet long to accommodate four sash. The frame slopes to the south. The back side may be 18 to 24 inches high and front side 3 or 4 inches lower. It is ordinarily made of

boards, but permanent frames may be constructed of brick. It is customary to provide a space of 6 to 10 inches deep between the bed and lower side of the sash or roof, or even more for tall potted plants. The picture shows the details. The area in which the frames are set should be protected from cold and prevailing winds by a rising slope, a high board fence, a building, hedge, or other obstruction. If the frame yard is near the main buildings, it is much more accessible in rainy or snowy times, and the plants are likely to have better care. Water should also be at hand.

Unheated structures are coldframes and cold greenhouses.



Frames. With bottom heat a frame becomes a hotbed; without heat it is a coldframe. If manure space is required for bottom heat, it is placed in the space *K*, with earth layer at *O*. Deep coldframe at right above.

Coldframe is a simple low structure, covered with glass or oiled paper or cloth, in which plants are grown without artificial heat. It differs from the hotbed in the fact that it has no bottom heat. The atmosphere in the coldframe is warmer than that outside, because it is protected from winds and there is more or less of the sun's heat stored in the earth. The details of construction of the coldframe are similar to those for the hotbed.

A coldframe is ordinarily used for later work than the hotbed: seeds may be sown in a coldframe two to three and sometimes four weeks in advance of their sowing in the open; whereas in a hotbed the seeds may

be started one to three months earlier than out-of-doors. Coldframes are sometimes employed for the wintering over of hardy plants started in the fall. For example, cabbage seed may be sown in September in a coldframe and the young plants may be protected therein during the winter. If they are properly grown and hardened off, they will not be injured by the winter, even though they freeze. Lettuce and sometimes cauliflowers are carried over in the same way. Coldframes may also receive plants that have outgrown the hotbed and must be transplanted. Plants that need hardening off may also be transplanted from the hotbed into the coldframe. The coldframe in these cases is an intermediate stage between the hotbed and the open field. One coldframe of at least two sash (which will be an area about 6 x 6 feet) answers many purposes in the home garden, providing a starting place for seeds of tender and half-hardy plants, for the sprouting of cannas, dahlias and others that require a long season, and for the reception of plants in flats or pots when the ground is not yet ready to receive them. A four-sash frame (6 x 12 feet) affords double the satisfaction and is sufficient for most home gardens.

Cold greenhouse is really a coldframe large enough to stand up in. Usually it has a gable roof, both slopes being of glass. Hotbed sash may be used for such roofs, placed on a ridge-and-rafter framework. If one has 6-foot sashes, they may be made the roofs of a house about 9 feet wide outside and say 7 feet from ground level to peak. This gives an inside clear space of about 8 feet, which allows a central walk 2 feet wide and a bench either side 3 feet wide. Entrance may be at the end, even if necessary to lower the ground level inside by one step. Ventilation is provided from the ends, and every other sash, alternating, may be hinged at the top so that it can be raised somewhat at the bottom. Such a house can be heated temporarily by an oil stove if provision is made to pipe away the gases. One may have much satisfaction in such a simple structure and be able to prolong the gardening season by two months and perhaps more.

Hotbed is a frame or box that has artificial heat and a transparent covering and in which plants are grown. It differs from a coldframe in having artificial bottom heat. This bottom heat is supplied by fermenting organic matter, hot air, hot water or steam conveyed in pipes, and electricity.

The time of starting a hotbed depends on the kinds of plants to be grown, the time one wishes to gain, and something, also, on the kind of heat employed. The hardier the plant the earlier it can be started. In the latitude of New York, from the first to the middle of March is the usual time for starting a hotbed. In this bed are sown seeds of early

flowers and such vegetables as cabbage, cauliflower, tomato. In the raising of plants in the hotbed, it is essential that they do not become "drawn" or "leggy." To prevent this, they must be given plenty of room, thorough ventilation on all pleasant days, and not too great heat. It is well to transplant them once or twice before they are finally set in the field, particularly if they are started, in New York, as early as the first or middle of March. When transplanted, they can be set in another hotbed or in a coldframe; but it is important that the succeeding frames in which they are set should not be very much colder than the one in which they grew, else they may become stunted. It is well, however, to transplant them into a gradually cooler and freer atmosphere to harden them off, that they may go into the open ground without danger. On every pleasant day, raise the sash at the upper end 1 or 2 inches, or if the sun shines brightly and the wind does not blow, give even more air; and eventually strip off the sashes entirely. It is important that the plants are not kept too close and grown too soft. It is usually advisable to sow cabbage, lettuce and hardy plants in different frames from tomatoes and other tender things, in order that the proper requirements may be given to each. At night the hotbeds (at least early in the season) need more protection than the glass sash. It was formerly the custom to use thick rye-straw mats to cover them, but it is now common practice to use straw matting or other fabric purchased of carpet dealers. This is rolled out on the sashes at night in one or two thicknesses; and if the weather is sharp, board shutters, the size of the sash, may be laid on top.

Three types of heat are employed in hotbeds. (1) The older method was the use of fermenting horse manure. This is still employed, and manure is usually available to market-gardeners in the vicinity of large cities. (2) Pipes carrying steam or hot water may be extended from a greenhouse or the residence, and there are also small portable fuel heaters available for direct hotbed heating. (3) Electric heating of hotbeds has been developed in recent time, the cost of operation depending of course on the price of current in the particular locality. Probably with the scarcity of horse manure in the ordinary home garden, the better plan is to consider one of the mechanical methods of heating the hotbed.

In starting plants in a hotbed, one must not expect to gain as much time in the crop as one gains in the starting of the seeds: that is, if seeds are started two months ahead of the normal season, one will not gain two months in the ripening of the crop. Ordinarily, one cannot expect to gain much more than one-half the time, particularly if the plants are transplanted to the field from the hotbed.

Some plants may be grown to maturity in the hotbed, as lettuce and radishes. After hotbeds have been emptied of their plants, the sashes may be stored away, and the frames used for the growing of a crop of melons or cucumbers.

Greenhouse. In America the word greenhouse has come to be applied to all kinds of glass-houses in which plants are grown. Originally the word was applied to those houses in which plants are merely preserved or kept green in the winter. Other types of glass-houses are the conservatory, in which plants are kept or displayed; stove or hothouse, in which plants are grown in a high temperature; the propagating pit, in which the multiplication of plants is carried forward; and the houses of various temperatures, as cold, cool and intermediate. The principles that underlie the construction and management of glass-houses are too extensive to be discussed here. The reader should refer to special books on the topic.

The smaller the glass-house the more difficult it is to manage, because it is likely to be more variable in temperature, moisture and other conditions. This is particularly true if the house is a small lean-to against the south side of a dwelling, for it becomes very hot at midday and comparatively cold at night. To moderate the heat in these little houses, it is ordinarily advisable to use ground glass for the roof or to whitewash it. The house conservatory may be heated by a coal stove, but the best results are rarely to be attained in this case. A stove is likely to leak gas, and the temperature is more or less uneven. The best results are to be attained when the conservatory is heated by steam or hot water, piped in the modern fashion with wrought iron pipes, or by an electric installation. If the conservatory is heated from the heater that supplies the dwelling house, it should have an extra amount of pipe; otherwise it will be necessary to keep the dwelling house too hot for comfort in order to maintain the conservatory at its proper temperature. It is always best, when practicable, to heat the conservatory with a separate apparatus. There are various small hot water and steam heaters, the size of coal stoves, that are excellent for the purpose. For a small conservatory, hot water is usually preferable to steam, since it is less likely to fluctuate. For large establishments, however, the steam is usually better.

GLOBE-FLOWER: *Trollius europæus.*
GLOBULARIA: see *Perennials*, page 202.
GLORY-OF-THE-SNOW: *Chionodoxa.*

GLOXINIA (*Sinningia speciosa*). *Gesneria Family.* Choice greenhouse tuberous-rooted rich-flowered perennials, sometimes seen in window-gardens but really not adapted to them; Brazilian.

Gloxinias must have a uniform moist and warm atmosphere and protection from the sun. They will not stand abuse or varying conditions. Propagated often by leaf-cuttings, which should give flowering plants in one year. From the leaf, inserted half its length in the soil (or sometimes only the petiole inserted) a tuber arises. This tuber, after resting until midwinter or later, is planted and flowering plants soon arise. Gloxinias also grow readily from seeds, which may be germinated in a temperature of about 70°. Flowering plants may be had in a year if seeds are sown in late winter or early spring. This is the usual method. Soil should be porous and rich.

GOATS-RUE: see *Perennials*, page 202.

GOLDEN-EARDROPS: *Dicentra chrysantha.*

GOLDEN-GLOW: *Rudbeckia laciniata* var. *hortensia.*

GOLDENROD (*Solidago*). *Composite Family.* The goldenrods of the wayside and fields are so familiar that the thought of bringing them into the garden is distasteful to some persons. But if given a suitable place in a border, they have great possibilities. A large clump against a hedge of green, or massed behind a well grown plant of the blue-flowering wild asters, makes a striking contrast. They bloom late in the season, and the rich yellow and golden colors and the graceful forms are pleasing. If soil is too fertile, they may run too much to foliage. Species are many.

Goldenrods grow more vigorously and the blooms are larger if the roots are divided every third or fourth year. Some species are catalogued by nurserymen, and the stock is likely to be superior to the wild types. Goldenrods range in height from 2 to 6 feet. All are easily propagated by division. Transplant in autumn, if convenient, although spring planting may be equally successful.

GOLDEN-TUFT: *Alyssum saxatile.*

GOMPHRENA globosa. Globe Amaranth. *Amaranth Family.* A useful tender annual everlasting for winter bouquets, native in Old World tropics. It is a branching plant 1-1½ feet high bearing many clover-like but durable heads in violet, red, white, yellowish. It is also well adapted to bedding.

Seeds may be placed in heat in March, the plants transplanted once before setting out to cause them to grow stocky and branching; or they may be sown in a warm place where the plants are to grow. The flowers, to retain their colors, should be cut before fully expanded and dried in a

dark airy place. See *Everlastings*. Set the plants 18 inches apart. The term Bachelors-Button is sometimes applied to this plant, as also to the cornflower (*Centaurea Cyanus*).

GOOSEBERRY. *Saxifrage Family*. Two marked types of gooseberry are in cultivation, the American kinds derived directly or indirectly from *Ribes hirtellum*, native in the eastern United States, and the European kinds derived from *R. Grossularia* of the Old World. The American kinds are much smaller-fruited but are little subject to the destructive mildew.

Currants and Gooseberries.

There is now no reason why, with a little care, good crops of many of the best English varieties may not be grown. The price for good fruits of gooseberry is usually remunerative, as the market is rarely overstocked by the sudden ripening of the crop, since the fruits ripen through a long season. A large part of the crop is picked green for culinary purposes.

Leading varieties are Poorman (red), Chautauqua (green), Industry (red) and Fredonia (dark red), in order of season of ripening.

The propagation of the gooseberry is similar to that of the currant, although the practice of earthing up a whole plant, causing every branch thus covered to throw out roots, is common with the European varieties. The rooted branches are cut off the following spring and planted in nursery rows or sometimes directly in the field. In order to succeed with this method, the plant should have been cut back to the ground so that all the shoots are yearling.

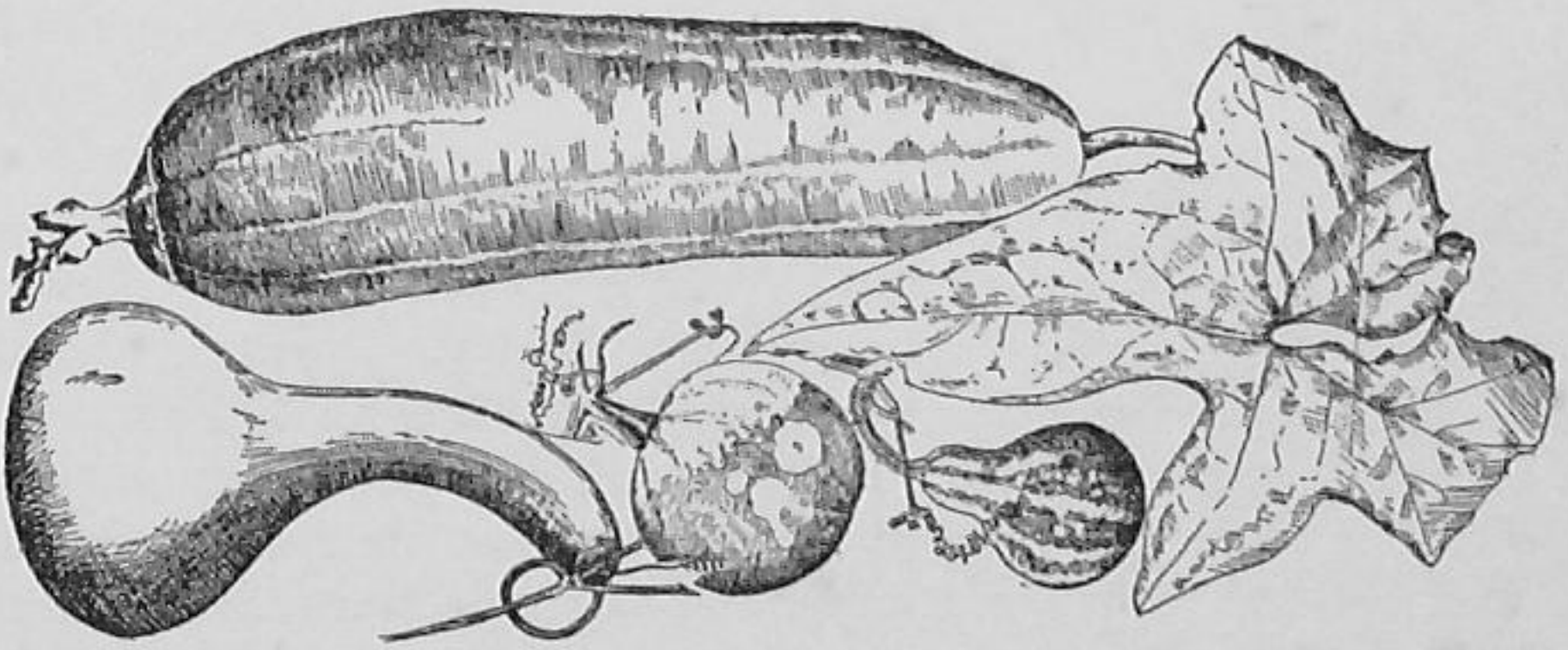
Pruning is essentially the same as for the currant (which see); and the treatment of the currant-worm is the same as for that fruit.

Gooseberries should be set (either in fall or early spring) 3 to 4 feet apart; rows 5 to 7 feet apart. Choose a rich rather moist soil. The tops need no winter protection. If mildew and worms are to be kept in check, spraying must be begun with the first sign of trouble and be thoroughly performed.

The leading disease of gooseberries is mildew, particularly on varieties of the European type: spray every two weeks or less early in the season with lime-sulfur or bordeaux. Just as the leaves are expanding, use rotenone; this is a recent remedy advised in these fruits in place of the arsenates for the worms. Directions come with the material.

GORMANIA: see *Sedum.*

GOURDS are valuable rapid-growing pumpkin-like screen vines, the curious fruits of many varieties adding much to their attractiveness. Cultivation is the same as for melons or squashes. They grow 10 to 15 feet. Provide a chicken-wire trellis; or let them run on a brush pile. They are tender annuals, of undetermined origin; they give name to the Cucurbitaceæ or Gourd Family.



Gourds. Top and leaf, towel, dishcloth or rag gourd, *Luffa cylindrica*; lower left, white-flowered dipper gourd, *Lagenaria leucantha*; lower center, apple and pear yellow-flowered gourds, *Cucurbita Pepo* var. *ovifera.*

The foregoing paragraph alludes to the common yellow-flowered gourds. Another class of gourds is the produce of *Lagenaria leucantha* (*vulgaris*), comprising the dipper, bottle, calabash and sugar-trough gourds and Hercules club. This species is a musky-scented somewhat sticky vine running 20 feet and more, bearing prominent white flowers. It is native in Old World tropics, but has run wild elsewhere. It is a tender annual; seeds are usually planted where the vines are to grow.

Very different plants are the Luffas, often known as towel, dishcloth and rag gourds, and vegetable-sponge, from the soft dried insides

of the ripe fruits used as sponges. They are tender climbing tropical annuals, grown from seeds planted where the vines are wanted. The common one is *L. cylindrica* with slender fruits 1-2 feet long.

GOUTWEED: see *Perennials*, page 201.

GRAFTING: page 222.

GRAPE. *Vine Family.* Two cultural groups of grapes are recognized, the American kinds derived from various native species, and the European kinds derived from the Old World *Vitis vinifera*, the wine grape. Outside of California and adjacent southern regions, practically all the vineyard grapes are of North American origin or hybrids with *V. vinifera.* The leading native parent is *Vitis Labrusca.*

One of the surest of fruit crops is the grape, a crop each year being reasonably certain after the third year from the time of setting the vines. The American grapes do well on any soil that is under good cultivation and well drained. Avoid over-stimulating manures. The exposure should be to the sun; and the place preferably should admit of cultivation on all sides. One- or two-year-old vines should be planted, preferably in early spring. At planting the vine is cut back to two or three eyes, and the roots are well shortened in. The hole in which the plant is to be set should be large enough to allow a full spreading of the roots. Fine soil should be worked around the roots and firmed with the feet. If the season should be dry, a mulch of coarse litter may be spread around the vine. If all the buds start, the strongest one or two may be allowed to grow. The canes arising from these buds should be staked and allowed to grow through the season; or in large plantations the first-year canes may be allowed to lie on the ground. The second year one cane should be cut back to the same number of eyes as the first year and all others removed. After growth begins in the spring, two of the strongest buds should be allowed to remain. These two canes now arising may be grown to a single stake through the second summer, or they may be spread horizontally on a trellis. These are the canes which form the permanent arms or parts of the vine. From them start the upright shoots which, in succeeding years, are to bear the fruits.

Success in grape growing depends greatly on the pruning. To understand the pruning of American vineyard grapes, the operator must grasp this principle: *Fruit is borne on wood of the present season, which arises from wood of the previous season.* To illustrate: A growing shoot or cane of 1933 makes buds. In 1934 a shoot arises from each bud; and near the base of this shoot the grapes are borne (1 to 4 clusters on each shoot). While every bud on the 1933 shoot may produce shoots or canes in 1934, only the strongest of these new canes bear fruit. The

skilled grape grower can tell by the looks of his cane (as he prunes it in winter) which buds will give rise to the best grape-producing wood the following season. The larger and stronger buds usually give best results; but if the cane itself is very big and stout, or if it is very weak and slender, he does not expect good results from any of its buds. A hard well-ripened cane the diameter of a man's little finger is the best size.

Another principle to be mastered is this: *A vine should bear only a limited number of clusters,*—say 30 to 80. A shoot bears clusters near its base; beyond these clusters the shoot grows on into a long leafy cane. An average of two clusters may be reckoned to a shoot. If the vine is strong enough to bear 60 clusters, 30 good buds must be left at the pruning (which is December to late February).

The essential operation of pruning a grape vine, therefore, is each year to cut back a limited number of good canes to a few buds, and to cut off entirely all the remaining canes or wood of the previous season's growth. If a cane is cut back to two or three buds, the stub-like part that remains is called a spur. Present systems, however, cut each cane back to eight or ten buds (on strong varieties), and three or four canes are left,—all radiating from near the head or trunk of the vine. The top of the vine does not grow bigger from year to year, after it has once covered the trellis, but is cut back to practically the same number of buds each year. Since these buds are on new wood, it is obvious that they are each year farther and farther removed from the head of the vine. To obviate this difficulty, new canes are taken out each year or two from near the head of the vine, and the two-year or three-year-old wood is cut away.

The training of grapes is a different matter. A dozen systems of training may be practiced on the same trellis and from the same style of pruning,—for training is only the disposition or arrangement of the parts. On arbors, it is best to carry one permanent arm or trunk from each root over the framework to the peak. Each year the canes are cut back to short spurs (of two or three buds) along the sides of this trunk.

Grapes are set 6 to 8 feet apart in rows which are 8 to 10 feet apart. A trellis made of two or three wires is the best support. Slat trellises catch too much wind and blow down. In very cold climates, the vines may be taken off the trellis in early winter and laid on the ground and lightly covered with earth. Along the boundaries of home lots, where grapes are often planted, little is to be expected in the way of fruit because the ground is not well tilled; but if one side of the row can be

tilled and fertilized with a nitrogen fertilizer good results may be expected, other things being equal. For mildew and rot, spray with bordeaux mixture.

Concord is the most cosmopolitan vineyard variety in the American grapes, but its quality is not the best. For the home garden in the North, a good selection may be made from the following, given in order of season of ripening: Portland (white), Fredonia (black), Worden (black), Brighton (red), Delaware (red), Niagara (white), Concord (black), Sheridan (black), Brocton (white), Catawba (red).

Grapes are sprayed with bordeaux mixture just before the leaves appear or before the buds are open if black-rot has been prevalent. Just before the blossoms expand, when the new shoots are 8-10 inches long, spray with bordeaux mixture; use the mixture again just after blossoming, to which arsenate of lead may be added for rose-chafer, flea-beetle, and other insects, and this spray may be repeated in two weeks; again in ten days or two weeks the vines may be sprayed, omitting the arsenate. If black-rot is bad, additional sprayings of bordeaux may be necessary.

Grapery.—The European grapes on their own roots do not generally thrive out-of-doors in eastern America. Grape houses are necessary, with or without artificial heat. Fruit for home use may be grown very satisfactorily in a cold grapery (without artificial heat). A simple lean-to against the south side of a building or wall is cheap and serviceable. When a separate building is desired, an even-span house running north and south is preferable. There is no advantage in having a curved roof, except as a matter of looks. A compost of four parts rotted turf to one of manure is laid on a sloping cement bottom outside the house, making a border 12 feet wide and 2 feet deep. The cement may be replaced with rubble on well-drained soils, but it is a poor makeshift. Every three years the upper 6 inches of the border should be renewed with manure. The border inside the house is prepared likewise. Two-year-old potted vines are planted about 4 feet apart in a single row. Part of the roots go through a crevice in the wall to the outer border and part remain inside; or all may go outside if the house is desired for other purposes. One strong cane is trained to a wire trellis hanging at least 18 inches from the glass, and is cut back to 3 feet the first year, 6 the second, and 9 the third. Do not be in a hurry to get a long cane. Pruning is on the spur system, as recommended for arbors on page 123. The vines are usually laid on the ground for winter and covered with leaves or wrapped with cloth.

As soon as the buds swell in early spring, tie the vines to the trellis and start out one shoot from each spur, rubbing off all others. After the

berries begin to color, however, it is better to leave all further growth to shade the fruit. Pinch back each of these laterals two joints beyond the second bunch. To keep down red-spider and thrips, the foliage should be sprayed with water every bright morning except during the blooming season. At least one-third of the berries should be thinned from each bunch; do not be afraid of taking out too many. Water the inside border frequently all through the summer, and the outside occasionally if the season is dry. Mildew may appear in July. The best preventives are to syringe faithfully, admit air freely, and sprinkle sulfur on the ground; spraying may be employed.

Fruit may be kept fresh on the vines in a warm (or artificially heated) grapery until late December; in a coldhouse it must be picked before frost. After the fruit is off, ventilate from top and bottom and withhold water, so as to ripen the wood thoroughly. Along in November the canes are pruned, covered with straw or wrapped with mats and laid down till spring. Black Hamburg is a standard varietity for a cold grapery; Bowood, Muscat, Muscat of Alexandria and Chasselas Musque may be added in the warmhouse. Good vines will live and bear almost indefinitely.

GRAPEFRUIT (*Citrus paradisi*, native in Asia). *Rue Family*. It is sensitive to cold, and in the United States the commercial culture is prominently developed in southern peninsular Florida, and even there the choice of location is very important; grown also abundantly in southern Texas and southern California. It thrives on light sandy or porous well-drained land. Trees are set 18-25 feet apart, and they usually begin to bear in three or four years and reach full bearing at about ten years. They are propagated by budding on seedling stocks.

GRASSES of various kinds are grown for ornament, the most popular types being the hardy perennials, which make attractive clumps in the lawn or border. The best of the permanent kinds in the North are the various sorts of Eulalia (properly Miscanthus). When once established they remain for years, making large and bold clumps. The striped kind, or zebra-grass, is particularly good. These grasses thrive in any good soil. They grow 4 to 7 feet high. The great reed, *Arundo Donax*, is a bold subject and perfectly hardy, with a variegated form. In a rich and rather moist soil, it grows 10 to 12 feet high when well established. Pampas-grass is excellent in the middle states and South and in California. Plume-grass (Erianthus) is a striking lawn plant south of New York. Ribbon-grass (Phalaris) is common in old yards. Some of the pennisetums are ornamental in borders. Some of the big native grasses and sedges make attractive lawn clumps.

Grasses are also grown for dry or everlasting bouquets. For this purpose, small-growing delicate annual species are mostly used. Good types are species of agrostis, briza, bromus, eragrostis, lagurus, aspris (aira), lamarckia. Jobs-tears or Coix is interesting for the ornamental seeds, grown as an annual but perennial in warm countries; the large seed-like bodies are used as beads and otherwise. Seeds of these and of others are sold by seedsmen. With ordinary treatment, they thrive in any garden soil.

For the use of grasses in sod-making, see *Lawn*.

GREENHOUSE: see page 118.

GREVILLEA robusta. Silk-Oak. *Protea Family.* As grown in houses and by florists, the juvenile state of a large Australian tree which is also planted as a street tree in the warm parts of the country. The plants grow freely from seed, and until they become too large are as decorative as ferns. They withstand much abuse. They are useful as jardinière subjects. Seeds sown in spring give handsome plants by the next winter. When the plants become ragged they are thrown away. Formerly much raised by florists, but now little seen.

GROUND-COVER. It is a general desire to cover the ground about buildings, and also as a background for artistic planting. Other cover than grass is often necessary, as in shade and under certain kinds of trees. Native and spontaneous ground-covers can be readily utilized. Usually nature covers the bare spots, in countries of liberal rainfall. Old cemeteries and other neglected properties are likely to yield useful suggestions. The periwinkle or ground-myrtle (*Vinca minor*) is one of the best covers for shade; it is hardy, persistent, glossy-leaved, evergreen, dense, and has blue flowers in spring. The common woods blue violet (as *Viola papilionacea*) makes an excellent marginal cover and takes care of itself. Lily-of-the-valley thrives in shade and holds its foliage till autumn. Moneywort and ground ivy (*Lysimachia Nummularia* and *Nepeta hederacea*) make dense covers, invading even shady corners; they are likely to become weeds, however, and one must be on guard, particularly if they become established in lawns. The true or English ivy allowed to run on the ground provides a complete evergreen cover where it is hardy. The Japanese pachysandra is another good evergreen cover-plant. The native woodsy hog-peanut (*Amphicarpæa*) makes a deep cover on the shady side of a building. Woods ferns are to be considered. Where fully hardy, Japanese honeysuckle (*Lonicera japonica*) makes a heavy covering when allowed to run on the ground. The introduced coltsfoot or tussilago, although somewhat

weedy, makes a better appearance than banks of gravel and rubbish. The clumps of hosta (funkia) also persist well in shade. *Mazus reptans* (erroneously grown as *rugosus*), available of nurserymen, as also certain of the carpeting sedums, make interesting covers in shade. Other plants to be mentioned for shady spots are woodruff (an asperula), wild ginger (asarum), the somewhat weedy creeping commelinas (*C. communis* and *C. nudiflora*), the running native dichondra.

Other plants adapted for ground-cover are *Cymbalaria muralis*, *Euphorbia Cyparissias*, *Mentha Requieni*, *Nepeta Mussini*, *Thymus Serpyllum*, *Veronica repens*. See regular alphabetic entries.

In certain areas, as in courts and similar places, flat stones may be used to advantage as a ground-cover with liberal spaces between for grass. This lends a personal touch to the premises, and the moisture held by the stones may support greenery where otherwise it might not persist.

Another kind of requirement is to find a way of covering garden beds that have spent their vegetation in early autumn. If one wants temporary greenery for the autumn and open days of winter, one may sow winter wheat, digging it up or spading it under in spring.

Plants adapted for ground-cover not regularly treated in the text are:

Epigæa repens. Trailing Arbutus. Evergreen with creeping stems, bright green lvs. and small fragrant white or pink fls. E. N. Amer.

Epimedium. Low semi-evergreen perennials useful for planting under trees, with pinnate lvs. and small fls. in red, pink, white and yellow borne in racemes in spring. Names appearing in the trade are *alpinum*, *bicolorum*, *macranthum* and its varieties *niveum*, *roseum*, *violaceum*, and *pinnatum*.

Herniaria glabra. Trailing per. forming mats and adapted to sandy soil, the foliage usually bronzy-red in winter. Eu., Asia.

Lysimachia Nummularia. Moneywort. A creeping per. with round lvs. and yellow fls. Eu. but naturalized E. N. Amer.

Mitchella repens. Partridge-Berry. A native trailing evergreen with shining dark green lvs. often lined with white, white fls. and scarlet berries: creeps flat on the ground; a woods plant.

Pachysandra terminalis. Japanese Spurge. Procumbent evergreen much grown for ground-cover both in shade and sun, the foliage often bordered and variegated with white. Japan.

Sagina subulata. Evergreen tufted per. forming a dense cover, with very small lvs. and white fls. Corsica.

Santolina Chamæcyparissus (*incana*). An evergreen subshrub becoming 2 ft. high, with very fine silvery-tomentose lvs. and yellow fls. in heads. Medit. region.

GROUNDSEL: *Senecio*.

GUMBO: *Okra*.

GYPSOPHILA. *Pink Family*. Annual and perennial hardy slenderly branching summer-blooming herbs of good habit, native in the Old World, widely used for the mist-like effect in bouquets; also grown in rock-gardens and borders.

For the annuals seeds may be sown directly in the open; thin to 8 to 12 inches. The perennials are increased by seeds, division and cuttings. They do well even in poor soil.

G. acutifolia. 1½-3 ft., per.: white. Caucasus.

G. cerastoides. 4 in., creeping, per.: white veined pink. Himalayas.

G. Ehrlei. Double-flowered form of *paniculata.*

G. elegans. 1½ ft., ann.: white or pink. Caucasus.

G. muralis. 1 ft., ann.: pink. Eu.

G. paniculata. BABYS-BREATH. 2-3 ft., per.: white. Eu., Asia. One of the Galiums is also called Babys-Breath.

G. repens. 6 in., prostrate, per.: white or pink. Eu. Var. *rosea*, rose. Var. *monstrosa* is larger.

HAWORTHIA: see *Succulents.*

HEDERA: *Ivy.*

HEDGES are fences or dense division lines made of growing woody plants. They are much less used in this country than in Europe, and for several reasons. The climate is relatively dry, and most hedges do not thrive so well here as there; labor is high-priced, and the trimming is likely to be neglected; farms are so large that much fencing is required; timber and wire are cheaper than live hedges. However, they are used with good effect about home grounds.

To obtain a good hedge, it is necessary to have a thoroughly well-prepared deep soil, to set the plants close, and to shear them at least twice every year. For evergreen hedges the most serviceable plant in general is the arbor-vitæ. The plants may be set 1 to 2½ feet apart. For choice hedges about the grounds, particularly outside the northern states, some of the retinisporas are very useful. One of the most satisfactory coniferous plants for hedges is the common hemlock, which stands shearing well and makes a very soft and pleasing mass. The plants may be set 1 to 3 feet apart. Other plants that hold their leaves and are good for hedges are the common box and the privets. Box hedges are the best for low borders about walks and flower-beds. The dwarf variety can be kept down to a height of 6 inches to a foot for any number of years. The larger-growing varieties make excellent hedges 3, 4 and 5 feet high. The ordinary privet or prim holds its leaves well into winter in the North. The so-called Californian privet holds its leaves rather longer and stands better along the seashore, but it is less hardy than the other. In the southern states, nothing is better than *Citrus* (or *Poncirus*) *trifoliata.* Certain of the barberries and mahonias are useful, particularly *Berberis Thunbergii* which is partially evergreen.

For hedges of deciduous plants, the most common species are the buckthorn, the European thorn-apple or cratægus, osage-orange, and various kinds of roses, particularly *Rosa rugosa.*

Hedges should be trimmed the year after they are set, although they should not be cut very closely until they reach the desired or permanent height. Thereafter they should be sheared into the desired form in spring or fall. If the plants are allowed to grow a year or two without trimming, they lose the lower leaves and become open and straggly. Osage-orange and some other plants are plashed—that is, the plants are set at an angle rather than perpendicularly, and they are wired together in such a way that they make an impenetrable barrier just above the surface of the ground.

HELENIUM. SNEEZEWEED. *Composite Family.* Tall hardy native perennials (as commonly cultivated) useful for flower-gardens and rear borders; flower-heads yellow or brownish, blooming late summer and autumn.

Of easy cultivation, doing well in sunny situations. Propagated by seeds, division and cuttings.

H. autumnale. 4-6 ft.: yellow. E. N. Amer. Var. *rubrum*, deep red. Var. *superbum*, flowers large.

H. Bigelovii. 4 ft.: rays yellow, disk brownish. Calif.

H. Hoopesii. 2-3 ft.: yellow. W. N. Amer.

HELIANTHUS: *Sunflower; Artichoke.*

HELICHRYSUM bracteatum. STRAWFLOWER. *Composite Family.* Perhaps the best of the hardy annuals grown in home gardens as immortelles or everlastings. It is an Australian plant, thriving readily in an open sunny situation and in any ordinary soil; the varieties are ornamental in the flower-garden as well as very useful in dry bouquets. It grows 1½-3 feet or more tall, erect, branching, producing bright heads in yellow, rose, red, white, in summer and autumn. Seeds may be sown where the plants are to stand; thin to 12-18 inches apart for best results. For use as everlasting, cut with long stems before heads are expanded, remove the leaves, and hang in a dry place. See *Everlastings.*

HELIOPSIS. *Composite Family.* Sunflower-like native hardy perennials making good cut-flower and border plants, blooming in summer and autumn.

They thrive in sunny locations. Propagated by seeds, cuttings and division.

H. helianthoides (*lævis*). 3-5 ft.: heads numerous. E. N. Amer. Var. *Pitcheriana*, deeper yellow.

H. scabra. 3-5 ft., rough-hairy: heads few or solitary. E. N. Amer. Var. *excelsa*, chrome-yellow. Var. *gratissima*, pale yellow. Var. *zinniæflora*, double.

HELIOTROPE. *Borage Family.* Favorite house or border plants, growing readily from cuttings or seeds, and producing quantities of fragrant violet, purple or white flowers. Two species are in culvitation, from Peru (*Heliotropium arborescens* and *corymbosum*, the former commonly but inaccurately known as *H. peruvianum*). They are half-hardy branching perennials but treated mostly as annuals, beginning to bloom when small, usually grown 1-3 feet high but if retained to greater age may be trained on rafters or posts in the conservatory.

One of the best methods of cultivation is to set a strong plant in the border and peg the new growths to the ground, where they will root and form a perfect mat, flowering profusely in the autumn months until frost. They endure the temperature of a living-room well if the room is not too dry. Red-spider is a natural enemy of the heliotrope, and when once it obtains a foothold is a very difficult pest to manage, but frequent syringing with water will keep it in check. A light rich soil and liberal heat are requirements for heliotropes. If used for bedding in the open garden, they may be grown from seeds which, if started inside, should give blooming plants by midsummer or later.

Garden-heliotrope is *Valeriana officinalis.*

HELIPTERUM. *Composite Family.* Annual half-hardy everlastings from Australia, the white, violet or rose chaff-like heads used for dry bouquets. Height 1-2 feet, erect. See *Everlastings.*

Seeds should preferably be started in a hotbed or window and plants set 1 foot apart when danger of frost is past; but those sown in the open usually produce good autumn-blooming plants. The flowers should be gathered when about half expanded and hung in the shade to dry.

H. Manglesii (*Rhodanthe Manglesii*). 1-1½ ft.: lvs. ovate: pink or white.

H. roseum (*Acroclinium roseum*). 2 ft.: lvs. narrow: rose or white.

HELLEBORUS niger. CHRISTMAS-ROSE. *Crowfoot Family.* Low hardy perennial of Europe, prized as one of the earliest plants to bloom, the flowers appearing even in winter when the weather is mild. It may be had in flower at the holidays if grown in a frame and protected. The usual time for it to flower in the open border is the earliest days of spring. It will continue to bloom for many years if grown in a shady place. Roots may be divided as an increase is wanted. It may also be grown from seeds; and seedlings may be expected to bloom a year from the spring in which they are sown. Height 6 to 18 inches. Flowers white or purplish, durable.

HEMEROCALLIS. DAY-LILY. *Lily Family.* Hardy and durable more or less tuberous-rooted perennials of eastern Asia blooming in

spring and summer, producing many long narrow grass-like leaves. There are several species, with colors ranging from bright yellow to rich orange. The heights range from 1½ to 4 or 5 feet. Not to be confused with the plantain-lilies (see *Hosta*), which have broadened leaves and blue or white flowers.

Any good garden soil is satisfactory. Propagated by division and sometimes by seeds.

H. aurantiaca. Golden Summer Day-Lily. 2-3 ft.: orange, late spring and summer. Japan. Var. *major,* larger.

H. citrina. Long Yellow Day-Lily. 4 ft.: lemon-yellow, fragrant, summer. China.

H. Dumortierii. Narrow Dwarf Day-Lily. 1-2 ft.: pale orange, fragrant, spring. Japan.

H. flava. Tall Yellow Day-Lily. 3 ft.: yellow, fragrant, spring. Asia.

H. fulva. Tawny Day-Lily. 3-6 ft.: orange-red, summer. Eu., Asia. Var. *Kwanso,* double.

H. Middendorffii. Broad Dwarf Day-Lily. 1-2 ft.: pale orange, fragrant, spring. Siberia.

H. serotina (*Thunbergii*). Late Yellow Day-Lily. 2-3 ft.: lemon-yellow, summer. Japan.

Day-lilies. Left, plant and spray of *Hemerocallis flava*; center, two flowers of *H. serotina*; upper right, *H. aurantiaca*; lower right, *H. Middendorffii.*

HEMP, BOWSTRING-: *Sansevieria.*
HEN-AND-CHICKENS: *Sempervivum tectorum.*
HEPATICA: see *Perennials,* page 202.
HERNIARIA: see *Ground-Cover,* page 127.
HESPERIS: see *Perennials,* page 202.
HEUCHERA: see *Perennials,* page 202.

HIBISCUS. *Mallow Family.* Annuals and perennials, some of them shrubs, with showy hollyhock-like flowers, grown for ornament and two of them (see *Okra* and *Roselle*) for edible parts.

As a half-hardy flower-garden annual, *H. Trionum* of Africa is sometimes grown and it frequently seeds itself. It grows 1-2 feet high and spreads widely and bears large white or sulfur-yellow flowers with dark center and seeds inclosed in an inflated papery calyx; each bloom is short-lived and is sometimes called flower-of-an-hour. Seeds may be sown directly in the garden; give plenty of room.

Hibiscus (*H. Moscheutos* form) and Hollyhock.

Other species of Hibiscus are:

H. Abelmoschus. Musk-Mallow. To 6 ft., ann. or bien.: lvs. broadly lobed: fls. 4 in. across, yellow with crimson eye. India.

H. cannabinus. 3 ft or more, ann. or per.: lvs. narrowly lobed: fls. 3-4 in. across, yellow with crimson eye. Old World tropics.

H. esculentus: see *Okra.*

H. Manihot. To 9 ft., ann. or per.: lvs. in narrow long lobes: fls. to 9 in. across, yellowish or whitish with dark center. Probably Asian.

H. mutabilis. Cotton-Rose. Shrub or tree-like: lvs. broadly lobed: fls. 3-4 in. across, white changing to pink and red. China.

H. oculiroseus. Crimson-eye Rose-Mallow. Like *H. Moscheutos* but fls. white with rose or crimson center. E. N. Amer.

H. Sabdariffa: see *Roselle.*

H. schizopetalus. Shrub much like *H. Rosa-sinensis* but bearing long-stalked hanging fls. with cut recurved petals. E. Afr.

The Rose-Mallows are mostly *H. Moscheutos*, native in swamps in the eastern United States. It is perennial, sending up each year strong woody stems 3-8 feet high that bear great delicate pink, rose or whitish flowers 4-8 inches across. They grow readily from seeds, blooming the following year; and clumps may be divided.

The shrubby species are many, and some of them are amongst the most showy plants of the tropics, particularly the Rose-of-China, *H. Rosa-sinensis*, sometimes grown under glass and also bedded out for

the brilliant summer bloom. The Rose-of-Sharon or Shrub-Althea is *H. syriacus*, a hardy strong shrub producing abundant flowers in rose, purple, cream-color and white in late summer and autumn. Plants may be purchased of dealers.

Several other tall showy herbaceous species are sometimes grown. All of them are of simple requirements in good garden conditions with sunny exposure.

HICORIA: *Pecan.*

HIPPEASTRUM: see *Amaryllis.*

HOLLYHOCK. *Mallow Family.* Stately hardy plants, 5-9 feet tall, well known everywhere, native in China, summer-blooming, bearing large wide-open flowers along the main axis in white, rose, red, yellowish, single and double. Species are two, the usual one being *Althæa rosea*, and one with deeply lobed or fingered leaves *A. ficifolia.*

The culture is very simple. The seed is usually sown in July, and the plants set where wanted the following spring. They will bloom the same year in which they are transplanted—the year following the seed-sowing. New plants should be set every two years, as the plant is essentially biennial.

For the rust of hollyhocks, remove affected leaves promptly; do not allow diseased leaves to remain over winter; dust with sulfur or green-sulfur. The rust also attacks the common weedy mallow (*Malva rotundifolia*) of gardens.

HONESTY, MOONWORT. *Mustard Family.* Hardy annual and biennial of Europe and Asia (*Lunaria annua*, formerly known as *L. biennis*), an old-fashioned plant grown for the great flat seed-pods, 1½ inch or more long, from which the sides fall in late autumn leaving the thin satiny dissepiment rimmed like a spectacle-glass; the stems with these pods are cut for winter bouquets. If seeds are sown early in spring, the plant usually fruits the same year; if sown later, up to midsummer, it is biennial. The plant is erect, reaching 2-3 feet, bearing fragrant mostly pink-purple flowers of no special beauty; let the plants stand 8-10 inches apart; it does well in partial shade. The name moonwort is derived from the full-moon pods, as also the Latin name *Lunaria* (luna, *moon*).

A perennial species is sometimes grown, *L. rediviva*, with narrow pods.

HOP, ORNAMENTAL. *Mulberry Family. Humulus japonicus*, the annual hop, is one of the best rapid-growing screen vines. It makes a dense canopy of attractive foliage. The variegated variety is excellent for porch or front screen, always attracting attention to its markings. It is propagated by seed sown in boxes in March. When once established,

it will seed itself and start as soon as the soil becomes warm. Set plants 4 to 8 feet apart; height 8 to 20 feet.

The common perennial hop (*H. Lupulus*) also makes an effective screen and arbor vine, growing to great length; and the hops are always interesting, if one has both male and female vines; propagated by cuttings of the underground stems as well as by seeds.

HOREHOUND: *Sweet Herbs.*

HORSE-RADISH (*Armoracia rusticana*). *Mustard Family.* Hardy perennial of Europe, grown for the deep persistent roots that are grated and used as a relish.

As a kitchen-garden vegetable, it is usually planted in some out-of-the-way spot and a piece of the root dug as often as needed, the fragments of roots being left in the ground to grow for further use. This method results in having nothing but tough stringy roots, very unlike the product of a properly planted and well-cared-for bed. The best method is to plant root-cuttings or "sets" in spring at the time of setting early cabbage, and the crop dug as late the same fall as the weather permits. It becomes, therefore, an annual crop. The roots for planting are small pieces, 4 to 8 inches long, obtained when trimming the roots dug in autumn. These pieces may be packed in sand and stored until wanted the following spring. The roots should be set with the upper end 3 or 4 inches below the surface of the ground, using a dibber or sharp-pointed stick in making the holes or planting in furrows. The crop may be planted between rows of early-sown beets, lettuce or other crop, and given full possession of the ground when these crops are harvested. When the ground is inclined to be stiff or the subsoil is near the surface, the roots may be set in a slanting position. In fact, many gardeners practice this method, thinking that the roots make a better growth and are more uniform in size. A good horse-radish root is straight and shapely, not unlike a parsnip. Such result requires deep well-prepared fertile land. It is a practice in some places to strip the sets or cuttings once or twice in the growing season to insure long and shapely roots; the earth is loosened away from the set when the leaves have reached a length of 10 or 12 inches and the top side roots removed, the soil being then replaced; sometimes the sets are lifted for this purpose.

HOSTA. Plantain-Lily. *Lily Family.* The Hostas are mostly known as Funkias, and the name Niobe has been revived for them. They are native in Japan and China, hardy and durable perennials prized for the dense spreading clumps of radical leaves and the upstanding racemes of white and blue flowers.

The plantain-lillies are of the easiest culture, propagated by division. They are excellent for borders or as formal edgings to long walks and drives. There are forms with striped leaves. The mounds of leaves do well in shady places, but die to the ground in winter.

H. cærulea (*ovata*). BLUE PLANTAIN-LILY. 3 ft.: lavender-purple, summer.

H. decorata. BLUNT PLANTAIN-LILY. 2 ft., lvs. with white margins: lilac, summer.

H. erromena. MIDSUMMER PLANTAIN-LILY. To 3 ft., with pale lilac fls. above the foliage.

H. Fortunei. TALL-CLUSTER PLANTAIN-LILY. 2 ft., glaucous: pale lilac, late spring and early summer.

H. japonica (*lanceolata, lancifolia*). NARROW-LEAVED PLANTAIN-LILY. 2 ft.: lilac, summer and autumn.

H. plantaginea (*subcordata*). FRAGRANT PLANTAIN-LILY. 2½ ft.: white, fragrant, late summer and autumn.

H. Sieboldiana or *glauca*. SHORT-CLUSTER PLANTAIN-LILY. 1 ft., glaucous: lilac, spring and early summer.

H. undulata. WAVY-LEAVED PLANTAIN-LILY. 2½ ft., foliage striped with cream: pale lavender.

Plantain-lilies. Left and upper center, *Hosta undulata*; left center, *H. erromena*; right, *H. plantaginea*.

HOTBED: see page 116.

HOUSELEEK: *Sempervivum*.

HOUSTONIA: see *Perennials*, page 202.

HOWEA: *Palms*.

HOYA: *Wax-Plant*.

HUERNIA: see *Succulents*.

HUMULUS: *Hop*.

HUNNEMANNIA fumariæfolia. TULIP-POPPY. *Poppy Family*. Mexican tender perennial but grown in the flower-garden as an effective yellow-flowered annual resembling somewhat Eschscholzia but rising with strong stems 2 feet high; the foliage is attractive, and the flowers

(2-3 inches across) are excellent for cutting. It blooms from midsummer till frost from seeds sown in the open as soon as the ground is thoroughly warm; it does not transplant well.

HYACINTH. *Lily Family.* Hardy bulbs of southeastern Europe and adjacent Asia, well known for the profuse very fragrant bloom in spring. The flowers are many on a simple scape 6-12 inches or more high, white, pink, red, blue, yellowish, sometimes double; grown also for indoor bloom. See *Bulbs.*

For outdoor bloom, the bulbs are planted in autumn, usually early in October in the latitude of New York City. The ground should be deep and fertile. For an effective bed, plant all the bulbs at uniform depth, about 6 inches to the bottom of the bulb; large bulbs may be set 5 or 6 inches apart. Mulch for winter. The bulbs may remain year after year, but the leaves should be allowed to grow to full maturity if good succeeding crops are to be secured.

For winter flowering, the bulbs should be potted in October in soil composed of loam, leaf-mold and sand. If ordinary flower-pots are used, put in the bottom a few pieces of broken pots, charcoal or small stones for drainage; then fill the pot with earth, so that when the bulb is planted the top will be on a level with the rim. Fill in around the bulb with soil, leaving just the tip of the bulb showing. These pots of bulbs should be placed in a cold pit, cellar or on the shady side of a building. In all cases, plunge the pot in some cool material (as cinders). Before the weather becomes cold enough to freeze a crust on the ground, the pots should have a protection of straw or leaves to keep the bulbs from severe freezing. In six to eight weeks the bulbs should have made roots enough to grow the plant, and the pots may be placed in a cool room for a short time. When the plants have started into growth, they may be placed in a warmer situation. Watering should be carefully attended to from this time, and when the plant is in bloom the pot may be set in a sacuer or other shallow dish containing water. After flowering, the bulbs may be ripened by gradually withholding water until the leaves die. They may then be planted out in the border, where they will bloom each spring for a number of years, but will not prove satisfactory for forcing again.

Water culture of hyacinths.—The hyacinth is the most popular of the Dutch bulbs for growing in vases. The narcissus may be grown in water, and do just as well, but it is not as pretty in glasses as the hyacinth. Glasses for hyacinths may be obtained from florists who deal in supplies, and in varicus shapes and colors. The usual form is tall and narrow, with a cup-like mouth to hold the bulb. They are filled with water, so that it will just reach the base of the bulb when it has been placed in position.

The vessels of dark-colored glass are preferable to those of clear glass. When the glasses have been arranged, they are set away in a cool dark place to form roots like potted bulbs. Results are usually secured earlier in water than in soil. To keep the water sweet, a few lumps of charcoal may be put in the glass. As the water evaporates, add fresh. Do not disturb the roots by taking out the bulb. Bring into heat gradually as in the case of potted bulbs.

HYSSOP: *Sweet Herbs.*

IBERIS: *Candytuft.*

ICE-PLANT. *Carpet-Weed Family.* A Mesembryanthemum (properly *Cryophytum crystallinum*) of wide distribution, deriving its common name from the glistening particles on its foliage. It is a trailing half-hardy annual, or grown as such, readily raised from seeds sown where the plants are to remain. Give plenty of room for it to spread. It is sometimes seen in lawn vases and hanging baskets. The white or light rose flowers are small and not conspicuous and open only in sunshine.

A related plant, sometimes seen in window-gardens and conservatories, is *Aptenia* (*Mesembryanthemum*) *cordifolia*, a perennial from South Africa. It is a diffuse plant suitable for basket or little trellis, with heart-shaped leaves that have glistening points, and small purple flowers. A form has variegated leaves. Propagated by pieces of the stems.

Other species of the old genus Mesembryanthemum (which is now divided into many genera) are grown in California and the South and are seen under glass in collections of fanciers. These various species may not be ice-plants, however, with glistening exudations.

IMPATIENS. *Balsam Family.* The commonest Impatiens is accounted for under *Balsam.* Other species are grown in the flower-garden as tender brittle annuals of bright colors, mostly in red, scarlet and purple but running also to white. The flowers are of odd shapes. The usual one now is probably *I. Holstii*, although the scarlet *I. Sultani* was formerly common; these two species make excellent pot-plants for window and conservatory; sow seeds indoors and transplant carefully as the seedlings break easily. They make bushy semi-succulent plants 1½-2 feet high, giving bloom the first season even if started out-of-doors. Protect from wind.

INCARVILLEA: see *Perennials*, page 202.

INDIGO, FALSE: see *Perennials*, page 201.

INSECTS AND DISEASES. The bugs and the fungi keep the gardener awake. The general attitude of the gardener should be to get there first. He will inform himself by means of a few good timely bulletins and books, for these publications are soon out of date inasmuch as the bugs and things keep the authors moving also. The garden supplies will include a portable compressed-air sprayer and perhaps a wheeled tank sprayer of say 25 gallons capacity; also insecticides and fungicides, and at least one authentic spray-calendar; every year it is well to obtain the current publication on the subject from the state college of agriculture or experiment station.

Spraying has come to be one of the standard horticultural operations. Most kinds of injurious fungi and insects can be combated by a spray in which various poisons or injurious substances are contained. There are two general classes of spraying material: fungicides, or those for the control of fungi or plant diseases; insecticides, or those for the control of insect enemies. The materials are of course poisonous and should be used with due caution.

The fungicides usually contain copper or sulfur, or both. Most injurious fungi work on the interior of the leaf or stem, and only the spore-bearing parts come to the surface. It is, therefore, important that spraying with fungicides be begun early to prevent the fungus from getting a hold. It is much better to spray once thoroughly than to spray a half dozen times carelessly. It is important that the entire surface of the foliage or stems be covered with the material to prevent the access of the fungi.

Of insecticides, there are two general types: those that kill by external contact and are applied to plant-lice, scale insects, and all others that suck their food; and the poisonous compounds used for the chewing insects, as all the tribes of worms and beetles.

Spray thoroughly, if it is necessary to spray at all. There is no sense in half-way work. The general rule is to spray the entire plant until the foliage is covered or the material begins to drip. The bug is not likely to search for the poison; therefore put it on him.

Insecticides and fungicides have taken on quite a new character in the past score of years. A number of the former materials have gone out. In commercial orchard and field work the operator must inform himself with care and proceed with exact knowledge. He will compound his own materials. In home places in villages and cities the resident usually can hire the large trees and more extensive shrubbery sprayed by persons who are equipped for it. For the ordinary garden, package insecticides and fungicides may be purchased of seedmen and other dealers, with full directions for their dilution and application. The gardener will need

lime-sulfur for scale insects, and it also has value as fungicide; arsenate of lead for chewing insects; nicotine preparations for plant-lice and other sucking insects; hellebore for currant-worms; bordeaux mixture for fungus attacks;and also others.

Fumigation is a desirable process in frames and greenhouses for aphis and white-fly, for which some of the nicotine preparations may be used. In commercial establishments and large places, the deadly hydrocyanic acid gas may be employed but only under the most careful safeguards and by persons skilled in its use.

Following are directions for making fungicides and insecticides mostly adapted from Cornell Extension Bulletin number 206:

Bordeaux mixture (fungicide) is made by mixing a solution of copper sulfate (blue vitriol) with milk of lime. A mixture made from 4 pounds of copper sulfate and 4 pounds of lime to 50 gallons of water is indicated by the formula 4-4-50; 5 pounds of copper sulfate and 5 pounds of lime to 50 gallons of water, by 5-5-50, and so on. In order to make bordeaux mixture of any strength, the procedure should be as follows:

A stock solution of copper sulfate is made in a barrel from 50 pounds of copper sulfate dissolved in 50 gallons of water. If the crystals, placed in a gunny sack, are suspended just beneath the surface of the water, they will dissolve in the course of three or four hours.

A stock mixture of lime is made by mixing 50 pounds of chemical hydrate lime in 50 gallons of water. Some investigators prefer 50 pounds of freshly slaked burned lime in place of the hydrated material. Air-slaked lime should not be used.

The sprayer is filled three-fourths full of water. If a 4-4-50 solution is desired, 4 gallons of copper-sulfate stock solution is added to this water for every 50 gallons of mixture to be made. The solution requires stirring until it is well diluted, after which 4 gallons of the stock mixture of milk of lime is added to each 50 gallons of the mixture. The lime water is run through a strainer in order to prevent the larger particles of lime from getting into the spray tank. While the milk of lime is being added to the dilute copper-sulfate solution in the sprayer tank, the material in the tank should be stirred constantly. The sky-blue bordeaux mixture will result. Enough water to make the required amount of mixture must now be added. The milk of lime may be added first if desired. Calcium arsenate may be added to the bordeaux mixture if insects are to tbe con-trolled. For making small quantities of the fungicide, 4 ounces of copper sulfate, 4 ounces of hydrated lime, and 3 gallons of water are necessary. There is some indication that a suspension weaker in lime, as a 4-2-50, is more effective than a 4-4-50 mixture.

If only a small amount of the spray material is required, prepared bordeaux mixtures are available on the market and prove handy. But in larger quantities they are expensive as compared with the home-mixed material.

Copper-lime dust (fungicide). Some growers prefer the use of dust instead of the liquid application. The dust is made of monohydrated copper sulfate, the best grade of chemical hydrated lime, and sometimes calcium arsenate. The monohydrated copper sulfate may be bought already mixed with the lime or obtained separately and mixed at home. The formula for the dust is 20 pounds of the monohydrated copper sulfate and 80 pounds of the lime. If 20 pounds of calcium arsenate are added, the formula is written 20-20-60.

The dusting should be done only when the plants are wet with dew or rain. If the dust is put on when the foliage is dry, the copper is washed off by the next shower and will be of no value. For this reason the dusting is done late in the evening or just after daybreak. All parts of the plant should be covered thoroughly. It is not enough merely to walk along one side of a vegetable row and apply the dust with a hand machine. It is necessary to move the nozzles from one side to the other and at different angles, so that every leaf is treated uniformly. If a horse-drawn duster is used, there should be three nozzles for each row of plants except when the plants are very small. One of the nozzles should be directed straight downward and one on each side of the row directed inward at the same angle that the branches or the leaves of the plant extend from the main stem.

Nicotine (insecticide). For spraying purposes, nicotine is usually sold in the form of nicotine sulfate. The standard brands of nicotine sulfate on the market contain 40 per cent of nicotine. The recommendations in this article are based on a product of that strength. Nicotine sulfate is not volatile, but the fumes of the nicotine are liberated when the material is applied as a spray in combination with soap. Nicotine sulfate is not effective when mixed with water only. It is not so effective in combination with bordeaux mixture as when used with soap.

For greenhouse use, nicotine is often sold in the form of a 40 per cent solution, the nicotine being in the "free," or uncombined, form.

Nicotine dust is usually made by mixing nicotine sulfate with hydrated lime. Nicotine-lime dusts can be bought ready mixed, or they may be prepared at home in a ball mixer or in a self-mixing duster. Since the commercial brands of nicotine sulfate contain 40 per cent, by weight, of nicotine, 5 pounds, or 2 quarts, of this material is added to 95 pounds of hydrated lime to give a dust containing 2 per cent of nicotine. For a 3 per cent nicotine-lime dust, 7½ pounds, or 3 quarts, is required; for a 4

per cent mixture, 10 pounds, or 1 gallon. To produce an effective dust, it is necessary to mix the materials so thoroughly that each particle of lime carries a bit of nicotine. This can be easily accomplished by using a self-mixing duster or a ball mixer. Unless the grower is going to use enough of the dust to make it worth while to purchase or construct a good mixer, it will be more profitable to buy the dust ready mixed.

Soap (insecticide). Soaps are used with nicotine sulfate and water to liberate the nicotine and to increase the wetting and spreading qualities of the spray. The most satisfactory soap for this purpose is potash fish-oil soap. This is a soft soap, dissolving easily in water. The harder soda fish-oil soaps and laundry soap are unsatisfactory because of the difficulty of dissolving them. Soaps vary greatly in water content. The amount to use, therefore, varies considerably, usually from 3 to 5 pounds in 100 gallons of the spray mixture.

Pyrethrum (insecticide). Several brands of pyrethrum products in which the active ingredients, pyrethrins, are combined in various ways with alcohols or soaps are on the market. Most of these preparations are somewhat too expensive, when used at effective dilutions, for large commercial plantings although recent experiments have shown that greater dilutions may be employed.

Recently pyrethrum dusts have been found effective against certain vegetable insects. For the most part these are composed of the ground flowers diluted with talc, clay, gypsum, tobacco powder or sulfur dust. In most cases it seems necessary to have not less than ½ of 1 per cent pyrethrins in the finished dust to effect satisfactory control. Such diluted dusts are more economical than the liquid sprays and should be given further trial by vegetable-growers. Their chief usefulness so far is for the control of cabbage-worms, the melon and pickle-worms, the strawberry leaf-roller and the Mexican bean beetle and bean leafhopper. For melon and pickle-worms and bean leafhopper sulfur as the diluent is important, since sulfur dust has considerably toxicity in itself against these insects. In the case of strawberries the sulfur is a useful diluent when it is desired to control red-spider, leaf-roller and weevil after the berries are set.

Rotenone. Extracts containing rotenone as the chief active ingredient are now available under various trade names. These usually also contain pyrethrins and are often adjusted to combine about 1 per cent rotenone and about 1.2 or 1.3 per cent pyrethrins. On account of the relatively high cost at effective dilutions, their use has so far been chiefly confined to garden plantings.

Rotenone-bearing dusts are coming into wide commercial use, especially against cabbage-worms. They remove the danger of excess

arsenical residues and also in many cases actually give better control than normal dilutions of arsenical dusts. The chief source of the rotenone so far has been powdered derris root which, in addition to rotenone, contains other active principles toxic to many insects. Talc or clay are the most satisfactory and cheapest diluents, although for certain insects tobacco or sulfur dust is more often used.

For worms on cabbage, cauliflower, broccoli, and other related vegetables, a satisfactory kill may be obtained by the use of a derris dust containing not less than ½ of 1 per cent rotenone applied at the rate of about 20 to 30 pounds to the acre. Such dusts are now on the market under several brand names and range from not less than ½ of 1 per cent to 1 per cent rotenone content. Several growers organizations and dealers are also buying ground derris root and the diluent and are mixing derris dusts for local use. A dust of the above rotenone dilutions with sulfur as the diluent has given excellent and economical control of both the melon and pickle-worms on squash. About 10 per cent of clay or talc in this combination improves the general dusting qualities of the mixture.

Magnesium arsenate. The commercial use of magnesium arsenate is almost entirely for control of the Mexican bean beetle. It is preferred for this purpose because it is less likely to injure bean foliage than is calcium arsenate.

Lead and calcium arsenate. The use of lead arsenate is not advisable on most vegetable crops because there is danger that harmful residues may be left on the plants.

Calcium arsenate has a very restricted use on vegetable crops. It may be used on beans for the Mexican bean beetle before the pods form if magnesium arsenate is not available.

INULA: see *Perennials*, page 202.

IONOPSIDIUM acaule. DIAMOND-FLOWER. *Mustard Family.* A very small annual from Portugal, with long-stalked round leaves and violet or white flowers on stems a few inches high.

Grown in the flower-garden from seeds sown in spring or summer; spring bloom may be obtained by sowing in autumn and carrying the seedlings over winter under glass. It is a delicate little plant, useful in rock-gardens when not exposed too much to wind and sun; it is sometimes grown in pots.

IPOMŒA. *Morning-Glory Family.* A genus of many species climbing and shrubby, but known to horticulture in temperate climates as twining plants. The genus is most familiar in the morning-glories, of

which *I. purpurea* from tropical America is the commonest. They are tender twining annuals bearing profusely of purple, lilac and pink trumpet-shaped flowers.

The morning-glory is perhaps the most popular of twining herbs, because of the ease with which it may be grown, the quickness with which it covers the object, and the quantities of bright cheerful flowers it bears. Many of the kinds—in fact, all that are generally known—may be readily grown from seed, flowering early in the summer. Provide rich soil and plenty of water. The Imperial Japanese morning-glories are *I. Nil*, with similar requirements. Blue Dawn-flower is *I. Leari*, a perennial bearing large showy blue flowers turning pink and with a white tube; seeds should be started early, to obtain bloom in the North. Brazilian morning-glory, perennial with rose-purple flowers and stems bearing stiff hairs is *I. setosa*, requiring too long a season for the North. *I. tricolor* (*rubro-cærulea*) is perennial but grown as an annual, bearing purplish- or reddish-blue flowers with white tube.

Dwarf morning-glories are of another genus, *Convolvulus tricolor* (*minor*). They come into flower sooner than the tall climbing species, and are covered with flowers through a long season. They may be used with excellent effect in vases or large hanging baskets. Give a full sunny exposure, and soil not very rich. They grow 1 foot high and are more or less trailing, often covering a space 2 feet across; half-hardy annuals. The azure-blue, purple or white flowers, are produced all summer, not closing by day as do the climbing kinds.

Aside from the various morning-glories, the genus has several interesting tender twiners, all of simple cultural requirements. *I. Horsfalliæ* is a tropical tall somewhat woody plant grown in the open far south and sometimes under glass for the rich rose or light purple flowers. *I. dissecta* of the southern United States is a useful fence and screen vine, perennial, with narrowly-parted leaves and nearly white red-centered interesting flowers. *I. paniculata* (*digitata*) of the tropics is a vigorous twiner with digitate leaves and large lilac or pinkish flowers. These and others are propagated by seeds and cuttings; they are little known in the North as open garden plants. *I. Batatas* is the sweet potato.

Related plants are moonflower which is a Calonyction, cypress-vine and cardinal-climber which are Quamoclits.

IRIS. *Iris Family.* Popular handsome perennials, of which the Blue Flag is familiar to every old-fashioned garden, although there are white and yellow kinds. Planters usually think of two classes in the genus, those with branching rhizomes or rootstocks and those with bulbous base. Of the rhizomatous kinds there are at least two well-marked groups,

those with prominent beards on the falls or outer hanging segments of the flower and those without beards. The bearded irises comprise the greater number of the common garden species and varieties, as the early German and Florentine kinds; the mourning iris, *I. susiana*, is also bearded but it belongs to a different group from the Germanica kinds, with a short rhizome and brown-purple or nearly black flowers, and is tender in the North. The beardless irises include the many handsome later-flowering Japanese varieties, *I. lævigata* and *I. Kaempferi*, as well as the Siberian and related kinds. The bulbous irises are usually more tender; they include the Spanish and English irises, *I. Xiphium* and *I. xiphioides*, as well as the Persian and orchid-flowered. Much attention has been given to irises in recent years by amateurs and fanciers, and many choice kinds are now available from dealers. They are spring and summer bloomers.

Most irises thrive best in a rather moist or retentive soil, and some of them may be colonized in margins of ponds. They are sometimes grown from seeds, blooming the second year, but usually they are propagated by division of the rootstocks. Plant the pieces 12 to 18 inches apart if a mass effect is desired, or farther apart for best individual blooms and for strongest plants that produce seven to ten flowering stalks. Usually the plants must attain some age before the fullest bloom is obtained, but when the plants begin to fail, dig them up, divide the roots, discard the old parts and grow a new stock as before. Kinds with thick and heavy rootstocks may be removed when dormant, but those with fibrous slender root systems only when new roots are starting.

Of the bulbous section, most species are not hardy in the North. The bulbs should be taken up and replanted every two or three years. The bulbs give rise to only a single stem.

Commonest listed specific names are noted in the following list. *I. reticulata*, *I. Xiphium*, and *I. xiphioides* are bulbous, but the others are rhizomatous.

I. atroviolacea. Deep violet form of *pumila.*

I. aurea. 3 ft.: golden-yellow. Kashmir.

I. azurea. Blue form of *pumila.*

I. bracteata. 4-12 in.: yellow with brown-purple veins. Ore.

I. chrysographes. 1-1½ ft.: violet-purple. China.

I. chrysophylla. 1 ft.: cream color. Ore.

I. cristata. 3-9 in.: blue with white and yellow crest. E. N. Amer.

I. Delavayi. 3-4 ft.: violet-purple marked with white. China.

I. dichotoma. 2 ft.: white marked with purple. Asia.

I. ensata. 1-1½ ft.: lilac to white. Asia.

I. flavissima (*arenaria*). 3-8 in.: yellow veined brown-purple, with orange beard. Eu., Asia.

I. foliosa. 1-1½ ft.: blue-purple. Cent. U. S.

I. Forrestii. 1½ ft.: yellow. China.

I. fulva. 2-3 ft.: reddish-brown or coppery variegated with blue and green. S. U. S.

I. germanica. 2 ft.: reddish or blue-purple with white beard. Var. *florentina*, nearly white.

I. gracilipes. 10-12 in.: pink-lilac with white patch and yellow crest. Japan.

I. graminea. 1-3 ft.: yellowish-white with purple veins. Eu.

I. Kaempferi. JAPANESE IRIS. 2 ft.: reddish-purple but varying to many colors. Asia.

I. Kochii. 1½-2 ft.: red-purple. Istria.

I. lacustris. 3-9 in.: blue. Shores of Great Lakes.

I. lævigata. 2 ft.: blue-purple. Asia. Source of certain kinds cultivated in Japan.

I. missouriensis. 1-2 ft.: pale blue variegated. W. N. Amer.

I. Monnieri. 3 ft.: lemon-yellow.

I. ochroleuca. 3 ft.: white with yellow markings. Asia Minor.

I. orientalis (*sibirica* var. *orientalis*). 1½ ft.: blue-purple or white. Asia.

I. pallida. 2-3 ft.: pale lavender-blue with white and yellow beard. Eu. Var. *dalmatica*, garden form.

I. prismatica. 3 ft.: blue or violet with yellow veins. E. N. Amer.

I. Pseudacorus. YELLOW FLAG. 3 ft.: bright yellow. Eu., Afr., Asia.

I. pumila, 3-6 in.: yellow to lilac. Eu., Asia.

I. reticulata. 1 ft.: deep violet marked with orange. Caucasus. Var. *cyanea*, blue.

I. sibirica. 1-3 ft.: lilac-blue or blue-purple. Eu. Var. *flexuosa* (*alba*), white.

I. spuria. 1-2 ft.: blue-purple or lilac. Eu., Asia.

I. susiana. 1-1½ ft.: purple-black. Asia.

I. tectorum. 1-1½ ft.: lilac or blue-purple. China. Var. *alba*, white.

I. tenax. 1 ft.: lilac-purple varying to white. W. N. Amer.

I. verna. 3-8 in.: violet-blue to white. E. N. Amer.

I. versicolor. 3 ft.: purplish-blue. E. N. Amer.

Iris. German iris (Loreley) above; *Iris Xiphium* below.

I. Wilsoni. 2 ft.: pale yellow veined with reddish-brown and purple. China.

I. xiphioides. ENGLISH IRIS. 1½ ft.: blue-purple with golden patch. Pyrenees.

I. Xiphium. SPANISH IRIS. 1½-2 ft.: blue-purple with yellow patch, variable in cultivation. Medit. region.

IVY. Many plants are known as ivy, but the name belongs to *Hedera Helix* of the Aralia Family, a plant usually known in North America as English ivy. It is an evergreen root-climber (although there are erect forms of the species), hardy in protected places as far north as New York and southern New England. It clings closely, and is excellent for covering walls, doing best in this country in partially shaded places; used also in window-gardens, window-boxes, vases, hanging baskets, and allowed to run as a ground-cover under trees. It propagates readily by layers and cuttings, and by rooted parts. The plant is native in Europe and Asia.

For Kenilworth ivy, see *Linaria;* Ground ivy, *Nepeta;* German ivy, *Senecio.*

JACK-IN-THE-PULPIT: see *Perennials*, page 201.

JACOBS-LADDER: *Polemonium cæruleum.*

JASIONE: see *Perennials*, page 203.

JASMINE, ROCK-: *Androsace.*

JERUSALEM ARTICHOKE: *Artichoke.*

JERUSALEM-CHERRY (*Solanum PseudoCapsicum*). *Nightshade Family.* A small shrub, of the tropics, that holds its ornamental scarlet or yellow globular berries a long time and is capable of being grown as a compact pot subject; useful for conservatory and window decoration. Small plants in pots may be had of seedsmen and florists; or one may grow it from seeds which, if sown in late winter or early spring, should give fruit-bearing plants for autumn and early winter. Keep the plants growing from pot to pot as needed until the proper stature is attained, then allow them to bloom and fruit. Sometimes the young plants are turned out to the open ground for summer and lifted in autumn.

JOE-PYE WEED: *Eupatorium purpureum.*

JOSEPHS-COAT: *Amaranthus tricolor.*

JUNEBERRY. *Rose Family.* Several American species of *Amelanchier* yield edible blueberry-like fruits and one of them (probably *A. stolonifera*, in the variety known as Success) has come into cultivation for the purpose. It is a hardy bush 2-3 feet high, spreading by suckers. It may be grown much like currants, and the row soon fills with plants. The red-purple attractive fruits are ripe in late spring and early summer. The plant needs no special care.

KALANCHOE: see *Succulents.*

KALE (*Brassica oleracea* var. *acephala*). *Mustard Family.* Several kinds of plants are known as kale, although all belonging to one botanical group. Some of them, as the cow kales of Europe, grow 7 feet and more tall, and leaves are taken as the plants grow. Another race is the collards of the South (see *Collards*). The usual kitchen-garden kales are low-growing spreading plants, extensively used for winter and spring greens. The culture as given to late cabbage is suitable. They are very hardy. At the approach of severe freezing weather a slight protection is given in the North. The leaves remain green through the winter and may be gathered from under the snow at a time when material for greens is scarce, and yield early spring greens. Some of the kales are very ornamental because of their blue and purple curled foliage. The Scotch Curled is the most popular variety. Kales are extensively grown in the South and shipped north in winter. Let the plants stand 18 to 30 inches apart. Young cabbage plants are sometimes used as kale. Borecole is a kind of kale. Sea-kale is a different vegetable (which see).

KENTIA: see *Palms.*

KNIPHOFIA. TRITOMA. TORCH-LILY. POKER-PLANT. *Lily Family.* South African rhizomatous perennials making clumps of long grass-like leaves and sending up scapes 2-4 feet high that bear at the top a brilliant poker-like spike of scarlet and orange flowers. They are striking plants in the border.

The torch-lilies propagate readily by division of the rhizome, or by offsets when these are produced. They also grow freely from seeds which, if started early indoors, may produce blooming plants the same year although the second and subsequent years should yield the best results. Seedlings may not reproduce the exact variety. In regions where the plants are not hardy under a winter mulch, the roots may be lifted in autumn and stored in dryish earth in a cellar. The season of bloom is normally autumn with us, but some of the newer races begin flowering in midsummer.

K. Pfitzeri. A form of *Uvaria.*

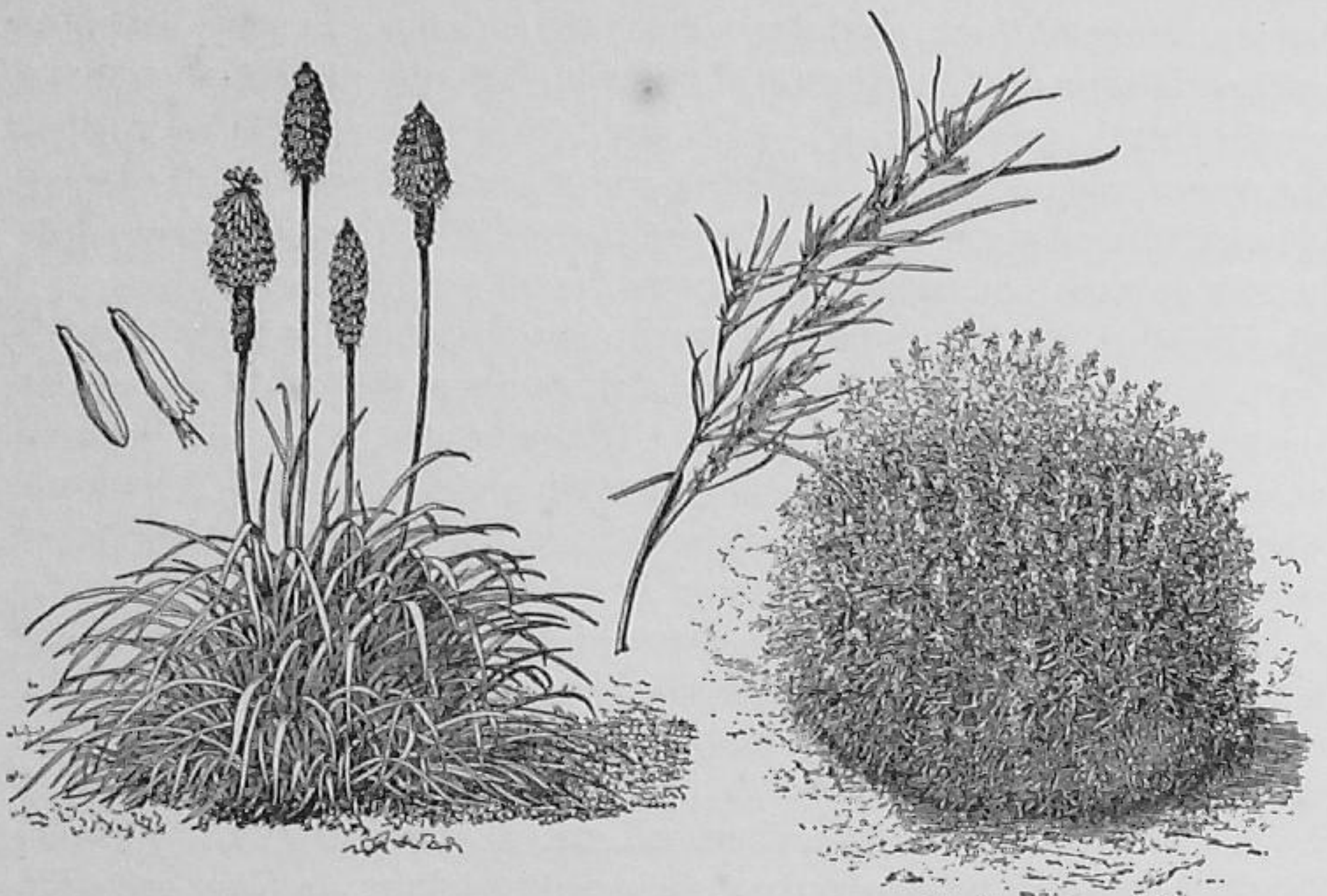
K. rufa. Fls. yellow tinged red, ¾ in. long.

K. Uvaria. Fls. scarlet, 2 in. long. Var. *grandiflora*, larger.

KNOTWEED: *Polygonum.*

KOCHIA scoparia. SUMMER-CYPRESS. *Crowfoot Family.* Hardy Eurasian annual, planted for its symmetrical shape and dense growth, a fine-foliaged plant green in summer and red in autumn. Seeds may be put in the ground as soon as it is warm, in a line or row where a hedge-like

effect is desired; thin to 2 feet if the attractive symmetry of the individual plant is to be developed. It reaches 2-3 feet in height, and if well grown the plants look as if they had been sheared into form.



Kniphofia or poker-plant at left; Kochia or summer-cypress at right.

KOHLRABI (*Brassica caulorapa*). *Mustard Family.* This vegetable looks like a leafy turnip growing above ground. If used when small (2 to 3 inches diameter), and not allowed to become hard and tough, it is of superior quality when quickly grown. It should be more generally known. The culture is very simple. A succession of sowings should be made from early spring until the middle of summer, in drills 18 inches to 2 feet apart, thinning the young plants to 6 or 8 inches in the rows. It matures as quickly as turnips. One ounce of seed is required for 200-300 feet of drill.

LACE-FLOWER, BLUE: *Didiscus.*

LACTUCA: *Lettuce.*

LAGENARIA: *Gourds.*

LAMBS-EARS: see *Perennials*, page 203.

LAND AND SOIL. Having made the proper mental and spiritual preparation for the making of a garden, two initial considerations remain. First is the land; perhaps the home gardener has no choice as to soils and other characteristics of the land but he must be determined to make the most of it. Second consideration is the endeavor to provide the

conditions in which the plant naturally thrives. It is futile to try to thwart the plant in this respect. Plants that require full sun should not be grown in shade. In fact, relatively few plants give good results in bloom and fruit under the shade of trees and building. In such places the gardening is very restricted and the effort would better be confined mostly to ground-covers and to the few shrubs (as Indian currant) that thrive in shade. Certain plants require acid soil. This subject has not been carefully determined for most of the ornamental plants, but certain lists are available, as in Hortus, pages 577-580.

Soils are of many kinds. The classification depends on one's point of view. Gardeners ordinarily call a good friable dark colored rich soil a garden loam. No soil is so good that it cannot be improved. It is bettered in four general ways: (1) by good initial preparation, (2) by tillage, (3) by the application of various substances, (4) by a proper system of cropping.

It is usual and proper advice to make the ground rich. Yet we must remember that many plants—of which tomato, cosmos, dahlia, China aster, scabiosa, are examples—tend to grow too late in the North before they fruit or bloom. For mass effect of certain flowers—as wild aster and goldenrod—better and brighter effects are usually obtained in a rather thin dryish soil if it is still strong enough to carry the plants to good stature; and often a rather thick planting produces much display although the flowers may not be so large or the plants so heavy bearing.

Drainage serves two purposes: to carry superfluous water from the land; to lower the water-table or hard-pan and thereby to make the soil loose and friable above. Nearly all hard clay lands are much benefited by draining, even though they are not too wet. The region of free or standing water is lowered and air is admitted into the soil, rendering it fine and mellow. For carrying off mere top water, surface or open ditches are sufficient; but if the soil is to be ameliorated, the drain must be beneath the surface. The best underdrains are those of hollow or cylindrical tiles, but good results may be had by making drains with stones. In regions of many flat stones, a good conduit may be laid with them, but they are likely to get out of order. If there is considerable fall to the ditch, the bottom may be filled for the space of 10 inches or a foot with common stones rolled in, and the water will find its way between them. If the filling is even deeper than this, the results may be better; and such ditches also provide place for disposing of superfluous stones.

The deeper the ditch, within reasonable limits, the farther it will draw on either side. It should always be deep enough to be protected from freezing, particularly if tiles are used. About 3 feet should be the least depth in regions of very deep freezing. Drains as deep as this need

not be placed oftener than 2 to 3 rods apart, unless, in garden conditions, it is desired very thoroughly to ameliorate a heavy clay soil, in which case they may be placed every 20 feet. The better the fall the quicker the drain will act and the more permanent it will be, as it will tend to clean itself and not fill with silt. It is important that the outlet be entirely free, and protected with stones or mason work. The roots of certain trees, particularly of willows and elms, are attracted by tile drains, and often fill the pipes. When the drain goes near such trees, therefore, it is well to cement the joints. In general practice, however, the joints should not be cemented. In laying the tiles, it is well to cover the joints with inverted sod, tarred paper, wisps of straw, stones or other material. This prevents the fresh earth from falling between the joints, and by the time the material is decayed the earth will have become so thoroughly set that no further trouble will result. Although underdrains take off superfluous water, nevertheless an underdrained soil will hold more moisture than one not drained, particularly in the case of clay lands with high subsoils. This is because fine mellow soils are able to hold more moisture than very loose and open or very dense and compact ones. A well-constructed underdrain should last indefinitely.

Tillage is the stirring of the soil for the purpose of improving its productiveness. It is a fundamental operation in agricultural practice. Most farmers till for three reasons: to get the seed into the land; to keep the weeds down; and to get the crop out of the land. The real reason for tillage, however, is to ameliorate the land; that is, tillage makes the soil mellow and fine, and an agreeable place in which plants may grow. It enables the soil to hold moisture, to present the greatest feeding surface to roots, to allow the circulation of air, and intensifies many chemical and biological activities. Tilling the soil is the first means of making it productive. If one understands the many forces that are set at work, the tilling of the land becomes one of the most interesting of all agricultural operations.

The exact method of tilling in any particular case must be determined by many circumstances. Light soils are handled differently from heavy soils, and much depends also on the season of the year. In all ordinary lands, effort should be made to work them deep, so that there is a sufficient reservoir for the storage of moisture and a large area in which roots can work. Subsequent tillage throughout the growing season is performed very largely for the purpose of keeping the top soil loose and fine so that the moisture from beneath does not pass off into the atmosphere. This loose layer of soil, extending two or three inches from the surface, may itself be dry; but it breaks up the capillary connection between the lower soil and the air, and thereby checks evaporation. This surface

layer is often spoken of as the earth-mulch. It answers much the same purpose as a mulch of straw or leaves in interposing a material between the moist soil and air. If this mulch is repaired as often as it should be, weeds cannot grow; but the object of the tilling is more to make and maintain the mulch than to destroy weeds. The surface should be tilled shallow in the growing season as often as it tends to become compact or encrusted. This is after every rain, and usually as often as once in ten days when there is no rain. The tools to be used for this surface tillage are those that comminute or fine the soil most completely without compacting it or leaving it in ridges or in furrows. In garden work, a fine-toothed rake is desirable; whereas in field work, some of the wire-tooth weeders or smoothing harrows are excellent. In hard and lumpy fields, however, it is necessary to use heavier and rougher tools.

To break down hard clay soils, one must exercise great care not to work them when wet; and also not very much when dry. There is a time, shortly after a rain, when clay lumps break to pieces with a very slight blow. At this time it is well to go over them with a harrow or a rake. After the next rain, they can be gone over again, and before the end of the season the soil should be in good condition. An excellent way of breaking down clay land is to plow or spade in autumn and allow it to weather in winter. In such cases the land should not be raked or harrowed, but allowed to lie rough and loose. Very hard clay lands sometimes run together or cement if handled in this way, but this will not occur if the land has stubble or sod or a dressing of manure, for the fibrous matter will then prevent it from puddling. Lime sown on clay land at the rate of 20 to 40 bushels to the acre also has an effect in pulverizing it. This may be applied in autumn, or preferably in spring when the land is plowed.

Humus and top-dressings provide important amendments to garden land. An old and standard practice is to work vegetable matter into it to provide humus. Soils that are loose, black and friable contain much of this vegetable mold. In many cases the chief value of stable manure is to add this humus. Many soils need humus more than they need plant-food, and hence stable manure gives better results in those cases than commercial fertilizer. The farmer secures the humus by plowing under stubble and sod, and occasional green crops; and the roots that remain and the vegetable waste add a goodly share.

A new caution has arisen in recent years, however, on the application of vegetable wastes and compost materials to the land because we now know that serious crop diseases may be spread by such practice, as in the case of diseased cabbage and lettuce refuse. Such materials must be securely plowed or spaded under or thoroughly rotted.

In considering the improvement of lands by the application of foreign substances, two purposes are to be considered; the improvement of the physical texture, or tilth; the increasing of plant-food. These are co-ordinate objects. In some cases one may be of prime importance, and in another case the other may be more necessary. Lands with a fair store of available plant-food may be unproductive. Such lands may be greatly benefited by stable manure, even though the manure may have lost a large part of its fertility by being baptized under the eaves of the barn. If plant-food alone is needed, then concentrated or commercial fertilizer may be the best to apply. In most cases the chief amelioration is to be wrought by tillage, stable manures, mulches, green crops, and the like; if special results are desired, commercial fertilizers may be added more or less liberally, as the case demands.

The top-dressing of land is beneficial because it tends to prevent the escape of moisture, and often improves the physical texture. If the material contains plant-food, the land is also directly enriched. The trimmings from lawns may be a protection to lands if allowed to remain; and the leaves that blow into clumps of shrubbery may often be allowed to remain with good results. However, if the leaves become too thick year after year, they tend to induce surface rooting of the shrubs. This, however, may be no disadvantage unless the mulch were finally to be removed. One of the best top-dressings for borders and shrubbery is spent tan bark, since it does not pile up on the ground, but tends to work into it. Well-rotted sawdust often has the same effect. These materials are used by gardeners, when they can be had, since they can be raked into the soil in the spring, and need not be removed.

Manure adds plant-food and also improves the texture or physical condition of the soil. The latter effect, as we have found, is often its greatest value. If one wants plant-food alone, one may often do better to add it in some more concentrated form. Manure, when thoroughly incorporated with the soil, makes the ground congenial for the plant. It is important, in garden operations, that the manure be rotted or composted, or "short" or "fine," as the gardeners say. It then incorporates readily with the soil and quickly gives up its fertility. Manure is composted by letting it decay in piles. The compost pile should be flat on top, so that it will catch the rains, and 3 to 5 feet high.

The most desirable manure for the garden and for house plants is probably old cow manure. It does not burn or lose its strength. It may be kept for a number of years if piled under shelter, becoming more available each year. It mixes well with soil and leaf-mold. When once rotted, this manure is very lasting and easily assimilated by plants. Horse manure is likely to become overheated, and to lose its value; and is

too loose and dry for many purposes. Pig manure, unless well composted with soil or refuse, is usually too heavy and rich. Sheep manure is at its best when used in a liquid form, although it is excellent to mix with soil to loosen it.

All garden refuse, such as vines, leaves, decaying vegetables (unless diseased), will make manure if composted with soil; and if the wash water is thrown on the compost pile some fertility may be added. Wood-ashes from stoves, the chip dirt from the woodshed—in fact, almost any substance that will decay—furnishes plant-food, and should be added to the compost pile; but be careful not to spread weed seeds, insects and plant diseases by this means. This pile should be turned often, to mix the material.

When practicable, it is best to apply manure in autumn, as it then becomes incorporated with the soil before spring. Beds to be used for flowers next year may be dressed with manure in fall and deeply spaded, leaving the surface rough and loose.

Fertilizer. Commercial fertilizers add plant-food, but usually they have only a small influence in correcting faulty texture. Therefore, before concentrated fertilizers are applied, the land should be put into good physical condition by judicious tillage and by the incorporation of vegetable mold or humus. The fertilizer then shows its best results. It is well for the gardener always to have on hand good concentrated fertilizing materials, representing nitrogen, potash, phosphoric acid and perhaps lime. These are good supplements to manure and compost, and they may be applied effectively also in the row or the hill when seeds are sown or when the plants are transferred from flats or pots. If the garden is to produce its optimum, one crop follows another closely and two or more crops may be grown at the same time; therefore the plant-food requirements must be always in mind and liberally supplied.

Nitrogen is obtained in nitrate of soda, sulfate of ammonia, and animal tankage. Potash is carried in muriate and sulfate of potash, and phosphoric acid in superphosphate, acid phosphate, and bone.

Mulch is employed both in protecting plants from severe freezing and severe drought. The same material may be used in either case, although it is now considered best to make an earth-mulch to prevent evaporation and retain the moisture through the dry season. The mulching of the ground around blackberries, currants, gooseberries or raspberries with straw or hay is often practiced to keep the fruits clean; and the winter mulch of strawberry beds is raked between the rows for the same purpose, as well as to retain moisture and to afford summer protection. Winter mulch usually consists of leaves, straw, hay, rough manure, boughs of evergreens, or any coarse material that will protect the plants from

severe weather and the heaving caused by alternate freezing and thawing. This mulch should be removed as spring advances, unless it is of such a character as to be worked into the soil to add fertility or to loosen heavy lands. Near the seacoast salt hay is considered to be a perfect mulch. The winter mulch must not contain too strong or heavy manures, or plants may be injured by the leaching. For flower borders and shrubbery, muck or peat makes a good winter mulch. Ordinarily the mulch may be placed to the depth of 3 to 6 inches, and if it is of loose material it may be still deeper. Some plants, however, as the globe artichoke, may be smothered by a very heavy mulch in winter. If dry and loose, mice may nest in it and girdle trees or bushes. Even perfectly hardy plants are benefited by a winter mulch, because it improves conditions. Autumn leaves, as they drift into shrubberies, make mulch; it is not always necessary to remove these leaves.

LANTANA Camara. *Verbena Family.* A popular greenhouse pot-plant occasionally seen in window-gardens, being grown for the profusion of orange-red to pinkish heliotrope-shaped flowers. It is a native shrub in the southern United States and southwards. In the South, and sometimes in the North, it is planted out for the summer.

It is very easy to grow, and also to propagate by means of cuttings. Although the flowers of the common species are somewhat ill-scented, the profusion of bloom makes it desirable. It is a weed in many tropical countries.

LANTERN-PLANT: *Physalis Alkekengi.*

LARKSPUR: *Delphinium.*

LATANIA: see *Palms.*

LATHYRUS: *Pea, Everlasting; Sweet Pea.*

LAUREL. Many evergreen broad-leaved plants are known as laurel, but the true laurel or sweet bay is *Laurus nobilis*, a tree of the Mediterranean region, one of the Laurel Family. It is extensively used as a tub-plant for decoration of lawns and porches in summer in the North and for halls, corridors, restaurants, and other places where formal greenery is required, the head being clipped to desired shape. When making new growth in spring and summer, liquid manure may be applied. The laurel is propagated by firm cuttings, well ripened, 3 or 4 inches long; but the home gardener will do better to purchase new plants.

Other plants known as laurel are *Kalmia latifolia* and *Rhododendron maximum* of the Heath Family, species of Prunus (or Laurocerasus) of the Rose Family, and the California laurel, *Umbellularia californica*, of the Laurel Family.

LAVATERA: *Mallow.*

LAVENDER: *Sweet Herbs.* **Sea-:** *Statice.*

LAWN AND SURFACING. Two essentials are at the foundation of a satisfactory lawn: a pleasing surface or contour; a dense firm sod.

Inasmuch as the lawn is, or should be, a permanent area, it is necessary that the greatest care be exercised to grade the land and thoroughly to prepare it before seeds are sown. About a new building the filling should be allowed to settle, so that the finished surface slopes gradually away from the foundations and the steps. If the land is very hard clay, or if the place is rather low, it is always well to lay tile underdrains at frequent intervals. Every pains should be taken to make the land deep and loose, so that the grass roots will run far into the soil and not be pressed for lack of moisture in a dry time. If the land has not had applications of manure in recent years, it is well to plow in, or to spade in, a liberal quantity of well-rotted litter from the barnyard. Work this into the ground as deeply as possible. If the hardpan is rather high, it is well to subsoil the area or to trench it (that is, to spade it up two or three spades deep) if the area is small; ordinarily however, it is better to correct the hardpan by good tile underdrains laid 20 to 25 feet apart and below frost damage. In lowering the grade, be careful to save the surface soil and remove enough of the subsoil to make the required contour and then replace the top earth. If the surface soil is very poor to begin with, or if very weedy, it may be necessary to bring new earth to the place.

Thorough deep preparation of the land at the beginning is good practice, but recent experiments have shown that fertility can be maintained by frequent top-dressings. This dressing consists preferably of compost to which chemical fertilizer is added. The dressing is applied three or more times a year, ordinarily two of the applications being in the spring and another in autumn. If the sod is not vigorous or satisfactory, other applications may be advisable. Good sod requires good feeding, and as much attention as one would give to a garden crop. There are varying opinions as to whether land for lawn should be acid; probably a neutral reaction is generally to be advised; welfare of the trees and shrubs is to be considered.

Compost is rotted manure and leaves and garden wastes. The material may be placed in a pile where surface drainage will not take away the leachings. The pile should be turned several times with a fork, and at least one year will be required to produce a humous material that is soft and can be sifted through a quarter-inch screen. Keep the pile moist, and therefore do not slope the top so that it sheds rain. If straw and other materials do not rot readily, mix a little sulfate of ammonia or nitrate of soda in the pile. Black earth from low lands is not compost.

Weeds are avoided by fallowing and cover-cropping the area a year before seeding (if it is foul), by care in not surfacing with weedy soil, by using clean seed, by hand-pulling when necessary, and sometimes by poisoning the soil with lead arsenate, and by getting thick firm sod. Many of the weeds of new lawns soon disappear naturally, as they are annual.

In the Japanese beetle zone poisoning of the soil with arsenate of lead is necessary. The arsenate is raked or drilled into the surface just before seeding at the rate of 5 pounds in 50 pounds of dry carrier (such as sand or soil) on 1,000 square feet of lawn area. On established lawns it may be mixed with the top dressing of compost and broadcast on the surface at the rate of 1 or 2 pounds to 1,000 square feet in two or three applications totaling 5 pounds a year. Some green-keepers are sure their lawns are more free of the mouse-ear chickweed when lead arsenate is used but its control of other lawn weeds is still doubtful.

Shallow creeping weeds in the lawn, such as chickweed, speedwell, heal-all and ground ivy, are best controlled by sprinkling the patches with ammonium sulfate or nitrate of soda. Both of these chemical fertilizers will kill the shallow weeds with only temporary burning of the grass. After the weeds have dried up, the grass soon regains its green color and grows more vigorously than before.

With 1 cubic yard of screened compost 15 pounds of ammonium sulfate may be mixed, and this material will top-dress about 5,000 square feet of lawn at each application. If rain does not immediately follow, water should be applied from a hose to prevent burning the grass. The ammonium sulfate provides an acid soil reaction. Other good chemical nitrogenous fertilizers that have an alkaline reaction are nitrate of soda and nitrate of calcium. Tankage, bone-meal, pulverized sheep and poultry manure are good fertilizers. Cottonseed meal is a commendable complete fertilizer with good nitrogen content that does not burn the sod and may be applied either alone or mixed with sand or earth for easy handling; it is used at the rate of about 15 pounds to 1,000 square feet of surface. There are also good special fertilizers some of which, however, are expensive for large areas.

The kind of grass seed to sow depends on the region and also on the personal taste of the owner. There are good commercial mixtures. The standard northern lawn grass is Kentucky blue-grass (*Poa pratensis*) sometimes called june-grass. Only the best cleaned seed should be used at the rate of at least 4 pounds to 1,000 square feet. Usually 1 pound of redtop is added, making 5 pounds to 1,000 square feet. The redtop seed is very much smaller and germinates quickly and grows rapidly and makes a good temporary lawn the first year while the blue-

grass is getting established. Much experience in lawn grass mixtures is now available from keepers of golf courses, and these persons may be consulted for the particular locality.

In the southern states, june-grass will not hold, and Bermuda-grass is used, being sown about as thick as recommended for the june-grass. The june-grass alone gives an excellent lawn in a very short time. Whether one shall sow white clover in the lawn depends mostly on personal taste. If one likes white clover, it is well to put in a quart or two of seed to the acre, sowing it separately from the june-grass to insure even distribution. It thrives where the land is rather moist, but roots deeply and often keeps green in dry places. Other lawn grasses are the bents and the fescues.

In sowing lawn grass seed, it is well to go over the area twice, once in each direction to ensure even distribution. The surface may then be lightly raked or a compost application added.

If the ground can be developed to good condition and free from weeds, early autumn sowing of grass seed is desirable. Grass starts best in a cool season; it should secure foothold before winter, start early in spring, be ahead of the weeds.

In newly graded lawns, it is a good plan to shape the area thoroughly in autumn, allowing it to settle in winter; and then, if the surface remains even, to sow the grass seed on one of the latest snows in spring. By sowing it on the snow, one can see that it is distributed evenly; and when the snow melts, the seed is carried into the land and does not need covering. See that sparrows do not eat it.

It is seldom that one secures a perfectly good and uniform sod from one sowing; particularly is this true if the soil varies in different parts of the area. If the surface contour is satisfactory, it is unwise to dig up the areas on which the seed has not caught. It is best to rake them over with a steel rake in autumn or spring, apply a compost-fertilizer dressing, and sow more seed. Top-dressing with compost in late autumn evens up the surface and prepares the area for early spring growth. Care must be taken in northern climates not to fertilize at such time in autumn that a resulting stimulated new growth may perish in winter.

Lawns are sometimes made by planting grass from certified or selected sods; this is a special practice to be followed under advice, although small pieces of good turf may be set or rolled in a soft surface with satisfactory results.

Mow the lawn frequently when it is growing rapidly,—in spring and early summer. In autumn mow less frequently, and let it go into the winter with a long coat of grass. If the lawn is mown as often as is needed, it will not be necessary to rake off the trimmings. Many persons make the mistake of raking the lawn clean in late fall.

The common practice of sprinkling lawns is usually injurious, since the water is not supplied in sufficient amount to wet down very far, and the grass tends to make surface roots. When the watering is omitted the plants suffer. The more a lawn is sprinkled, the more the grass depends on the sprinkling. If it is necessary to water the lawn, the water should be allowed to run directly from the hose until the surface area is completely soaked, or merely to break its force so that it will not wash away the surface or compact the area. It is best to do this at nightfall. When the water is applied by means of a sprinkler, a large part of it evaporates and may accomplish little. The fundamental treatment of the lawn is to have the land so deep and porous that the grass roots strike deep into the soil and do not need the surface water. A well-made lawn needs watering only in unusually dry times, unless there are many trees.

Sodding. While the best way in general to obtain a lawn is by the sowing of seed for small areas, along the sides of walks and drives sods may be used. The results are quicker. Unless the sod is of the right kind, however, and very carefully laid, the results are not good. Sod adapted to the work is that which comes from an old closely grazed pasture. Sod from a sheep pasture is supposed to be specially good. Such sod has been so closely grazed that it has made a very dense mat, and all the weeds have been destroyed. The droppings of the animals also make the ground rich. The sod should be cut in thin strips, not more than 1½ or 2 inches in thickness. If it is thicker than that, it is heavy and bulky to handle, and is not so easily laid. Ordinarily, the sod is cut in strips 10 inches or a foot wide. A board is laid on the sod and the strip is cut along either side of it with a sod-cutter or a sharp spade. Two men then roll up the sod. One stands on the strip of sod with his face toward the man who, with the spade, cuts it loose beneath. As it is cut loose, the man on the strip rolls the sod so that the upper surface is on the inside of the roll. Strips longer than 10 or 12 feet make rolls too heavy to handle with ease.

The ground on which the sod is to be placed should be very loose, so that the sod can be pounded down firmly. A heavy pounder should be used, as a block of wood. It is usually impossible to pound down sod with the back of a spade sufficiently firm unless the earth is very mellow. The sod should be pounded until the top is about level with the surrounding surface. This insures contact with the soil beneath, so that there are no air spaces and no likelihood of drying out. Sod pounded down as firmly as this should grow readily. If a sod edging is laid along walks and drives, it should be pounded down an inch or more lower than the surrounding loose land which is seeded, because the loose land will

finally settle; otherwise the sod border is likely to be higher than adjacent land after a year or two.

Surfacing. However good the sod or the covering, the lawn is not satisfactory unless the shaping of the surface is pleasing. Soft flowing surfaces are to be attained as far as possible. In formal and semi-formal premises, sharp rectangular lines may be advisable as part of the architecture or studied design; but the general rule is to follow a naturalistic treatment. In any case, the advice of an expert is always desirable, even though the area is small and the problem seemingly simple; yet the owner himself should develop a feeling for artistic form and contour.

The treatment of banks or sharp slopes is likely to give trouble, and formal terraces or steep declivities are often constructed where there is really no need for them. Terraces may be desirable for two reasons: to hold a very steep slope; to afford an architectural base for a building.

It is rarely necessary to make a distinct terrace in the usual lawn. Even if the lawn is very steep, it may be better to make a gradual slope than to cut the place in two with a formal bank. A terrace makes a place look smaller. It is difficult to make and to keep in repair. The surface is not readily cut with a lawn-mower. Unless the sod is very dense, the upper edge tends to wash off with the rains and the foot tends to fill in. Nature does not have straight banks unless they are rock. Banks may be carried out into the lawn in long gradual easy slopes and curves: the lawn is then one area rather than two.

If it is necessary to terrace a yard to hold it, the bank would better be at one side rather than in the middle; one is then able to obtain a good breadth of lawn. If the terrace is at the outer side next the street, a perpendicular mason-work retaining wall may be constructed. If it is on the inner side of the lawn, it may be placed close to the building and be made to appear as a part of the architecture: it may be made the base of the building; there may be a balustrade around the edge of the terrace to give it architectural feeling. The descent from the terrace to the lawn may be made by means of steps, so as to add to the architectural aspect of the place. Terraces are most in place about buildings that have many strong horizontal lines. The general tendency is to make too many terraces. The cases are relatively few in which they may not be dispensed with to advantage.

LAYERS: page 218.

LEEK (*Allium Porrum*, probably derived from a species native to Eurasia). *Lily Family.* A hardy plant, used in cookery. Well grown leeks have a very agreeable and not very strong onion flavor. They are of the easiest culture; usually grown as a second crop, to follow beets,

early peas, and other early stuff. The seed should be sown in a seed-bed in April or early May and the seedlings planted out in the garden in July, in rows 1 or 2 feet apart, the plants being 6 inches apart in the rows. The plants should be set deep if the neck or lower part of the leaves is to be used in a blanched condition. The soil may be drawn towards the plants in hoeing, to further the blanching. Being very hardy, the plants may be dug in late fall, and stored in the same way as celery, in trenches or in a cool root-cellar. In mild climates, seed is sometimes sown in late summer or early autumn and the seedlings transplanted the following spring; in this way early results are secured. One ounce of seed supplies about 100 feet of drill.

LEONTOPODIUM: *Edelweiss.*

LEOPARD-PLANT: *Farfugium.*

LEOPARDS-BANE: *Doronicum.*

LEPIDIUM: *Cress.*

LETTUCE (varieties of *Lactuca sativa*, a plant probably derived from a species of Old World origin). *Composite Family.* Hardy annual salad vegetable, the radical leaves being used; grown both in the open and under glass.

The winter and early spring crops of lettuce are grown in forcing-houses and coldframes, but a supply from the garden may be had from April to November, by the use of a cheap frame in which to grow the first and last crops, relying on a succession of sowings for the intermediate supply. Seed for the first crop may be sown in a coldframe in March, growing the plants thick and having many plants that are small and tender; or, by thinning out to the distance of 6 or more inches and allowing the plants to make a larger growth, the plants removed may be set in the open ground for the next crop. Sowings should be made in the garden from April to October, at short intervals. A moist location should be chosen for the July and August sowings. The early and late sowings should be of some loose-growing variety, as they are in edible condition sooner than the cabbage or heading varieties. In the garden, plants may stand 6 to 12 inches apart in the rows, and the rows may be as close together as the system of tillage will allow.

The cabbage varieties are far superior for salads to the loose-growing kinds. To be grown to perfection, they should have rich soil, frequent cultivation and an occasional stimulant, such as liquid manure or nitrate of soda. For good-sized heads the plants should stand 10 to 16 inches in the row. The Cos lettuce is an upright-growing type much esteemed in Europe, but less grown here. The leaves of the full-grown plants are tied together, thus blanching the center, making it a desirable

salad or garnishing variety, known often as Romaine. It thrives best in summer. One ounce of lettuce seed will grow 3,000 plants or sow 100 feet of drill.

In the middle South lettuce is sometimes sown in autumn and allowed to stand over winter with some protection of mulch or otherwise; it resumes growth at the first approach of warm weather.

Several lettuce diseases are destructive. There is no direct control, but good rotation, destruction of weeds in the patch and vicinity, and removal of all lettuce trimmings will help to keep the troubles in check. Bottom-rot is handled by dusting underneath the plants with a special ethyl-mercury-phosphate preparation.

LEUCOJUM: *Snowflake.*

LIATRIS. GAYFEATHER. *Composite Family.* Perennials suitable for borders and wild-gardens; the rose-purple or white disk-flowers (no rays) are borne in heads in spikes or racemes in late summer and autumn.

They do well in any soil or exposure. Propagated by seeds, division and some kinds by offsets.

L. elegans. 4 ft.: fls. white but inner bracts rose-tipped. S. U. S.

L. pycnostachya. 4-5 ft.: purple. W. N. Amer.

L. scariosa. 4-6 ft.: bluish-purple. E. N. Amer.

L. spicata. 4-6 ft.: blue-purple or white. E. N. Amer.

LIGULARIA: *Farfugium; Senecio.*

LILY. *Lily Family.* Bulbous plants of many kinds, native in the north temperate zone, prized for the excellent spring and summer bloom. It has been said of this genus that it has no "poor relations," each species being perfect in itself. Many of the choicest kinds are comparatively unknown in cultivation, although easy to cultivate. In fact, all the lilies may be grown with comparative ease. A light rich well-drained soil, mellow to the depth of at least 1 foot, a handful of sand under each bulb if the soil is inclined to be stiff, and planting so that the crown of the bulb is at least 4 inches below the surface in the species that make roots above the bulb, and shallow with most kinds that have roots only underneath, are the general requirements. One exception to the depth of planting is *Lilium auratum*, or Goldband lily; this should be planted deeper—at least 8 inches below the surface—as the new bulbs form over the old one and soon bring the bulbs to the surface if they are not planted deep; and other species not in general cultivation have similar characteristics. Many of the species are hardy, with a winter covering, in the North.

Most kinds are the better for remaining undisturbed for a number of years; but if they are to be taken up and divided, or moved to other quarters, they should not be allowed to become dry. The small bulbs, or offsets, may be planted in the border, and if protected will grow to flowering size in two or three years. In taking up bulbs for division it is best to do so soon after the tops die following blooming. At least this should be accomplished early in the fall, not later than October in the North, giving the plants a chance to become established before freezing weather. A mulch of coarse litter or evergreen boughs should be placed over the bulbs after the ground has become frozen, to be gradually removed as the spring advances.

Lilies. Upper left, *Lilium croceum*; lower left, *L. speciosum*; center, *L. candidum*; upper right, *L. elegans*; lower right, *L. tigrinum*.

As pot-plants some lilies are very satisfactory, especially those that may be forced into bloom in late winter. The best kinds for this purpose are Easter lily and also Madonna lily. The winter culture of these for forcing is the same as for hyacinths (in pots), which see. The article on *Bulbs* gives directions for both outdoor and indoor growing which are applicable to lilies.

L. auratum. GOLDBAND LILY. 5-6 ft.: white spotted crimson with yellow stripe, fragrant. Japan. Var. *platyphyllum*, lvs. broader.

L. Batemanniæ. 2-3 ft.: orange-red' A form of *dauricum.*

L. canadense. MEADOW LILY. 4-5 ft.: orange-yellow to red, spotted purplish-brown. E. N. Amer.

L. candidum. Madonna Lily. 3-4 ft.: white. Eu., Asia.

L. carolinianum. 3-4 ft.: orange-scarlet spotted purple-brown, petals reflexed. E. N. Amer.

L. columbianum. 3-4 ft.: reddish-orange spotted purple, petals reflexed. W. N. Amer.

L. croceum. Orange Lily. 3-6 ft.: orange spotted crimson. Eu.

L. dauricum. Candlestick Lily. 2-3 ft.: orange-red spotted purplish-black. Siberia.

L. elegans. 1-2 ft.: orange-red spotted black-purple. Japan.

L. Grayi. 2-4 ft.: red spotted purplish-brown. E. N. Amer.

L. Hansoni. 3-5 ft.: orange-yellow spotted purplish-brown, fragrant. Japan.

L. Henryi. 6-9 ft.: orange spotted brown, petals recurved. China.

L. japonicum (*Krameri*). 2-3 ft.: rose or pink, fragrant. Japan.

L. longiflorum. 2-3 ft.: white, fragrant. Japan. Var. *eximium* (*Harrisii*), Easter Lily, taller, fls. larger. Var. *giganteum*, stems purple-brown.

L. Martagon. 3-6 ft.: purple spotted purplish-black, petals reflexed. Eu., Asia. Var. *album*, white. Var. *dalmaticum*, nearly black.

L. pardalinum. Leopard Lily. 6-8 ft.: orange-red spotted purple, petals reflexed. W. N. Amer.

L. philadelphicum. Orangecup Lily. 2-3 ft.: orange-red spotted purple. E. N. Amer.

L. philippinense. 1-1½ ft.: white tinged green, fragrant. Philippines. Var. *formosanum*, tinged purple. Formosa.

L. regale. Royal Lily. 3-5 ft.: lilac or purple, white inside, yellow at base, fragrant. China.

L. rubellum. 2 ft.: rose-pink, fragrant. Japan.

L. Sargentiæ. 5-6 ft.: rose-purple, white inside, fragrant. China.

L. speciosum. Showy Japanese Lily. 2-4 ft.: white spotted rose, fragrant, petals reflexed. Japan. Var. *magnificum*, tinged crimson, large. Var. *Melpomene*, deeper rose. Var. *rubrum*, carmine-pink.

L. superbum. American Turks-Cap Lily. 6-8 ft.: orange-scarlet spotted purplish-brown, petals reflexed. E. N. Amer.

L. tenuifolium. Coral Lily. 2-3 ft.: bright scarlet, petals reflexed. Asia.

L. testaceum. Nankeen Lily. 5-7 ft.: apricot or nankeen-yellow, fragrant, petals reflexed.

L. tigrinum. Tiger Lily. 5-6 ft.: orange-or salmon-red spotted purple-black, petals reflexed. Asia. Var. *splendens*, larger.

L. umbellatum. Western Orangecup Lily. 2 ft.: red or orange, spotted. N. Amer.

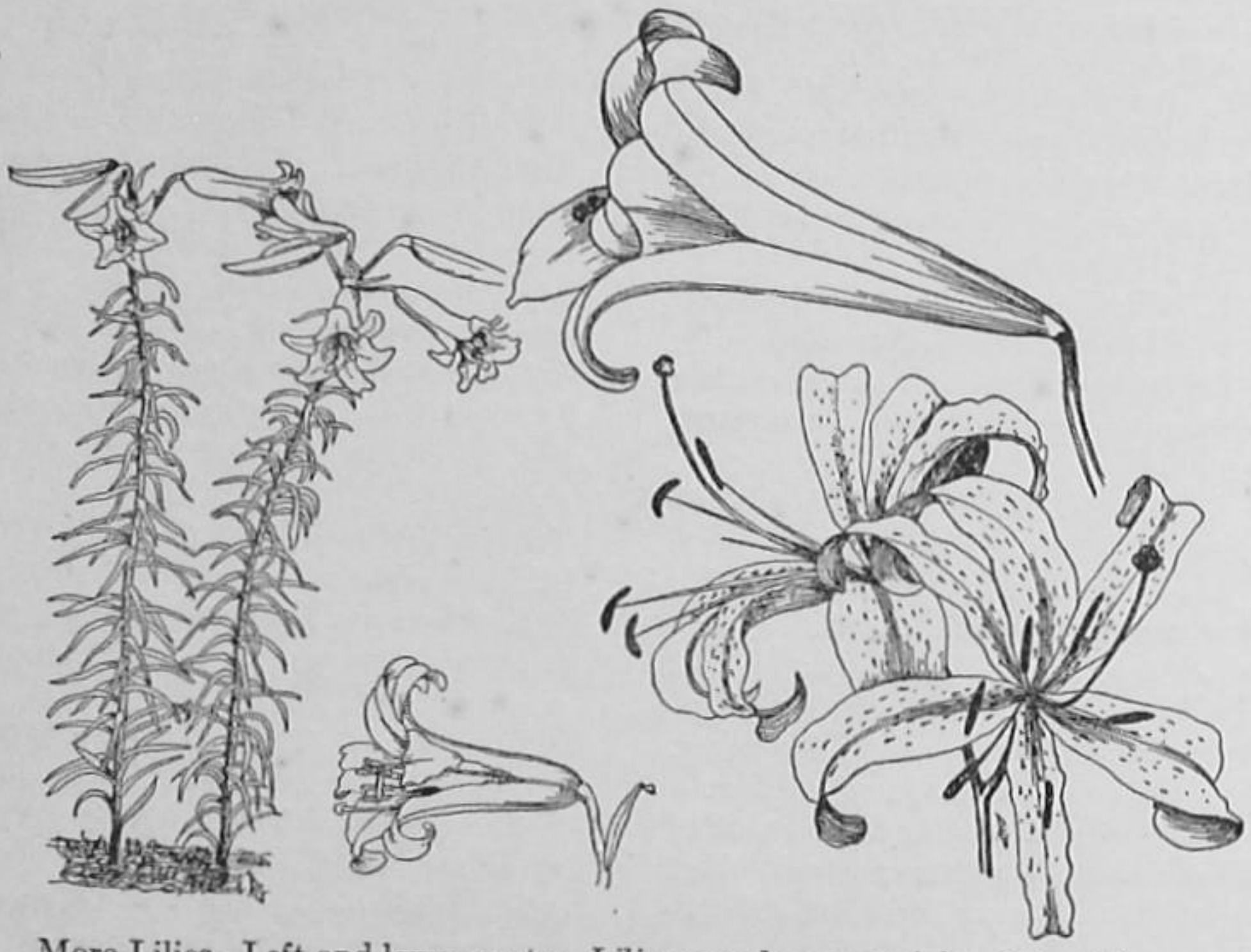
L. warleyense (*Willmottiæ*). 4-5 ft.: orange-red spotted brown, petals recurved. China.

L. Washingtonianum. 5-6 ft.: white spotted purple, fragrant. W. N. Amer.

LILY, African-: *Agapanthus africanus.* **Atamasco-:** *Zephyranthes Atamasco.* **Belladonna-:** *Amaryllis Belladonna.* **Blackberry-:** see *Perennials*, page 201. **Checkered-:** *Fritillaria meleagris.* **Chinese Sacred-:** *Narcissus.* **Day-:** *Hemerocallis.* **Guernsey-:** *Nerine sarniensis.* **Jacobean-:** *Sprekelia formosissima.* **Plantain-:** *Hosta.* **St. Bernard-:** *Anthericum Liliago.* **St. Bruno-:** *Anthericum Liliastrum.* **Scarborough-:** *Vallota speciosa.* **Torch-:** *Kniphofia.*

LILY-OF-THE-VALLEY (*Convallaria majalis*). *Lily Family.* A perfectly hardy little perennial, native in Eurasia and North America, bear-

ing racemes of small white bell-shaped fragrant flowers in early spring. For ordinary cultivation, sods or mats of roots may be dug from any place in which the plant is colonized. Usually it thrives best in partial shade; and the leaves make an attrractive mat on the north side of a building, or other shady place in which grass will not grow. The plants take care of themselves year after year; but if fertilized and given other good care superior bloom will result.



More Lilies. Left and lower center, *Lilium regale*; upper right, *L. longiflorum*; lower right, *L. auratum*.

For forcing indoors, imported or specially grown roots or "pips" are used. These roots may be planted in pots, and treated as recommended for winter-flowering bulbs, under *Bulbs*. Florists force them in greater heat, however, often giving them a bottom heat of 80° or 90°; but skill and experience are required to attain uniformly good results.

LILY-TURF. *Lily Family*. These Asian plants, known to the trade as Ophiopogon, belong to the genera Liriope and Mondo. They make excellent ground-cover and are hardy in parts of New York; foliage grass-like; flowers in racemes or spikes. Propagated by division of plants.

Mondo Jaburan. Lvs. 2 ft. long: white. Japan.

Mondo japonicum. Lvs. 10-12 in. long: light blue.

Liriope Muscari. Lvs. 1½ ft. long: lilac-purple. Var. *variegata*, foliage striped yellow.

LIMONIUM: *Statice.*

LINARIA. TOADFLAX. *Figwort Family.* Small erect plants, the usual garden kinds annual, native in north temperate zone. Most of the annuals are 12-20 inches high, with violet or purplish spurred flowers. Seeds may be sown where plants are to grow in open situation; thin to 6-8 inches. Perennial kinds are somewhat planted in rock-gardens. Increased also by division.

The Kenilworth ivy is commonly included with the Linarias but is better kept distinct as *Cymbalaria muralis.* It is a running rooting neat perennial vine with lilac-blue flowers, readily grown from seeds and division of the runners. It is useful under benches in greenhouses, for covering rocks and rough places in the garden, and for vases and hanging baskets.

L. alpina. 4-6 in., per.: blue with orange palate. Alps.

L. dalmatica. 3-4 ft., per.: bright yellow. Eu.

L. maroccana. 1-1½ ft., ann.: violet-purple with yellow patch on palate. Morocco.

LINUM. *Flax Family.* One half-hardy annual from northern Africa, *L. grandiflorum,* is well known in flower-gardens for its brilliant red flowers appearing over a long season. It grows 12 inches and more high, erect and branching, slender. Seeds may be sown in the garden. For mass effect plants may stand 6-9 inches apart.

Another annual species is *L. usitatissimum,* the agricultural flax from which linseed and flax fiber are obtained; not grown for ornament.

A hardy perennial blue-flowered flax, *L. perenne,* of Europe, is frequent in borders. It grows about 18 inches high, much branched, and although the individual flowers are short-lived, the continuous bloom makes the plant effective. Readily raised from seeds, blooming profusely the following year. Other perennial species grown are *L. alpinum,* 6 inches, blue; *L. flavum,* 2 feet, golden-yellow; *L. narbonense,* 2 feet, azure-blue with white eye.

LIRIOPE: *Lily-Turf.*

LIVISTONA: see *Palms.*

LOBELIA. *Lobelia Family.* Several species are ornamental annual and perennial herbs.

The principal annual lobelia is *L. Erinus* from South Africa, with many named varieties, much used for edgings, ribbon beds, vases and hanging baskets because of its compact habit and more or less trailing stems and profusion of blue, violet or white flowers throughout the season. It thrives in any good garden soil. Grown from seeds sown directly in the garden, or sometimes started in the house for earlier

edgings. It usually grows 6-8 inches high and may be planted 6 inches apart. The dwarf compact varieties are used in bedding. *L. tenuior* is a similar Australian annual to 1½ feet with bright blue flowers.

Perennial lobelia kinds include the brilliant native hardy cardinal-flower, *L. cardinalis*, and the European hybrids (as *L. Gerardii*) which are not hardy in the North. *L. siphilitica* has deep blue or purplish flowers. These are erect-growing, little branched, 2-3 feet and sometimes more; grown from seeds, blooming the following year.

LOBULARIA: *Alyssum maritimum.*

LOGANBERRY: see *Blackberry.*

LOOSESTRIFE, PURPLE: see *Perennials*, page 203.

LOVAGE: *Sweet Herbs.*

LOVE-IN-A-MIST: *Nigella damascena.*

LOVE-LIES-BLEEDING: *Amaranthus caudatus.*

LUFFA: *Gourds.*

LUNARIA: *Honesty.*

LUPINE. *Pea Family.* Many species of Lupinus, annual and perennial, some of them grown for ornament and others for forage and edible seeds. A popular lupine is the perennial *L. polyphyllus* and its varieties *albus*, *roseus* and *Moerheimii*, of the Pacific Coast, a neat but robust hardy plant 3 feet or more high, bearing long racemes of blue, white and rose-colored flowers, different colors often in the same blossom. It is easy to grow; seeds give blooming plants the following year.

The annual lupines are several, mostly derivatives probably from *L. pubescens* (under many Latin names) but some of them from *L. hirsutus*, *L. mutabilis* and *L. Hartwegii.* Those grown for ornament have small seeds; certain agricultural species grown in other countries have seeds as large as peas or even small beans. The flower-garden kinds grow about 2 feet high, and may be thinned (from plants raised directly in the garden) to 1 foot or so. The long upstanding racemes, in summer, carry attractive pea-shaped flowers in white, blue and rose. Most of them are derived from species native in Mexico, as *L. Hartwegii*, blue. They usually profit from slight shade. They are sometimes forced for cut-flowers.

LYCHNIS. Campion. *Pink Family.* Several hardy annuals and perennials (including Viscaria), from north temperate zone, are old garden favorites, blooming through the summer.

Campions are of easy cultivation and withstand dry soils. All are readily propagated by seeds giving bloom the second year or sometimes the first year. Plants of perennials may also be divided in spring.

L. alpina. 1 ft., per.: pink, in dense heads. Eu., Asia, N. Amer.

L. Arkwrightii. Scarlet: hybrid.

L. chalcedonica. MALTESE CROSS. 2-3 ft., per.: scarlet, in dense heads. Eu., Asia.

L. Cœli-rosa (*Agrostemma Cœli-rosa*). ROSE-OF-HEAVEN. 1-1½ ft., ann.: rose-red, solitary. Medit. region. Var. *alba*, white.

L. Coronaria (*Agrostemma Coronaria*). MULLEIN-PINK. DUSTY MILLER. 2-3 ft., white-woolly, bien. or per.: crimson, solitary. Eu.

L. Flos-cuculi (*Agrostemma Flos-Cuculi*). RAGGED ROBIN. CUCKOO-FLOWER. 1-2 ft., per.: red or pink, in loose clusters. Eu., Asia.

L. Flos-Jovis (*Agrostemma Flos-Jovis*). FLOWER-OF-JOVE. 1-1½ ft., per., white-woolly: pink, in dense clusters. Eu.

Maltese Cross, *Lychnis chalcedonica.*

L. Haageana. 1 ft., per.: orange-red, scarlet or crimson: hybrid.

L. Viscaria. GERMAN CATCHFLY. 1-1½ ft., per., sticky: red or purple, in loose clusters. Eu., Asia.

LYCOPERSICON: *Tomato.*

LYCORIS: see *Amaryllis.*

LYSIMACHIA: see *Ground-Cover.*

LYTHRUM: see *Perennials*, page 203.

MACLEAYA: see *Perennials*, page 201.

MALCOMIA: *Stock.*

MALLOW. *Mallow Family.* Several botanically distinct genera of annual and perennial ornamental herbs are known as mallows, mostly native in Europe and Asia. All of them have hollyhock-like flowers but of course smaller.

If the name is restricted in usage, it should be applied to the Malvas, of which three or four are not unusual in cultivation. *M. moschata*, the Musk Mallow, perennial, usually 1½ feet high with pink and white flowers, is a good plant for borders, blooming in late spring and early summer; it is also common along roadsides as an escape in some parts of the country; plants bloom the first year if seed is started early. *M. mauritiana*, better treated as a variety of *M. sylvestris*, is usually biennial but blooms well the first year from seed. It reaches 3 or 4 feet and bears lilac-purple flowers along the main stem and branches. *M. crispa* is an unbranched stately annual to 8 feet, grown for its striking habit and the attractively curled leaves.

The Poppy-Mallow is Callirhoe, native in North America, usually *C. involucrata*, a hardy perennial with procumbent or almost trailing

stems and shoots that rise 9 to 12 inches and bear rosy or cherry-red attractive flowers with lighter center from summer till autumn. Grcwn from seeds, blooming next year, also by division.

Another mallow is *Malope trifida* (*grandiflora*), half-hardy branching annual 2-3 feet, with showy rose and purple flowers; sow seeds where plants are to bloom and give plenty of room.

Tree Mallow is Lavatera, the usual one in gardens being *L. trimestris*, an attractive branching half-hardy annual 3 feet and more high carrying cup-like pink showy flowers all summer; sow where plants are wanted; thin to 12 inches or more.

For Rose-Mallow, often improperly called Marshmallow, see *Hibiscus*.

MALOPE: see *Mallow*.

MALTESE CROSS: *Lychnis chalcedonica*.

MALVA: *Mallow*.

MANURE: page 152.

MAPLE, FLOWERING: *Abutilon*.

MARGUERITE: see *Chrysanthemum*.

MARIGOLD (*Tagetes*). *Composite Family*. The marigolds of the old-fashioned gardens are still among the best plants for autumn color. They are hardy annuals of the easiest culture on land not so rich as to cause too strong growth. They have been much improved of late years. The old-fashioned Aztec (so-called African) marigolds, but native in Mexico as are the others, grow 2 to 3 feet, and are useful for scattering in mixed borders or making masses or displays of color in yellow and orange. The French or dwarf marigolds grow about 1 foot high and are more tufty in their habit. They are better adapted for edging than for mass effects in the main parts of the grounds.

All marigolds may be sown where the plants are to stand, since the flowers are usually not wanted until late summer or early fall, at which time they usually give their best bloom. If they are wanted earlier, however, the seeds may be started in the house or hotbed. Tall varieties of the Aztec class may be allowed to stand 10 to 18 inches apart and the dwarfs at somewhat less distances. All of them should have full sunny exposure, and a rather light soil is to be preferred.

The Pot-Marigold is *Calendula* and Cape-Marigold *Dimorphotheca*.

T. erecta. AZTEC (improperly called African) MARIGOLD. Yellow to orange, heads 2-4 in. across, rays numerous.

T. patula. FRENCH MARIGOLD. Yellow with red markings, heads 1½ in. across, rays numerous.

T. tenuifolia (*signata*). STRIPED MARIGOLD. Yellow, heads 1 in. across, rays few.

Marigolds and Coreopsis. Left, Aztec marigold, *Tagetes erecta*; two in center, single-flowered forms of French marigold, *T. patula*; lower right, striped marigold, *T. tenuifolia*; upper right, *Coreopsis tinctoria*.

MARJORAM: *Sweet Herbs.*

MARTYNIA. Unicorn-Plant. *Martynia Family.* One species (*Proboscidea Jussieui*), native from Indiana to New Mexico, is grown in vegetable-gardens for the odd partially matured pods to be used in pickles. It is a tender wide-spreading robust annual covering a space 3 or 4 feet across. Sow seeds where plants are to stand when weather becomes warm, thinning to at least 2 feet.

MARVEL-OF-PERU: *Four-O'Clock.*

MATHIOLA: *Stock.*

MATRICARIA. Matricary. False Chamomile. *Composite Family.* Annual and perennial white-flowered hardy herbs with finely divided foliage, grown for ornament after the manner of the outdoor flower-garden chrysanthemums and anthemis; native in the Old World. Some of them produce full double heads. *M. capensis* is *Chrysanthemum Parthenium.*

M. Chamomilla. Sweet False Chamomile. 2 ft., ann.: heads 1 in. across. Eu., Asia.

M. inodora. Scentless False Chamomile. 2 ft., ann.: heads 1½ in. across, sometimes double. Eu.

M. Tchihatchewii. Turfing Daisy. 6-12 in., forming mats, per.: heads 1 in. across. Asia Minor.

MAZUS. *Figwort Family.* Low tufted perennials used for ground-cover and rock-gardens, having blue or white two-lipped flowers. Propagated by division and seeds.

M. japonicus (*rugosus*). Blue, lower lip brown-spotted. Asia. Weedy plant, probably not in cult.; ses *M. reptans.*

M. pumilio. White or bluish with yellow center. New Zeal., Australia.

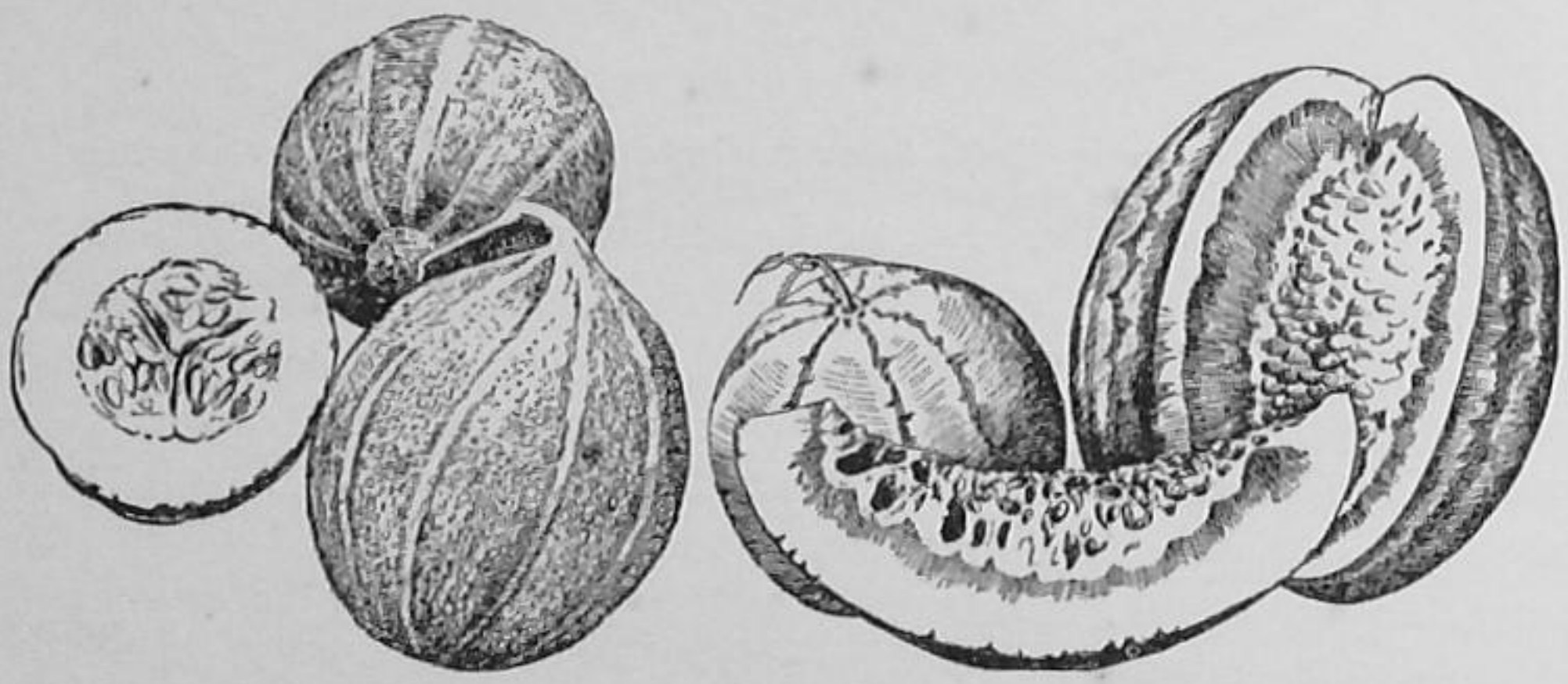
M. reptans (*repens*, erroneously). Purplish-blue, lower lip spotted white, yellow and purple. Said to be Himalayan. The usual hort. species, although grown as *M. rugosus* which may not be in cult. in this country.

MEADOW-RUE: *Thalictrum.*

MEADOWSWEET: *Filipendula.*

MECONOPSIS: see *Perennials*, page 203.

MELON, MUSKMELON (*Cucumis Melo*). *Gourd Family.* Tender tendril-bearing vine, probably native in Asia, grown for the edible fruit.



Melons. Left, muskmelons, *Cucumis Melo*; right, watermelon, *Citrullus vulgaris.*

The natural soil for melons is a light sandy loam, well enriched with rotted manure, although good crops may be grown on land naturally heavy if the hills are specially prepared. When only heavy soil is available, the earth where the seeds are to be planted should be thoroughly pulverized and mixed with fine well-rotted manure. A sprinkling of leaf-mold or chip-dirt helps to lighten it. On this hill ten or fifteen seeds may be sown when the weather is warm and settled, thinning to four or five vines when danger of insects is over. The season may be advanced and the damage from insects lessened by starting the plants in hotbeds. This may be accomplished by using fresh sod, cut into 6-inch pieces, placing them grass-side down in the hotbed, sowing eight to ten seeds on each piece, and covering with 2 inches of light soil. When all danger of frost is over, and the ground has become warm, these sods may be carefully lifted and set in the prepared hills. The plants usually grow

without check, and fruit two to four weeks ahead of those from seed planted directly in the hill. Old quart berry-boxes are excellent to plant seeds in, as, when they are set in the ground, they quickly decay, causing no restriction to the roots. In the field the hill may be protected for a time by paper covers which are manufactured for the purpose. Hackensack, Emerald Gem, Montreal, Rocky Ford, Burrell Gem and the Nutmeg Melon are good home varieties. One ounce of seed will plant about fifty hills.

The Honey Dew and Cassaba melons belong to a separate race (var. *inodorus*), with larger flowers and fruits, the latter with little if any musky odor and keeping into winter; culture as for other melons except that a long season is required and they are not grown in the North.

Snake or Serpent Melon, *Cucumis Melo* var. *flexuosus*; sometimes three feet long.

The Snake or Serpent melon (var. *flexuosus*) is a long slender and often oddly crooked fruit, usually not more than two inches thick at any point and sometimes 3 feet long. It is grown mostly as a curiosity, but is used in preserving.

Mango melon is still another race (var. *Chito*), a small orange-like or lemon-like plain yellow or greenish fruit employed in preserves and pickles.

As with all cucurbits, melons profit by long rotation of crops as an agency in lessening disease. Seed may be treated by placing in a cheese-cloth bag and dipping for five minutes in a 1-1000 corrosive sublimate solution (1 tablet in pint of water). Spraying with bordeaux mixture 3-3-50 is standard practice; or copper-arsenate-lime dust may be employed. These treatments are for scab on leaves and fruit.

MENTHA. MINT. *Mint Family.* Perennial aromatic herbs, some of them grown as sweet herbs, others for ornament, and one a ground-cover; the small flowers are purplish, pink or white.

Mints are of simple culture. Propagated usually by cuttings and division; stolons and runners are sometimes employed, and seeds when available.

M. piperita. PEPPERMINT. 3 ft.: purple. Eu.

M. Requieni. Creeping, with very small round lvs.: mauve or pale purple. Corsica.

M. rotundifolia. 2-2½ ft.: purple. Eu., N. Amer. Var. *variegata*, foliage variegated.

M. spicata. SPEARMINT (which see). 2 ft.: purplish. Eu., N. Amer.

MENTZELIA Lindleyi, known mostly in cultivation as *Bartonia aurea. Loasa Family.* Diffuse yellow-flowered hardy annual, conspicuous for its many bright stamens; native in California. Seeds should be sown where the plants are to stand, and thin to 10 inches or more; plants usually stand about 1½ feet high, but often grow taller. The fragrant flowers open at evening and close by day.

MERTENSIA: see *Perennials*, page 203.

MESEMBRYANTHEMUM: *Ice-Plant.*

MIGNONETTE (*Reseda odorata*). *Mignonette Family.* The common mignonette is a plain-looking half-hardy annual with yellowish-white flowers everywhere grown for its delightful fragrance; native in northern Africa. It grows 12-18 inches high but soon lops or spreads and covers a space of a foot or more.

Mignonette needs a cool soil, only moderately rich, shade part of the day, and careful attention to cutting the flower-stalks before the seeds are ripe. If a sowing is made in late April, followed by a second sowing in early July, the season may be extended until severe frosts. It may be sown in pots late in summer and bloomed in the house in winter.

MIMOSA: *Sensitive-Plant.*

MIMULUS. MONKEY-FLOWER (from the personate grinning corollas of some species). *Figwort Family.* Perennial herbs of wide distribution, the two usual garden kinds grown commonly as tender annuals or short-lived perennials for the bloom. *M. moschatus,* Musk-Plant, of western North America, has pale yellow lightly dotted flowers and a somewhat trailing habit, making it useful for vases and hanging baskets. *M. luteus,* from Chile, has large oddly spotted flowers; the race known as *tigrinus* is commonest in cultivation, comprising more highly developed forms or crosses, sometimes grown in windows. Both species are grown from seeds sown indoors, blooming the same year if started early; they may be carried over winter as blooming plants in the window-garden or conservatory; before the plants begin to fail have a new lot coming on from seeds.

MINA: *Cardinal-Climber.*

MINT: *Mentha; Spearmint; Sweet Herbs.*

MIRABILIS: *Four-O'Clock.*

MIST-FLOWER: *Eupatorium cœlestinum.*

MITCHELLA: see *Ground-Cover.*

MITELLA: see *Perennials*, page 203.

MOMORDICA. *Gourd Family.* Tender tendril-climbing annuals of the Old World tropics; used in the South as porch and screen vines. The foliage is deeply lobed and attractive; the flowers are small, yellow or whitish and somewhat cucumber-like. The fruits are odd and warty, in common cultivated kinds splitting open when ripe and disclosing the red inside and the sculptured seeds. Two species are well known, the Balsam-Pear (*M. Charantia*) with oval or oblong fruits 4-7 inches long, much naturalized in warm countries, and the Balsam-Apple (*M. Balsamina*) with ellipsoid fruits 3 inches or less long. Plant seeds where vines are to grow as soon as weather is warm; they are rapid growers.

MONARDA. *Mint Family.* One species is much prized in garden borders, *M. didyma*, for its heads of bright scarlet-red and its more or less colored floral leaves. It is a native hardy perennial, 2 feet or so tall, with erect little-branched stems; good summer bloomer. It is propagated by seeds and division. The plant is known as bee-balm and Oswego-tea. Wild bergamot, *M. fistulosa*, is also planted; it grows to 3 feet with lilac to purple flowers.

MONDO: *Lily-Turf.*

MONEYWORT: see *Ground-Cover.*

MONKEY-FLOWER: *Mimulus.*

MONKEY-PUZZLE TREE: *Araucaria.*

MONKSHOOD: *Aconitum.*

MONTBRETIA (*Tritonia crocosmæflora*). *Iris Family.* A bigeneric hybrid, planted for the bright profuse orange-scarlet summer bloom. Montbretias are classed by gardeners with summer bulbs. The bulbs (corms) may be planted early in spring, even before frosts have ceased, directly in the garden in a sunny exposure, 3 or 4 inches deep and 6 inches or more apart. The plant grows 2-3 feet and more high and the branches bear long showy spikes. The bulbs may remain in the ground all winter with protection of mulch, but in the North it is better to dig them and store in the cellar. The Montbretia class is native in South Africa.

MOONFLOWER. *Morning-Glory Family.* Two tall-twining tender milky-juiced herbs of the American tropics, grown for the great flowers that open at night. The common one has white flowers 4-6 inches across, *Calonyction aculeatum* (but better known as *Ipomœa Bona-Nox*). The other, *C. muricatum*, has smaller purple flowers. A well grown plant

trained over a porch trellis, or allowed to grow at random over a low tree or shrub, is a striking object when in full flower at dusk or in a moonlit evening.

In the southern states the moonflower is perennial, but even when well protected does not survive the winters in the North. Cuttings may be made before danger of frost and wintered in the house, or the plants may be grown from seed sown in early spring indoors. Cuttings usually give best results in the northern states, as the seasons are not long enough for seed plants to give good bloom. Seeds should be scalded or filed just before sowing.

MOONWORT: *Honesty.*

MORNING-GLORY: *Ipomœa.*

MORUS: see *Mulberry.*

MOUNTAIN FLEECE: *Polygonum affine.*

MOUNTAIN FRINGE: *Adlumia fungosa.*

MOURNING-BRIDE: *Scabiosa.*

MUGWORT: *Artemisia vulgaris.*

MULBERRY. *Mulberry Family.* Hardy small trees from many regions, representing different species of Morus. Both for fruit and ornament the mulberry should be more generally planted. Even if the fruit is not to the taste, the tree is naturally open-centered and round-headed, and is an interesting subject; some of the varieties have finely cut leaves. The fruits are in great demand by the birds, and after they begin to ripen the strawberry beds and cherry trees are free from robins and other fruit-eating birds. For this reason alone they are a valuable tree for the fruit-grower. Trees may be purchased cheaper than one can propagate them.

If planted in orchard form, place them 25 to 30 feet apart. About the borders of a place they can go closer. The Russian varieties are often planted for windbreaks, for they are very hardy and thrive under the greatest neglect; and for this purpose they may be planted 8 to 20 feet apart; they make excellent screens and stand clipping well. New American, Trowbridge and Thorburn are leading kinds of fruit-bearing mulberries for the North. The true Downing is not hardy in the northern states; but New American has been sold under this name. Mulberries thrive in any good soil, and need no special treatment. A weeping mulberry is frequent as an ornamental oddity, being grafted 4 or 5 feet high on a straight tree variety.

MULCH: page 153.

MULLEIN: *Verbascum.*

MUSHROOM. The life cycle of the mushroom begins with germination of a spore, which gives rise to a thread-like growth called mycelium. The mycelium develops during a period of many weeks an extensive underground system by which it concentrates the food in a central point. Here the threads or strands enlarge, eventually forming a group of "buttons" or small mushrooms. The only species of mushroom commonly cultivated in the United States is *Agaricus campestris*.

Mushrooms are produced from spawn, a specially prepared material filled with living mushroom mycelium with which the prepared beds are inoculated. Prior to 1918 spawn was sold in tightly pressed bricks made of horse manure, cow manure and partly rotted leaves inoculated with either spores or mycelium. Since that time bottle spawn, also with manure as a base, has mostly replaced brick spawn. Bottle spawn has the advantage of being free from diseases and insects, but does not keep as long under ordinary conditions.

Mushrooms can be grown wherever the temperature can be maintained between 45° and 65°, providing the relative humidity is kept high and the ventilation controlled. Sunlight is not harmful to mushrooms but they are usually grown in the dark because it is easier and cheaper to control the temperature and humidity in structures without windows. Cellars, caves, old barns, and specially constructed mushroom houses are employed.

Special mushroom houses may be built to fit the beds, but with house cellars, old barns, and the like, the beds are usually built to fit the structure. Eighteen feet is a convenient width for two tiers of beds. Mushroom houses are usually built to accommodate six to ten beds high. In structures already built the height of ceiling will determine the number of beds in a tier, one above the other.

Beds are usually constructed in several tiers. The bottom bed should be 6 inches to a foot above the floor to insure a good "heat" during fermentation of the compost in the bed. A space of 2 feet is allowed between the bottom of one bed and that of the next bed above it. The beds are usually 6 to 8 inches deep and 6 feet wide when there is an alley on both sides or 3 feet wide when there is an alley on only one side. The tiers of beds are supported by 2- by 4-inch uprights set at 4-foot intervals. Cross supports may be 2 by 4's or 1½ by 6 inch boards. One-inch boards are used for the bed bottoms and sides. The boards should be left loose to facilitate cleaning. The compost will hold them in place when the beds are filled. A space 2½ feet wide is left for an alleyway between the tiers of beds. An 18-inch picking alleyway is usually left between the beds and the outside walls.

Horse manure with straw bedding is employed almost exclusively as the raw material for mushroom compost. Manure from grain-fed horses bedded with wheat straw seems to be best. Experiments indicate that cottonseed meal added to the manure will increase the yields. Manure is usually prepared as soon as a pile is assembled sufficient to fill the mushroom house or a definite unit of bed space. It is difficult to compost less than 1 ton of manure at any time.

Aeration, moisture content, and temperature are the most important factors affecting the process of preparation. These factors are largely dependent on the size, shape and compactness of the pile, the quantity of water added and the number of days between turnings. Manure containing a moderate amount of straw is usually piled 4 to 6 feet high when first assembled. It is piled deeper if it contains an excess of straw. The lateral dimensions should be greater than this and may be most any size necessary to accommodate the required amount of manure. The piles are usually allowed to stand undisturbed for ten days before the first turning. Repeated turnings are made at intervals of about a week. Usually three or four turnings are sufficient. The smaller the piles and the lesser the amount of straw, the sooner the pile will be ready. Twenty to thirty-five days are generally required to heat and fit the manure.

The material should be kept moist at all times,—neither wet nor dry. The practical test is to squeeze a ball of it tightly in the hand. If the hand is not moistened it will be too dry; if water oozes out freely between the fingers it is too wet. Manure in a desirable condition contains about 60 to 70 per cent water, on the wet-weight basis. There is great necessity of avoiding soggy manure, especially near the end of the composting period. It is one of the most common causes of failure.

Manure should be placed in the beds at about the rate of 1 bushel to 2 square feet of bed space. If the material has the correct moisture content or is too wet, it should be allowed to lie loosely in the beds during the heating process. If it is too dry it should be packed to help retain the moisture. As soon as the beds are filled, the house, or that section of the structure containing the beds, is sealed tightly for a few days to allow the manure to go through a final period of fermentation. High temperatures are generated in the beds and in the air surrounding them. The manure in the beds should reach a temperature of 130° to 145° and the surrounding air temperature should reach 120° to 130°. This eradicates most of the harmful insects and fungi, seems to bring about a condition which later encourages a healthier and more rapid run of spawn, and allows the grower to dry out the manure if it is too wet.

The high temperatures are usually maintained for twelve hours, or until the excess water is driven off if the compost is too wet.

At the peak heat calcium cyanide is usually dusted in the aisles of separate commercial houses at the rate of 1 pound to 1,000 cubic feet of air space, or sulfur is burned at the rate of 2 pounds to 1,000 cubic feet. At this time the insects not already killed have been driven to the surface of the manure and are readily annihilated. This is the only opportunity to poison them, since mushroom mycelium is destroyed by practically any treatment that is effective in controlling insects and diseases. Air the place thoroughly for at least an hour or more before entering, by opening windows and doors. These fumigants cannot safely be used in house cellars. Wherever employed, cyanide should be used with extreme caution and under advice.

After heating, the temperature is gradually lowered to 75° for spawning. Mushroom mycelium will develop most rapidly from the spawn inoculations if this temperature is maintained for a week or ten days after spawning. The beds are then allowed to cool slowly until a cropping temperature of 45° to 65° is reached. Most spawn producers advise the use of spawn pieces about one-half as large as a hen's egg. They should be spaced from 8 inches to 1 foot and about 1 to 1½ inches deep. An imperial quart bottle of manure spawn will inoculate 30 to 40 square feet of bed area. The new-type rye spawn will inoculate about twice this area.

Casing is the term applied to spreading soil about an inch thick over the entire bed. This is applied two to four weeks after spawning. A good casing soil holds water well and does not form a crust on the surface when it becomes dry. Silt loams to light clay loams, containing a fair amount of organic matter and with a reaction approximately neutral, are best. Acid soils should be limed or avoided. Ground limestone is the best form of lime to apply as there is little danger of using too much.

The length of the growing period and the quality of the mushrooms are largely determined by the temperature of the beds. At a temperature of 45° to 55° good beds continue to bear mushrooms for five or six months, whereas in a house held at 60° to 65° the beds exhaust themselves in about three months. At the lower temperatures the mushrooms grow larger, firmer and heavier, though more slowly than at the higher temperatures. The total yield will not be greatly different, but favors the lower temperatures somewhat. When the bed space is the limiting factor, the temperature is kept high so that two crops can be grown during the season. Common cultivated mushrooms can be grown only between limits of 45° and 68°. Lower temperatures, even below freezing, do not permanently injure the beds, but temperatures over 70° for a few days will often seriously injure the crop.

A relative humidity of 70 to 80 per cent is most satisfactory. When lower than this the casing soil dries out too rapidly and the surface of the musnroom caps becomes tough and sometimes cracked. If the relative humidity is too high, the water spattered on the caps when the beds are watered dries too slowly and a disease is produced called "spot."

The usual practice is to begin watering the beds lightly every day as soon as they have been cased. Light waterings may be necessary before this if the compost becomes too dry. Watering should be sufficient to keep the casing soil moderately moist and to allow a normal strand formation throughout this soil layer. Care should be taken to avoid excess watering. Several light waterings are preferable to a few heavy ones because of the danger of excess water leaching through the soil and forming a wet layer of manure just underneath. Such a layer may prevent the healthy mycelium lower in the bed from growing up to the soil. On the other hand, if the soil is too dry or if only the upper layer is moist, fewer mushrooms will develop, and they will tend to form beneath the soil layer rather than on the surface.

Mushrooms are pulled, with a slight twist, rather than cut. This removes the fleshy stump, which would otherwise decay and contaminate the bed. When fleshy stumps remain in the bed, after larger clusters are picked, they should be removed and the hole filled with fresh soil. The proper time for harvesting is about twelve hours before the veil would normally break. A little experience will soon make this point clear. Large numbers of button mushrooms from $\frac{1}{8}$ to $\frac{3}{8}$ inch in diameter die off in normal beds because of crowding or breaking of the mycelial strands while harvesting adjacent mushrooms. With a little practice these can be distinguished fairly early from healthy buttons and should be removed.

Most of the mushrooms sold in the United States are marketed fresh, although in the past fifteen years a canning industry has been developed to satisfy the demand for canned mushrooms and to take care of the producers surplus in certain seasons. In selling, the small grower may have an advantage over the large grower if he is able to retail his entire crop, or sell it to retailers.—*Arthur J. Pratt.*

MUSKMELON: *Melon.*

MUSK-PLANT: *Mimulus moschatus.*

MUSTARD (species of *Brassica*). *Mustard Family.* Hardy annuals of supposed Asian origin. As vegetable-garden crops the mustards are grown for greens, the commonest one in this country being Southern Curled or Ostrich Plume. Seeds are sown in early spring directly in the garden and the rosette or clump of foliage is ready for use in two months or so. Plants may stand 5 or 6 inches apart and be further thinned as

used. If allowed to go to seed they often self-sow, but they are also likely to become weedy.

MYOSOTIS: *Forget-Me-Not.*

NARCISSUS. *Amaryllis Family.* Hardy spring-flowering bulbous plants, including the daffodils, jonquils, and other species, native Europe to China. The flowers are yellow or white, borne singly or in clusters terminating scapes 12-20 inches high.

The ease with which these plants may be grown, the beauty and fragrance of the flowers, as well as their lasting qualities when cut, render them of prime importance as flower-garden subjects and also for colonizing; and some of them are incomparable for pot culture in the window and conservatory. Good bulbs planted in September or October bloom in April or May. The bulbs may remain in the ground for a number of years, although better results may be expected by taking them up every few years, and resetting in a different location. Choose a moist loamy soil, slightly protected from the sun. No fresh manure should come directly in contact with the bulb, but if needed to hold moisture the manure may be spaded down to the depth of twelve inches.

Narcissus may be forced into flower through the winter, as are hyacinths and tulips, and also described under *Bulbs.* An interesting kind for winter bloom is the "Chinese Sacred-Lily." This grows in water without any soil whatever. Secure a bowl or glass dish about three times the size of the bulb; put attractive stones in the bottom; set in the bulb and build up around it with stones so as to hold it stiff when the leaves have grown; tuck two or three small pieces of charcoal among the stones to keep the water sweet, then fill the dish with water and add a little every few days, as it evaporates. Set the dish in a warm light place. In about six weeks the fragrant white flowers will fill the room with perfume. This plant is a form of *Narcissus Tazetta;* another form is the Paper-White narcissus, much grown for winter bloom and readily handled in the window, blooming at Christmas if started early.

NASTURTIUM (*Tropæolum*, usually *T. majus*). *Tropæolum Family.* Tender satisfactory annuals, or cultivated as such, native in tropical America. There are dwarf and climbing kinds, with similar bloom. The spurred irregular flowers are yellow, orange, maroon, scarlet, nearly white, and many intermediate colors and combinations.

For a long season of flowers and a large growth of vine the seed should be sown in early spring, in boxes or pots, the plants carried along until the first of May, and planted out where wanted. Good results are obtained, however, by planting directly in the ground when it is settled and

warm. The flowers are usually of better color in rather poor soils, while for rapid growth of vine a well-enriched border would be the best. The dwarf varieties may be planted 2 or 3 feet apart, and the tall ones as wanted to make a screen. The tall kinds grow 5 to 10 feet. All the kinds bloom until killed by frost.

The Canary-bird-Flower is *Tropæolum peregrinum* (*canariense*). It is a tender annual tall climber, South American, with canary-yellow fringed flowers. Seeds may be sown in the open, or started indoors in the North.

Nasturtium of botanists is a very different class of plants, one of which is water-cress; see *Cress*.

NECTARINE: *Peach*.

NEMESIA. *Figwort Family*. Linaria-like small erect plants from Africa, grown in flower-gardens as tender annuals; flowers white, yellow, purple, rose, orange; height 10-18 inches. The usual species is *N. strumosa* and its improved race or variety *Suttonii*. Sow seeds in garden, or for earlier bloom start them indoors; thin to 6-10 inches; provide a position somewhat protected from hot sun.

NEMOPHILA. *Water-Leaf Family*. Flower-garden hardy annuals of western North America, represented in gardens mostly by *N. insignis* or Baby Blue-Eyes. It is a spreading plant mostly 1 foot or less high, with deep blue or white flowers. It thrives in partial shade and rather moist soil. Seeds may be sown in the open, plants thinned to 6 inches and others taken out as they spread. Other kinds have dark brown or blue spots in the corolla or sometimes darker-veined.

NEPETA. *Mint Family*. Mostly aromatic perennials with blue or white flowers, grown in the border or for ground-cover.

Nepetas are easily grown and *N. hederacea* is likely to spread and choke out other low vegetation and to become troublesome in lawns. Propagated by seeds and division. Common catnip is *Nepeta Cataria*.

N. hederacea (*Glechoma*). Ground Ivy. Creeping, lvs. round: light blue. Eu., Asia.

N. Mussini. 1-2 ft., much branched, gray-green: blue with dark spots. Asia. A good summer ground-cover.

NERINE: see *Amaryllis*.

NERIUM: *Oleander*.

NICOTIANA. *Nightshade Family*. Mostly tender stout herbs, grown with us as annuals for ornament, and one of them is the tobacco; native for the most part in tropical America. Some of them are stately plants and may be grown in the back row, serving as heavy foliage

screens; *N. tomentosa* (*colossea*) reaches 10-12 feet and more where seasons are long; *N. Tabacum*, the tobacco, may also be grown for this purpose. The commonest kinds now are *N. alata* var. *grandiflora* (*affinis*), half-hardy, 2-3 feet or more with showy white long-tubed fragrant flowers that close in cloudy weather; *N. Sanderæ*, a series of hybrids much like the last but with rose-colored flowers; *N. sylvestris*, 4 feet and more, with many very long-tubed white fragrant drooping flowers borne in clusters. The season of bloom is midsummer till frost.

Nierembergia, Nicotiana, Nigella. Left, *Nierembergia frutescens*, confused in cultivation with *N. gracilis*; center and separate flower, *Nicotiana alata* var. *grandiflora*, commonly known as *N. affinis*; right, *Nigella damascena*.

The seeds are very fine, and should be sown on the surface of the soil, in boxes or pots, and lightly covered. When planted out they should be set 2 to 3 feet apart, according to kind. Seeds may also be sown carefully in the garden when the ground is warm. Some of them self-sow from year to year.

NIEREMBERGIA. *Nightshade Family.* Tender or half-hardy perennials or semi-woody plants of South America grown sometimes as annuals, blooming the first year if seed is sown early. *N. frutescens* and *N. gracilis* are the usual species thus handled; they are useful in the

conservatory; flowers white tinged and veined purple or lilac throughout. Another and hardy species is *N. rivularis*, a creeping mat-forming plant with creamy-white flowers tinged rose or blue; useful for the rock-garden.

NIGELLA. Fennel-Flower. *Crowfoot Family.* Annual hardy or half-hardy flower-garden subjects of southern Europe and adjacent Asia, grown for the blue or white flowers and finely cut foliage. In *N. damascena* the flower is surrounded by a multifid involucre, whence the name Love-in-a-Mist. The nigellas come quickly from seeds sown directly in the open. The plants are 1-1½ feet high, erect, branching; thin to 8-12 inches.

NIOBE: *Hosta.*

OAK, SILK-: *Grevillea robusta.*

OCONEE-BELLS: *Shortia galacifolia.*

ŒNOTHERA. *Evening-Primrose Family.* Two cultural groups may be recognized, all native in America: those with flowers opening at nightfall and closing in the morning or forenoon, known as evening-primroses; those that remain open all day and are known as sundrops. Both these classes are biennial or perennial. There is also a class of annual flower-garden kinds, with flowers white, yellow or rose, readily raised from seeds sown in the open garden.

The evening-primroses are fragrant and attract night insects, especially large moths, seldom seen until dusk. The opening of the flowers of the large-flowering varieties is a source of pleasure and surprise, as one flower follows another in opening, and in a large plant the late opening flowers seem to burst all at one time. The usual cultivated kind is *Œ. Lamarckiana*, biennial but flowering profusely the first year from seeds.

The sundrops are perennial, and may be propagated by seeds or division. They grow 1½-3 feet high, and usually make strong clumps.

Œ. fruticosa. 1-3 ft., per.: yellow, 2 in. across. Improved forms are vars. *major* and *Youngii.*

Œ. glauca. Sundrop differing from *fruticosa* in technical characters. Var. *Fraseri*, lvs. narrower.

Œ. Lamarckiana. 3-4 ft., bien.: yellow, very large.

Œ. missouriensis. 1 ft., per.: yellow, 4-6 in. across.

Œ. pratensis. 2-3 ft., per., in clumps: yellow, 2 in. across.

Œ. speciosa. 1-3 ft., per.: white changing to pink, 3 in. across.

Œ. tetraptera. 1-1½ ft., ann.: whitish becoming rose.

OKRA. Gumbo. *Mallow Family.* From the green pods of this vegetable is made the well-known gumbo soup of the South, where the plant is more extensively grown than in the North. The pods are also

used in their green state for stews, and are dried and used in winter, when they are nutritious, and form no little part of the diet in certain sections of the country. The seeds are sensitive to cold and moisture, and should not be sown until the ground has become warm. The seed should be sown in a drill 1 inch deep, the plants thinned to 12 inches in the row for the dwarf varieties and 18-36 inches for the tall varieties; the rows are usually far enough apart to admit of horse tillage. One ounce of seed supplies 50-100 feet of drill, depending on the thickness of sowing. The tall kinds reach 4-7 feet. The culture given corn or cotton is suitable. Okra is a species of Hibiscus (*H. esculentus*), native in Old World tropics. Dwarf varieties are grown in the North.

OLD MAN: *Artemisia Abrotanum.*

OLD WOMAN: *Artemisia Stelleriana.*

OLEANDER. *Dogbane Family.* One evergreen shrub, with white, rose-red or purplish flowers, sometimes double, is much planted in semi-tropical regions and is also an old favorite tub-plant for the porch and window-garden; it is native in the Mediterranean region, known as *Nerium Oleander.*

The varieties of oleander are of easy management and well adapted to home culture, growing in pots or tubs for several years without special care. Well grown specimens are effective as porch or lawn subjects, or may be used to good advantage in mixed beds of tall-growing plants, plunging the pot or tub to the rim. The plants should be cut back after flowering. They should be rested in any out-of-the-way place through the winter. When brought out in the spring, they should be given sun and air to make a sturdy growth. Propagation is effected by using well-ripened wood for cuttings, placed in a close frame; or the slips may be rooted in a bottle or can of water, care being taken to supply water as evaporation takes place. When rooted, they may be potted, using soil with a large proportion of sand. Well-established plants may be re-potted in good loam and rotted manure.

Sweet-scented oleander, *Nerium indicum*, is sometimes grown; it is a smaller shrub with narrower leaves, flowers pink to white, frequently double.

ONION. *Lily Family.* Universal hardy garden vegetables, biennials, but usually grown only for the edible bulbs that form the first year; they are Asian in origin. The dry onions of the market are grown directly from seeds, but early bunch and salad onions are raised in the home garden from small bulbs that may be (1) "sets," which are dry little onions that have not attained their full development the year previous

and which resume growth when planted, (2) "tops," which are the bulbels or little "acorns" that arise in the flower-cluster instead of flowers, (3) "multipliers," which are bulbs with two or more cores and that break up into separate bulbs when planted.

In growing onions from seed, it is only necessary to say that seeds should be in the ground very early in order that the bulbs make their growth before the extreme hot weather of August, when, for want of moisture and because of the heat, the bulbs may ripen up while small. Early in April, in New York, if the ground is in condition, the seed should be sown thickly in drills 12 to 16 inches apart, and the ground above the seeds well firmed. Plants may be thinned 2-6 inches, depending on the variety or size of bulbs to be produced. Good cultivation and constant weeding is the price of a good crop of onions. The land should be in the finest possible tilth. In cultivating and hoeing, the soil should be kept away from the rows, not covering the growing bulbs, but allowing them to spread over the surface of the ground. When the crop is ready to be harvested, the bulbs may be pulled or cultivated up, left to dry in double rows for several days, the tops and roots taken off, and the bulbs stored in a dry place. Later in the season they may be allowed to freeze, covering with chaff or straw to hold them frozen, and kept until early spring; but this method is usually unsafe with beginners, and always so in a changeable climate. Onion seed should always be fresh when sown—preferably of the last year's crop. One ounce of onion seed will sow 100 feet or more of drill.

Extra early small onions, or extra large ones if allowed to grow the full season, may be obtained by sowing the seeds in a hotbed or house in February or March and later transplanting to the open. The large southern onions that do not regularly mature at the North may be brought to perfection in this way.

The extremely early crop of onion is grown from sets. The sets may be saved from the crop harvested the previous fall, saving no bulbs measuring over $\frac{3}{4}$ inch in diameter, or, better, they may be purchased from the seedsman, who has them specially grown for the purpose. These sets should be planted as early as possible, preferably on land that has been manured and trenched in the fall. Plant in rows 12 inches apart, the sets being 2 or 3 inches in the row. Push the sets well down into the ground and cover with soil, firming them with the feet or a roller. In cultivating, the soil should be thrown towards the tops, as the white stems are usually sought as an indication of mildness. The crop will be in condition to use in three to four weeks, and may be made to last until small seed onions are to be had. Tops or so-called Egyptian onions, as well as multipliers or potato onions, may be grown in the same way.

Muck lands are now much employed for the raising of the commercial crop, but they are not likely to be available for home gardening.

Onion insects and diseases are likely to be serious. Clean uninfected land is essential; this means crop rotation, destruction of weeds and onion refuse, proper and sanitary storage facilities for the bulbs as well as careful handling. Ordinary rotation does not insure against smut, however, because the organism lives long in the soil. The attack of smut is in the seedling stage and soil should be sterilized in the neighborhood of the germinating seed; for this purpose a formaldehyde solution is applied in the furrow, for which one should consult the county agent or latest publications. Maggot is now controlled by oil emulsion to which bordeaux mixture may be added. For home use, the emulsion may be purchased of supply stores. The purpose is to moisten the base of the young plant uniformly to destroy eggs and young maggots.

ONOPORDUM: *Thistle.*

OPHIOPOGON: *Lily-Turf.*

ORANGE (*Citrus sinensis*, native probably in China). *Rue Family.* The Mandarin and Tangerine oranges are a related species, *C. nobilis*, native in southeastern Asia; the Satsuma race is a form of the same species. The sour or Seville orange is still another species, *C. Aurantium*, also Asian but naturalized elsewhere.

The common sweet orange may be planted 25 x 25 feet or less. The trees are propagated by budding on seedling stocks of various kinds as of sour orange, sweet orange, grapefruit, a form of lemon, and *Citrus* (or properly *Poncirus*) *trifoliata*, the last for the colder limits of orange growing. Trees should begin to bear in three years after planting. The season for oranges in Florida is October to June; in California it practically covers the year.

ORCHIDS, NATIVE. Many of the native hardy orchids are among the choicest of small perennial herbs for transfer to grounds when one has proper place for them, as real rock-gardens, bogs, shady places. Amongst them are several kinds of cypripedium or lady-slipper, the choice calypso, arethusa, calopogon, epipactis or goodyera, orchis, a number of the habenarias and spiranthes. Some of the species are interesting for their rarity even if not showy. Certain kinds are offered by dealers, and are not difficult to grow. The secret of success, of course, is to provide as nearly as possible the conditions in which the plants grow naturally. A more or less acid soil is indicated for some of them, but probably many of them are tolerant of different conditions.

OREODOXA: see *Palms.*

ORNITHOGALUM. *Lily Family.* Bulbs sometimes seen in window-gardens and conservatories, with basal leaves and terminal racemes or clusters of white, yellow or reddish flowers. Propagated by offsets. See *Bulbs* for general care.

O. arabicum. 2 ft.: white with black pistil. Medit. region.

O. caudatum. 3 ft.: white with green center. S. Afr.

O. thyrsoides. 1½ ft.: white or yellow. S. Afr.

O. umbellatum. STAR-OF-BETHLEHEM. 1 ft.: white, green outside. Medit. region.

OXALIS. *Wood-Sorrel Family.* Several species of oxalis are grown in conservatories, windows, hanging baskets and vases. They are small plants yielding abundant bright flowers in yellow, pink, rose and purple. The usual cultivated species are not hardy in the open in the North, although there are hardy kinds sometimes used in edgings and rockwork.

The ordinary window-garden kinds grow without extra care, and bloom freely in the late winter and spring months; they are mostly increased by bulbs, a few by division of the root. Give a sunny window, for the flowers open only in sun or very bright light. The bulbous kinds are treated as recommended for *Bulbs*, except that the bulbs or tubers must not freeze.

O. Bowieana. Lfts. 3, large: fls. rose-purple, 2 in. across. S. Afr.

O. cernua. BERMUDA BUTTERCUP. Lfts. 3: fls. bright yellow, 1½ in. across. S. Afr.; naturalized in Bermuda and elsewhere.

O. rubra. Lfts. 3: fls. pink or rose to lilac or white, ½ in. or less across. Brazil.

OXLIP: *Primula elatior.*

OYSTER-PLANT: *Salsify.*

PACHYSANDRA: see *Ground-Cover.*

PÆONIA: *Peony.*

PALMETTO: see *Palms.*

PALMS. *Palm Family.* Highly ornamental plants of very diverse size and habit from the tropics and subtropics around the world, several of which are grown in conservatories and windows and employed in decoration in halls, hotels and exhibitions. Some of the palms are shrubs, others climbing woody vines, and many others small or large trees. It is to be understood that conservatory and house palms are juvenile states of plants that in nature may grow to large size before they flower and fruit; therefore one should not expect them to be satisfactory and decorative indefinitely, and should be ready to discard them when they have outgrown their usefulness.

Many palms are well adapted for house use when small, and as the growth is usually very slow, a plant may be kept for several years. They

thrive in partial shade. They may be placed in a sitting- or drawing-room more satisfactorily than most house plants. One of the frequent causes of failure is over-potting and subsequent over-watering. A palm should not be repotted until the mass of roots fills the soil; then a pot only a size larger should be employed. Use ample drainage in the bottom to carry off excess of water. Although the plants need a moist soil, water standing at the roots proves injurious. A soil composed of well-rotted sod, leaf-mold and a little sand meets the requirements. Washing the foliage occasionally with soap water and a sponge will remove dirt and scale. Among the best palms for house culture are Chrysalidocarpus (but still known as Areca), Howeas (often called Kentias), Livistona (mostly under the erroneous name *Latania borbonica*), *Syagrus* (*Cocos*) *Weddelliana*. The date palm makes a pleasing plant when young and may be grown from seed of the common commercial date. When house palms become weak or diseased, take them to a florist for treatment and recuperation, if they are to be retained.

Propagation of palms is by seeds, which may sometimes be purchased of seedsmen inasmuch as house subjects seldom bear fruit. In field culture, the date may be propagated by means of suckers. Seeds germinate satisfactorily only under favorable conditions and growth is likely to be slow; the best plan for the householder is to purchase new plants from a dealer.

Archontophœnix Cunninghamiana (*Seaforthia elegans*). Tall tree: lvs. pinnate, green underneath: fr. red, size of cherry, below the lvs. *A. Alexandræ* has lvs. grayish-white underneath. Queensland. Planted in S. Fla. and S. Calif. These are the KING PALMS.

Areca: Chrysalidocarpus.

Arecastrum Romanzoffianum (*Cocos plumosa*). QUEEN PALM. Slender tree: lvs. pinnate: fr. about 1 in. long, greenish, containing a hard nut, among the lvs. Brazil. Planted in S. Fla. and S. Calif.

Butia capitata (*Cocos capitata*). Low tree or sometimes trunk very short: lvs. pinnate, arching: fr. greenish, to 1 in. long, with hard nut, among the lvs. Brazil. Planted in Fla., Gulf Coast, Calif.

Chamærops humilis. MEDITERRANEAN PALM. Bushy: lvs. fan-like, with spiny petioles: fr. yellow or brown, fleshy, in a close cluster in the foliage. Medit. region. Planted far south and sometimes under glass.

Chrysalidocarpus lutescens (*Areca lutescens*). Bushy, to 30 ft., with many trunks: lvs. pinnate, with yellow petioles: fr. ¾ in. long, nearly black. Madagascar. Much grown in pots and tubs; also in warm regions.

Cocos capitata: Butia.

Cocos nucifera. COCONUT. Tree: lvs. pinnate: fr. a large nut in husk, among foliage. Old World tropics. Much planted in S. Fla.

Cocos plumosa: Arecastrum.

Cocos Weddelliana: Syagrus.

Howea Belmoreana (*Kentia Belmoreana*). Small or medium tree: lvs. pinnate, arching, pinnæ crowded: fr. to 1½ in. long, dry, in long cluster from leaf-crown. Lord Howe Isl. Frequently seen under glass.

Howea Forsteriana (*Kentia Forsteriana*). Taller tree: lvs. little overarching, pinnæ not crowded: fr. in cluster, usually less than 2 ft. long. Lord Howe Isl. Common under glass, and in pots and tubs.

Kentia: Howea.

Latania borbonica: erroneous name for the following Livistona.

Livistona chinensis. CHINESE FAN PALM. Tree: lvs. palmate, petiole usually spiny on young plants: fr. drupe-like, ½ in. long, blue, among lvs. China. Planted in southernmost parts; commonest fan palm in tubs.

Oreodoxa: Roystonea.

Phœnix canariensis. Tree: lvs. long, pinnate, petioles spiny: fr. drupe-like, in clusters among lvs. Canary Isls. Much planted in Calif. and elsewhere; also as large specimens in tubs.

Phœnix dactylifera. DATE. Tall tree: lvs. pinnate, glaucous: fr. an edible drupe. Old World. Planted commercially in Ariz. and S. Calif.

Phœnix Roebelenii. Small tree: pinnæ narrow and graceful: fr. about ½ in. long. E. Asia. Useful in pots and tubs.

Roystonea regia (*Oreodoxa regia*). ROYAL PALM. Tall graceful tree: lvs. pinnate: fr. small, in clusters from upper trunk. Everglades, Cuba. Planted in S. Fla.

Sabal Palmetto. PALMETTO. Tree low or tall: lvs. fan-shaped: fr. small, size of currants, black, in clusters among foliage. S. Atlantic coast, Fla.

Seaforthia: Archontophœnix.

Syagrus Weddelliana (*Cocos Weddelliana*). Little tree: lvs. pinnate, pinnæ narrow: fr. about ½ in. long, from among lvs. Brazil. Favorite for pots.

Trachycarpus Fortunei (*T. excelsus*). WINDMILL PALM. Small slender tree with hair-like fiber on trunk: lvs. fan-shaped: fr. small, angled, dry, among foliage. China. Hardiest of common exotic palms; planted in open South.

Washingtonia filifera. CALIFORNIA FAN PALM. Large stout tree: lvs. palmate, very filiferous: fr. drupe-like, size of currants, in long clusters among foliage. S. Calif.

Washingtonia robusta (*gracilis*). More slender, with narrow crown, stiffer less deeply cut lvs. with few fibers on old tree. Mex. Much planted in Calif., with the former.

PANDANUS. SCREW-PINE. *Screw-Pine Family.* Bushes and small trees of the Old World tropics, grown in the juvenile state for pot-plants in conservatories, windows and for porch decoration. The long stiff leaves and slow growth give them a formal and durable character.

The usual kinds are *P. utilis* and *P. Veitchii*, well adapted to house culture. The singular habit of growth, bright glossy leaves, and the ability to withstand the dust and shade of a dwelling room, make them a desirable addition to the house collection. They are propagated by the offsets or young plants that grow around the base of the trunk; or they may be increased by seed. If by the former method, the offsets should be cut off and set in sand, at a temperature of 65° to 70°. These cuttings root slowly and the plants for a time make a very slow growth. The general cultural treatment is that of palms, which see.

PANSY AND VIOLET. *Violet Family.* Low spring-flowering perennial herbs of temperate climates, two or three of them much grown for the bloom.

Pansies are normally perennial but some races are essentially annual as to horticultural treatment or at least biennial inasmuch as they are supposed to give their best bloom when relatively young; they are sometimes classed with biennials, although the plants may persist and with good care bloom for a number of years. It is well to have a new stock coming on each year from seed; and if one wants choice flowers careful attention must be given to the securing of well-bred strains and the seeds of such kinds are necessarily expensive. Pansies thrive in a cool rather moist soil, and although they may benefit by some protection from the noonday sun they should not be planted in shade. As the ground becomes warm a mulch of leaf-mold or other light material may be spread over the bed to retain moisture and exclude heat. Spring and fall give the best bloom, but with attention to these details and to watering and not allowing seeds to form or long weak growths to choke the bed, good pansies may be had all summer; by pruning and otherwise the plants should be kept stocky and compact; do not grow too thickly—say 8 inches apart each way. Seeds sown in boxes in January or February make blooming plants by April, taking the place of those blooming earlier from overwintered stock. Sown in the open ground as soon as the frost is out, they give bloom in summer and autumn. Seeds sown in August or September, in boxes or frame, make plants large enough to reset in November and bloom the following March; or they may be left until March in open seedbeds before setting out. Also, if they are sown very thinly in the frames they may remain undisturbed through the winter, blooming very early the following spring. The frame should be protected by mats, boards or other covering through the severe cold, and as the sun gains strength care should be taken to keep them from heaving by alternate thawing and freezing.

The pansy is supposed to be a development from *Viola tricolor* of the Old World (var. *hortensis*), but it is doubtful whether it should be included in that species. Two other Violas are in common cultivation. One of them is *V. cornuta* of Spain and the Pyrenees, usually known as Tufted or Bedding pansy, or as Horned violet from the large spur on the flower. It is a perennial growing in attractive clumps, but seeds sown early give good blooming plants summer till frost. It is effective for mass or bedding effects. Flowers are normally violet, but white and other shades are available.

The other Viola is *V. odorata*, the Sweet or English violet, much grown under glass by florists for cut-flowers. Its fragrance is delightful and the colors are violet, rose and white; double forms are well known. While the culture of violets as house plants rarely proves successful, there is no reason why a good supply may not be had elsewhere through the

greater part of winter and spring. A sheltered location being chosen, young plants from runners may be set in August or September. Have the ground rich and well drained. The plants make good crowns by December, and often bloom before weather sufficiently cold to freeze them. To have flowers in the winter, it is necessary to provide some protection to the plants. This may best be accomplished by building a frame of boards large enough to cover the plants, making the frame in the same way as for a hotbed, four to six inches higher at the back than the front. Cover the frame with sash or boards, and as the weather becomes severe, mats or straw should be placed over and around the frame to protect the plants from freezing. Whenever the weather permits, the covering should be removed and air admitted, but no harm will come if the frames are not disturbed for several weeks. A large exposure of sunlight and a high temperature through the middle of winter are to be avoided, for if the plants are stimulated a shorter period of bloom will result. In April the frame may be removed, the plants yielding the latter part of the crop without protection. Violets belong with the "cool" plants of florists. When well hardened off, considerable frost does not harm them. They should always be kept stocky. Start a new lot from runner-plants each year. They thrive in a temperature of 55° to 65°.

Violas. Left, pansy, *Viola tricolor* var. *hortensis*; lower right, wild violet, *V. tricolor*, introduced in North America.

There are many charming species of Viola adaptable for colonizing in edgings and wild places and in rock-gardens. Some of these follow.

V. blanda. White, petals reflexed. E. N. Amer.

V. calcarata. Violet, very long-spurred. Eu.

V. canadensis. White tinged violet, yellow at base. N. Amer.

V. canina. Bluish-purple, with yellow spur. Eu.

V. cornuta. See description above in text.

V. cucullata. Violet, sometimes white. E. N. Amer.

V. elegantula (*bosniaca*). Rose-purple with yellow-striped spot. Eu.

V. florariensis. Purple, yellow at base. Garden origin.

V. gracilis. Violet. Eu., Asia.

V. Hallii. Upper petals dark violet, 3 lower yellow or white. Ore., Calif.

V. lutea. Yellow, rarely violet. Eu.

V. odorata. See account in text.

V. pedata (*pedata* var. *bicolor*). Dark violet and lilac. E. N. Amer.

V. pubescens. Bright yellow. E. N. Amer.

V. rugulosa. White inside and yellow base, often tinged violet. N. W. N. Amer.

V. tricolor. See discussion of pansy above.

PAPAVER: *Poppy.*

PARADISEA: *Anthericum Liliastrum.*

PARDANTHUS: see *Perennials*, page 201.

PARSLEY (*Petroselinum hortense*). *Parsley Family.* A hardy biennial or short-lived perennial grown in the vegetable-garden for the leaves, used either as salad or a garnish, or for flavoring; native in Europe. The curled parsley (var. *crispum*) and the fern-leaved (var. *filicinum*) are the races mostly grown.

The seed is slow to germinate, and often the second or third sowing is made, thinking the first is a failure; but usually after what would seem a long time the young plants will be seen. To hasten germination, the seed may be soaked in warm water. In the open ground seedlings should be thinned to stand 5 or 6 inches in the row, the rows being 10 to 12 inches apart. A few plants in a border will give a supply for a large family, and with a little protection will live over winter. Roots may be lifted in the fall, put into boxes or old cans, and grown in a sunny window for winter use. A new set of plants should be started each year and the old ones discarded. One ounce of seed supplies about 150 feet of drill.

A race with thick parsnip-like root, var. *radicosum*, is sometimes grown under the name of turnip-rooted parsley for the edible roots.

PARSNIP (*Pastinaca sativa*). *Parsley Family.* Popular hardy biennial, developed in Europe, grown for the thick edible roots. A form of the species, var. *sylvestris*, is extensively run wild in this country.

Land for parsnips should be deep and mellow to insure long unbranched straight symmetrical roots. Seed is sown in spring where the plants are to grow; plants are thinned to 5 or 6 or more inches in the row if large roots are desired; rows may be 16-18 inches apart, or more if horse tillage is to be employed. The roots will not be ready for use till late autumn, and they may be left in the ground as they grew and used in spring; many persons think the quality is improved by leaving them over winter. If dug in autumn, they may be stored in the cellar the same as other roots. The seed, which must be not over one year old, should be sown as early as possible in well-prepared soil, firmed with the feet or roller. As the seed germinates rather slowly the ground often becomes crusted or baked, in which case it should be broken and fined with a

garden rake. This operation often means the success of the crop. Radish or cabbage seeds may be sown with the parsnip seed to mark the row and break the crust. One ounce of seed sows 150-200 feet of drill.

PARTRIDGE-BERRY: see *Ground-Cover*.

PASQUE FLOWER: *Anemone Pulsatilla*.

PASSIFLORA. Passion-Flower. *Passion-Flower Family.* Ornamental and odd climbers, mostly tropical. Some of them, as the granadilla, bear edible fruits in warm countries. A few of them are grown in conservatories and are sometimes planted out for summer. They are mostly perennial, sometimes woody. They propagate from cuttings of the young growth, and by seeds when available. They need a warm temperature, usually 65-70° at night when grown under glass. *P. cærulea* and *P. alato-cærulea* (*Pfordtii*), the former Brazilian, the latter a horticultural hybrid, are probably the mostly adaptable for potting out in summer. They are high tendril-climbers with striking parti-colored wide-open flowers 3-4 inches across.

PASTINACA: *Parsnip*.

PEA (*Pisum sativum*, native in Europe or Asia or both, but the exact origin obscure). *Pea Family.* Important hardy annual, tendril-climbing and needing support and the early dwarf ("bush") varieties allowed to lop; grown for the edible green seeds, and one race for the edible pod with the seeds intact after the way of string beans but this sort is little known in this country. Peas are cool-season plants.

Peas are "smooth" and "wrinkled." The smooth kinds are usually planted somewhat earlier and for that reason mature earlier, but they are inferior to the wrinkled kinds in quality; they should be planted only in a small way in the home garden. The dwarf and half-dwarf varieties are likely to be grown to the exclusion of the tall or running kinds but the latter usually give best results. The trouble of providing support is largely overcome if one procures chicken-wire 2½ or 3 feet wide and stout stakes; as soon as the crop is off, the wire is rolled up, the stakes pulled and allowed to dry in the sun, and the material is then properly stored, being used over and over again for years. Plant double rows of the tall varieties: that is, two rows from 4 to 8 inches apart, with the wire between, the double rows being 3 feet apart or wide enough for convenient tillage. The dwarf varieties may be planted four rows in a block, the rows only 6 or 8 inches apart. The peas on the two center rows may be picked from the outside. Leave a space between the blocks sufficient for tillage. At the time of the first planting only the smooth varieties should be sown.

A succession should be sown that will come to maturity one after the other, extending the season six or eight weeks. If a further supply is wanted the early quick-maturing varieties may be sown in August, although peas are not an autumn crop. In the hot weather of midsummer they do not thrive well. One quart of seed will plant about 100 feet of drill or less in the wrinkled and large-seeded sorts. It is a common mistake to leave peas too thick in the row; plants should be thinned to 3 or 4 inches at least for the tall kinds. The first sowing of smooth peas is usually the initial planting operation in the garden, as they may be put in the ground before frosty weather is past; plant the early kinds 3 or 4 inches deep.

Peas. Two left, everlasting pea, *Lathyrus latifolius*, grown for ornament; two right, garden edible pea, *Pisum sativum*.

The planting of strictly healthy seed, choice of well-drained land, long rotations, destruction of diseased vines, aid in keeping insects and diseases of peas in check. Early plantings escape some of the difficulties. Pea lice are controlled by dusting or spraying with nicotine preparations. Weevil may be dispatched by fumigating mature infested peas with bisulfide of carbon. In controlling root-rot, other leguminous plants in the vicinity that may act as hosts must be destroyed, as alfalfa, vetch, sweet clover; other plants may sometimes harbor the organism.

PEA, EVERLASTING (*Lathyrus latifolius*). *Pea Family*. This pea does not have the colors or fragrance of the sweet pea, but is excellent for planting against rocks, stumps, or fences or on rear borders. Plants bloom through a long season, and, being perfectly hardy, will live for years; height 2 to 10 feet. Raised from seeds or from cuttings, usually the

former. Keep the seed-pods picked off to lengthen period of bloom. The plant is native in Europe; commonly bright rose-color but there are white-flowered and also dark rose races.

PEACH (*Prunus* or *Amygdalus Persica*). *Rose Family.* Choice tree fruit, native in China, but now widely grown in temperate regions and sometimes spontaneous; there are also double-flowered and other ornamental races, but little grown in North America.

Given the proper exposure, peaches may be fruited in many places where now it is thought impossible to have a crop. It is usually the practice of the amateur to set peach trees in the shelter of some building, exposed on the south or east to the sun, and "in a pocket" as regards winds. This should be reversed, except in the close vicinity of large bodies of water. The fruit-buds of peaches stand very cold weather when perfectly dormant, often as low as 12° or 15° below zero in New York; but if the buds once become swollen, comparatively light freezing destroys them. Therefore, if the trees are set on elevations where a constant air drainage may be obtained, sheltered, if at all, on the south and east from the warming influence of the sun, the buds remain dormant until the ground becomes warm, and the chances of a failure are lessened. This advice applies mostly to interior regions. A well-drained sandy loam or gravelly soil suits the peach better than a heavy soil; but if the heavier soil is well drained, good crops may be obtained.

Peaches are comparatively short-lived but with good care should produce satisfactorily from ten to fifteen years. They bear young, usually a partial crop the third year. If a crop may be had every other year until the trees are nine to twelve years old, they will have well repaid the effort of cultivation. But they often bear twice this long. Young trees may be set every four or five years to replace older ones, thus having trees at a bearing age at all times on a small place. Trees should be set not closer than 18 feet apart each way; 22 by 22 is a more desirable distance.

Peach trees are purchased when one year old, that is, one year from the bud. For example, the bud is set in the fall of 1933. It remains dormant until the spring of 1934 when it pushes into vigorous growth; and in the autumn of 1934 the tree is ready for sale. In the South June-budded trees may be had: the bud is inserted in June, the growth takes place the same season and in the autumn the tree is ready for sale. Peach trees more than a year old are scarcely worth buying. It is common practice, when setting peach trees, to prune them back to a whip, leaving a stub bearing not more than one bud where each branch is cut off.

The pruning of bearing peach trees consists of maintaining an open-centered tree, heading back and thinning of main limbs to admit sunlight and to stimulate new growth on which the fruit is borne.

Peaches respond to the use of nitrogen fertilizers on soils low in organic matter. Three to 5 pounds to a tree may be used with safety on mature specimens. Fertilizers should be applied at about the time growth starts in the spring or somewhat earlier.

The great menaces of the peach are yellows, the borer, the curculio, and brown-rot.

The yellows is a communicable disease, the cause of which is not definitely known. It shows itself in the fruit ripening prematurely, with distinct red spots which extend through the flesh, and later by the throwing out of fine branching twiggy tufts along the main branches. The only treatment is to pull out the trees and burn them. Other trees may be set in the same places.

Borer in the peach tree is handled by digging it out every spring and fall. Trees attacked by the borer have an exudation of gum about the crown. If the borers are dug out twice a year they will not get sufficient start to make the operation very laborious. Recently the use of para-dichlorobenzine has given good results in the control of peach borer. The material may be purchased of seedsmen and others, with full directions. It is safely applied on the ground close to trees four years old or older, but not touching the trunk, about ¾ or 1 ounce to the tree; it is covered with earth, and the gas penetrates into the burrows of the borers. Application is made in August or September, and after three or four weeks the earth is pulled away from the tree.

For scale and leaf-curl peaches are sprayed when dormant, in late autumn or early spring, with lime-sulfur. The first seasonal spray is made when blossom-buds begin to show color if brown-rot has been prevalent, using lime-sulfur. The regular summer spray for peaches is made when the husks or old calyx-rings are shedding, for curculio, brown-rot and scab, using for the purpose dry-mix lime-sulfur and arsenate of lead; if another or later spray is necessary, the arsenate is omitted.

As peach trees are of short life, the recommended varieties change rather rapidly. Kinds now in favor are Greensboro, Carman, Champion, South Haven, Belle of Georgia, Hale, Elberta for market; Chili or Hill's Chili is an old variety not now often seen but a hardy tree, reliable bearer, and excellent in home use for pickles, canning and preserving. There are many other good varieties.

Nectarines are smooth peaches, the surface of the fruit being much like that of the plum. The culture is the same as for peach. Sure Crop and Hunter are two of the most popular varieties.

PEAR (species of *Pyrus*). *Rose Family.* Historic orchard and garden favorites, of three botanical groups: (1) The European pear, *Pyrus communis*, comprising all the old standard varieties. (2) The Asian pear, *P. serotina*, native in China, characterized by the absence of calyx on the fruit, a very gritty hard flesh and long-keeping quality, and sharply serrate long-pointed leaves; the Sand pear belongs here, but the species is not much grown in America. (3) The Eurasian race, hybrid between the two (*P. Lecontei*), represented principally by Kieffer and Leconte.

No fruit plantation is complete without trees of various kinds of pears, ripening from early August till winter, yet they appear unfortunately to have fallen from favor in recent years. The late varieties are generally good keepers, and extend the season into February, thus supplying fruit for six or seven months.

As the pear grows to perfection on quince, the dwarf tree is peculiarly adapted to planting on small home grounds, and is often used as a boundary plant, or to serve the purpose of a screen. These dwarf trees should be set deep—4 to 6 inches below the union—to prevent the stock from growing. Dwarf trees may be set as near together as 10 to 16 feet, while the standard or tall-growing pears should be set 18 to 25 feet apart. Trees are planted when two or three years old. Dwarfs are kept within bounds by thorough and systematic pruning and heading-in.

The pear thrives on strong gravelly loams and on clay land, if well underdrained, and for this reason may succeed in places where other fruits might fail. A good steady growth should be maintained, but the use of too liberal quantities of nitrogenous manures should be avoided, as they tend to make a rank growth and invite attacks of blight. Cross-pollination should be provided, by mixed planting; not more than three to four rows of any one variety should be planted together.

The most serious menace to pear growing is the blight, often called fire-blight because an injured orchard looks as if fire had swept through it. There is no remedy, but the disease may usually be held in check by cutting off and burning all diseased parts promptly and by allowing no hold-over blighted parts to remain. Some varieties are specially susceptible. The disease also attacks apples and quinces.

If affected with scale or blister-mite, pear trees may be sprayed when dormant, as for apples. As the blossom-buds begin to separate but before they open, lime-sulfur may be applied for fungus diseases and psylla eggs. A "calyx spray," about one week after petals fall, may be made of

lime-sulfur, copper sulfate, lime, and arsenate of lead for fungus and codlin-moth, to which nicotine sulfate may be added for psylla; this may be repeated on varieties subject to scab in about two weeks. If psylla is bad, an emergency spray of copper sulfate or black-leaf 40 may be applied.

Varieties of pears include Tyson, Bartlett, Clairgeau, Clapp, Anjou, Flemish Beauty (needs careful spraying for scab), Bosc, Seckel, Sheldon, Louise Bonne, Lawrence, Howell which bears well of clean pears under partial neglect in home grounds, Winter Nelis, Duchess for dwarfs. The three most important commercial varieties are Bartlett, Bosc and Seckel.

PECAN (*Carya* or *Hicoria Pecan*). *Walnut Family.* A large tree, native Indiana and Iowa southward, now cultivated in the South for the excellent nuts; some of the hardy varieties may be grown even in parts of New York and New England. There are now many superior named varieties.

Any good deep fertile farm soil is suitable for pecans if it is not droughty or water-logged. While trees have been set as close as 25 feet in orchards, they will need 60 feet by the time they yield maximum crops. The named varieties are budded or grafted on seedling stocks; the home grower will prefer to purchase the trees of reliable nurserymen. They are planted when two years from the bud. A good tap-root should be retained. Planting is usually in autumn or early winter in the South. Clean tillage is given, as for other orchard fruits. For the first few years, inter-cropping may be practiced. The nuts are usually harvested from the ground when they fall naturally, or the later ones are threshed from the trees with long poles. For two or three weeks the nuts are stored in a cool dry place to cure, and are then ready for the market or consumption.

PELARGONIUM. *Geranium Family.* Here belong the plants known as geraniums—the most satisfactory house plants, and extensively used in bedding. No plants give better returns in leaf and flower; and these features, added to the ease of propagation, make them general favorites. There are two classes of them: the common house or "fish" geraniums (from the odor of the foliage), *P. hortorum*, and the show or Lady Washington geraniums, *P. domesticum*. They are derived from plants native in South Africa.

The common geraniums are much more satisfactory when not more than a year old. Take cuttings from the old plants at least once a year. In four or five months the young plants begin to bloom. Plants may be taken up from the garden and potted, but they rarely give as much satisfaction as young vigorous subjects. Repot frequently until they are

in 4- to 5-inch pots; then let them bloom. Old plants carried over winter in the cellar should not be set in the ground in spring; it is better to bring them into warmth and light in late winter to start them into growth; from this growth new plants may be propagated and the old ones thrown away. Properly handled, plants of this class give practically continuous bloom. There are many improved and choice varieties.

The show pelargoniums have only one period of bloom, usually in spring, but they make up in size and coloring. This section is more difficult to manage as a house plant than the common geranium, needing more direct light to keep it stocky, and being troubled by insects. Still, all the trouble taken to grow them is well repaid by the handsome blossoms. Take cuttings in late spring, after flowering, and blooming plants may be had the following year. Good results are sometimes secured by keeping the plants two or three years. Cut back after each blooming season.

PENNYROYAL: *Sweet Herbs.*

PENSTEMON. *Figwort Family.* Many perennials of the north temperate zone, a good number of them hardy and desirable in the North. One race, *P. gloxinioides*, hybrid between a Mexican species and others, is raised as an annual, not being hardy in the northern states and Canada. Others are planted in borders and rock-gardens.

Grown from seeds sown early in heat, the seedlings transplanted into flats or pots, and when the weather is settled put into the open ground at 10-12 inches. In mild regions the plants may withstand the winter if protected. Propagation is also by division and rarely by cuttings in summer.

P. barbatus. 5-6 ft.: red. W. N. Amer.

P. campanulatus. 2 ft.: rose-purple or violet. Mex., Guatemala. Sometimes grown as *Gerardia hybrida.*

P. diffusus. 2 ft.: blue or purple. W. N. Amer.

P. Digitalis. 5 ft.: white or pinkish. N. Amer.

P. glaber. 2 ft.: blue or purple. W. N. Amer.

P. gloxinioides. 2-3 ft.: foxglove-like fls. of many colors.

P. grandiflorus. 6 ft.: lavender-blue. Cent. U. S.

P. Hartwegii. 4 ft.: scarlet. Mex.

P. heterophyllus. 5 ft., shrubby: purple. Calif.

P. hirsutus (*pubescens*). 3 ft., sticky: purplish or violet. E. N. Amer.

P. Menziesii. 6 in.: violet-blue or purple. W. N. Amer.

P. ovatus. 4 ft.: blue becoming purple. W. N. Amer.

P. procerus. 1 ft.: purplish-blue. W. N. Amer.

P. rupicola. 4 in., decumbent, shrubby: rose-crimson. Wash.

PEONY (species of *Pæonia*). *Crowfoot Family.* Strong hardy enduring leafy perennial herbs that make dense clumps from thick roots,

producing abundant large flowers in late spring and early summer, the usual colors being rose, pink, and white.

Of peonies there are two unlike groups: the shrubby or tree peonies, *Pæonia suffruticosa* (*Moutan*), once the dominant kind in cultivation; the herbaceous kinds, chiefly the progeny of *P. albiflora*, the common peonies of the present day. The herbaceous peonies have been markedly improved in recent years and they are now standard florists and fanciers plants. Many of them are attractively fragrant; the colors are chaste and brilliant and cover a wide range. They thrive in any good fertile soil, if it holds moisture well. Good bloom should be obtained the second year after planting and should continue, with proper care and fertilizing, for twenty years or more. Peonies may stand at least 3 feet apart in the rows. They grow 2-3 feet high, with lower and higher limits, making bushy attractive plants.

Propagation is by division of the roots made preferably in autumn. Each piece should have a strong bud or eye. These pieces are covered 2 inches when planted.

Peonies are little sold as species, but as horticultural varieties, which are usually derivatives of *P. albiflora*, mostly double-flowered.

P. albiflora. 2-3 ft. or more: lvs. glabrous, not dissected into very narrow parts but segments acuminate: fls. white or pink, stamens golden-yellow. E. Asia.

P. officinalis. Lvs. pale and more or less pubescent underneath, not dissected, segments obtuse or not acuminate: fls. crimson to white or yellowish stamens red. S. Eu., W. Asia.

P. tenuifolia. 2 ft. or less: lvs. finely dissected: fls. crimson or purple. S. E. Eu., S. W. Asia.

P. suffruticosa (*Moutan*). Tree Peony. Shrubby, to 5 ft.: leaflets stalked, segments broad: fls. very large, red to white. China.

Peonies, single and double, with fruiting specimen at right. *Pæonia albiflora*, and the fine-leaved one *P. tenuifolia*.

PEPPER. *Nightshade Family.* What is known in the vegetable-garden as pepper, or red pepper, is a very different plant from the true pepper of commerce used as a seasoning. There are many varieties, probably all forms of *Capsicum frutescens* of the American tropics, which is a woody plant but it remains herbaceous in the North until killed by frost.

Peppers are tender while young, although they endure frost in autumn. Their culture is that recommended for eggplant. A small seedsman's packet of seed will be sufficient for a large number of plants, say two hundred. The large Bell peppers are the mildest, and are used for making "stuffed peppers" and other dishes. The small hot peppers are used for seasoning and sauces. Seeds would better be started indoors for the northern states, although early varieties bear well from seed sown in the open ground as soon as it is thoroughly warm. From the original pan or flat the little seedlings may be transplanted to other flats or to pots before putting them in the garden. Rows should be as far apart as will admit of good tillage, usually 2-3 feet, and the plants may stand 10 to 18 inches apart in the row depending on the variety.

PEPPERMINT: *Mentha; Sweet Herbs.*

PERENNIALS. A perennial is a plant that lives year after year; in horticultural speech it is applied to herbaceous plants in contrast to annuals and biennials. Not all herbaceous perennials are of indefinite duration. Many of them begin to fail even after the second year and others after three or four years. Some species persist any number of years, as peony, goldenrod, bleeding-heart, gas-plant or dictamnus, paniculate phlox, Japanese anemone, certain of the native sunflowers, lily-turfs, epimediums, plantain-lilies, day-lilies, border chrysanthemums, loosestrife. The gardener soon learns by experience and observation which species are long-lived and which ones need renewing frequently.

Long-lived or durable perennials may be propagated by division of strong clumps or stools, and some of them by late summer cuttings from main shoots. Standard method of propagating most species of herbaceous perennials is by seeds. If sown in spring, or perhaps in midsummer, in a well-prepared protected seed-bed or in pots or flats in a frame or a glasshouse, seeds should give strong plants by autumn and usually fit for setting in the field with expectation of bloom the succeeding year. Strong-germinating seeds, as of aquilegias and the larger campanulas, may be sown directly where the plants are to stand if one can spare the room. It is satisfaction to rear perennials from seeds, as much a part of the rewards of gardening as viewing flowers of the mature plant.

Available and attractive herbaceous perennials are many, and choice can be made that will provide flowers or interesting foliage throughout the season. They must be chosen for one's particular climate and situation. Catalogues and local lists provide good suggestions, but in the end the reliable guide is one's own observation and experience. See that seed-pods do not mature (unless one wishes seeds for sowing) and the bloom and vigor will be prolonged; and the plants should not suffer from drought. Mulching in late autumn is desirable, even though the plants are hardy.

Proper way to grow most herbaceous perennials to satisfaction in the landscape is in a border at the rear or side of the property, related to boundaries and background foliage. If an herbaceous garden is desired, parallel strips four or five feet wide may be laid out, with ample space between for walks of sod. Unavoidable vacancies may be filled with annuals or perhaps with pot-plants turned out for the summer. It is always well to have a propagating strip somewhere about the place, where young plants may be coming on and also where surplus stock may be kept. If the garden is protected from sweeping winds the results should be better; tall and slender plants may be neatly staked and tied.

Aside from the perennials listed in regular alphabetical order in this book, others are frequent in gardens. They require no special cultural treatment. Some of these ornamental perennials are:

Acanthus mollis. 2-3 ft., with large lobed lvs. and rose, lilac or whitish fls. in long spikes. Eu. Usually not hardy in the North without ample winter protection.

Actæa. Baneberry. Cohosh. Herbs 1½-2 ft., grown in wild- or rock-gardens, having compound lvs., small white fls. in spring followed by shiny berries. *A. alba* has white berries and *A. rubra* red. E. N. Amer.

Ægopodium Podagraria. Goutweed. Bishops-Weed. 12-14 in., with small white fls. in June. Eu. In var. *variegatum* the lvs. are margined with white. Useful for edgings and as a low gound-cover.

Arisæma triphyllum. Jack-in-the-Pulpit. A tuberous-rooted herb to 3 ft. with 3-parted lvs. and inconspicuous fls. borne on a spadix surrounded by a green purple-striped spathe followed by cobs of red berries. E. N. Amer.

Baptisia australis. False Indigo. Native in E. N. Amer.: to 6 ft. tall, with 3-parted lvs. and indigo-blue pea-like fls. in racemes in summer.

Belamcanda (*Pardanthus*) *chinensis.* Blackberry-Lily. An iridaceous plant to 3 or 4 ft. having orange fls. spotted with red and black seeds in clusters resembling a blackberry. China, Japan.

Bocconia (or properly *Macleaya*) *cordata.* Plume-Poppy. Glaucous per. to 8 ft. with lobed lvs. and abundant small cream-colored fls. in attractive terminal panicles 1 ft. long. China, Japan.

Boltonia. N. American aster-like herbs to 8 ft. tall, *B. asteroides* with white to violet and purple rays and *B.*

latisquama with blue-violet rays and larger heads.

Cassia marilandica. WILD SENNA. To 4 ft. or more, with pinnate lvs. and yellow fls. in axillary racemes. E. U. S.

Catananche cærulea. CUPIDS-DART. Per. but blooming the first year from seed, 2 ft.: heads 2 in. across, with blue rays and chaff-like involucre, on long slender stems. Eu. Makes a good everlasting.

Centranthus ruber. RED VALERIAN. Glaucous herb to 3 ft. with small fragrant red fls. in close clusters or white in var. *albus*. Eu., Asia.

Cephalaria alpina. European per. to 6 ft. with pinnately cut foliage and round heads of sulfur-yellow fls. *C. tatarica* has creamy-white fls.

Cerastium tomentosum. SNOW-IN-SUMMER. A gray-woolly creeping plant to 6 in. with white fls. in early summer. Eu. *C. Biebersteinii* has longer lvs. and larger fls. *C. arvense* makes attractive white-flowered mats in spring.

Chelone. TURTLE-HEAD. N. American plants often known as Penstemons, growing to 3 ft. high, *C. glabra* with white or pinkish two-lipped fls. and *C. Lyoni* with rose-purple fls.

Dictamnus albus (*Fraxinella*). GAS-PLANT. A strong-smelling durable herb to 3 ft. with compound lvs. and white fls. (rosy-purple in var. *rubra*) in terminal racemes. Eu., Asia.

Dodecatheon Meadia. A small N. American per. with basal lvs. and cyclamen-like rose fls. borne in umbels at top of scapes.

Dracocephalum Ruyschiana. 1-2 ft., with narrow lvs. and blue two-lipped fls. in spikes. Siberia.

Epilobium angustifolium. FIREWEED. 4-8 ft., with showy purple fls. in long terminal racemes. Eu., Asia, N. Amer.

Eranthis hyemalis. A tuberous-rooted herb a few inches high with basal palmately cut lvs. and solitary yellow fls. in very early spring. Eu., but somewhat run wild in U. S.

Erinus alpinus. Tufted plant 3-4 in. high with purple fls. in short racemes. Eu.

Galax aphylla. An evergreen herb native Va. to Ga., with basal heart-shaped shining lvs. turning bronze in autumn and small white fls.

Galega officinalis. GOATS-RUE. To 3 ft., with compound lvs. and purplish-blue pea-like fls. in racemes. Eu., Asia. Var. *alba* has white fls. and var. *Hartlandii* lilac fls. and lvs. variegated when young.

Gaura Lindheimeri. 4 ft., with white fls. in terminal spikes. La., Tex.

Gerberia Jamesoni. TRANSVAAL DAISY. 1½ ft., the lvs. lobed or cut, large heads of orange-red fls. Transvaal. Var. *hybrida* comprises color forms. Not hardy North.

Gillenia trifoliata. INDIAN PHYSIC. A branching per. to 4 ft., native in E. N. Amer., with 3-parted lvs. and white or pinkish fls. in terminal panicles.

Globularia trichosantha. GLOBE-DAISY. 6-12 in., with blue fls. in globular heads. Asia.

Hepatica americana (*triloba*) and *H. acutiloba*. 4-6 in., with 3-lobed lvs. and lavender-blue to white fls. E. N. Amer.

Hesperis matronalis. DAMES-ROCKET. Per. or bien. to 3 ft., having fragrant lilac fls. in terminal racemes. Eu., somewhat naturalized. Var. *nivea* has white fls.

Heuchera sanguinea. CORAL-BELLS. 1-2 ft., with basal lobed lvs. and bright red fls. on slender scapes. S. U. S., Mex.

Houstonia cærulea. BLUETS. Small tufted plant to 7 in. with solitary violet, blue or white, yellow-eyed fls. E. N. Amer.

Incarvillea Delavayi. A Chinese herb to 2 ft., having pinnate lvs. and large rose-purple fls. in terminal clusters.

Inula Royleana. 2 ft., the showy orange-yellow heads to 4 in. across. Himalayas.

Jasione perennis. 1 ft., the blue fls. in long-stalked globose heads. Eu.

Lythrum Salicaria. PURPLE LOOSESTRIFE. 2-3 ft., the purple fls. in dense terminal spikes. Old World. Var. *roseum superbum* has larger rose fls.

Meconopsis betonicifolia var. *Baileyi.* Poppy-like per. to 6 ft. with blue-violet or purple fls. China.

Mertensia virginica. VIRGINIA-BLUEBELLS. An attractive native herb 1½-2 ft. high with dainty blue fls. in nodding clusters in spring.

Mitella diphylla. American woods plant 1½ ft. high with small white fls. in racemes in early spring.

Physostegia virginiana. 3-4 ft.: fls. purplish-red, rose or lilac varying to white, in spikes. E. N. Amer.

Podophyllum peltatum. To 1½ ft., with large palmately lobed lvs. and solitary large white waxy fls. concealed by the foliage. E. N. Amer.

Polygonatum commutatum. SOLOMONS-SEAL. A native per. to 8 ft. with attractive broad lvs. and greenish drooping fls.

Potentilla nepalensis. 1-2 ft., with 5-parted lvs. and rose-red fls. in panicles. Himalayas. Var. *Willmottiæ,* dwarf with magenta-rose fls.

Prunella grandiflora. 1 ft., with purple fls. in dense bracted spikes. Eu.

Pulmonaria angustifolia. European per. to 1 ft., having long-stalked basal lvs. and blue fls.

Ramonda pyrenaica. 3 in., with ovate basal lvs. and purple or white fls. in spring. Pyrenees.

Sanguinaria canadensis. BLOODROOT. A native per. to 8 in. with large basal lobed lvs. and white or pinkish solitary fls. in early spring, from blood-red rhizomes.

Silphium perfoliatum. CUP-PLANT. A sunflower-like plant to 8 ft. with yellow heads 3 in. across in summer. E. N. Amer.

Sisyrinchium bellum. BLUE-EYED GRASS. A per. to 1½ ft. with grass-like tufted lvs. and violet-purple fls. about ½ in. long in terminal umbels. Calif.

Smilacina racemosa. FALSE SOLOMONS-SEAL. 3 ft., the white or greenish fls. in panicles, berries red. N. Amer.

Soldanella alpina. 6 in., with roundish basal lvs. and pale blue fls. in spring. Eu.

Stachys lanata. LAMBS-EARS. White-woolly plant 1½ ft. high, with small purple fls. Asia.

Stenanthium robustum. FEATHER-FLEECE. To 5 ft., having narrow lvs. and greenish or white fls. in large compound panicles. E. N. Amer.

Stokesia lævis (*cyanea*). STOKES ASTER. 1½-2 ft., the lvs. somewhat spiny-toothed, blue or purplish-blue fls. in heads 4 in. across. Var. *alba* has white fls. S. U. S. Not hardy North.

Teucrium Chamædrys. Procumbent and woody, having red-purple or rose spotted fls. in loose spikes. Eu.

Thermopsis caroliniana. A native herb 4-5 ft. high with 3-parted lvs. and yellow pea-like fls. in terminal racemes.

Tiarella cordifolia. FOAM-FLOWER. A native tufted woods plant 1 ft. high, having basal heart-shaped lvs. and reddish or whitish fls. in racemes.

Tradescantia virginiana. SPIDERWORT. 2-3 ft., with long narrow lvs. and violet-purple fls. or white in var. *alba.* N. Amer. There are several good related species.

Tunica Saxifraga. European tufted per. 6-10 in. high with narrow lvs. and pink or pale purple fls. in summer, white in var. *alba.*

Valeriana officinalis. GARDEN-HELIOTROPE. To 5 ft., with pinnately cut lvs. and very fragrant whitish, pinkish or lavender fls. Eu., Asia.

Zauschneria californica. CALIFORNIA FUCHSIA. Per. with decumbent or nearly erect stems to 2½ ft., the scarlet fuchsia-like fls. to 2 in. long. Calif.

Following are suggestive lists of perennials for the central and eastern country.

With white flowers

Achillea
Æthionema iberideum
Ajuga reptans
Allium
Alyssum
Ammobium alatum
Androsace lactea
Anemone
Anthemis
Anthericum Liliago
Aquilegia vulgaris
Arabis
Arenaria
Argemone
Artemisia lactiflora
Asperula
Boltonia asteroides
Campanula
Cerastium
Chelone glabra
Chrysanthemum
Cimicifuga
Convallaria majalis
Dianthus
Dicentra
Dictamnus albus
Digitalis purpurea
Draba fladnizensis
Eremurus himalaicus
Erigeron
Eupatorium urticæfolium
Euphorbia corollata
Filipendula
Galega officinalis
Gaura Lindheimeri
Gillenia trifoliata
Gypsophila
Helleborus niger
Hepatica americana
Hesperis matronalis
Hosta plantaginea
Houstonia cærulea
Iberis
Iris
Leontopodium alpinum
Liatris spicata
Lupinus polyphyllus
Malva moschata
Matricaria Tchihatchewii
Mazus pumilio
Mitella diphylla
Œnothera speciosa
Oxalis rubra
Pæonia
Papaver
Penstemon
Phlox
Physostegia virginiana
Polygonum
Primula
Ramonda pyrenaica
Romneya Coulteri
Salvia
Sanguinaria canadensis
Saxifraga
Sedum
Shortia galacifolia
Sidalcea candida
Silene
Statice Armeria
Stenanthium robustum
Tradescantia virginiana
Trillium
Tunica Saxifraga
Valeriana officinalis
Verbena
Veronica
Yucca

With yellow, orange or cream flowers

Achillea
Aconitum lycoctonum
Adonis
Allium Moly
Alyssum
Anthemis tinctoria
Aquilegia
Artemisia
Belamcanda chinensis
Bocconia cordata
Cassia marilandica
Centaurea macrocephala
Cephalaria alpina
Cheiranthus Cheiri
Dianthus Knappii
Dicentra chrysantha
Digitalis ambigua
Doronicum
Draba
Eranthis hyemalis
Erigeron aurantiacus
Erysimum pulchellum
Euphorbia Myrsinites
Gaillardia aristata
Gentiana sino-ornata
Gerberia Jamesoni
Geum
Helenium
Helianthus
Heliopsis
Hemerocallis
Inula Royleana
Iris
Kniphofia rufa
Limonium Bonduellii
Linaria dalmatica
Linum flavum
Œnothera
Oxalis cernua
Papaver
Primula
Ranunculus
Rudbeckia
Saxifraga
Scabiosa ochroleuca
Sedum
Sempervivum
Senecio clivorum
Silphium perfoliatum
Thermopsis caroliniana
Trollius
Verbena

With red, rose or pink flowers

Achillea Millefolium roseum
Æthionema
Allium cernuum
Androsace
Anemone
Aquilegia
Arabis muralis
Asperula cynanchica
Aubrietia deltoidea
Callirhoe involucrata
Centaurea dealbata
Centranthus ruber
Chrysanthemum coccineum
Dianthus
Dicentra
Digitalis purpurea
Dodecatheon Meadia
Eremurus robustus
Filipendula
Geum
Gypsophila repens
Heuchera sanguinea

Hibiscus Moscheutos
Iberis
Kniphofia Uvaria
Lobelia cardinalis
Lupinus polyphyllus
Lychnis
Malva moschata
Monarda didyma
Oxalis rubra
Pæonia
Papaver
Penstemon
Phlox
Physostegia virginiana
Polygonum
Potentilla nepalensis
Primula
Saponaria officinalis
Saxifraga
Sedum
Sempervivum
Sidalcea
Silene
Statice
Teucrium Chamædrys
Tunica Saxifraga
Valeriana officinalis
Verbena
Veronica
Zauschneria californica

With blue, lilac or purple flowers

Aconitum
Æthionema coridifolium
Ajuga
Allium tibeticum
Anchusa
Anemone
Aquilegia
Arabis aubretioides
Aster
Aubrietia deltoidea
Baptisia australis
Boltonia
Campanula
Catananche cærulea
Centaurea
Chelone Lyoni
Cymbalaria muralis
Dianthus
Digitalis purpurea
Dracocephalum Ruyschiana
Echinacea purpurea
Echinops
Epilobium angustifolium
Erigeron
Erinus alpinus
Eryngium
Eupatorium
Filipendula purpurea
Galega officinalis
Gentiana
Geranium
Globularia trichosantha
Hepatica americana
Hesperis matronalis
Hosta
Houstonia cærulea
Iberis
Incarvillea Delavayi
Iris
Jasione perennis
Liatris
Linaria alpina
Linum
Lobelia siphilitica
Lupinus polyphyllus
Lychnis Viscaria
Lythrum Salicaria
Mazus
Meconopsis betonicifolia Baileyi
Mertensia virginica
Monarda fistulosa
Nepeta Mussini
Oxalis
Pæonia tenuifolia
Papaver
Penstemon
Phlox
Physostegia virginiana
Polemonium
Primula
Prunella grandiflora
Pulmonaria angustifolia
Ramonda pyrenaica
Salvia
Saxifraga crassifolia
Scabiosa
Sedum
Senecio pulcher
Silene
Soldanella alpina
Stachys lanata
Statice
Stokesia lævis
Teucrium Chamædrys
Tradescantia virginiana
Trillium erectum
Tunica Saxifraga
Valeriana officinalis
Verbena
Veronica

PERILLA fruticosa var. **crispa** (*nankinensis*). *Mint Family.* Asian half-hardy annual, grown for the colored coleus-like purple-brown foliage which, in some races, is much crisped. It is a rather weedy plant, about 2 feet high and branched; erect; sow in open ground; thin to 8 inches or more apart, and for best effect do not allow the plants to run to seed.

PERIWINKLE: *Vinca.*

PERSEA: *Avocado.*

PETROSELINUM: *Parsley.*

PE-TSAI: see *Cabbage.*

PETUNIA. *Nightshade Family.* South American tender annuals, or grown as such in the flower-garden, well known for the profusion of bloom through a long season and their evening fragrance. The improve-

ment in size and markings of the petunia has been marked of late. Now almost every shade of color may be found, aside from yellow. The original species are not common in unmodified form.

A bed of petunias makes a mass of color equaled by few other flowers. They are also excellent single plants for pots, baskets or window-boxes, blooming freely through the winter. Plants grow 1-2 feet high and spread or lop late in the season.

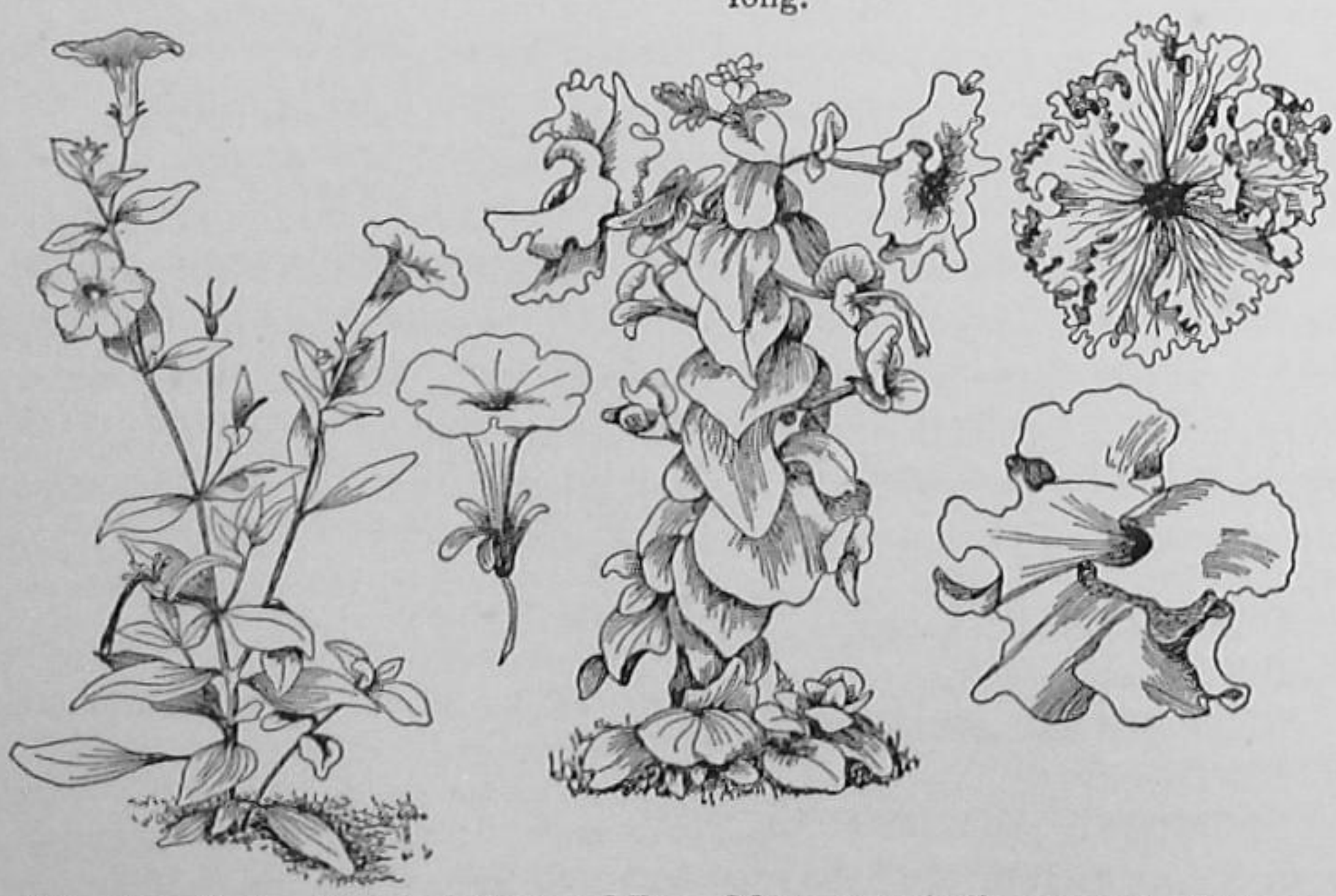
The single varieties grow freely from seed, but if plants of one special color are wanted cuttings should be made. These cuttings root easily and bloom early. Cuttings may be made of the double varieties, although they are grown also from seed. For common petunias, sow seeds where plants are to grow, in a warm sunny place; or for earlier bloom, seeds may be started in the house. Thin to 12 inches apart. The season of bloom is cut short only by frost.

Some of the common races of petunia self-sow year after year; these are usually rather small-flowered floriferous sorts that make a brilliant show in late summer and autumn if allowed a sunny exposure and soil not over-rich.

P. axillaris. LARGE WHITE PETUNIA. Erect or upright, to 2 ft.: fls. white, to 2½ in. long.

P. hybrida. COMMON GARDEN PETUNIA, in many forms and colors, derivatives from one or both the main species.

P. violacea. VIOLET PETUNIA. Low plant, nearly or quite prostrate or lopping: fls. rose-red or violet, to 1½ in. long.



Petunias. Left, plant and flower of Rosy Morn, practically or nearly *Petunia violacea;* fluted and fringed petunias of the horticultural race *P. hybrida*.

PHACELIA. *Water-Leaf Family.* Two Californian half-hardy or hardy annual phacelias are somewhat cultivated in the flower-garden for the blue or purple flowers, *P. Whitlavia* (*Whitlavia grandiflora*) and *P. campanularia*, very much alike and known sometimes as California Bluebells. They grow about 1-1½ feet high, branching, erect, but not very stiff or strong. Sow seeds as soon as frost is past, and thin to 6-8 inches for bedding effects or farther for specimen plants; provide an open location, and see that the plants do not go to seed; summer bloomers.

PHASEOLUS: *Bean.*

PHEASANTS-EYE: *Adonis.*

PHLOX. *Phlox Family.* Four common cultural types of phlox may be recognized: the flower-garden annual, *P. Drummondii* of Texas; the summer perennial phloxes, mostly derived from *P. paniculata* native in the eastern United States, now available in many named varieties; the moss-pinks, *P. subulata* and *P. nivalis*, mat-forming perennial spring bloomers native also in the eastern states; various dwarf montane perennials employed in rock-gardening.

The annual phlox is propagated by seed sown early in the spring in the border, or in March in boxes and transplanted. It blooms early, and continues until late in autumn. There are now many varieties, marked by stature as well as by bloom. The dwarf kinds may stand only 6-8 inches high, the tall kinds 12-18 inches. The colors are rose, scarlet, lilac, buff, white, and intermediate shades.

Summer perennial phloxes are deservedly popular for their excellent and abundant color, striking tall erect habit, and hardiness. They average about 3 feet tall, and the flower-clusters are often 1 foot long. For satisfactory bloom through a long season, provide rich deep soil and see that they never suffer for lack of moisture; and give the plants a space of 2 or 3 feet, particularly after the clumps have attained their size. Clumps may be divided before the blooms begin to lessen in size; three to four years is about the limit of best bloom. Propagate by means of the side shoots, or seeds may be employed to obtain new varieties.

P. adsurgens. 4-6 in., per.: rose or whitish. Ore.

P. amæna. 10-12 in., per.: purple. S. U. S.

P. Arendsii. 2 ft., per.: lavender or mauve. Hybrid.

P. decussata. Forms of *paniculata.*

P. divaricata (*canadensis*). 1-1½ ft., per.: violet-blue to mauve. E. N. Amer. Var. *Laphamii*, darker larger fls.

P. Drummondii. 8-18 in., ann.: rose to white, red, pink and purple. Tex. Var. *grandiflora*, larger. Var. *stellaris*, petals cut and fringed.

P. nivalis. Trailing White Phlox. 6-8 in., per.: white. Va. to Fla.

P. ovata. 1-2 ft., per.: purple or pink. E. N. Amer.

P. paniculata. 3-4 ft., per.: pink-purple to white, scarlet, purple. E. N. Amer.

P. pilosa. 1-1½ ft., per.: purple to pink and white. E. N. Amer.

P. procumbens. 1 ft., per.: bright purple. Hybrid.

P. stolonifera (*reptans*). 1 ft., per.: purple or violet. E. N. Amer.

P. subulata. Moss-Pink. 6 in., per.: purple to pink and white. E. N. Amer. Var. *alba*, white, *atropurpurea*, deep purple, *lilacina*, lilac, *rosea*, rose.

P. suffruticosa. 1-3 ft., per.: purple to rose and white.

Perennial Summer Phlox, forms of *Phlox paniculata.*

PHŒNIX: see *Palms.*

PHYSALIS. *Nightshade Family.* Some of the species of physalis are annual and grown for the edible berry borne inside a husk (enlarged calyx); the usual one is *P. pruinosa*, the Husk- or Strawberry-Tomato, native over a wide range in the western hemisphere. It is a diffuse often somewhat prostrate plant 2-3 feet high and requiring as much space as this either way. Seeds may be sown in the open ground as soon as weather is warm. The yellow berries or "tomatoes" may be put away in their dry husks and kept through the winter.

Another physalis is a hardy perennial, grown for ornament, the large red enlarged calices being showy. It is the Chinese Lantern-Plant, *P. Alkekengi* (*Francheti*, *Bunyardi*), propagating by long underground stems, and also from seed. The plant grows about 2 feet high and is of bushy habit. The "lanterns" are gaudy in autumn and may be used for dry bouquets.

PHYSIC, INDIAN: see *Perennials*, page 202.

PHYSOSTEGIA: see *Perennials*, page 203.

PIE-PLANT: *Rhubarb.*

PINCUSHION-FLOWER: *Scabiosa.*

PINE, NORFOLK-ISLAND-: *Araucaria.* **Screw-:** *Pandanus.*

PINK: *Dianthus.* **Moss-:** *Phlox subulata.* **Mullein-:** *Lychnis Coronaria.* **Sea-:** *Statice.*

PISUM: *Pea.*

PLATYCODON: *Campanula.*

PLUM. *Rose Family.* Plums may be recognized under three main pomological classes:

(1) The Domesticas, *Prunus domestica*, probably originally from southwestern Asia. Here are included the common plums and prunes long grown in Europe and the eastern states of the Union and on the Pacific Coast. Such varieties as Bavay (Green Gage), Bradshaw, Lombard, Damsons, Egg plums, Reine Claude, Grand Duke, Washington, belong here.

(2) The Japanese plums, *P. salicina* (*triflora*) represented by Abundance, Chabot, Red June, Burbank, Satsuma, Kelsey, Georgeson, and others. The Japanese kinds thrive over a wider extent of territory than the Domesticas.

(3) The Americana plums, products in recent time of several native species as of *P. americana, P. nigra, P. hortulana, P. Munsoniana, P. angustifolia.* Varieties of this native group are Wild Goose, Golden Beauty, Cheney, Hawkeye, De Soto, Forest Garden, Newman, Miner, Wolf, Weaver, Wayland, and many others. These plums thrive over a wide range in the interior country and the South.

Wherever the Domestica and Japanese plums can be grown, the native plums are not destined to become popular; but many of the natives are much hardier than others, and are therefore adapted to regions in which the Domestica and Japanese are not safe. Others of the natives are well adapted to the middle and southern states. The Domestica and Japanese plums are considerably hardier than peaches, but not as hardy as the apple. The northern limit of their general cultivation is the southern peninsula of Michigan, central and southern Ontario, central New York and central New England.

Plums thrive on a great variety of soils, but they do better, as a rule, on those that are rather heavy and have a considerable content of clay. In fact, many of the varieties thrive on clay as hard as that on which pears grow. On the other hand, they often do well in light and even almost sandy soils if good attention is given to tillage and fertilizing.

The trees are set when two and three years from the bud. It is preferable to have plum trees on stocks of the same species, but it is not

always possible to secure them at the nurseries. In the South, plums are worked mostly on peach roots, and these make excellent trees where the climate is not too severe and especially on the lighter lands on which they are planted in the South In the North the larger part of the plums are grown on Myrobalan plum roots. This Myrobalan is an Old World species of plum, of smaller growth than the Domestica. This stock, therefore, tends to dwarf the tree, and it is also likely to throw up sprouts from the roots. Plum trees are set 15 to 20 feet apart.

Plums are pruned much the same as apples and pears. That is, the top is thinned out from year to year, and all superfluous branches and broken or diseased wood are removed. If the soil is very strong and the trees are close together, it may be well to head them in a little each year, especially those varieties that grow very strong and robust.

For the control of scale, fruit lecanium or European red mite, a lubricating oil emulsion diluted to contain 3 per cent of oil is used. This spray should be applied after the sap has started but before the buds break.

In the control of brown-rot, curculio, and leaf-spot, lime-sulfur and lead arsenate are applied after the sap has started but before the buds break. For the control of curculio, a spray should be made after the shucks have fallen, and in trees badly infested a second spray may be necessary and should be applied about one week later. For this spray lime-sulfur and arsenate of lead are used, the lime-sulfur being added for the control of brown-rot. With Japanese varieties dry-mix sulfur, lime spray, or sulfur dust should be substituted for the lime-sulfur.

Black-knot should be cut from trees in the dormant season and thereafter as soon as it makes its appearance. It is desirable that diseased limbs be burned.

PODOPHYLLUM: see *Perennials*, page 203.

POINSETTIA (*Euphorbia* or *Poinsettia pulcherrima*). *Spurge Family.* A shrub of Mexico and Central America now much grown for the winter "bloom" which is composed of showy vermillion-red floral leaves or in some cases pink or whitish.

For midwinter bloom the plant is propagated in early summer by means of cuttings taken from the new growth of over-wintered stock. Strike the cuttings in a warm place, 65° or more, and keep them growing in pots as needed. If not kept growing too long in too large pots, the bloom will be earlier, and cuttings struck in August may bloom at Christmas. Several small plants in one large pot make a good house decoration. After blooming, keep only as many plants as are needed for cutting stock, drying them off until new growth is wanted in spring.

POKER-PLANT: *Kniphofia.*

POLANISIA: see *Cleome.*

POLEMONIUM. *Phlox Family.* Spring- and summer-blooming perennials with cut foliage and terminal clusters of blue, white or yellowish flowers; grown in borders, flower-gardens and rock-gardens.

Cultivation is simple in fertile well-drained soil. Propagated by division, or seeds sown in autumn.

P. cæruleum. Jacobs-Ladder. Greek Valerian. 2-3 ft.: blue, drooping. Eu. Var. *album,* white.

P. carneum. 2 ft.: salmon becoming purplish. W. N. Amer.

P. humile (*Richardsonii*). 8-9 in.: blue or purplish. Arctic regions.

P. reptans. 8-12 in.: light blue. E. N. Amer.

POLIANTHES: *Tuberose.*

POLYANTHUS: *Primula.*

POLYGONATUM: see *Perennials,* page 203.

POLYGONUM. Knotweed. Fleece-Flower. *Buckwheat Family.* Herbs of different habits, some of them grown for mass effects and others in borders for the profusion of small flowers in summer and autumn. One is a frequent big annual, but most of the horticultural kinds are durable perennials. Some species are attractive fence and arbor vines.

Knotweeds grow in any soil but most of them prefer moist locations. Propagated by seeds and division.

P. affine (*Brunonis*). Mountain Fleece. 1-1½ ft., per: rose-red. Himalayas.

P. amplexicaule. China Fleece-Vine. 2-3 ft., per.: rose-red or white. Himalayas.

P. Auberti. Vine, per.: whitish, fragrant: hardy and durable. Asia.

P. cuspidatum (*Sieboldi*). 6-8 ft., per.: greenish-white. Japan. Var. *compactum,* smaller.

P. orientale. Princes-Feather. 6 ft., ann., hairy: pink or rose. Asia, Australia.

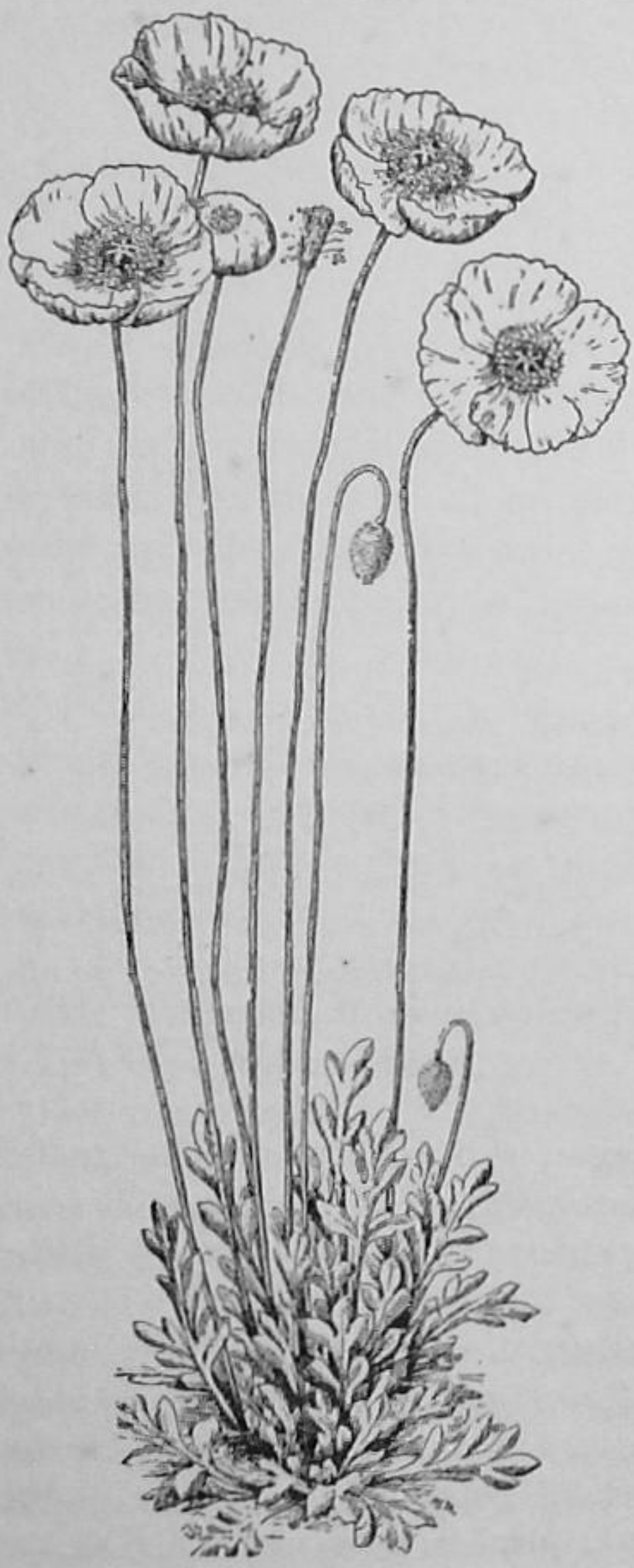
P. sachalinense. Sacaline. 9-12 ft., per.: greenish. Saghalin Isl.

POOLS: see *Water-Lilies.*

POPPY (many species of *Papaver,* the cultivated kinds native mostly in the temperate regions of the Old World). *Poppy Family.* Three garden groups may be recognized: the annuals, grown in the flower-garden for the very showy summer bloom in reds, cinnabar, purple to white, represented particularly by the Corn and Shirley poppies (*P. Rhœas*), and the Opium poppy (*P. somniferum*); the large perennial hardy border kinds, mostly late spring and summer bloomers, known particularly in *P. orientale;* the Iceland poppy, *P. nudicaule* of the arctic regions in eastern and western hemispheres, prized for the chaste fragrant bloom in spring on stems about 1 foot high.

All of the kinds grow readily from seed, which, in most cases, should be sown where the plants are to bloom. The seeds of the oriental and the Iceland poppy may be sown in pots, the plants wintered over in a frame and carefully planted out the second spring. The poppy is impatient of root disturbance, however, and the safest method is to sow the seed where wanted. The annual poppies should be sown early in the open ground, as they are hardy or half-hardy; if mass effect is desired they may stand as thickly as 4 or 5 inches, but for better plants the distance should be greater.

For Prickly-poppy see *Argemone;* California-poppy *Eschscholzia;* Tulip-poppy *Hunnemannia;* Matilja-poppy *Romneya;* Plume-poppy *Bocconia* or *Macleaya cordata.*



Iceland Poppy, *Papaver nudicaule.*

P. alpinum. 1C in., per.: white or yellow, fragrant. Alps.

P. bracteatum. 3 ft., per.: blood-red. Eu., Asia.

P. caucasicum. 2 ft., bien.: scarlet, petals yellowish at base. Caucasus.

P. dubium. 2 ft., ann.: rose or white, center darker. Eu. Var. *lævigatum* is glabrous with purple usually spotted fls.

P. glaucum. Tulip Poppy. 2 ft., ann.: scarlet with spots at base, very large (4 in. across). S. W. Asia.

P. nudicaule. Iceland Poppy. 1 ft., per.: white, yellow, orange, reddish, fragrant. Arctic regions.

P. orientale. Oriental Poppy. 4 ft., per.: scarlet with black spot, orange or pink. Eu., Asia.

P. pavoninum. Peacock Poppy. 1 ft., ann.: scarlet and darker spotted, small (1 in. across). S. W. Asia.

P. pilosum. 3 ft., per.: brick-red. Bithynia.

P. pyrenaicum (*rhæticum*). 4 in., per.: yellow or orange. Pyrenees.

P. Rhæas. Corn Poppy. 3 ft., ann.: red, purple, white. Eu., Asia. Var. *umbrosum* has dark red fls. with spots. Shirley poppies are forms of *P. Rhæas.*

P. rupifragum. 1-1½ ft., per.: pale red, to 3 in. across. Spain.

P. somniferum. Opium Poppy. 4 ft., ann.: white, pink, red, purple. Eu., Asia.

PORTULACA. PURSLANE. *Portulaca* or *Purslane Family.* The common cultivated kind is a brilliant little tender annual, low-growing and sun-loving, the common *P. grandiflora*, ROSE-MOSS, native in southern South America. Plants usually seed themselves, and once established may continue for years. Many of the varieties produce a good percentage of flowers as double as roses and of many colors. Seed should be sown where wanted. They bloom freely in light sandy soil in the full blaze of the sun, from early summer till frost. The flowers, in brilliant rose, red, yellow, white and striped, do not rise more than 4 to 6 inches above the ground; the stems trail to 1 foot or more; it is customary to let them stand 6-8 inches apart and cover the ground as they will.

The common "pussley," a weed in gardens, is *P. oleracea;* a very fleshy erect form of it, var. *sativa*, is grown as a pot-herb.

POTATO (*Solanum tuberosum* of the temperate Andes). *Nightshade Family.* Indispensable food crop for the vegetable-garden and field, the culture being well known and requiring little description here.

Land for potatoes should be rather loamy, and ought to have a liberal supply of potash, either naturally or supplied in the drill. See that the land is deeply plowed or spaded, so that the roots can penetrate. Plant the potatoes 3 or 4 inches below the natural surface of the ground. It is ordinarily best to drop the pieces in drills. A continuous drill may be made by dropping one piece every 6 inches, but it is usually best to drop two pieces about every 12 to 18 inches. The drills are far enough apart to allow good cultivation. If horse cultivation is employed, the drills should be at least 3 feet apart. The common practice of growing potatoes in ridges or elevated hills is doubtful, unless the land is so wet that this practice is necessary to insure proper drainage, but in this case the land is not adapted to the growing of potatoes, or perhaps for the very early crop inasmuch as the ridges dry out and warm up quickly. If the land is elevated into ridges or hills, there is loss of moisture by evaporation. At the last cultivating the potatoes may be hilled up slightly in order to cover the tubers; but the hills need not be made in the beginning.

Small potatoes are considered not to be so good as large ones for planting. One reason is because too many sprouts arise from each one, and these sprouts are likely to crowd each other. The same is true of the tip end or seed end of the tuber. Even when it is cut off, the eyes are so numerous that one secures many weak shoots rather than two or three strong ones. It is ordinarily best to cut the potatoes to two or three

eyes, leaving as much tuber as possible with each piece. Seven to eight bushels of potatoes are required to plant an acre.

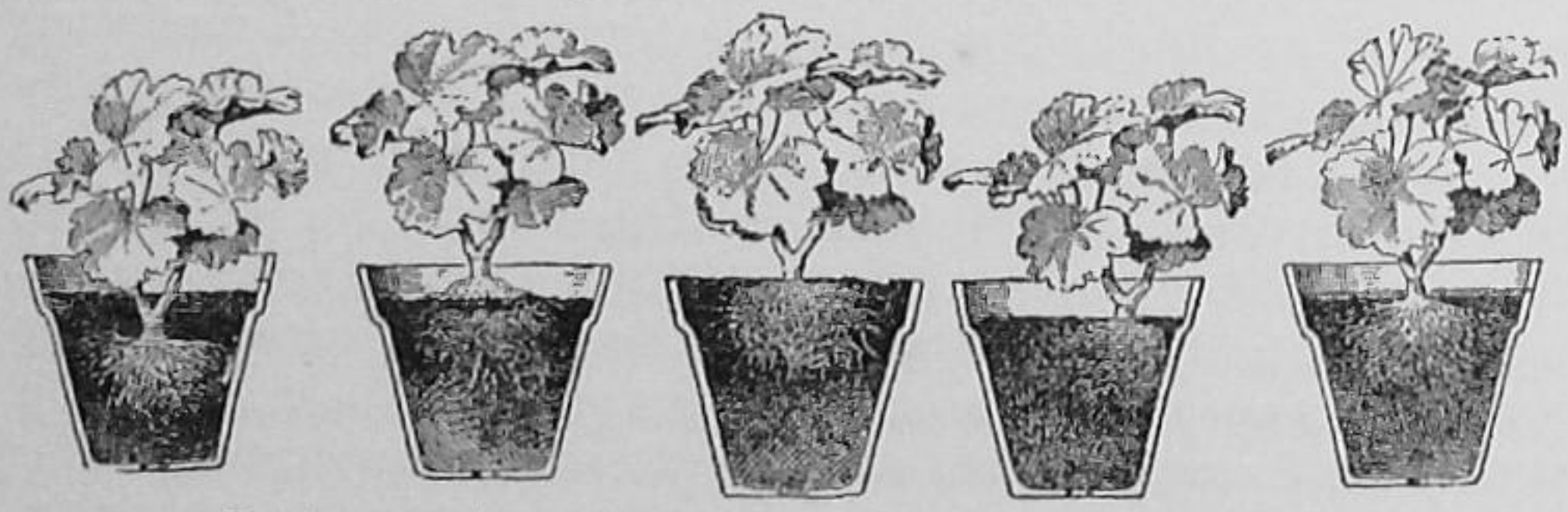
For a very early crop in the garden, tubers are sometimes sprouted in the cellar. When the sprouts are 4 to 6 inches high the tubers are carefully planted. It is essential that the sprouts are not broken in the handling. In this practice, also, the tubers are first cut into large pieces, so that they will not dry out too much.

The staple remedy for the potato-bug is arsenate of lead or arsenate of calcium, combined with bordeaux mixture for the blight. Frequent and thorough spraying is necessary. Bordeaux mixture and arsenate of calcium may be applied for flea-beetle.

POTENTILLA: see *Perennials*, page 203.

POT-MARIGOLD: *Calendula.*

POTTING. The amateur should early become accustomed to the growing of plants in pots, either as a stage in transfer from seed-pan to garden or permanently for window decoration. A special skill in the handling of pots soon develops a deftness in handicraft that is itself a joy. The gardener should provide a liberal supply of pots, from 3's to 6's and perhaps a few of larger sizes. Pot-grown plants of even hardy and shrubby things are often available from nurserymen, and if not pot-bound they suffer little check when turned into the garden and the losses should be practically none.



Potting: too deep; plant too high; too full; one-sided; good.

The operation of potting, while in itself simple, is often associated with success or failure in the growth of the plant. The first common reason of failure is using a too large pot; second, imperfect drainage; and third, poor physical condition of the soil.

A small-rooted cutting or a feeble plant should have a pot only large enough to hold soil sufficient to surround the roots to the extent of 1 or 2 inches. More soil holds too much moisture, thus excluding the air. As the plants grow and the ball of earth becomes well covered with white roots, and before these roots become dark in color, the plant

should be repotted, using a pot one size larger and usually a little richer soil. This operation should continue until the plant has made the desired growth. If it is desired to grow a geranium, fuchsia, begonia, or plants of a similar character, large enough for a window plant—say to the height or breadth of two feet,—a 6-inch pot may be large enough, provided the soil is sufficiently fertile to continue the growth while in flower. It often happens that pots of the various sizes are not at hand; and in case the pot is too large, it should have the drainage increased until it will take up as much room in the bottom as the pot is too large. Bear in mind that the soil should not hold free water. After the plant has filled the pot with roots it is often necessary to supply more food. This may be accomplished by digging out the top soil down to the young white roots, replacing with new soil in which a little rotted manure, a pinch of bone-meal or other plant-food, has been added. Liquid manure may be used. This liquid manure is made from well-rotted cow, horse, or sheep manure placed in a tub or barrel, covered with water, and allowed to stand until the strength of the manure is soaked out. This liquid should be diluted with clear water before using until it has the color of weak coffee. If used with judgment, nothing will cause a better growth or a greater quantity of flowers.

The drainage may consist of any coarse material, such as old broken pots, small stones, pieces of charcoal, and the like, over which may be placed small broken sod or a little moss to keep the earth from washing down and eventually stopping up the crevices through which the excess water should flow.

A safe rule to follow in first potting most house plants is to use one-third turf-loam, one-third leaf-mold or decayed leaves, and one-third sand, thoroughly mixed. Reduce the amount of leaf-mold and sand at successive pottings, adding a little well-rotted manure, until, when the plants have been potted in 6-inch pots, at least three-fourths of the soil is turfy loam. Press the soil firmly in the pot and around the plant. Never fill the pot level full of soil, else the plant cannot be watered; nor, on the other hand, leave the soil so low from the rim that the plant will be drowned.

PRIMROSE (species of *Primula*). *Primrose Family.* Five cultural classes of primroses are to be distinguished: the greehouse or window-garden kinds; the cowslip and polyanthus kinds; the other hardy garden species; the auricula (which see, page 30); various alpine and montane species useful in rock-gardens. All are perennial.

The greenhouse species are chiefly *Primula sinensis*, the Chinese primrose; *P. obconica;* formerly the Baby primrose, *P. Forbesii*, was

popular under glass, but the Fairy primrose, *P. malacoides*, has now mostly taken its place. The Chinese primrose is usually grown from seed. The seed sown in March or April makes flowering plants by winter, if the young plants are shifted to larger pots as needed. If sown in January plants should give good bloom for Christmas. The seed should be sown on the flat surface of the soil, which is composed of equal parts loam, leaf-mold and sand. The seed should be pressed down lightly and the soil watered carefully to prevent the seed from being washed into the soil. Very fine sphagnum moss may be sifted over the seed, or the box set in a place where the soil will remain moist until the seeds germinate. When the plants are large enough they should be potted separately or pricked out into shallow boxes. Frequent pottings or transplantings should be given until September, when they should be in the pots in which they are to bloom for winter and spring. The two essentials to successful growth through the hot summer are shade and moisture. All primulas are impatient of a dry atmosphere and fluctuating conditions. The other conservatory species are handled similarly. Be careful not to grow them too warm; a growing temperature not to exceed 55-60° F. is best; when first brought into the house in autumn they may be kept for a time as low as 45° at night.

The hardy primroses, whether of the polyanthus or other types, are grown usually from seeds, blooming freely the second year. The cowslip, oxlip and polyanthus are tufted plants with narrow foliage and bear umbels of yellow, purple, blue, brownish, crimson, white on scapes 4-10 or 15 inches high. They are excellent for early spring-blooming edgings and are perfectly hardy. Other and taller kinds, often with flowers in successive whorls, as *P. japonica*, are excellent in borders and rockwork; they may need protection.

Polyanthus Primrose, *Primula polyantha*.

P. Beesiana. 2 ft.: rose-lilac with yellow eye, summer. China.

P. Bulleyana. 2-2½ ft.: deep yellow, summer. China.

P. cortusoides. 1 ft.: rose, spring. Siberia.

P. denticulata. 10-12 in.: lilac, early spring. Himalayas. Var. *cachemiriana* (*cashmiriana*), purple with yellow eye.

P. elatior. OXLIP. 8 in.: yellow, spring. Eu., Asia.

P. farinosa. Birdseye Primrose. 8-12 in.: lilac-purple with yellow eye, early summer. Old World.

P. Florindæ. 1-4 ft.: sulfur-yellow, summer. Tibet.

P. Forbesii. Baby Primrose. 12-14 in.: rose or lilac. Asia.

P. frondosa. 5 in.: rosy-lilac, spring. Balkans.

P. japonica. 2 ft.: purple, rose, white, summer. Japan.

P. kewensis. 1½ ft.: bright yellow, fragrant. Hybrid.

P. malacoides. Fairy Primrose. 1-1½ ft.: lilac and rose. China.

P. obconica. 1 ft.: lilac or pink. China. Var. *gigantea*, larger.

P. polyantha. Polyanthus. 1 ft.: many colors, early spring. Hybrid.

P. pulverulenta. 3 ft.: purple with orange-brown eye, summer. China.

P. sinensis (*chinensis*). Chinese Primrose. 8 in.: many colors. China. Var. *stellata*, umbels superimposed.

P. Veitchii. 12-18 in.: rose. China.

P. veris (*officinalis*). Cowslip. 8 in.: yellow, fragrant, spring. Eu.

P. vulgaris (*acaulis*). 6 in.: yellow, purple or blue, spring. Eu.

PRIMROSE, EVENING-: *Œnothera.*

PRINCES-FEATHER: *Amaranthus hybridus* var. *hypochondriacus; Polemonium orientale.*

PROBOSCIDEA: *Martynia.*

PROPAGATION. Singular satisfaction inheres in the effort to multiply plants, increasing their number. To be sure, there are nurserymen and seedsmen of whom one may purchase with full satisfaction, but in many cases the gardener likes to try his hand for himself; and one must sow the seeds and transplant the seedlings. Special literature on the propagation of plants is available.

Propagation by seeds. Seeds of most plants should be kept dry and also rather cool. It is better to rely on fresh seeds. Test them by germinating in boxes in the house, if possible, before planting them in the open. If beans, peas, corn or other seeds become buggy, pour a little bisulfide of carbon (very inflammable) into them. The material will not injure the seeds even if poured on them. It soon evaporates. A teaspoonful kills the insects in four quarts of seeds, if the receptacle is tight.

Most tree seeds should be kept moist until planted. They are usually buried or kept in sand.

In sowing seeds, the general rule is to cover them twice or three times their thickness. This rule applies to the greater number of kinds of seeds, but in many plants of a naturally short season of bloom or growth, an example of which is the sweet pea, it may be advisable to sow the seed deeper. Also, in sowing very minute seeds, as tobacco, petunia, begonia, and others of like size, care should be taken to place them only under the surface of the soil,—simply pressed down with a smooth surface or allowed to settle into the soil with the soaking in of the water. The soil for all seeds should be loose and porous, to allow the excessive

moisture to escape and the warmth to penetrate, but should be firmer directly over the seeds to induce an upward flow of moisture. One of the most common mistakes is sowing all kinds at the same time without regard to the season, thus causing a failure with some, while others grow freely. Seeds of tender plants should be sown only when the ground has become thoroughly warm, while seeds of the so-called hardy plants may be sown as early in the spring as the ground is fit to work. A few kinds are the better for soaking, especially such as for some reason have been delayed in sowing. Sweet pea seed is benefited by soaking if not put into the ground until the soil is warm. Seed of canna, moonflower and others with hard shells may be scraped until the outer shell is pierced or is very thin, to allow the entrance of water.

It is generally better to buy garden seeds than to grow them, for those who make a business of seed-growing become expert in the cultivation and selection of the plants.

The seedlings are to be transplanted before they begin to crowd or become "drawn." This operation the gardener calls in one instance "pricking out." This means taking the young plants from the seed-box as soon as they are large enough to be handled—usually when the first "rough" leaves have developed—and replanting them in other boxes or pots, either singly or at a greater distance apart than they were when in the seed-boxes. The term transplanting is used in the operation of setting out plants from the hotbed, frame or house to the garden; also in removing shrubs or trees. Transplant on a cloudy day, and just before a rain, if possible, if the plants are going in the open ground. Plants usually "take" quickly if transplanted on freshly plowed or spaded ground. Shade if necessary for a day or two, but do not cover closely. If the plants are of considerable size it is good practice to remove part of the leaf surface to reduce transpiration.

Propagation by division. Division is simply the process of dividing plants that have rootstocks or tubers, or produce offsets or suckers, the parts being cut or broken into pieces. Thus rhubarb is multiplied by cutting the roots into pieces bearing an eye or bud; dahlia is increased by breaking apart the clustered roots. Division is performed mostly in the dormant season, either after the plants have ripened in autumn or before the growth starts in spring.

Propagation by layers. Layers are parts (usually stems) laid on the earth while still attached to the parent, with the expectation that they will take root and can then be separated as independent plants. The vine-like plants can be propagated readily by means of layers; so can most soft-wooded plants, as willows, maples, currants. It is usual to put down the branches in the fall. In a year they should be ready to be

severed from the parent. They may also be made in spring, before growth starts. See that the layered part rests in moist earth. Usually roots arise more freely if the shoot is cracked or notched at the buried point. The layer may be held down by a forked stick ("pegged down"), or by a stone or clod. See that the shoot does not throw up suckers behind the layered part.

A special kind of propagation, in which the part is not severed until roots form, is known as air-layering (or pot-layering) because the roots are stuck in a pot or ball of moss (whence the term "mossing") secured to a branch or trunk that cannot be bent to the ground. A notch is usually made at the desired place, and earth held around it by splitting a pot and applying it to the limb. When sufficient roots have formed in the pot, the branch is severed beneath it, the top perhaps shortened-in, and the part treated as an independent plant. The atmosphere should be moist, if possible, where the operation is performed, particularly if the part is merely balled with moss and without a pot or other protection.

Propagation by cuttings. Cuttings are parts of plants inserted in soil or water with the intention that they shall grow and make new plants. They are of various kinds. They may be classified, with reference to the age of the wood or tissue, into two classes; viz., those made from perfectly hard or dormant wood (taken from the winter twigs of trees and bushes), and those from more or less immature or growing "wood." They may be classified again in respect to the part of the plant from which they are taken, as root-cuttings, tuber-cuttings (as the ordinary "seed" planted for potatoes), stem-cuttings and leaf-cuttings.

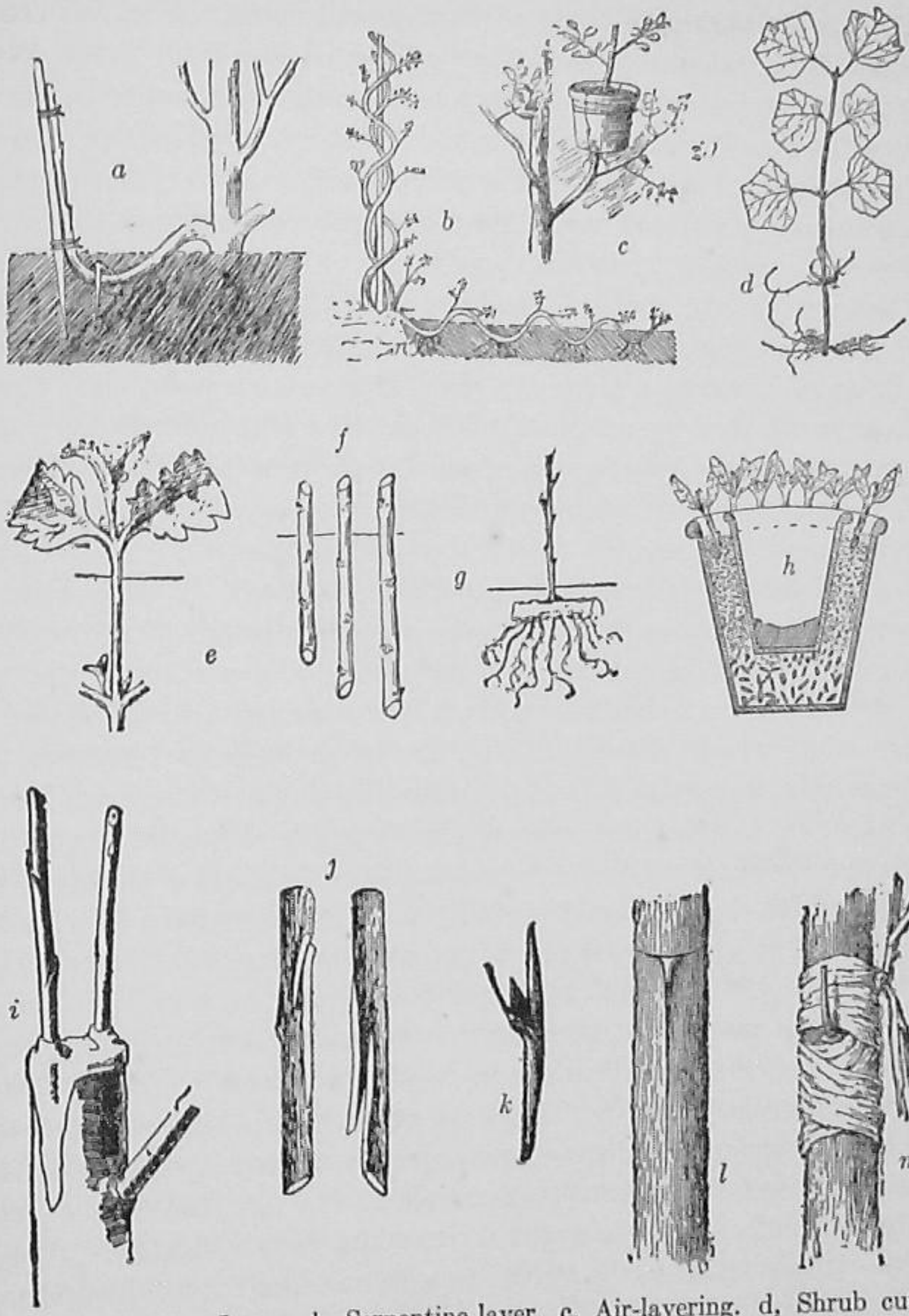
Dormant-wood stem-cuttings are used for grapes, currants, quinces, willows, poplars and many other kinds of soft-wooded trees and shrubs. Cuttings are ordinarily taken in fall or winter, but cut into the proper lengths and then buried in sand or moss where they do not freeze, that the lower end may heal over or callus. In spring these cuttings are set in the ground, preferably in a rather sandy and well-drained place. Usually, hardwood cuttings are made with two to four joints or buds, and when they are planted only the upper bud projects above the ground. They may be planted erect, or somewhat slanting. That the cutting may reach down to moist earth, it is desirable that it should not be less than 6 linches long; and it is sometimes better if it is 8 to 12 inches. If the wood is short-jointed, there may be several buds on a cutting of this length; and to prevent too many shoots from arising from these buds, the lowermost buds are often cut out. Roots start readily if the lower buds are removed, since the buds grow into shoots and not into roots. Cuttings of currants, grapes, quinces, and the like may

be set in rows far enough apart to admit of easy tillage either with horse or hand tools, and the cuttings may be placed 3 to 8 inches apart in the row. After the cuttings have grown for one season, the plants are usually transplanted and given more room for the second year's growth, after which they are ready to be set in permanent plantations. In some cases, the plants are set at the end of the first year; but two-year plants are stronger and usually preferable.

Root-cuttings are used for blackberries, raspberries, and a few other things. They are ordinarily made of roots from the size of a lead pencil to one's little finger, and are cut in lengths 3 to 5 inches long. The cuttings are stored the same as stem-cuttings and allowed to callus. In the spring they are planted in a horizontal or nearly horizontal position in moist sandy soil, being entirely covered to a depth of 1 or 2 inches.

Softwood- or greenwood-cuttings are rooted under cover, in a greenhouse, coldframe or a dwelling house. They are usually made of wood mature enough to break when it is bent sharply. When the wood is so soft that it will bend and not break, it is too immature, in most plants, for the making of good cuttings. One to two joints is the proper length of a greenwood-cutting. If of two joints, the lower leaf should be cut off and the upper leaves cut in two, so that they do not present their entire surface to the air and thereby evaporate the plant juices too rapidly. If the cutting is of only one joint, the lower end is usually cut just above a joint. In either case, the cuttings are usually inserted in sand or well-washed gravel, nearly or quite up to the leaves. Keep the bed uniformly moist throughout its depth, but avoid any soil that holds so much moisture that it becomes muddy and sour. These cuttings should be shaded until they begin to emit roots. Coleus, geraniums, fuchsias, and nearly all the common greenhouse and house plants, are propagated by these cuttings or slips. Greenwood-cuttings should have gentle bottom heat; the soil should be such that it will hold moisture and yet not remain wet; the air about the tops should not become close and stagnant, else the plants will damp-off; and the tops should be shaded for a time.

Leaf-cuttings are often used for the fancy-leaved begonias, gloxinias, and a few other plants. The young plant usually arises most readily from the leaf-stalk or petiole. The leaf, therefore, is inserted into the ground much as is a green-cutting. Begonia leaves, however, throw out young plants from the main veins when these veins or ribs are cut. Therefore, well grown and firm begonia leaves are sometimes laid flat on the sand and the main veins cut; then the leaf is weighted down with pebbles or pegs so that these cut surfaces come into intimate contact



Propagation. a, Layer. b, Serpentine layer. c, Air-layering. d, Shrub cutting. e, Herbaceous cutting. f, Dormant-wood cuttings. g, Root-cutting from which an upward shoot has grown. h, Double pot for cuttings. i, Cleft-graft after waxing. j, Whip-graft, not yet put together and tied. k, A "bud"; l, the stock, ready to receive the bud; m, the bud tied.

with the soil beneath. The begonia leaf may be treated in various other ways and give good results.

An excellent method of starting cuttings in the living-room is to make a double pot. Inside a 6-inch pot, set a 4-inch pot. Fill the bottom between with gravel or bits of brick, for drainage. Plug the hole in the

inside pot. Fill the spaces between the pots with earth, and in this set the cuttings. Water may be poured into the inner pot to supply the moisture.

The gardener soon learns what kinds of plants may be expected to grow readily from cuttings of various kinds. Usually they are plants with soft or pliant mature wood or with rather thick firm leaves. Very hard-wooded plants, as oaks, one would hardly attempt to propagate from cuttings. Yet one is often surprised when making experiments under proper conditions, and the number propagatable this way is greater than we suppose.

Propagation by grafting and budding. Grafting and budding is the operation of inserting a piece of a plant into another plant with the intention that it shall grow. It differs from the making of cuttings in the fact that the severed part grows in another plant rather than in the soil. There are two general kinds of grafting—one of which (1) inserts a piece of branch in the stock (grafting proper), and one (2) which inserts only a bud with little or no wood attached (budding). In both cases the success of the operation depends on the growing together of the cambium of the cion (or cutting) and that of the stock. The cambium is the new and growing tissue which lies underneath the bark and on the outside of the growing wood. Therefore, the line of demarcation between the bark and the wood should coincide when the cion and stock are joined. The plant upon which the severed piece is set is called the stock. The part which is removed and set into the stock is called a cion if it is a piece of a branch, or a bud if it is only a single point with a bit of tissue attached. The greater part of grafting and budding is performed when the cion or bud is nearly or quite dormant, that is, usually in winter and early in spring, and budding may be undertaken then, or late in summer when the buds have nearly or quite matured.

The prime object of grafting is to perpetuate a kind of plant that does not reproduce itself from seed or of which seed is very difficult to obtain. Cions or buds are therefore taken from this plant and set into whatever kind of plant is available on which they will grow. Thus, if one wants to propagate the Baldwin apple, one does not for that purpose sow seeds thereof, but takes cions or buds from a Baldwin tree and grafts them into some other apple tree. The stocks are usually obtained from seeds. In the case of the apple, young plants are raised from seeds obtained mostly from cider factories, without reference to the variety from which they came. When the seedlings have grown to a certain age, they are budded or grafted; and thereafter they bear fruit like that of the tree from which the cions were taken.

(1) Grafting proper is the insertion of a small branch (or cion), usually bearing more than one bud. In grafting on small stocks, it is customary to employ the whip-graft. Both stock and cion are cut

across diagonally, and a split made in each, so that one fits into the other. The graft is tied securely with a string, and then, if it is above ground, it is also waxed carefully. In larger limbs or stocks, the common method is to employ the cleft-graft. This consists in cutting off the stock, splitting it and inserting a wedge-shaped cion in one or both sides of the split, taking care that the cambium layer of the cion matches that of the stock. The exposed surfaces are then securely covered with wax. Grafting is usually performed early in the spring, just before the buds swell. The cions should have been cut before this time, when they were perfectly dormant. Cions may be stored in sand in the cellar or in the ice house, or they may be buried in the field. The object is to keep them fresh and dormant until they are wanted.

If it is desired to change the top of an old plum, apple or pear tree to some other variety, it is usually accomplished by means of the cleft-graft. It the tree is very young, budding or whip-grafting may be employed. On an old top the cions should begin to bear when three or four years old. All the main limbs should be grafted. It is important to keep down the suckers or water-sprouts from around the grafts, and part of the remaining top should be cut away each year until the top is entirely changed over (which will result in two to four years).

A good wax for covering the exposed parts is made as follows: Resin 4 parts by weight; beeswax, 2 parts; tallow, 1 part. In making the wax, the materials are first broken up and melted together. When thoroughly melted the liquid is poured into a pail or tub of cold water. It soon becomes hard enough to handle, and it is then pulled and worked over until it becomes tough or "gets a grain," at which stage it attains the color of very light-colored manila paper. When wax is applied by hand, the hands must be well greased. Hard cake tallow is the best material for this purpose. In top-grafting large trees, it is well to carry a reserve supply of tallow when waxing, by smearing the backs of the hands before entering the tree.

(2) Budding consists in inserting a bud underneath the bark of the stock, and the commonest practice is that shown in the illustrations. Budding is mostly performed in July, August and early September, when the bark is still loose or will peel. Twigs are cut from the tree which it is desired to propagate, and the buds are cut off with a sharp knife, a shield-shaped bit of bark (with possibly a little wood) being left with them. The bud is then shoved into a slit made in the stock, and it is held in place by tying with soft strand. In two or three weeks the bud will have "stuck" (that is, it will have grown fast to the stock), and the strand is cut to prevent its strangling the stock. Ordinarily the bud does not grow until the following spring, at which time the entire

stock or branch in which the bud is inserted is cut off an inch above the bud; and the bud thereby receives all the energy of the stock. Budding is the commonest grafting operation in nurseries. Seeds of peaches may be sown in spring, and the plants which result will be ready for budding the same August. The following spring, or a year from the planting of the seed, the stock is cut off just above the bud (which is inserted near the ground), and in the fall of that year the tree is ready for sale; that is, the top is one season old and the root is two seasons old, but in the trade it is known as a one-year-old tree. In apples and pears the stock is usually two years old before it is budded, and the tree is not sold until the top has grown two or three years. Budding may be performed also in the spring, in which case the bud grows the same season. Budding is always undertaken in young branches, preferably in those not more than one year old.

PRUNELLA: see *Perennials*, page 203.

PRUNES are varieties of plums with firm meaty flesh, and which readily make dried fruit. Some of the prunes are commercially grown in the East, but they are sold in the green state as other plums are; and they are adapted to all the uses of other plums. Prunes are cultivated like other plums. In this country the product is raised and prepared on the Pacific Coast.

PRUNING AND TRIMMING. It is commonly necessary to prune and to shape plants albeit there are those who deny the advisability of it because it is not "natural": neither is it "natural" to wear shoes. But nature prunes mercilessly, else there would be no long boles to forest trees. Yet pruning must be undertaken with discrimination and not as a formula. There are persons calling themselves gardeners and pruners who would shear every bush as soon as it begins to assume its true character and to be interesing.

Trimming is a term ordinarily confounded with pruning. The word should be restricted to the shaping of plants and not to the thinning of them, or to pruning for wood, fruit or other special object. Trimming is only one of the means of pruning. Trimming is mostly employed on hedges. It is also practiced to keep evergreens in shape. Many ornamental plants are also trimmed into various forms for topiary work. Fruit-trees should be pruned, as a rule, rather than trimmed: they should be allowed to take their natural form, the pruner taking out the superfluous wood and keeping them within manageable bounds.

Of pruning proper there are two types of inquiry: that which has to do with healing of the wounds; that which concerns the shaping of the top and the general welfare of the tree or other plant.

When a limb is cut off, the wound heals by being covered with callus tissue, which grows out from the cambium region and rolls over the face of the exposure. The hard wood itself never heals; that is, the cells do not have the power of making new cells; the old wood is covered up, or hermetically sealed as a cap is put on a fruit-jar. It is evident, therefore, that no kind of dressing will hasten the healing of the wound. The merit of a dressing is to keep the wound sound and healthy until the callus naturally covers it over. A good dressing is thick linseed-oil paint.

So far as the wound is concerned, the best time for pruning is ordinarily in spring, when the vital activities are beginning; but the season also influences fruit-bearing and wood-making, and these questions should be considered. Wounds on strong main limbs heal best, where there is a full flow of sap. The limb should be cut so that the wound is parallel with the trunk on which it sits, and close to it. The longer the stub, the less rapid in general is the healing of the wound. It is the custom to cut the limb just outside the bulge at its base; but, in most cases, it is better to cut through this bulge, and to have the wound close to the main trunk.

Heavy pruning of the top tends to the production of wood; therefore the severe pruning of orchard trees, following three or four years of neglect, sets the trees into heavy wood-bearing, and makes them more vigorous. Such treatment generally tends away from fruit-bearing. This heavy pruning is usually necessary in neglected orchards, however, to bring trees back into shape and to revitalize them; it sets up a process of renewal; but the best treatment of an orchard is to prune it a little every year. It should be so handled that the tops of the trees will be open, that no two limbs interfere with each other, so that the fruit will not be so abundant as to overload the tree.

In general, it is best to prune hardy orchard trees late in winter or early in spring. It is sometimes better, however, to leave peaches and other tender fruits until after the buds have swollen, or even after the flowers have fallen, that one may determine how much they have been injured by the winter. Grape vines should be pruned in winter or not later (in the North) than the first of March. If pruned later than this, they may bleed. The above remarks apply to other woody plants as well as to fruit-trees.

Pruning has two objects: to trim the tree or to make it assume a designed shape; to render the tree more vigorous or more fruitful, or to

make some other change in its character. These objectives are well illustrated in the pruning of ornamental shrubs. If one wants the shrubs sheared into formal shape, the shearing may be undertaken at almost any time of the year; in fact, it is better to do it two or three times each year, to keep the trees trim and neat. If only once, it is well to perform it early in the season so that new growths may quickly arise and cover whatever damage may be wrought. If, however, the desire is to obtain more flowers, the case is very different. Some shrubs and trees bear their flowers on the wood of the preceding year. Such, for example, are the early flowering shrubs like lilacs and the snowballs. The flower-buds are made the autumn before. In this case, pruning in winter cuts off the flower-buds. The proper time for pruning them, therefore, is just after the flowers have passed. The flower-buds form later in the season for the production of flowers the following spring. Other shrubs, however (particularly those that blossom late in the season), bear on wood of the current year's growth. Some clematises blossom in late summer and fall on the wood of the season. Roses present a similar case. The greater the quantity of strong wood in any season, therefore, the greater the bloom in that season. With such shrubs, it is well to prune in winter or early spring, and rather heavily. The abundance of new shoots may be expected to bear flowers later in the season.

Following are shrubs which, for best results in flower-bearing, may be pruned when dormant (in winter): camellia, Jackmani type of clematis, cornus, hibiscus (shrubby), hydrangea, many loniceras or honeysuckles, philadelphus or mock-orange, some spireas.

Shrubs that may be pruned when in leaf (after blooming): lilac, deutzia, weigelas, exochorda, spring-flowering loniceras, tree peony, flowering almond, some spireas and viburnums, wisteria.

PRUNUS: *Almond; Apricot; Cherry; Peach; Plum.*

PULMONARIA: see *Perennials*, page 203.

PUMPKIN AND SQUASH (species of *Cucurbita*). *Gourd Family.* Tender annual mostly long-running tendril vines grown for the large fruits; nativity undetermined. The names pumpkin and squash are used more or less interchangeably. There are three species. *Cucurbita Pepo* comprises the common field pumpkins, vegetable-marrow, the summer crookneck and pattypan squashes, and also the yellow-flowered ornamental hard-shelled gourds. *C. moschata* comprises the cushaw, winter crookneck squashes and certain pie pumpkins requiring a long season and grown mostly in the South. *C. maxima* yields the marrow and turban squashes and other winter kinds, as the Hubbard and Mammoth Chile. These three species do not intercross.

The time of planting, method of preparing the hills and after culture of pumpkins and squashes are the same as for cucumbers and melons (which see), except that for the early bush varieties the hills should be 4 or 5 feet apart, and for the later running varieties 6 to 10 feet apart. Eight to ten seeds should be planted in each hill, thinning to four plants after danger from bugs is over. Of the early summer squashes, one ounce of seed will plant fifty hills; of the later varieties, one ounce will plant about twenty hills. In growing winter squashes in a northern climate, it is essential that the plants start off quickly and vigorously: a little chemical fertilizer will help.

Pumpkins or Squashes. Above, *Cucurbita maxima*; left, *C. moschata*; right, *C. Pepo.*

Clean culture, early destruction or plowing under of infected vines, long rotations, aid greatly in keeping cucurbit plantations healthy. Squash-bug may be trapped under pieces of board about the plants. Squash borers cannot be combatted after entering the base of the vine unless the insect is cut out with a lengthwise slit and the injured part covered with earth. Covering 2 or 3 feet of the vine causes it to throw out roots which will carry the plant in case of attack. Eggs are killed by nicotine sulfate applied early in four weekly intervals.

PURSLANE: *Portulaca.*
PUSSLEY: *Portulaca.*
PYRETHRUM: *Chrysanthemum.*
PYRUS: *Apple; Pear.*
QUAMOCLIT: *Cardinal-Climber; Cypress-Vine.*
QUEEN-OF-THE-MEADOW: *Filipendula Ulmaria.*
QUEEN-OF-THE-PRAIRIE: *Filipendula rubra.*
QUINCE (*Cydonia oblonga*). *Rose Family.* A small crooked-branched tree native in Asia, grown in temperate climates for its aromatic fruit which is used in preserves and cookery. It is a slow-growing shallow-rooted tree, requiring a rather heavy moist deep soil for best results. The trees may be set one rod apart both ways which is greater than the usual full height of large specimens. The quince propagates from long hardwood cuttings, also from seeds and the seedlings are sometimes employed as stocks on which to graft or bud named varieties or for the dwarfing of the pear. Trees are planted when one or two years old; the second or third year thereafter a few fruits should be produced and then the crop should be steady for any number of years. Trees should be allowed to assume their natural form, the extra growths to be removed by annual pruning. Fire-blight is a serious menace; see *Pear*. Spraying for quinces follows practices with apples. Orange is the leading quince variety.

The flowering quinces are very different plants, of the related genus *Chænomeles*, in China and Japan. They are prized for the brilliant wax-like orange-red, scarlet and sometimes white flowers in early spring.

RADISH (*Raphanus sativus*). *Mustard Family.* Popular annual and biennial hardy herbs of Old World development grown for the thick edible roots, and one race (the rat-tailed radish or "aerial radish," var. *caudatus*) for the very large pods that are employed in pickles.

Radishes should be grown quickly to be at their best. They become tough and woody if grown slowly or allowed to stay in the ground too long. A light soil, well enriched, will grow most of the early varieties to table size in four to five weeks. To have a supply through the early months, sowing should be made every week or two, beginning even before frost is past. For summer, the large white or gray varieties are best. The winter varieties may be sown in midsummer or later, harvested before severe frosts, and stored in sand in a cool cellar. When they are to be used, if thrown into cold water for a short time they will regain their crispness. Sow radishes thickly in drills, 12 to 18 inches apart. Thin to 2 inches or more, depending on the kind. One ounce of seed should provide about 100 feet of drill.

Maggot may be avoided if radishes are grown in beds in which the young plants can be completely screened with cheesecloth to keep out the fly. Treatment of soil about the plants with corrosive sublimate will control the maggot; detailed advice should be sought from latest bulletins or from technical advisors.

RAMONDA: see *Perennials*, page 203.

RANUNCULUS. Buttercup. *Crowfoot Family.* Of the large genus Ranunculus, which is of wide distribution in temperate and cold regions, very few are in general cultivation. These garden crowfoots are of two groups, perennials: the fibrous-rooted, represented by double-flowered forms of *R. repens* and *R. acris;* the tuberous-rooted (classed by seedsmen with bulbs), *R. asiaticus* and *R. aconitifolius.*

The former class is grown in the open as hardy perennials. The double form of *R. repens* is one of the plants known as bachelors-buttons, although that name would better be restricted to *Centaurea Cyanus.* This buttercup is an extensive creeper, rooting at the joints and thereby propagating. The double form of *R. acris* is less grown; it is an erect branching plant, 2 feet or more high, propagated by division.

The Turban and Persian buttercups are *R. asiaticus,* a species that has yielded many choice double forms under cultivation, some of the flowers or buttons being more than 2 inches in diameter and full double. The flowers are mostly bright yellow, but other colors are produced. The plant is erect, 6-18 inches high. These buttercups are not hardy in the northern states; they may be bloomed in pots from tubers started in late winter; or be set in the open border for late spring or early summer bloom, then lifted in late summer or autumn and stored in the cellar, being planted again the following spring as soon as frost leaves the ground; tubers are usually planted about 2 inches deep and 6-8 inches apart. In the open they are likely to do best in partial protection or shade from the midday sun. *R. asiaticus* is mostly simple-stemmed, while the related but less grown *R. aconitifolius* is a branched taller plant with smaller often white flowers.

RAPHANUS: *Radish.*

RASPBERRY (species of *Rubus*). *Rose Family.* Two classes of raspberries are well known. The red raspberries are derived from *Rubus idæus,* native around the world in the northern hemisphere; the American horticultural varieties are mostly forms of var. *strigosus,* the main representative of the species in the western hemisphere. The blackcaps are *R. occidentalis,* native in the United States and Canada. The purple-canes, represented by Shaffer and Columbian, are hybrids of the two.

As with blackberries and dewberries, raspberries bear on last year's canes, and these canes bear but once (see *Blackberry*). Therefore cut out the old canes after fruiting, or before the following spring, thus destroying such insects and fungi as may have lodged in them. New canes should have grown in the meantime, 3 to 6 to a hill or plant.

Soil that holds moisture without being wet, and thorough preparation of the ground, are conditions necessary to success. The blackcap raspberries should be set 3 to 4 feet apart, the rows 6 or 8 feet; the red varieties 3 feet apart, the rows 6 to 8 feet apart. Spring setting is usually preferable, particularly at the North.

Raspberries. Red at left, derivative of *Rubus idæus* or its natural varieties; blackcap at right, *R. occidentalis*.

With blackcaps and purple-canes the first year after the plants are set the canes should be pinched back when they reach the height of 30 to 36 inches. If a very vigorous growth has been made the first season two canes may be left for fruiting, but in the case of weak growth only one cane should be allowed to fruit; the third season from setting, a good crop should be produced. In case of low-growing plants—those that have been pinched back short—a mulch of straw or grass around the plants at fruiting time will help to hold the moisture, and also serve to keep the fruits clean in case of heavy rains.

The pruning of the black raspberry and the purple-cane varieties is similar to that of the blackberry. About the only difference is that the lateral branches should be shortened to 8 to 10 inches in the dormant pruning.

The pruning of red raspberries consists of cutting out the old fruiting wood after the fruit is harvested and in the spring shortening back the

new cane growth about 15 per cent of its length. As new canes develop during the growing season they are not pinched back as is the case with the other brambles.

A black raspberry plantation will last five to eight years with good care. The black varieties are propagated by layers, the tip of a cane being laid in the soil in midsummer; by autumn the tip will have taken root and may be separated. The red varieties are propagated by suckers from the roots. A plantation of reds usually lasts longer than of blacks provided they are kept free from disease and if careful attention is given to the growing of strong selected canes and the land is well fertilized. In nurseries both blacks and reds are often propagated by means of root-cuttings.

Raspberries may be bent over to the ground so that the snow will protect them, in severe climates.

For red-rust, pull out the plant, root and branch, and burn it. Short rotations—fruiting the plants only two or three years—and burning the old canes and trimmings, will do much to keep raspberry plantations healthy. Another serious disease is anthracnose, known by the grayish more or less sunken spots or patches on the canes. Spray with lime-sulfur in spring before growth starts, again when new canes are 6-8 inches high, and a third time just before blooming. Mosaic is doubtless the most serious of all raspberry diseases. Resistant varieties obtained from a disease-free source are always preferable for home or commercial plantings.

From year to year new varieties are introduced which take the place of old favorites. Latham is a red raspberry affected less by the ravages of mosaic than most other kinds. Newburg is also very resistant to the disease.

Following is a list of red raspberries in order of season of ripening, well adapted to home or commercial use: June, Lloyd George, Herbert, Newburg, Viking, Cuthbert and Latham. At the present time (1934), Latham predominates in commercial plantings.

Varieties of black raspberries recommended for planting are Kansas, Black Pearl, Plum Farmer, and Cumberland. Of these varieties, Plum Farmer leads in popularity.

There are a number of purple-cane varieties but Columbian will generally give best satisfaction.

RESEDA: *Mignonette.*

RHEUM: *Rhubarb.*

RHODANTHE: *Helipterum.*

RHODODENDRON: see *Azalea.*

RHUBARB (*Rheum Rhaponticum*). PIE-PLANT. *Buckwheat Family.* Hardy strong Old World perennial grown for the thick leaf-stalks that are cooked and eaten in early spring for their agreeable acid.

Any good garden land grows strong rhubarb. As large leaf-stalks in abundance are wanted, the land should be made fertile and kept moist. Poor soil may be made fertile by spading out the subsoil, filling with well-rotted manure to within 1 foot of the level, throwing in the top soil and setting the roots with the crowns 4 inches below the surface, firming them with the feet. The stalks should not be cut for use until the second year. Coarse manure should be thrown over the crowns in autumn, to be forked or spaded in lightly when spring opens. The plant is usually propagated by division of the fleshy roots, small pieces of which will grow if separated from the old established roots and planted in rich mellow soil, every piece having a good eye. The division is usually made in spring and the plants are set 3 or 4 or 5 feet apart either way. Tillage should be maintained after the cutting season is past, for on the strength of the roots will depend the crop the succeeding spring. If given good care and well manured, the plants live for years and yield abundantly. A dozen good roots will supply a large family.

RIBES: *Currant; Gooseberry.*

RICHARDIA: *Calla.*

RICINUS: *Castor-Bean.*

ROCHEA: see *Succulents.*

ROCK-GARDEN is a natural or artistically constructed area of limited dimensions in which saxicolous (rock-inhabiting) and similar plants particularly thrive. Often, however, the term means any rock display on which usual or ordinary plants are grown.

Three elements are essential to a real rock-garden: the rock placement should be natural, harmonious and attractive in itself; plants should be such as are adapted to rock pockets and clefts; fitness of plants and construction, and of the garden to its surroundings, should characterize the enterprise. Perhaps not many rock-gardens meet these requirements.

Piles of rocks, and particularly of slabs on edge, do not constitute a rock-garden, even though petunias and poppies and weeds thrive on the mounds. The choice of rock in the first place must receive much attention if worthy results are to be attained; and then they should be placed in a well-considered plan or design. Parts of the year will provide little covering vegetation and the area should even then be attractive and satisfying, and suggestive of choice natural places that one loves to visit. A natural rock outcrop, or an abandoned and weathered quarry, or a

glacial dump of boulders, afford ideal places for the making of rock-gardens, but one must exercise strong restraint not to spoil them; one does not often have such opportunities at hand in the home garden.

The rock-garden should be in keeping with its setting and seem to be a natural part of the grounds rather than a blemish or intrusion. In the usual cases, this means that it should be at one side or in the rear of the property. Only in exceptional situations, as when the residence is on a steep and rocky slope, is a rock-garden a proper part of the landscape picture when placed in front of the house or along the street. A line of ragged rocks bordering a drive is not a rock-garden.

Rocks should be solidly and durably set, to withstand heaving by frost and to provide permanent roothold for the plants. Ample pockets, crevices and clefts should be provided, running deep so that roots may find good anchorage and moisture. A mound of rocks with soil shoveled carelessly between the stones is subject to drought and to washing by heavy rains. Proper rock-plants require protection from such excesses. The pockets and interstices should drain naturally, at the same time that they retain moisture. The nature of the soil supplied to the rock-garden has close relation to holding of moisture as well as to its suitability for plants. Good provision should be made for watering the area.

Fill the crevices and root-leads with soil, so that there will be no hollow spaces to dry out: roots do not thrive in bare holes. Fibrous material, but not raw manure, may be mixed with rock-garden soil, and for montane and alpine plants a certain quantity of rock-chippings or grit may be added; it may be well to transport some of the soil itself if plants are taken naturally in the immediate neighborhood.

If the area is well protected from winds and scorching sun and kept moist, rocks soon become covered with moss and similar vegetation, and this adds greatly to the charm. In fact, if moss will not grow on any of the stones it is fair indication that the place is not a rock-garden. Whether the construction shall be located in sun or shade must depend directly on climate. In most parts of North America the rock-garden should not be open all day to burning sun. Much, again, depends on the kinds of plants. The attitude of the rock-gardener should be an effort to find plants adapted to the situation; this requires experiment year by year and affords one of the choicest entertainments in the growing of plants.

Chief charm of the rock-garden, however, is the vegetation that grows in it. Remember that the place is not a garden of rocks but a placement of rocks that are elements of a garden. The plants should be of low stature, attractive for vegetation and habit of growth as well as for bloom. Evergreen tufts and mats add greatly to the interest. For the greater

part, the most adaptable plants are those that grow naturally on mountains, cliffs, and moraines. A special department of rock-gardening is the growing of alpines, which are plants of high elevations; these choice subjects usually require close imitation of natural conditions in soil, exposure and protection. One does not often see a real alpine garden, but the growing of true alpines should increase for one has choice of some of the most charming plants in nature.

Rock-garden plants are mostly perennial, but certain compact annuals may be employed to good effect to fill vacancies. Many perennials are interesting all the year and give the area continuity; cushions and carpets of winter foliage are desirable. The number of adaptable plants is legion, and constantly increasing with new introductions. Some of the best gardening skill may be expressed in the growing of these subjects inasmuch as each individual plant must have the place and attention required of it.

Good rock-garden material may be found in the following genera, in some cases only the smaller or dwarfer or montane species being chosen: acæna, achillea, aconitum, adonis, æthionema, allium, alyssum, androsace, anemone, aquilegia, arabis, arenaria, aster (dwarf), aubrieta, campanula, cassiope, cerastium, cortusa, corydalis, daboecia, daphne, dianthus, dicentra, dodecatheon, draba, dryas, epigæa, epimedium, erinus, fritillaria, galax, gentiana, geum, helianthemum, hepatica, heuchera, houstonia, iberis, iris (dwarf), leontopodium, lewisia, linaria, linnæa, lithospermum, loiseleuria, lychnis, oxalis, papaver, penstemon, petrocallis, phlox, phyllodoce, potentilla, primula, pterocephalus, pyrola, ramonda, ranunculus, saxifraga, sedum, sempervivum, shortia, silene, soldanella, spraguea, talinum, thymus, trollius, veronica, viola, wahlenbergia; also among the ferns, certain of the smaller bulbs, and some of the small grasses and sedges. Some of the native orchids are desirable for the purpose.

Many of the small woody evergreens are useful as rock-garden subjects, particularly for the larger establishments and for the rear planting. Heaths are good, where hardy; also heather; some of the ground vaccinums, partridge-berry, pachistima, dwarf box, sarcococca, bearberry, very low rhododendrons, and a number of the dwarf junipers.

Probably more than in any other department of gardening, excepting only the greenhouse itself, the rock-garden requires unremitting attention to keep it clean, trim, free of weeds. It advertises its failures as well as its virtues. Weeds and vagrants have no place in a rock-garden. The area should be fresh and presentable at all times. A real rock-garden carefully kept is one of the choicest elements in a garden and also one of the saddest in neglect.

ROMAINE: *Lettuce.*

ROMNEYA Coulteri. MATILIJA-POPPY. *Poppy Family.* A perennial growing to 8 feet with cut foliage and fragrant solitary white flowers 6 inches across, in summer; native in California and Mexico.

This is a good flower-garden poppy and should be planted in sandy loam in a well-drained sunny place. After plants become established, they should be left alone. Propagated by suckers and slowly by seeds; transplants with difficulty.

RORIPA: *Cress.*

ROSE (species of *Rosa*, a characteristic genus of temperate parts of the northern hemisphere). *Rose Family.* Prime favorites in temperate regions and some of them are grown in the tropics with success, particularly the Noisettes. The species in cultivation are so many and the hybrid classes so much involved that it is difficult to make a serviceable classification of garden roses in a very brief statement. Moreover, the roses are fanciers plants and the breeding of new kinds is always in progress. The rose grower will need to keep in touch with current literature and discussion. A few of the main classes may be mentioned:

(1) The multiflora roses, *R. multiflora* and *R. cathayensis*, represented in the ramblers.

(2) Memorial rose, *R. Wichuraiana*, more or less evergreen ground trailer, useful for covering banks, and now a parent in many popular crosses, as Dorothy Perkins.

(3) Tea and China roses, *R. odorata* and *R. chinensis.*

(4) Hybrid Teas, *R. dilecta*, which is a name for a class of hybrids between the Tea and China roses on the one hand and Hybrid Perpetuals on the other. They are grown under glass and in the open in the southern part of the country.

(5) Bourbons and Hybrid Perpetuals, horticultural roses of mixed parentage.

(6) Noisettes or Champneys, *R. Noisettiana*, derivatives of *chinensis* probably by hybridization; grown popularly in warm regions.

(7) Sweetbriars, *R. Eglanteria* (*rubiginosa*), in late years with many attractive derivatives, as the Penzance Sweetbriar hybrids.

(8) Rugosas, strong good-foliaged shrubs; *R. rugosa* itself, from Japan and China, is probably the best of the hardy hedge roses, and the Bruants and other hybrids are attractive varieties.

9) Cherokee rose, *R. lævigata* from China and Japan but naturalized in the South, produces white and rose very large single fragrant flowers; it is a strong climbing evergreen.

(10) Banksia roses, *R. Banksiæ*, a climbing evergreen from China, abundantly used in California and other warm regions for its good foliage and abundance of small clustered white or yellowish somewhat fragrant flowers.

Aside from these outstanding classes, many other species of roses are planted, mostly in their natural or little-developed state. Some of them are native in North America. Their requirements are not different from those of other shrubbery.

Roses. Single rose, *Rosa spinosissima*; rambler rose, of the *R. multiflora* type.

It seems to be the first desire of the home-maker, when he considers the planting of his grounds, to set out garden roses; but it should be one of the last undertakings. Roses are essentially flower-garden subjects, rather than lawn ornaments. That is, the flowers are their chief beauty. Mostly they have little to commend them in the way of foliage or habit, and they are inveterately attacked by insects and sometimes by fungi. To obtain the best results with roses, they should be placed in a bed by themselves, where they can be tilled and pruned and well taken care of; and they should be grown as specimen plants, as are other flower-garden plants. The ordinary garden roses should rarely be grown in mixed borders of shrubbery.

If it is desired to have roses in mixed borders, then the single and informal types should be chosen. One of the best of these is *R. rugosa*. This has not only attractive flowers through the greater part of the season, but it also has interesting foliage and a striking habit. The profusion of bristles and spines gives it an individual and strong character. Even without the flowers, it is valuable to add character and cast to a foliage mass. The foliage is not attacked by insects or fungi, but remains green and glossy throughout the season. The fruit is also large and showy, and

persists well through the winter. Some of the wild roses are also excellent for mixing into foliage masses, but, as a rule, their foliage characteristics are rather weak, and they are liable to be attacked by thrips. A number of recently introduced species is increasing the list of shrubbery roses.

Roses require firm cool fertile soil. While they may be planted closely in beds and borders, the surface should be tilled if highly developed flowers are to be produced; and in the blooming season a moisture-retaining mulch usually gives excellent results. A clay soil, if well enriched and having perfect drainage, is good. Pruning should be carefully looked after, preferably in the spring. All weak growth should be cut out and the remainder well cut back. The flowers, except the Yellow Persian and the Harison Yellow, being borne on the new wood, the bushes should be cut back half or more of their growth.

In most cases, roses on their own roots are more satisfactory than budded stock. On own-rooted stock, the suckers or shoots from below the surface will be of the same kind, whereas with budded roses there is danger of the stock (usually Manetti or Dog rose) starting into growth and, not being discovered, outgrowing the bud, taking possession, and finally killing out the weaker growth. Yet, if the plants are set deep enough to prevent adventitious buds of the stock from starting, there is no question that finer roses may be grown than from plants on their own roots.

The summer insects that trouble the rose are often successfully treated by a forceful spray of clear water, early in the day and again at evening. Those having city water or good spray pumps will find this an easy method of keeping rose pests in check. Nicotine preparations applied in a spray may be used for aphis, thrips and some other insects, and arsenate of lead for chafer. Bordeaux mixture may be used for leaf-spot.

Varieties of roses for outdoor planting are numerous. The following list represents some of the most popular practical kinds in at least most parts of the eastern country: Ophelia, Frau Karl Druschki, Radiance, Duchess of Wellington, Dame Edith Helen, Mrs. Aaron Ward, Los Angeles, Mme. Edouard Herriot, Red Radiance, Gruss an Teplitz, Lady Alice Stanley, Killarney, White Killarney.

Among the climbers are: Dr. Van Fleet, Purity, American Pillar, Pauls Scarlet Climber, Dorothy Perkins, Tausendschön, Climbing American Beauty, Gardenia, Excelsa, Christine Wright, Hiawatha, Climbing Lady Ashtown, Mary Wallace. Some of the newer climbing roses with continuity of bloom are Pax and Blaze.

Dwarf polyanthas are popular, as Lafayette, Orleans, Edith Cavell.

Very dwarf roses may be placed in the rock-garden, as *R. chinensis* var. *minima*, which grows only 1 foot high, where hardy.

Roses in winter—Although the growing of roses under glass is a business which would better be left to florists, the following advice may be useful to those who have conservatories or inclosed window-gardens: When forcing roses for winter flowers, gardeners usually provide raised beds, in the best lighted houses they have. The bottom of the bed or bench is left with cracks between the boards for drainage; the cracks are covered with inverted strips of sod, and the bench is then covered with four or five inches of fresh fibrous loam. This is made from rotted sods, with decayed manure incorporated at the rate of about one part in four. Sod from any drained pasture-land makes good soil. The plants are set on the bed in the spring or early summer, from 12 to 18 inches apart, and are grown there all summer to be ready for the winter. In the winter they are kept at a temperature of 58° to 60° at night, and 5° to 10° warmer in the day. The heating pipes are often run under the benches, not because the rose likes bottom heat, but to economize space and to assist in drying out the beds in case of their becoming too wet. The greatest care is required in watering, in guarding the temperature and in ventilation. Draughts result in checks to the growth and in mildewed foliage. Dryness of the air, especially from fire heat, is followed by the appearance of the minute red-spider on the leaves. The aphis, or green plant-louse, appears under all conditions, and must be kept down by syringing with tobacco-tea or fumigation with tobacco stems or preparations.

ROSE, CHRISTMAS-: *Helleborus niger*. **Cotton-:** *Hibiscus mutabilis*.

ROSELLE (*Hibiscus Sabdariffa*). *Mallow Family*. Stout tender annual, making a bush 5 or 6 feet high, grown far South for the acid calices and involucres, commonly red, which are used for sauces, jellies and marmalade and for the making of a refreshing drink. It is raised from seeds sown in a seed-bed, the young plants being set in the field about 2 feet asunder in the row; the rows are far enough apart to admit of horse tillage. The balls (calices and attending involucres) are gathered before they become woody or stringy, and are employed fresh or dried for future use. Roselle is native in Old World tropics. It is sometimes called Jamaica sorrel.

ROSEMARY: *Sweet Herbs*.

ROSE-MOSS: *Portulaca*.

ROSE-OF-CHINA: *Hibiscus Rosa-sinensis*. **-of-Heaven:** *Lychnis Cœli-rosa*. **-of-Sharon:** *Hibiscus syriacus*.

ROYSTONEA: see *Palms*.

RUBBER-PLANT (*Ficus elastica*, of India). *Mulberry Family*. As a house and porch ornament, the rubber-plant is the juvenile state of a

large forest tree. Its stiff habit, thick shiny leaves, and ability to withstand adverse conditions make it a favorite for decoration. It does not reach the fruiting stage in house culture, and the plants are discarded as soon as they become too large or ungainly. Aside from maintaining young and vigorous plants and repotting as needed, the rubber-plant demands no special treatment.

New shapely plants may be purchased of dealers; or young shoots on an old plant may be taken off by means of air-layering (page 219) if one can maintain a rather moist atmosphere. Midway between the joints, a slanting cut is made in the stem, the cuts being held open by a wedge to facilitate callusing; the stem is then encased in sphagnum moss which is kept moist, and the temperature fairly high; when good roots have formed in the moss, the shoot is cut off, its end sealed or waxed over to prevent bleeding, and potted. The operation is usually performed in late winter or spring.

RUBUS: *Blackberry; Dewberry; Raspberry.*

RUDBECKIA. Coneflower. *Composite Family.* North American herbs with showy heads of flowers in summer and autumn, the rays yellow and disk greenish or yellowish to purplish. They are striking border plants and useful for cut-flowers.

Coneflowers thrive in most any soil or exposure. The annuals and biennials are raised from seeds; others by division, cuttings, and also by seeds sown the year before bloom is wanted.

R. bicolor. 2 ft., ann.: disk black. Var. *superba*, heads 2 in. across.

R. fulgida. 2 ft., per.: disk black-purple.

R. hirta. Black-eyed Susan. 3 ft., bien. or ann.: disk purplish-brown.

R. laciniata. 10-12 ft., per.: disk greenish-yellow, rays drooping. Var. *hortensia*, Golden-Glow, double.

R. maxima. 6-9 ft., per.: disk brownish, rays drooping.

R. nitida. 4 ft., per.: disk greenish or yellowish, rays drooping.

R. purpurea: see *Echinacea.*

R. speciosa (*Newmani*). 3 ft., per.: disk brown-purple.

R. sublomentosa. 6 ft., per., gray-hairy: disk brownish.

R. triloba. 4-5 ft., bien., but blooming first year from seed: disk black-purple.

RUE: *Sweet Herbs; Thalictrum.*

RUTABAGA: *Turnip.*

SABAL: see *Palms.*

SACALINE: *Polygonum sachalinense.*

SAFFRON: *Sweet Herbs.*

SAGE: *Salvia.*

SAGINA: see *Ground-Cover.*

SALPIGLOSSIS sinuata. *Nightshade Family.* Excellent half-hardy annual, native in Chile, grown in the flower-garden for the richly colored veiny yellow, golden, scarlet and velvety purple trumpet-shaped flowers. The plants are erect-growing, 20-30 inches high. The flowers are short-lived if lett on the plant, but will hold well if cut and placed in water.

Seed may be sown in heat in February or March, the seedlings grown along until May, when they may be planted out. It is usually best to pinch out the centers of the plants at this time to cause them to branch. Or the seeds may be put in the open ground as soon as it is warm and settled, and the plants thinned to 12-16 inches; good bloom should be had in late summer and autumn in the North.

Salpiglossis and Salvia. Left, plant and detached flower of *Salpiglossis sinuata*; right, scarlet sage, flowers and lower leaf, *Salvia splendens*.

SALSIFY (*Tragopogon porrifolius*). VEGETABLE-OYSTER or OYSTER-PLANT (from the flavor of the cooked root). *Composite Family.* European. Salsify is one of the best winter and early spring vegetables. The seed should be sown as early in the spring as possible. Handle the same as parsnips in every way. The roots, like parsnips, are not injured by the winter freeze, but part of the crop should be dug in the fall, and stored in soil or moss in a cellar for winter use. The plant is grown in deep mellow soil, so that symmetrical roots may develop, in drills with space between to allow for tillage, usually 12-18 inches apart; plants may be thinned to 3-6 inches. One ounce of seed sows 50 to 70 feet of drill. The crop requires the entire season in which to grow.

SALVIA. SAGE. *Mint Family.* Many species of annual and perennial herbs, several showy ornamentals, suitable for borders, bedding and mass planting; blooming in summer.

Scarlet sage is treated as an annual and seeds are usually started indoors. The other species are of simple culture but may require winter protection in the North. Propagation is usually by seeds but some kinds may be divided.

Garden sage, grown for use in cookery, is a durable perennial of easy culture at one side the garden; propagated by seeds and more quickly by division of still vigorous plants.

S. argentea. 4 ft., bien., foliage white-woolly: rose-white, purplish or yellowish. Medit. region.

S. azurea. 3 ft., per.: blue or white. E. N. Amer.

S. farinacea. 3 ft., per.: violet-blue with white- or violet-hairy calyx. Tex.

S. nemorosa (*virgata nemorosa*). 3 ft., per.: violet or purple. Eu., Asia.

S. officinalis. The kitchen-garden sage with blue or white fls. Medit. region.

S. patens. 2-2½ ft., per.: blue. Mex.

S. Pitcheri (*azurea* var. *grandiflora*). 4 ft., per., gray-hairy: blue or white. Cent. U. S.

S. pratensis. 3 ft., per.: bright blue. Eu.

S. Sclarea. CLARY. 3 ft., bien., floral lvs. rose and white: whitish-blue. Eu.

S. splendens. SCARLET SAGE. 8 ft., shrub but grown as ann.: scarlet. Brazil.

S. uliginosa. 5-6 ft., per.: blue or white. S. Amer.

SANDWORT: *Arenaria.*

SANGUINARIA: see *Perennials*, page 203.

SANSEVIERIA. BOWSTRING-HEMP. *Lily Family.* Stiff-leaved plants commonly grown in pots for house and porch decoration; the banded and variegated leaves are basal and whitish or yellowish flowers borne in spikes at tips of slender scapes.

Sansevierias withstand much abuse and do well in a rather heavy soil. Propagated by division; also by leaf-cuttings about 3 inches long which will root in about a month, then forming a stolon-like part which forms a new plant at some distance from the cutting.

S. cylindrica. Lvs. cylindrical, striped and banded with dark green. Afr.

S. thyrsiflora (*guineensis*). Lvs. nearly flat, banded with pale green and margined with yellow. Afr.

S. trifasciata var. *Laurentii.* Lvs. concave, striped with golden-yellow. Afr.

S. zeylanica. Lvs. concave, banded with light green, lined dark green on back. Ceylon. This is the name common in the trade but it is doubtful whether the plants are correctly determined.

SANTOLINA: see *Ground-Cover.*

SANVITALIA procumbens. *Composite Family.* One half-hardy annual is in cultivation, a procumbent or trailing plant native in Mexico, adaptable to vases, hanging baskets, edgings and flower-beds. The yellow flowers are freely borne through a long season, summer and autumn; height 6-8 inches. Seeds may be sown rather early, as soon as frost is out; thin to 8 inches or more to allow the plants to spread, perhaps removing some of them later if they crowd.

SAPONARIA. *Pink Family.* Herbs of the Old World, grown for the attractive flowers. One is a hardy annual, *S. Vaccaria* (or *Vaccaria vulgaris*), erect, 1-3 feet, little branching, with deep pink long-stemmed small flowers; not often grown; readily raised from seeds. *S. ocymoides* is a trailing hardy perennial sometimes grown on margins; it has bright pink phlox-like flowers. The commonest species is *S. officinalis*, Bouncing Bet, grown mostly in its double-flowered form which is sometimes known as *S. caucasica.* It is a hardy perennial eventually forming patches and abundantly run wild; flowers pink to whitish; stems usually about 2 feet high. Readily propagated by division; also by seeds.

SAVORY: *Sweet Herbs.*

SAXIFRAGA. Saxifrage. *Saxifrage Family.* Perennials adapted to rock-gardens and borders, with mostly basal leaves and clusters or racemes of white, pink, purple or yellow flowers in late spring and early summer. Many of the montane and alpine species are very low condensed plants with leaves in rosettes; these are specially adapted to rock-gardens.

Saxifrages thrive in shady situations in well-drained soil. They are increased by seeds and division of plants, also by stolons and bulblets when produced.

S. Aizoon. 1½ ft.: lvs. with incrusted white teeth: cream marked purple. N. Amer., Eu., Asia. Var. *rosea,* bright pink.

S. apiculata. 3-3½ in.: yellow. Hybrid.

S. cæspitosa. 6 in.: white. N. Amer., Eu., Asia.

S. cordifolia (properly *Bergenia cordifolia*). 1½ ft.: rose, in nodding clusters. Siberia.

S. Cotyledon. 2 ft.: white veined pink, fragrant. Eu. Var. *pyramidalis,* to 4 ft.

S. crassifolia (properly *Bergenia crassifolia*). 1½ ft.: rose, lilac or purple. Asia.

S. decipiens. 8-12 in.: white. Eu. Var. *bathoniensis,* scarlet.

S. Elizabethæ. 2 in.: yellow. Hybrid.

S. Hostii. 2 ft.: lvs. encrusted with lime: white, sometimes dotted purple. Eu.

S. lingulata. 1 ft.: margins of lvs. encrusted: white. Eu. Var. *lantoscana,* lvs. shorter.

S. Macnabiana. White spotted purple. Hybrid.

S. sarmentosa. STRAWBERRY-GERANIUM. 2 ft., with strawberry-like stolons: lvs. reddish below, above veined white: white. Asia. A good basket plant.

S. umbrosa. 1 ft.: white or pink. Eu. Var. *primuloides*, smaller, with primrose-like lvs. and rose fls.

S. virginiensis. 1 ft.: white. E. N. Amer.

SCABIOSA. MOURNING BRIDE. PINCUSHION-FLOWER. *Teasel Family.* The common kind is a useful half-hardy annual, yielding a profusion of bloom the greater part of the summer and autumn if not allowed to go to seed. Several perennial species are also grown in the flower-garden.

Scabiosas do best in sunny exposures and well-drained soil. Seed may be sown where the plants are wanted, or to hasten the season of bloom may be sown in boxes in February and grown along to be planted out in April. Perennials may also be increased by division.

S. amœna. 3 ft., per.: pale blue or lilac in round heads. W. Asia.

S. atropurpurea. SWEET SCABIOUS. 2-3 ft., ann.: purple, rose or white. Eu. This is the common mourning bride of gardens and many Latin names are applied to varieties of it, as *candidissima, compacta, grandiflora, pumila, nana.*

S. caucasica. 2-3 ft., per.: light blue. Caucasus. Var. *alba*, white.

S. Columbaria. 2 ft., per.: blue. Eu., Asia, Afr.

S. graminifolia. 1 ft. or more with grass-like lvs., per.: pale blue. Eu.

S. japonica. 2 ft., per.: violet-blue. Japan.

S. ochroleuca. 1½ ft., per.: yellow. Eu., Asia.

S. pyrenaica. 1½ ft., white-tomentose, per.: blue-lilac. Eu.

S. stellata. 1½ ft., ann.: blue in globose heads. S. Eu.

S. vestita. White-woolly, form of *S. pyrenaica* or synonym of it.

Scabious or Mourning Bride, *Scabiosa atropurpurea.*

SCHIZANTHUS. BUTTERFLY-FLOWER. *Nightshade Family.* Tender annuals, or grown as such, native in Chile, deservedly popular for the

profuse summer and autumn bloom, and also for house and conservatory in late winter and spring when sown in autumn and grown in pots. They make bushy plants 1½-2½ feet high and may be grown of equal diameter if given room; there are also dwarf races. The flowers and foliage are both finely cut; the colors are two or more in the same flower, ranging from white to yellow, pink and lilac. Plants usually need staking.

Seed may be sown where the plants are to remain, and plants thinned to 12 inches or more; or they may be started indoors for early bloom.

S. pinnatus. 1½-4 ft.: lilac or violet with yellow spot on upper lip, stamens prominent. Color variations are known as *candidissimus*, *carmineus*, *lilacinus*.

S. retusus. 2-2½ ft.: upper lip orange and notched.

S. wisetonensis. Hybrid: white, bluish, pink to carmine-brown, upper lip yellowish.

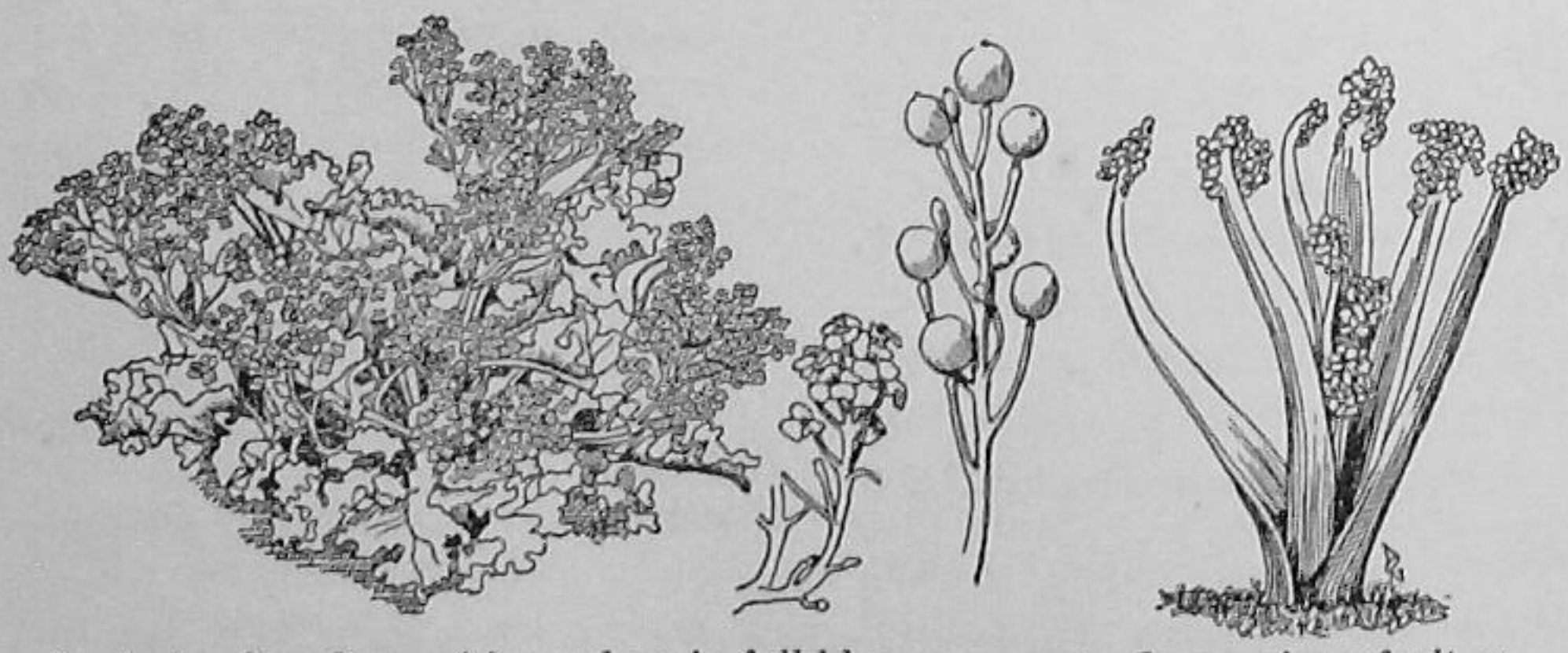
SCILLA: *Squill.*

SCREW-PINE: *Pandanus.*

SEAFORTHIA: *Palms.*

SEA-KALE (*Crambe maritima* of the seacoasts of western Europe). *Mustard Family.* Hardy perennials, grown for the edible early spring shoots, which are blanched by banking with earth or by covering with inverted flower-pots or otherwise, as soon as they emerge in spring.

Propagated by seeds sown in a hotbed early in spring, plants transplanted to the garden when from 2 to 3 inches high, and given high cultivation through the season, being covered with litter on the approach of winter. Sea-kale is also propagated by cuttings of the roots 4 or 5 inches long, planted directly in the ground in spring. The plants may stand 3 feet apart both ways or even somewhat more. They may make a back row or border for the vegetable-garden, remaining year after year; the large thick glaucous-blue foliage is very striking for a bold border and holding until cold weather, standing 1½-2½ feet high.



Sea-kale, *Crambe maritima*: plant in full bloom; separate flower piece; fruit or pods; blanched for eating.

SEA-LAVENDER, SEA-PINK: *Statice.*

SECHIUM: *Chayote.*

SEDUM. STONECROP. *Orpine Family.* Succulent mostly perennial herbs widely planted in rock-gardens, for edgings and ground-cover, most of them making mats; the white, yellow or rose flowers are borne in terminal clusters mostly in late spring and summer, a few in autumn.

Stonecrops prefer sunny locations and thrive even in poor soils. Propagated by pieces planted as cuttings, by offsets, and less often by seeds.

S. acre. 3-5 in., creeping: bright yellow. Old World.

S. Aizoon (*Maximowiczii*). 1-1½ ft.: yellow to orange. Asia.

S. Alberti (*Sempervivum Alberti*). 2 in., creeping: white. Turkestan.

S. album. 4-8 in., creeping: white. Eu., Asia, Afr.

S. altissimum. 1-2 ft.: greenish-white. Medit. region.

S. Anacampseros. 6 in.: dull purple. Eu.

S. anglicum. 2 in., creeping: white. Eu.

S. anopetalum. 9 in., creeping: whitish, rarely yellow. Eu., Asia Minor.

S. brevifolium. 1-2 in., creeping: white. Medit. region.

S. dasyphyllum. 2 in.: white tinged pink. Eu., Afr.

S. divergens. 6 in., creeping: bright yellow. W. N. Amer.

S. Ewersii. 6-12 in.: purplish-pink, late summer. Asia.

S. hispanicum. 4-6 in., ann. or bien.: pinkish-white. Eu., Asia. Var. *minus* (*glaucum*), 2 in., per., foliage glaucous.

S. kamtschaticum. 8-9 in.: orange-yellow. Asia.

S. lydium. 3 in.: white. Asia Minor.

S. Middendorffianum. 6-12 in.: yellow. Asia.

S. Nevii. 4 in.: white, anthers purple. S. U. S.

S. obtusatum (or *Gormania obtusata*). 6 in.: yellow. Calif.

Houseleek and Live-for-evers. Left, *Sempervivum Funckii;* center and upper right, *Sedum triphyllum;* right and lower right, *Sedum acre.*

S. oreganum (or *Gormania oregana*). 6 in.: yellow fading pink. W. N. Amer.

S. pruinatum. 6 in., very glaucous: straw-colored. Portugal.

S. pulchellum. 1 ft.: rose-purple. E. U. S.

S. reflexum. 6-12 in., creeping: bright yellow. Eu.

S. rupestre. 1 ft., creeping, glaucous: golden-yellow. Eu. Var. *Forsterianum,* not glaucous.

S. sarmentosum. Prostrate: bright yellow. Asia.

S. sexangulare. 2-3 in., creeping: yellow. Eu.

S. Sieboldii. 4-9 in.: pink, in autumn. Japan.

S. spathulifolium. 4 in., glaucous: bright yellow. W. N. Amer.

S. spectabile. 1½ ft.: pink, in autumn. Asia.

S. spurium (*oppositifolium*). 6 in., creeping: pink or white. Caucasus. Var. *coccineum*, deeper colored.

S. stenopetalum. 4-6 in.: bright yellow. W. N. Amer.

S. stoloniferum (*ibericum*). 6 in., creeping: rose. Asia. Var. *coccineum*, pink, foliage bronze in winter.

S. ternatum. 6 in.: white. E. U. S.

S. triphyllum. 2 ft.: purple. W. Asia.

SEEDS: page 217.

SEMPERVIVUM. HOUSELEEK. *Orpine Family.* Fleshy perennials with thick leaves in rosettes and terminal clusters of white, rose, yellow or purple flowers on bracted stout scapes; useful for rock-gardens, borders and sometimes as house plants; many of the kinds are hardy North.

For the general cultivation of houseleeks, see *Succulents.* Propagated by offsets or the small rosettes; also by seed when available.

S. arachnoideum. 4 in., foliage cobwebby: bright red. Eu.

S. arenarium. 9 in.: pale yellow tinged red. Tyrol.

S. blandum (*rubicundum*). 10 in.: pale rose. Transylvania.

S. Braunii. 9 in.: dull yellow. Tyrol.

S. calcareum. 1 ft.: pale red. France.

S. Doellianum. A form of *arachnoideum.*

S. Fauconnetti. 8 in.: bright red. Jura Mts.

S. fimbriatum. 10 in.: bright red. Eu.

S. Funckii. 9 in.: bright red-purple. Eu.

S. globiferum. 1 ft.: pale yellow. Russia.

S. Pittonii. 6 in.: yellowish-white. Styria.

S. soboliferum. 9 in.: pale yellow. Austria.

S. tectorum. HEN-AND-CHICKENS. 1 ft.: pinkish-red. Eu., Asia.

S. triste. 1 ft.: bright red: form of *tectorum.*

SENECIO. GROUNDSEL. *Composite Family.* The groundsels are a varied group but those grown are herbaceous perennials planted for the flowers or white foliage, and one a twining window-garden subject; flower-heads mostly on the yellow order.

They are of simple culture. Propagated by cuttings or division, also by seed.

S. Cineraria. DUSTY MILLER. 2-2½ ft., white-woolly: yellow or cream. Medit. region.

S. clivorum (properly *Ligularia clivorum*). 4 ft.: rays orange-yellow, disk brown. Asia.

S. cruentus: see *Cineraria.*

S. Kaempferi: see *Farfugium.*

S. leucostachys. Known as *S. Cineraria* var. *candidissima*, and differing in narrow lobes of lvs. and less stiff habit. Argentina.

S. mikanioides. GERMAN IVY. Twining: heads of yellow disk-fls. S. Afr.

S. pulcher. 4 ft., cobwebby: rays red-purple, disk yellow. S. Amer.

SENNA: see *Perennials*, page 202.

SENSITIVE-PLANT (*Mimosa pudica* of the American tropics). *Pea Family.* A low spreading perennial with pinnate leaves that quickly close up when touched. It is grown sometimes as a curiosity, treated as a tender annual. Seeds may be started under glass, or they may be sown in the open as soon as the ground is thoroughly warm. The plants eventually spread 2 feet and more, but in gardens they do not attain great size before frost and may stand 6-12 inches apart; give an open sunny position.

SHADE TREES. The most reliable shade trees are usually those native to the particular region, since they are hardy and adapted to the soil and other conditions. Elms, maples, basswoods, and the like, are nearly always dependable. Amongst the best exotic trees for shade in the northern parts of the country are the Norway maple, European lindens, horse-chestnut, and the European species of elm. Trees for shade should ordinarily be given sufficient room so that they may develop into full size and symmetrical heads. The beauty of trees resides largely in the characteristic qualities and habit of the particular species. The trees may be planted as close as 10 or 15 feet apart for temporary effect; but as soon as they begin to crowd they should be thinned.

Many shade trees are much subject to insects and disease; special advice should be sought for the locality from publications and qualified persons.

SHASTA DAISY: *Chrysanthemum.*

SHELTER-BELTS: *Windbreak.*

SHORTIA galacifolia. Oconee-Bells. *Diapensia Family.* An attractive rock-garden plant with round evergreen basal leaves and white bell-shaped nodding flowers borne singly at tips of stems to 8 inches high. There is a form with rose flowers.

Shortia is rather difficult to grow as it requires slightly acid soil conditions; it does best in shade in well-drained soil rich in humus and leaf-mold. Propagation is by division and runners.

SHRUBBERY. Shrubs or bushes have two kinds of values or uses: first, they are useful for their own sakes or as individual specimens; and second, in the making of foliage masses or groups. Ordinarily they are planted only for the former purpose in home grounds; but their greatest value is, nevertheless, in heavy masses about the borders of the place or in the angles of buildings. They should contribute to the general design of the place or to its pictorial effect. If they are planted in shrubberies or masses, the flowers are still as interesting and as showy as when

the bushes are planted alone. In fact, the flowers usually show to better advantage, since they have a heavy background of foliage. In the shrubbery mass the bushes are more easily cared for than when they are scattered as single specimens over the lawn. The single specimen which is irregular, or ragged, or untidy, is an undesirable object; but such a specimen may contribute an indispensable part to the border mass. In the border they do not need the attention to pruning that they do in the lawn. The main part of the shrubbery mass should be made of the stronger, larger growing and coarser kinds; and the more delicate ones, or those with highly colored leaves or showy flowers, may be placed near the inner edge of the plantation. Shrubs valued chiefly for their flowers or showy foliage, as, for example, *Hydrangea paniculata*, may be planted in front of a bold shrubbery mass, so that they have a background. Further suggestions will be found under the articles *Lawns* and *Borders*.

It is ordinarily best to plow or spade the entire area in which shrubs are to be set. For a year or two the ground should be tilled between the shrubs, either by horse tools or by hoes and rakes. If the place looks bare, seeds of quick-growing flowers may be scattered about the edges of the mass. The larger shrubs, as lilacs and mock-orange, may be set about 4 feet apart; but the smaller ones should be set about 2 feet apart if it is desired to secure an immediate effect. If after a few years the mass becomes too crowded, some of the specimens may be removed. Throw the shrubs into an irregular plantation, not in rows, and made the inner edge of the mass more or less undulating and broken. It is a good practice to mulch the plantation each autumn with light manure, leaf-mold or other material. Even though the shrubs are perfectly hardy, this mulch greatly improves the land and promotes growth. After the shrub borders have become two or three years old, the drifting leaves of autumn are caught therein and will be held as mulch, although the roots may start too high if the accumulation becomes very deep. It is often advisable not to remove these leaves, but to allow them to remain year after year, where they make a fine covering of leaf-mold. When the shrubs are first planted, they are headed back one-half or more; but after established they are not to be sheared, but allowed to take their own way, and after a few years the outermost ones will droop and meet the greensward.

SIDALCEA. *Mallow Family.* Perennial herbs of western North America grown in borders and flower-gardens, foliage lobed or divided; flowers purple, pink or white, in terminal spikes, of the form of small hollyhocks.

Sidalceas are of easy culture and thrive in light soil and sunny exposures. Propagated by seeds or division.

S. candida. 3 ft.,: white.

S. malvæflora. CHECKERBLOOM. 2 ft.: rose. Var. *atropurpurea,* purple. Var. *Listeri,* satiny pink.

S. nervata. 3 ft.: rose. Not advertised under this name but Rosy Gem and other garden forms evidently belong here.

SILENE. CATCHFLY. *Pink Family.* Some of the silenes are hardy annuals of very easy culture, as *S. Armeria;* others are perennials and grown in the rock-garden or border; summer-bloomers, and *S. Schafta* up to frost.

Sow seeds where the plants are to stand; or, if early results are desired, seeds may be started in boxes. The plants thrive in any garden soil, even if it is not very rich. The perennials may also be propagated by division and cuttings.

S. acaulis. MOSS CAMPION. 2 in., per., moss-like: fls. reddish-purple, solitary. Eu., N. Amer.

S. alpestris. ALPINE CATCHFLY. 6 in., per.: fls. glistening white, in panicles. Eu.

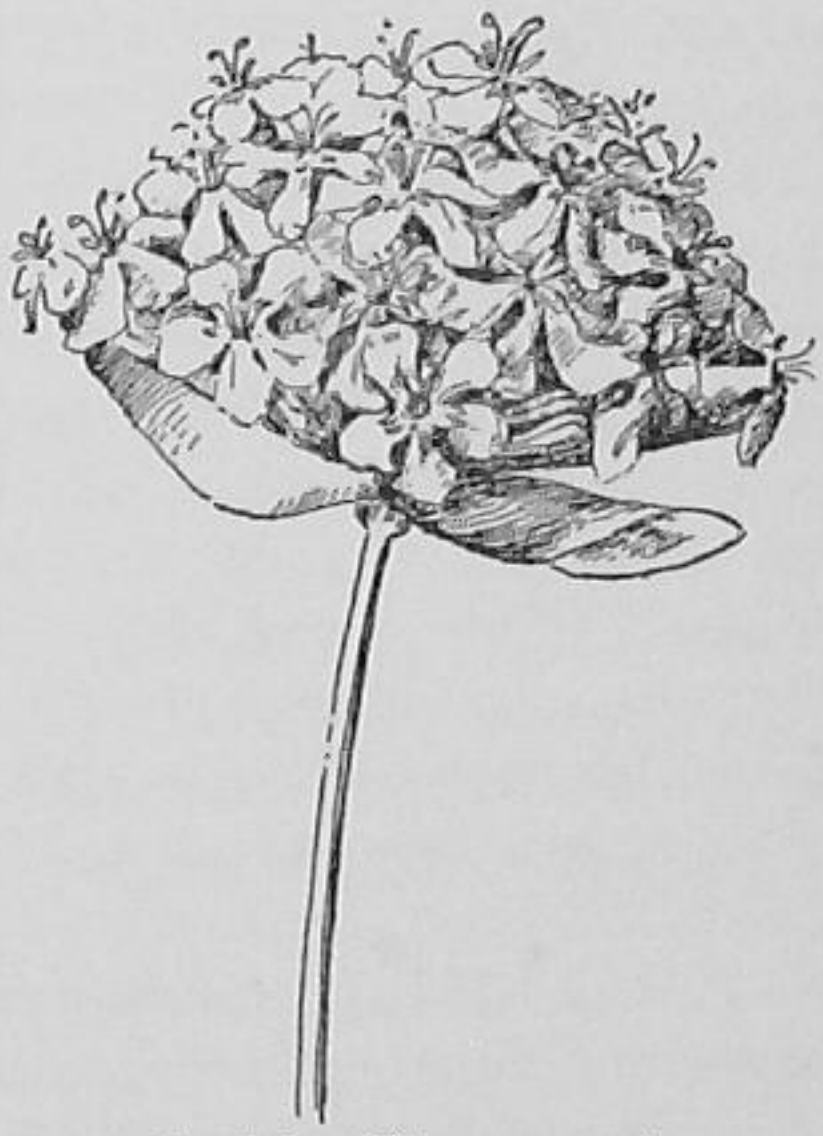
S. Armeria. SWEET WILLIAM CATCHFLY. 2 ft., ann.: fls. pink or rose, in compound cymes. Eu. Var. *alba,* white.

S. compacta (*orientalis*). 2 ft., bien.: fls. pink, in dense heads. Eu., Asia Minor.

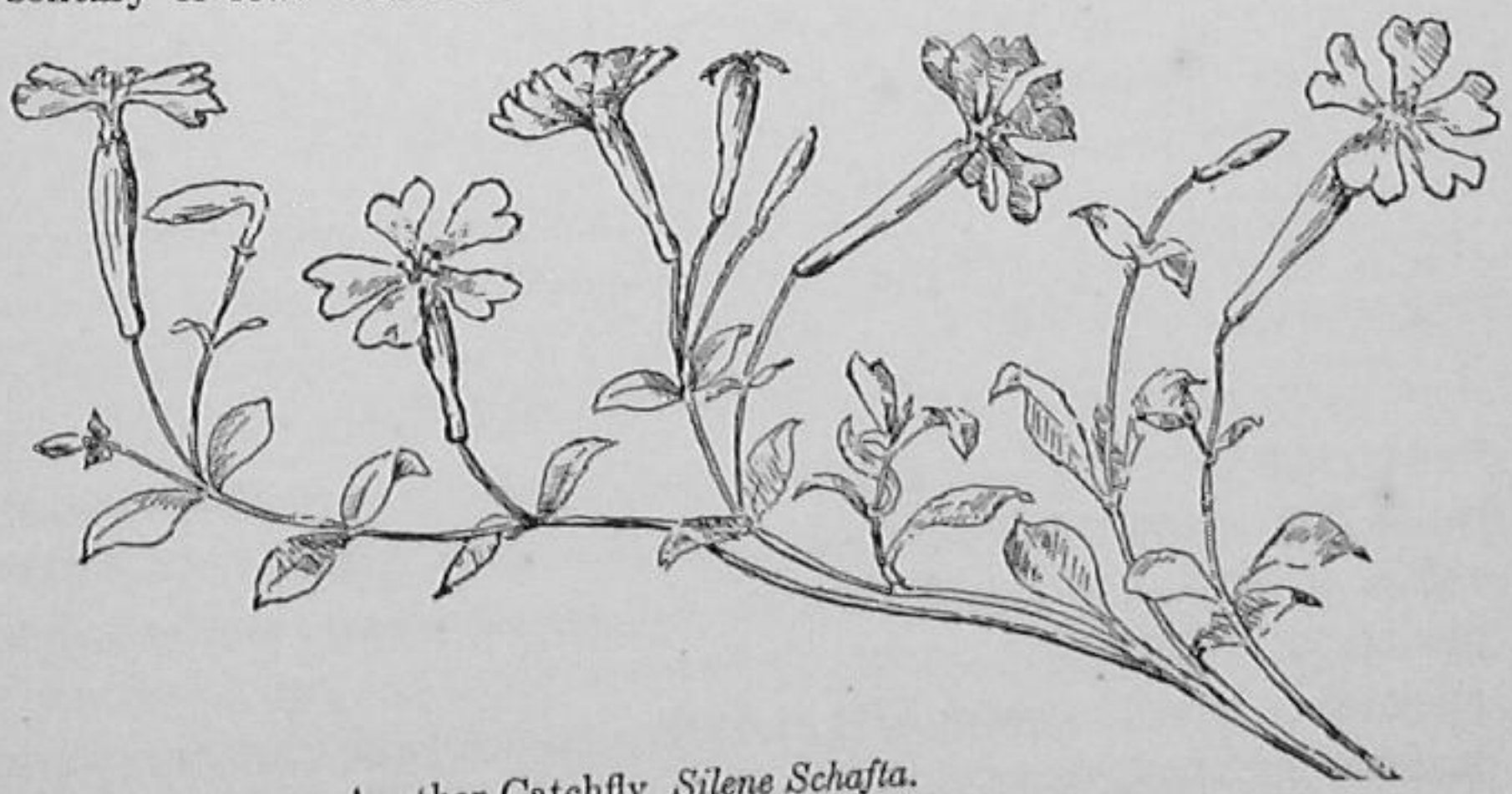
S. maritima. 1 ft., per.: fls. white, solitary or few, sometimes double. Eu.

S. Saxifraga. 8-10 in., per.: whitish, solitary or few. Eu., Asia Minor.

S. Schafta. 6 in., per.: rose or purple, solitary or few. Caucasus.



A Catchfly, *Silene compacta.*



Another Catchfly, *Silene Schafta.*

SILPHIUM: see *Perennials*, page 203.

SINNINGIA: *Gloxinia.*

SISYRINCHIUM: see *Perennials*, page 203.

SMILACINA: see *Perennials*, page 203.

SMILAX of the florists is a climbing asparagus, and therefore one of the *Lily Family*. While it cannot be recommended for house culture, the ease with which it may be grown and the uses to which the festoons of leaves may be put, entitle it to a place in the conservatory or greenhouse. Seed sown in pots or boxes in January or February, the plants shifted as needed until planted on the bench in August, grow fine strings of green by the holidays. The plants should be set on low benches, giving as much room as possible overhead. Green-colored strings should be used for the vines to climb on, the vines frequently syringed to keep down the red-spider, which is very destructive to this plant, and liquid manure given as the vines grow. The soil should contain a good proportion of sand and be enriched with well-rotted manure. After the first strings are cut, a second growth fully as good as the first may be had by cleaning up the plants and top-dressing the soil with rotted manure. Slightly shading the house through August will add to the color of the leaves. The odor from a vine of smilax thickly covered with the small flowers is very agreeable.

The native smilax used for Christmas greens is another plant, species of true *Smilax* or greenbrier. There are several native species, mostly woody and often evergreen.

SNAPDRAGON (*Antirrhinum majus*). *Figwort Family.* Perennial herbs, but grown as hardy annuals, with showy odd flowers in spikes, rose, red, purple, white, yellowish, of southern Europe. The tall or giant kinds are often 3 feet high, while the dwarfs are 12 to 18 inches. They bloom freely through a long season. The dwarf class is well adapted to bedding and flower-borders.

Any light soil, well enriched with rotted manure, will grow snapdragons to perfection. Distinct varieties should be propagated by cuttings, as they do not come true from seed. Sow seed early in the spring for summer bloom of the early varieties; for late spring or early summer results, start seeds indoors and transplant 8-12 inches apart. Although bloom is obtained the first year, late sown plants sometimes persist over winter and bloom early in the spring. Snapdragons make good window plants; for this purpose, seeds may be sown in late summer or vigorous plants may be cut back and lifted from the garden. They are now grown under glass for cut-flowers.

Snapdragon, Snowdrop, Snowflake. Left and detached flower, *Antirrhinum majus*; center two, plants of *Galanthus Elwesii*; right, *Leucojum vernum*.

SNAKEROOT, BLACK: *Cimicifuga racemosa.* **White:** *Eupatorium urticæfolium.*

SNEEZEWEED: *Helenium.*

SNEEZEWORT: *Achillea Ptarmica.*

SNOWDROP (*Galanthus nivalis* and *G. Elwesii* of southeastern Europe and adjacent Asia). *Amaryllis Family.* This is one of the earliest flowers of spring, always welcome. It should be planted in the edge of the border. The bulbs may be planted in October in any good border soil and left undisturbed for years; or they may be potted at that time, and after forming roots be gently forced into bloom in winter. The plant is usually less than 1 foot high and the nodding or declined flowers are white; hardy; bulbs may be placed 2 or 3 inches apart.

SNOWFLAKE (*Leucojum vernum* of central Europe). *Amaryllis Family.* Culture same as for *Snowdrop.* The white flowers are tipped with green, and the plant about 1 foot high.

SNOW-IN-SUMMER: see *Perennials*, page 202.

SNOW-ON-THE-MOUNTAIN: *Euphorbia marginata.*

SODDING: page 158.

SOILS: page 148.

SOLANUM: *Eggplant; Jerusalem-Cherry; Potato.*

SOLDANELLA: see *Perennials*, page 203.

SOLIDAGO: *Goldenrod.*

SOLOMONS-SEAL: see *Perennials*, page 203.

SOUTHERNWOOD: *Artemisia Abrotanum.*

SPANISH BAYONET: *Yucca aloifolia.*

SPEARMINT (*Mentha spicata*) is prized by many persons as a seasoning, particularly for the Thanksgiving and holiday cookery. It is perennial and perfectly hardy, and will live in the open garden year after year. If a supply of the fresh herbage is wanted in winter, remove sods of it to the house six weeks before wanted. Place the sods in boxes, and treat as for house plants. The plants should have been frosted and become perfectly dormant before removal.

SPECIES AND VARIETIES. A species is a kind of plant in nature, perpetuating itself generation by generation, possessing good marks of separation from all other plants. American elm, *Ulmus americana*, is one species; slippery elm, *U. fulva*, is another species. The American elm runs into several varieties or forms, as *U. americana* var. *columnaris* and var. *pendula*. Species of Ulmus are many. It is not allowable to speak of *Ulmus americana* as a variety or of *U. americana* var. *pendula* as a species.

A variety is always subordinate to a species. The prevailing habit of speaking of any kind or category of plant as a "variety" discloses lack of discrimination; it is not accurate.

To be satisfactorily successful in the growing of plants, the grower must be able to discriminate the kinds: he or she must know the plants. It is not necessary to know the Latin names, although such acquirement contributes to the precision of the knowledge and aids in consulting the literature. But in his or her own way the plants must be known as species or entities, for each kind has its own habits and requirements. A nice feeling for these differences enables the gardener to provide the proper conditions and to be observant of small requirements from season to season. One who does not know plants as kinds never makes a good gardener. No extent of fancy wisdom can take the place of this simple requirement.

SPECULARIA: see *Campanula.*

SPEEDWELL: *Veronica.*

SPIDER-FLOWER: *Cleome.*

SPIDERWORT: see *Perennials*, page 203.

SPINACH (*Spinacia oleracea*, native in southwestern Asia). *Goosefoot Family.* The prickly-seeded and round-seeded are forms of one species. Spinach is a cool-weather crop, grown for greens.

The earliest crop that finds its way to market is gathered from seed sown in September or October, protected by frames or other means through the winter, and cut soon after growth starts in early spring, or grown in the South where protection is not necessary. Even as far north as New York spinach may stand over winter without protection. Spinach is forced by placing sash over the frames in February and March, protecting the young leaves from severe freezing by mats or straw thrown over the frames. Seed may be sown in early spring for a succession. Spinach should be sown in drills 12 to 14 inches apart, one ounce being sufficient for 100 feet of drill, seed covered ½ to 1 inch; grow it only in autumn and spring. Fertile ground makes a succulent product.

Later in the season the New Zealand spinach may be used, as this grows readily through the heat of the summer. The seed is hard, and should be scalded and allowed to soak a few hours before sowing. This seed is usually sown in hills about 3 feet apart, sowing four to six seed in each hill. The seed may be started indoors and transplanted in the North where seasons are short. It is a very different plant from the true spinach, belonging to the Carpet-Weed Family, with the ice-plant, known as *Tetragonia expansa*.

Spinach aphis is controlled by 2 or 3 per cent nicotine-lime dust applied when temperature is above 70° and the foliage is dry. Maggot is prevented by screening beds securely with cheesecloth. Mildew of spinach is held in control by use of disease-free seed; practice rotation; destroy or plow under all refuse.

SPIRÆA (herbaceous): *Filipendula.*

SPRAYING: page 138.

SPREKELIA: see *Amaryllis.*

SPURGE: *Euphorbia.* **Japanese:** see *Ground-Cover.*

SQUASH: *Pumpkin.*

SQUILL (species of *Scilla*). *Lily Family.* Spring-flowering bulbs, mostly hardy, natives of temperate parts of the Old World. Bulbs may be planted in autumn; the plants persist for years. See *Bulbs.*

S. hispanica (*campanulata*). SPANISH BLUEBELL. 1½ ft.: fls. blue to rose-purple, 1 in. across. Spain, Portugal.

S. nonscripta (*nutans*). ENGLISH BLUEBELL. 1 ft.: fls. blue, ½ in. across. Eu.

S. sibirica. 6 in.: fls. deep blue, ½ in. across. Eu., Asia.

SQUIRREL-CORN: *Dicentra canadensis.*

STACHYS: see *Perennials*, page 203.

STAKING AND TYING. The gardener soon learns that wind storms are one of his worst menaces. He wants a protected area for the garden,

or he plants the borders heavily with strong tall things to act as a windbreak.

Therefore, also, should the gardener always have on hand a good supply of stakes. They need not be the crooked horny kind that one cuts by the roadside, for a good plant deserves a good stake. For low plants, the turned green stakes supplied by seedsmen are useful. For taller subjects, a bundle of bamboo stakes or canes, also to be had of dealers, should be ready. Raffia is good for tying, but for neat ornamental plants a ball of green twine should be on hand. Be timely with the staking, for if the plants have lopped and become crooked it is difficult to make them straight and comely again.

STAPELIA: see *Succulents*.

STAR-OF-BETHLEHEM: *Ornithogalum umbellatum*.

STARWORT: *Aster*.

STATICE. Sea-Pink. Sea-Lavender. *Plumbago Family*. The true statices are dwarf perennials with basal leaves and flowers in globular heads; most of the plants advertised as Statice belong to the genus Limonium with flowers in loose panicles or branching spikes.

Sea-pinks are grown in borders and rock-gardens and for dry bouquets. The panicled types of Limonium are useful for dainty effects in mixed bouquets. They thrive in any soil. Propagated by seed or division.

S. Armeria (*Armeria maritima*). 1 ft.: white, rose or purple, heads 1 in. across. Eu., N. Amer., Chile. Var. *alba*, white. Var. *Laucheana*, rose.

S. cæspitosa. 2 in.: pale lilac or pink. Spain, Portugal.

S. pseudo-Armeria (*Armeria cephalotes*). 1½ ft.: bright pink, heads 2 in. across. Eu. Var. *rubra*, rosy-red.

The true Limoniums in gardens are:

L. Bonduellii. 2 ft., ann. or bien.: yellow. Algeria.

L. latifolium. 2 ft., per.: fls. with white calyx and blue corolla. Eu., Asia.

L. sinuatum. 2 ft., per. or bien.: fls. with blue calyx and yellowish-white corolla. Medit. region.

L. Suworowi. 1½ ft., ann.: fls. with green lavender-tipped calyx and lavender corolla, in dense cylindrical spikes. Turkestan.

L. tataricum. 1 ft., per.: fls. with white calyx and red corolla. Eu.

L. vulgare. 1-1½ ft., per: fls. with whitish calyx and bluish corolla. Eu.

STENANTHIUM: see *Perennials*, page 203.

STOCK. *Mustard Family*. Three species of the Old World are in cultivation for ornament. (1) *Malcomia maritima*, Virginian stock, although native on the coasts of southern Europe, is a diffuse hardy annual about 1 foot high, bearing bright lilac, red and white single

flowers. Sow seeds where plants are to bloom, thinning to 12 inches; repeat the sowings for succession.

(2) *Mathiola bicornis*, annual much like the above in habit and culture the same, bearing very fragrant lilac or purple flowers that open at nightfall.

(3) The Brampton stock of florists, *Mathiola incana*, biennial or perennial, and its botanical variety *annua*, Ten-weeks stock, which is annual. These stocks are found in many old-fashioned gardens. The biennial stock is useful also in window-gardens. The Ten-weeks stock is usually grown from seed sown in hotbed or boxes in March. The seedlings are transplanted several times previous to being planted out in early May. At each transplanting the soil should be made a little richer. The double flowers will be more numerous when the soil is fertile. They should bloom in midsummer and all the autumn. Thin to 8-10 inches. The colors are white, light yellow, rose, pink, red, blue. The biennial stocks should be sown the season previous to that in which flowers are wanted, the plants wintered over in a cool house, and grown on the following spring. They may be planted out in summer and lifted into pots in August or September for winter flowering. These kinds may be increased by cuttings taken from the side shoots; but the sowing of seed is a surer method, and unless an extra fine variety is to be saved, it would be the best one to pursue. Stocks grow 1-2 feet high, erect, branching, with flowers in showy spikes. See page 259.

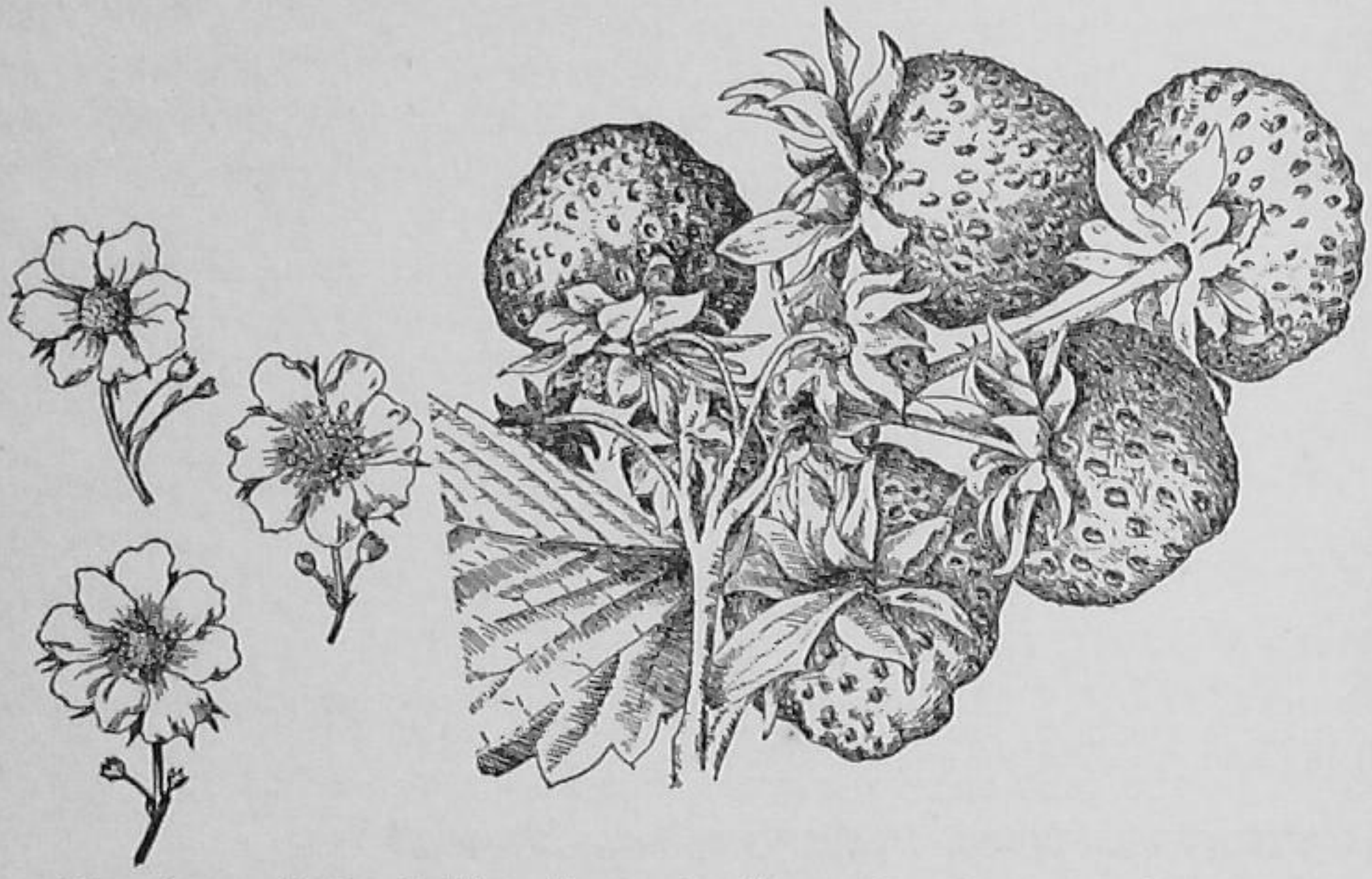
STOKESIA: see *Perennials*, page 203.

STONECROP: *Sedum.*

STRAWBERRY (species of *Fragaria*). *Rose Family.* The saying that strawberries will grow on almost any soil is misleading, although true. Particular varieties grow on certain soils better than others. What these varieties are can be determined only by an actual test, but it is a safe rule to choose such varieties as prove good in many localities. As to the methods of culture, so much depends on the size of the plot, the purpose for which the fruit is wanted, and the amount of care one is willing to give, that no set rule can be given for a garden in which few plants are grown and extra care can be given. Large fruits and a limited number of them may be had by growing to the single plant, keeping off all runners and relying on numerous fruit-crowns on one plant for the crop of berries.

Strawberries may be grown also by the matted-row system. Plants should be set in the spring just as soon as the ground is in good workable condition. Planting distances will depend on soil conditions and the ability of the variety as a plant maker. In general the rows should be

3½ feet apart with the plants in the row set about 15 to 18 inches apart. The ground should be worked frequently enough to kill weed growth and keep it in condition to facilitate proper rooting of the newly formed plants. The planting should be kept cultivated throughout the season, making conditions favorable for the development of new plants and to hold weed and grass growth in check. Some hand hoeing and weeding may be necessary.



Strawberry. Left, pistillate, hermaphrodite or "staminate," and (bottom) imperfect flowers.

For best results strawberries require a well-drained soil rich in organic matter. Sandy and gravelly loams are preferable to clay soils for strawberry plantings. A liberal application of well-rotted stable manure is the best fertilizer. Strawberries should not be planted on sod ground, as grubs are likely to destroy many of the plants. The ground should preferably have been under cultivation for one year before planting strawberries. When stable manure is not available, an application of a 5-10-5 fertilizer at the rate of 400 to 500 pounds to the acre will be of great value in proper development of plants and satisfactory yields of fruit.

Except in the case of a skilful grower in a favored locality, the fall setting of plants is not to be recommended, at least not in the North. The preparation of the soil and care of the plants more than overbalance the partial crop obtained the following spring.

Usually strawberries may be fruited twice and occasionally three times, provided the patch is well cared for and kept free from weed

growth. Some varieties do not produce pollen, and not more than two rows of these should be planted without a row of a pollen-bearing kind.

The winter treatment of a strawberry bed should consist in covering the plants, when the ground is frozen, in November or December, with straw or hay. Cover the ground and the plants to the depth of 3 to 4 inches. As soon as growth begins in spring, rake the mulch off, allowing it to lie between the rows; or, if the ground is hard or weedy, it may be taken off the patch entirely, the ground tilled, and then replaced for the purpose of holding moisture and keeping the berries clean.

The strawberry is subject to leaf-spot, some varieties being specially susceptible. If present, spray with bordeaux mixture as soon as spring starts and about twice thereafter before blooming. If the leaf-roller is in evidence, add arsenate of lead. If the plantation is to be fruited again and is infested with leaf diseases, mow the plants after fruiting and burn them off when there is wind that will pass the fire quickly so that the crowns will not be injured.

For varieties of strawberries consult yearly lists, as the kinds in favor change rather rapidly. At present, commendable names are Howard, Cleremont, Bouquet, Glen Mary, William Belt, Parsons, New York, Marshall, Chesapeake, Joe, Gandy and Wyona, in order of season of ripening. At present Howard is the most popular variety for home and commercial plantings.

STRAWFLOWER: *Helichrysum bracteatum.*

SUCCULENTS. In strict horticultural usage, succulents are thick, fleshy, sappy ornamentals, with mostly stiff or durable plant bodies, excluding cacti. In general popular opinion, cacti are considered to be succulents, or, more exactly, any succulent is supposed to be a cactus. The cacti constitute a great family by themselves, nearly all American, with characters of flowers, fruits, spines, mostly absence of foliage and woody structure, distinguishing them from other thick and condensed plants. See *Cactus.*

The association of typical succulents is the Orpine family, Crassulaceæ, including such genera as bryophyllum, cotyledon, crassula, echeveria, kalanchoe, rochea, sedum, sempervivum. Other kinds in other families are aloe, talinum, stapelia, huernia, haworthia, gasteria, and the great group mesembryanthemum now properly broken into many genera. The large angular and sometimes spiny tree-like euphorbias are commonly called cacti but may be distinguished even when not in bloom by their milky juice.

For the most part, succulents and cacti are natives in warm climates and not a great number of them are hardy in the open in the North.

Exceptions as to tenderness are many of the sedums, sempervivums, talinums. Many succulents may be handled easily in pots as small subjects and kept out-of-doors in warm weather. As they are commonly prized more for oddity than for bloom, it is not necessary to keep them from year to year, as many of them can be renewed from cuttings or offshoots. As succulence in plants is mostly an adaptation to dry climates, it follows that warm dry regions invite the greatest interest in growing them.

Succulents are not difficult to raise if one does not attempt to grow them where the climate is wholly against them. Provide a porous gritty soil for most of them and which is well drained but retentive of moisture, guard against soaking them when not in active growth, give a sunny exposure, let them take their time.

SUMMER-CYPRESS: *Kochia scoparia.*

SUMMER-FIR: *Artemisia sacrorum* var. *viride.*

SUMMER SAVORY: *Sweet Herbs.*

SUNDROP: *Œnothera.*

SUNFLOWER (species of *Helianthus*). *Composite Family.* With the exception of the girasole or Jerusalem artichoke, *H. tuberosus*, the sunflowers are grown as ornamental plants although seeds of the common great garden sunflower are sometimes employed as chicken feed and otherwise and the plant has been recommended as a constituent in silage. Many species of perennial sunflower are desirable for rear planting and wild-gardens; they may be procured from nurserymen or in some cases transferred from the wild.

The usual horticultural sunflowers are half-hardy yellow-flowered annuals, large and coarse plants grown from seeds planted when the weather is settled. The common kinds grow 4-8 feet tall and require much room, but there are dwarf races about 1 foot high and suitable for flower-beds. Some of the double-flowered kinds are specially attractive.

H. annuus. Common Sunflower. 12 ft., ann.: disk brownish-purple, heads 1 ft. across. W. N. Amer.

H. argophyllus. Silverleaf Sunflower. Ann. to 5 or 6 ft. with gray silky foliage: disk brownish. Tex.

H. debilis (*cucumerifolius*). Cucumber-leaf Sunflower. 4 ft., ann.: disk brown or purplish. S. U. S. Var. *purpureus*, rays pink or purple.

H. decapetalus (*multiflorus*). Thinleaf Sunflower. 5 ft., per.: disk yellowish. E. N. Amer.

H. lætiflorus. Showy Sunflower. 8 ft., per., often lopping: disk yellow. E. N. Amer.

H. Maximiliani. 12 ft., per.: disk yellowish. W. N. Amer.

H. mollis. Ashy Sunflower. 5 ft., white-hairy, per.: disk yellowish. E. N. Amer.

H. orgyalis. 10 ft., per.: disk brown or purplish. W. N. Amer.

Stock, Sunflower. Plant of *Mathiola incana*; *Helianthus lætiflorus*.

SWAINSONA galegifolia. *Pea Family.* An Australian little shrub, grown in small size for winter bloom. The pea-like flowers are red and in one variety white. It makes a desirable house plant, blooming in the late winter and early spring months. The foliage is finely cut, and adds to the beauty of the plant. It may be grown from cuttings. Propagate a new stock each year. Plants propagated in spring and early summer bloom in winter; those in late winter bloom in summer. The plant has been called the "Winter Sweet Pea," but the flowers are not fragrant.

SWAN RIVER DAISY: *Brachycome.*

SWEET BASIL: *Sweet Herbs.*

SWEET HERBS are many kinds of sweet-smelling and aromatic plants, used in flavoring and seasoning, in family remedies, and otherwise. The group has no cultural cohesion except that they are usually only incidents to the kitchen-garden and an area 2 or 4 feet square generally yields a sufficient supply for the family. They are largely members of the Mint and Parsley Families. Three cultural groups may be specified. (1) Some of them are annual and are therefore grown each year from seeds sown usually directly in the garden, as anise, coriander, saffron, summer savory, sweet basil. (2) Others are biennials and only short-lived perennials, as caraway, clary, dill, fennel, sweet marjoram. (3) The larger number are perennial, persisting for many years; they are grown from seeds or division: balm, catnip, costmary, horehound, hyssop, lavender, lovage, marjoram, pennyroyal, peppermint, rosemary, sage, tansy, tarragon, thyme, winter savory, wormwood.

Sweet Herbs. (a) rue, *Ruta graveolens*; (b) marjoram, *Origanum vulgare*; (c) summer savory, *Satureja hortensis*; (d) sage, *Salvia officinalis*; (e) wormwood, *Artemisia Absinthium*; (f) peppermint, *Mentha piperita*; (g) caraway, *Carum Carvi*; (h) coriander, *Coriandrum sativum*.

SWEET PEA (*Lathyrus odoratus*). *Pea Family.* Much-prized hardy tendril-climbing annual, native in Italy; the flowers are pea-like, very fragrant, now available in several shapes and many colors. In recent years several races have been developed; some of them are adapted to winter culture under glass, for which seeds may be sown in September.

Deep mellow soil, early planting, heavy mulching (or other means of maintaining moisture) suit them well. Sow the seeds as soon as the ground is fit to work in the spring, making a drill 5 or 6 inches deep. Sow thickly and cover with 1 or 2 inches of soil. When the plants have made 2 or 3 inches growth above the soil, fill the drill nearly full, leaving a slight depression in which water may be caught. After the ground is thoroughly soaked with water, a good mulch will hold the moisture. To have the ground ready in early spring, it is a good plan to trench it in the fall. The top then dries out very quickly in the spring and is left in good physical condition. Frequent syringing with clear water will keep off the red-spider that often destroys the foliage, and attention to picking the seed-pods will lengthen the season of bloom. If the finest flowers are wanted, do not let the plants stand less than 8-12 inches apart; provide ample support. Do not plant on the hot side of a wall or building.

A succession of sowings may be made at intervals through May and June, and a fair fall crop obtained if care is taken to water and mulch; but the best results will be secured with the very early planting. In the middle and southern states, the seed may be planted in autumn, particularly in lighter soils. It is easy to get soils too rich in nitrogen for sweet peas; in such case, they run to vine at the expense of flowers. If the plants are watered, apply enough to soak the soil, and do not water frequently; in dry weather, see that the plants do not suffer.

SWEET POTATO (*Ipomœa Batatas*). *Morning-Glory Family.* A root tuber much grown in North America for food; origin undetermined, but probably tropical American.

Sweet potatoes are grown from sprouts planted in rows in warm light rich land, sometimes on ridges or hills, not by planting the tubers, as with the common or Irish potato. One method of obtaining these sprouts is as follows: In April, tubers are planted in a partially spent hotbed by using the whole tuber (or if a large one, by cutting it in two through the long way), covering the tubers with 2 inches of light well-firmed soil. The sash should be put on the frames and only enough ventilation given to keep the potatoes from decaying. In ten or twelve days the young sprouts begin to appear, and the bed should be watered

if dry. The sprouts when pulled from the tuber will be found to have rootlets at the lower end and along the stems. These sprouts should be about 3 to 5 inches long by the time the ground is warm enough to plant them out. If two crops of sprouts are taken, one bushel of tubers should yield 3,000 to 4,000 of them. The ridges, if employed, or hills should be prepared by plowing out a furrow 4 to 6 inches deep. Scatter manure in the furrow and plow back the soil so as to raise the center at least 6 inches above the level. On this ridge the plants are set, placing them well in to the leaves, and about 12 to 18 inches apart in the rows, the rows being 3 to 4 feet apart. The after cultivation consists in tilling the soil between the rows; and as the vines begin to run they should be lifted frequently to prevent rooting at the joints. When the tips of the vines have been touched by frost the crop may be harvested, the tubers left to dry a few days, and then stored in a dry warm place. To keep sweet potatoes, store in layers in barrels or boxes in dry sand, and keep them in a dry room. For commercial purposes, specially constructed storage houses are built. See that all bruised or chilled potatoes are thrown out.

There are serious diseases and insects of sweet potatoes, most of which are best controlled by careful seed selection, rotation of crops, and destruction of all diseased refuse.

SWEET SULTAN: *Centaurea.*
SWEET WILLIAM: *Dianthus barbatus.*
SWISS CHARD: *Chard.*
SYAGRUS: see *Palms.*
TAGETES: *Marigold.*
TALINUM: see *Succulents.*
TANSY: *Sweet Herbs.*
TARAXACUM: *Dandelion.*
TARRAGON: *Artemisia Dracunculus; Sweet Herbs.*
TASSEL-FLOWER: *Emilia.*
TEA, OSWEGO-: *Monarda didyma.*
TERRACE: page 159.

TERRARIUM: A vivarium for the rearing of land animals and plants, as an aquarium is a container for aquatic animals and plants. It is commonly a box with glass sides and top, essentially like the old Wardian case in which living plants were transported overseas and which has long been known in greenhouses for the growing of filmy ferns, selaginellas and other plants that need close moist conditions; close propagating-boxes in greenhouses are maintained on essentially the same principle.

The terrarium may be small or large. It may be placed in a window, but it must be protected from blazing sunshine or the interior will become too hot; a northern or a partial exposure is usually advisable. It ordinarily acquires the heat of the room in which it is placed. It is evident that care must be taken to maintin equable temperature and moisture.

Sometimes the terrarium is merely a glass box or a covered glass bowl in which hardy berry plants, as mitchella, or foliage plants, as chimaphila, are kept fresh in winter. Again it is a miniature hothouse in which delicate small tropical plants are grown; newly propagated plants are interesting inhabitants and juvenile stages of larger plants as of the more graceful small palms like *Syagrus Weddelliana*. Many of the ferns make excellent subjects, also some of the club-mosses, fittonia, peperomia, and a number of the bulbs. Annual flowers may be grown in a terrarium, which is essentially a diminutive greenhouse. The florist may be sought for advice on methods and materials.

TETRAGONIA: *Spinach.*

TEUCRIUM: see *Perennials*, page 203.

THALICTRUM. Meadow-Rue. *Crowfoot Family.* Tall perennials useful for border planting; the foliage is fern-like and the small flowers borne in large panicles make a striking appearance due to their abundance and the hanging stamens. Some of them are inhabitants of wet places.

Meadow-rues prosper in well-drained but moist loamy soil in shady or protected positions. Increased by dividing the roots in early spring, and by seeds.

T. adiantifolium. A trade name referable either to *majus* or *minus*.

T. aquilegifolium. 3 ft.: fls. with white sepals and purple or pink stamens. Eu., Asia. Var. *atropurpureum*, deep purple.

T. dioicum. 2 ft.: greenish. E. N. Amer.

T. dipterocarpum. 2 ft.: rose or lilac. China.

T. glaucum. 4 ft.: yellow. Eu.

T. majus. 4 ft.: greenish-yellow. Eu., Asia.

T. minus. 1½ ft.: greenish-yellow. Eu., N. Afr., Asia.

T. polygamum (*Cornuti*). 8 ft.: white. E. N. Amer.

THERMOPSIS: see *Perennials*, page 203.

THINNING OF FRUIT has four general uses: to cause the remaining fruit to grow larger; to increase the chances of annual crops; to save the vitality of the plant; to enable one to combat insects and diseases by destroying the injured fruit. Similar results follow the thinning of flowers or disbudding.

The thinning of fruit is begun soon after the "June drop." It is then possible to determine which of the fruits are likely to persist. Peaches are usually thinned when the size of one's thumb. If thinned before this time, they are so small it is difficult to pick them off; and it is not so easy to see the work of the curculio and thereby to choose the injured fruits. Similar remarks apply to other fruits. The general tendency is not to thin enough. It is usually safer to take off what would seem to be too many than not to take off enough. The remaining specimens are better. Varieties that tend to overbear profit greatly by thinning. This is notably the case with many Japanese plums, which, if not thinned, are inferior.

Thinning may also be accomplished by pruning. If one knows where the fruit-buds are, cutting them off will have the effect of removing the fruit. In the case of tender fruits, as peaches, however, it may not be advisable to thin heavily by means of pruning, since the fruit may be still further reduced by the remaining days of winter, by late spring frost, or by the leaf-curl or other disease. However, the proper pruning of a peach tree in winter is, in part, a thinning of the fruit. The peach is borne on the wood of the previous season's growth. The best fruits are to be expected on the strongest and heaviest growths. It is the practice of peach growers to remove the weak and immature wood from the inside of the tree. This has the effect of thinning out the inferior fruit and allowing the energy of the tree to be expended on the remainder. Apples are less often thinned; but in many cases thinning can be undertaken with profit. On all home grounds, fruits should be thinned whenever the trees are very full. The discarded fruits should be completely destroyed if they bear insects or fungi.

THISTLE. *Composite Family.* Several of the thistles are striking plants for rear borders and places where bold effects are desired and where the spiny character does not interfere with walks or the manual operations. The best known kind in cultivation is *Onopordum Acanthium*, often called Scotch thistle. It is biennial or short-lived perennial, native in Europe, a hardy branching white-woolly plant often as high as a man or even higher, with pale purple (sometimes white) heads. It is raised from seeds.

Globe thistle is *Echinops.*

THUNBERGIA. Clock-Vine. *Figwort Family.* The common thunbergia of gardens is *T. alata* of tropical Africa but now naturalized in many countries. It is a tender annual twiner, known as Black-eyed Susan from the dark purple center in the buff, cream-colored or white

corolla, although the central eye is sometimes lacking. The plant grows readily from seeds sown either in the open or started indoors. It grows 4-6 feet or more; useful for low screens, also for vases and hanging baskets.

Other thunbergias are woody twiners grown in greenhouses and on arbors and verandas in warm countries; one is an erect shrub, *T. erecta* from tropical Africa, useful in conservatories and window-gardens when grown in pots; the flowers, produced most of the year, are attractive blue-purple with yellowish throat and tube. Plants may be had of dealers; or they may be grown from seeds when available or from cuttings of new wood. *T. grandiflora*, Bengal Clock-Vine, is a favorite woody porch and arbor cover in the warmest parts of the country, with large blue (sometimes white) flowers in pendent racemes.

THYMUS. THYME. *Mint Family.* Small aromatic durable sub-shrubs grown as ground-cover in rock-gardens and borders and also in kitchen-gardens for seasoning.

Thyme thrives even in poor dry soils. Propagated by division or seeds.

T. nitidus. 4 in.: lvs. shining above: purplish. Sicily.

T. Serpyllum (*azoricus*). MOTHER-OF-THYME. CREEPING THYME. Prostrate, evergreen, making dense mats: purplish. Eu., Asia, N. Afr.; also naturalized. Var. *albus*, white. Var. *argenteus*, foliage variegated with silver. Var. *coccineus*, crimson. Var. *lanuginosus*, gray-pubescent. Var. *vulgaris* (*citriodorus*), foliage small and lemon-scented.

T. vulgaris. 8 in.: lilac or purplish. Eu.

TIARELLA: see *Perennials*, page 203.

TIGRIDIA. TIGER-FLOWER. *Iris Family.* One of the summer bulbs of gardeners is *T. Pavonia*, native in Mexico and Guatemala. It is an erect plant, 15-30 inches high, bearing upward-looking widely expanded odd cup-shaped flowers with spotted center and several colors, 4-6 inches across. Each flower lasts a day but others take its place in succession through the summer. Corms are planted as soon as the ground is frostless and warm, 2-3 inches deep and 5-8 inches apart; lift them in autumn and store in cellar.

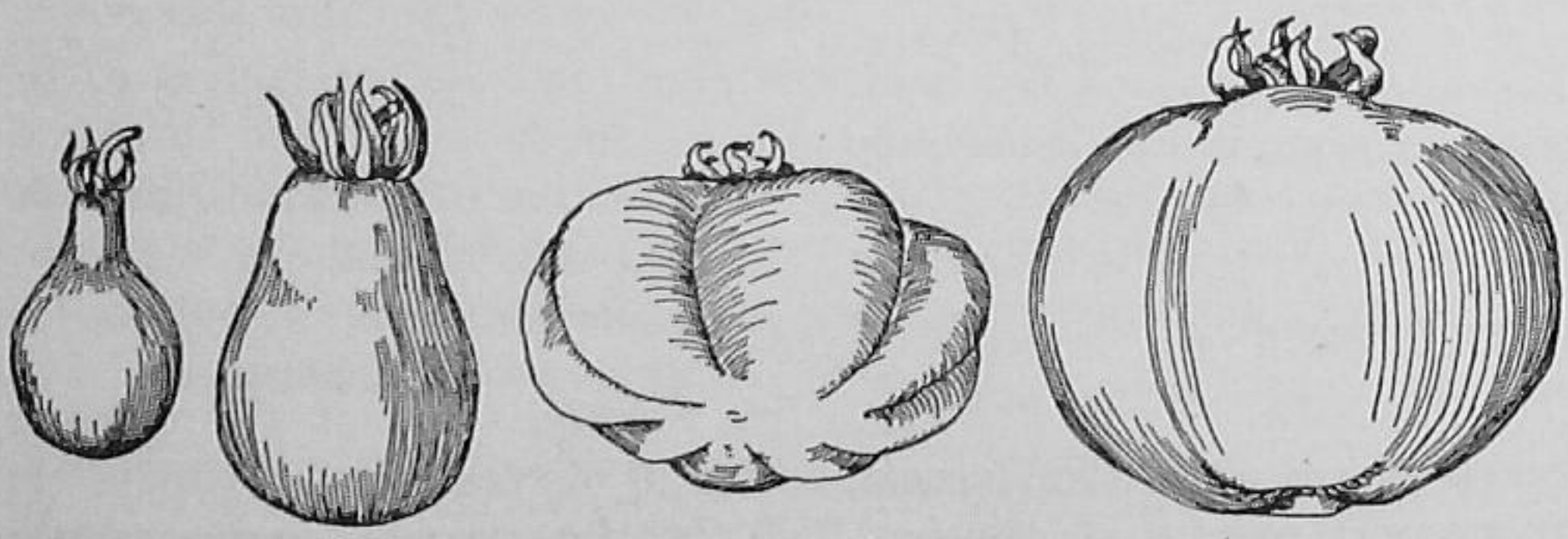
TILLAGE: page 150.

TOADFLAX: *Linaria.*

TOBACCO: *Nicotiana.*

TOMATO (varieties of *Lycopersicon esculentum*, native in western South America). *Nightshade Family.* Widely popular tender herb grown as an annual for the soft juicy fruits, both out-of-doors and under glass.

Early tomatoes are readily produced by starting the plants in a greenhouse, hotbed, or in shallow boxes in the window. A pinch of seed sown in March gives all the early plants a large family can use. When the plants have reached the height of two or three inches they should be transplanted into 3-inch flower pots, old berry boxes or other receptacles, and allowed to grow slowly and stocky until time to set them out, which is when all danger of frost is past. The young plants should not be allowed to become pot-bound or stunted. They should be in a vigorous growing condition when set out, full green and stocky, not slender and yellowed and with a blossom at the top. They may be set in rows 4 or 5 feet apart, the plants being the same distance in the rows. Support should be given to keep the fruits off the ground and to hasten the ripening. A trellis of chicken-wire makes an excellent support, as does the light lath fencing that may be made at home. Stout stakes, with wire strung the length of the rows, also answers the purpose. A showy method is that of a frame made like an inverted V, which allows the fruits to hang free; with a little attention to trimming, the light reaches the fruits and ripens them perfectly. This support is made by leaning together two lath frames. The late fruits may be picked green and ripened on a shelf in the sun; or they will ripen if placed in a drawer.



Tomatoes. Left, small pear and plum tomatoes; center, lobed or "rough" tomato of former time; right, apple or "smooth "tomato of present day.

If the family is fond of tomatoes, two or three sowings may be made in succession. The first sowings may be of the earliest varieties. A good range of varieties is always available from seedsmen, and it is interesting to provide the home garden with yellow as well as the usual red kinds, also the small plum and cherry kinds for conserves. One ounce of seed should produce 1,500 to 2,000 or more plants after the weaker ones are discarded. The soil should be "quick,"—one in which the fertility is at once available; stimulating manures applied afterwards are likely to delay the fruiting.

The various tomato diseases are held in check by rotations, destroying all tomato refuse, using only uninfected seed. Blight is controlled by bordeaux mixture 4-4-50 or copper-lime dust 20-20-60 in the seed-bed and for two or three weeks after plants are set in permanent quarters, and also flea-beetle particularly if, early in the season, an arsenate is added.

For the Husk- or Strawberry-tomato, see *Physalis*.

TOOLS of many kinds, and well chosen, are one of the joys of a garden. They enable the gardener properly and neatly to work the land and to care for the plants. There is great satisfaction in a well-made clean tool that does its work well, and a sense of good workmanship in keeping the tools bright, sharp, and in perfect repair. They should be under cover, and in place, when not in use. A cupboard may be built by the rear porch, or in the barn or garage. A garden of some size may well have a tool-house which, while not expensive, may still be shapely and neat and contribute an interesting feature to the landscape. Here may be stored under key not only the implements themselves but the hose, stakes, labels, insecticides, fertilizers, seeds, and other supplies.

TORCH-FLOWER: *Kniphofia.*

TORENIA. *Figwort Family.* A tropical tender annual of this genus, *T. Fournieri*, is a good flower-garden plant, yielding interesting parti-colored flowers in which blue and purplish predominate, and there is a variety with white in the place of blue; native of Cochin-China. It grows about 1 foot high and has a diffuse habit that adapts it also to vases and hanging baskets. Seeds may be sown in the open, but preferably indoors and the seedlings set in the ground 8-10 inches apart.

TRACHYCARPUS: see *Palms.*

TRACHYMENE: *Didiscus.*

TRADESCANTIA: see *Perennials*, page 203; *Zebrina.*

TRAGOPOGON: *Salsify.*

TRILLIUM. *Lily Family.* Choice perennial spring-blooming perennial woods herbs with short tuber-like rhizomes, useful for colonizing and the border; the solitary flowers are borne above three attractive whorled leaves.

Trilliums should be planted in shady places in rich moist soil. Propagated by seeds or roots transplanted after flowering from the wild.

T. erectum. 1 ft.: brown- or greenish-purple. E. N. Amer.

T. grandiflorum. 1½ ft.: white fading rosy-pink. E. N. Amer.

T. recurvatum. 1½ ft.: brown-purple. E. N. Amer.

T. undulatum. 2 ft.: white veined purple. E. N. Amer.

TRITOMA: *Kniphofia.*

TRITONIA: *Montbretia.*

TROLLIUS. *Crowfoot Family.* Durable perennials with lobed or divided foliage and showy terminal buttercup-like flowers in spring and early summer; useful in borders and for colonizing.

Moist soil should be provided. Propagated by seeds and division.

T. asiaticus. 2 ft.: orange. Siberia.

T. europæus. GLOBE-FLOWER. 2 ft.: lemon-yellow, globular. Eu.

T. laxus. 2 ft.: yellowish-green. E. U. S.

T. Ledebouri. 2 ft.: yellow. Siberia.

TROPÆOLUM: *Nasturtium.*

TUBEROSE (*Polianthes tuberosa*, referring to the tuberous [whence tuber-ose] root). *Amaryllis Family.* The species is probably Mexican but it is unrecognized in a native state. The stem grows 2-3 feet or more tall, bearing many white waxy very fragrant flowers in a long spike. The double variety known as Pearl is most popular.

The tuberose requires a long warm season for best results. In the North it is well to start the bulbs or tubers in the house, get them well under way in pots, and set them in the open when the weather is warm and settled. Yet good bloom may be obtained from strong fresh bulbs planted directly in the open in a warm place. The stock is increased by means of the offsets from the mother tuber; these may be handled the same as the blooming tubers; the second or third year they should give good flowers. Offsets should be removed, if present, before planting blooming tubers.

TULIP (species of *Tulipa*). *Lily Family.* Hardy spring-blooming bulbs native, in the various species, Europe to Japan. Most of the garden tulips are *T. Gesneriana* or derivatives from it. The parrot or dragon tulips are var. *Dracontia* of this species, and the Darwin tulips var. *Darwinia.*

Tulips are easy to grow. The advice given under *Bulbs*, *Crocus* and *Hyacinth* applies here. They may be forced for winter bloom (see under *Window-Gardens*). The garden bed will last several years if well cared for, but most satisfactory bloom is secured if the old bulbs are taken up every two or three years and replanted, all the inferior ones being cast aside. When the stock begins to run out, buy anew. Plant in October in the North, 4 to 6 inches deep; mulch in winter. The colors are many and brilliant.

T. Clusiana. 1 ft.: white or yellowish, purple at base, fragrant. Eu., Asia.

T. Eichleri. 6-12 in.: scarlet blue-black at base. Asia.

T. Gesneriana. 1½-2 ft.: white, red, yellow. Asia.

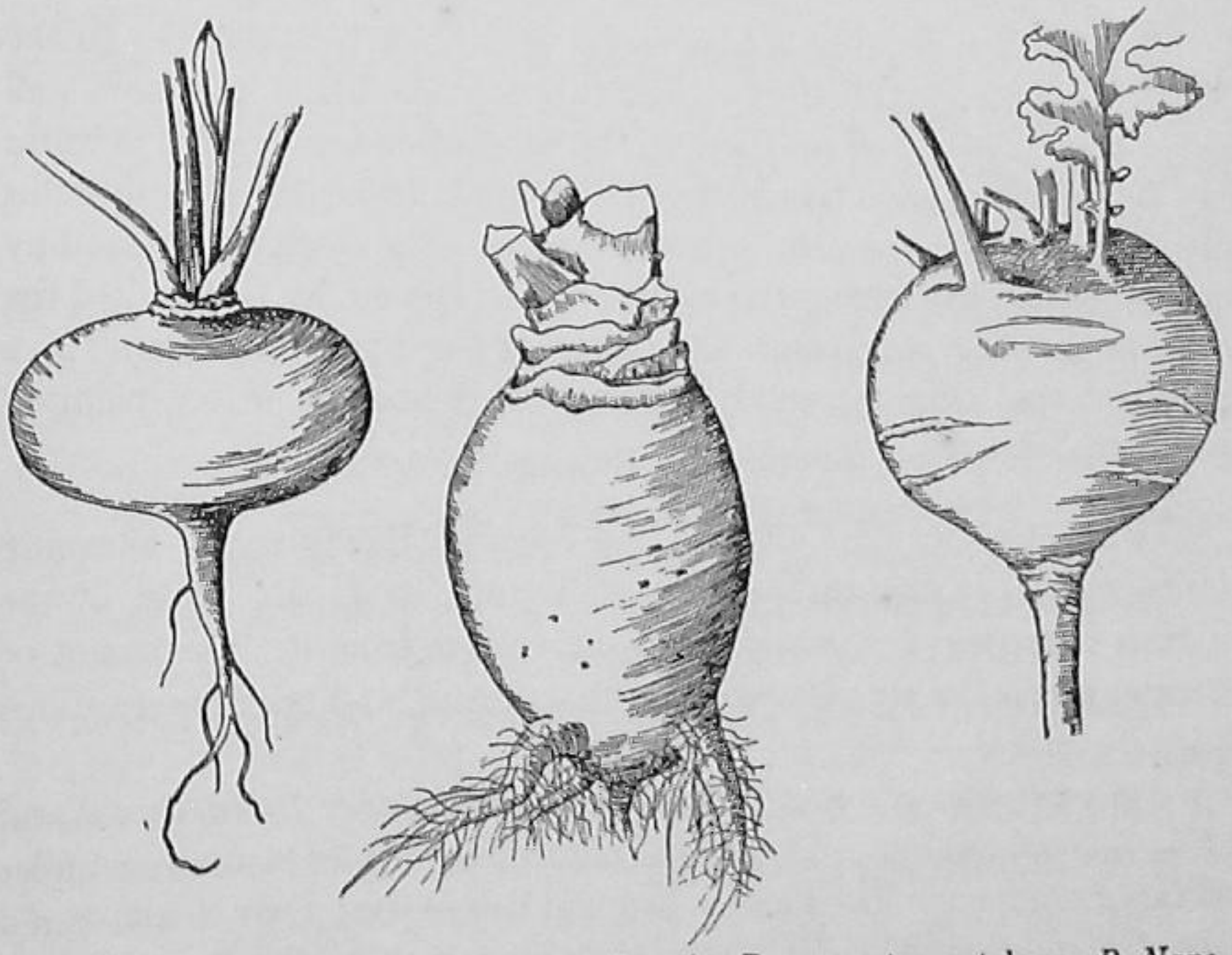
T. Kaufmanniana. 5-10 in.: cream or light yellow marked carmine. Turkestan.

T. Marjoletti. 1½-2 ft.: yellowish edged with purple. Savoy.

T. suaveolens. Duc Van Thol Tulip. 4-8 in.: bright yellow, fragrant. Eu.

TUNICA: see *Perennials*, page 203.

TURNIP, RUTABAGA. *Mustard Family.* Turnips and rutabagas are different classes or species of plants; the nativity and origin are undetermined, but they have come from Old World sources. Botanically, the turnip is *Brassica Rapa* and the rutabaga is *B. Napobrassica.* Both turnips and rutabagas are commonly grown as fall crops, but they may be had earlier if desired. Turnips are oftener grown for summer use than bagas. They are hardy plants and advantage may be taken of the full length of season. They are grown in rows or drills. One ounce of seed supplies 200 or more feet of drill.



Turnip and Relatives. Left, flat turnip, *Brassica Rapa*; center, rutabaga, *B. Napobrassica*; right, kohlrabi, *B. caulorapa.*

Turnips for early summer use may be sown as soon as the ground can be made ready. Thin to 3 or 4 inches in the row, and complete the thinning if necessary by pulling the earliest or largest tubers for the table. Edible roots of early kinds should be obtained in six to eight weeks. Rows may be 10 to 18 inches apart. Sow every two or three

weeks for succession. Late turnips, for autumn and winter use, may be sown in the North as late as July 25. They continue to grow after the first frosts. They are harvested and stored as are potatoes.

Rutabagas are similarly grown but they require a longer time. They are raised mostly for late autumn and winter use; for this purpose they are sown in June at the North.

TURTLE-HEAD: see *Perennials*, page 202.

TWINSPUR: *Diascia Barberæ.*

ULMARIA: *Filipendula.*

UMBRELLA PLANT (*Cyperus alternifolius* of Africa, and naturalized in the American tropics). *Sedge Family.* A perennial, deriving its name from the whorl of long grassy leaves at the top of the stalk or culm, which grows 1½-4 feet. It is popular as a window plant, remaining green and requiring little care. It thrives even when standing in or near water; the soil in the pot should be kept moist. It may be propagated by division; or by using the crown or umbrella, which is cut with an inch or two of stem and planted in sand or moss like a cutting, the leaves being shortened at the same time, the new plants arising from the axils.

UNICORN-PLANT: *Martynia.*

URSINIA anthemoides. *Composite Family.* A South African annual to 2 feet high, the leaves cut into linear lobes and the yellow or orange heads to 2 inches across. Propagated by seeds which may be sown in the open, or started under glass for early bloom.

VACCARIA: *Saponaria.*

VACCINIUM: *Blueberry; Cranberry.*

VALERIAN, GREEK: *Polemonium cæruleum.* **Red:** see *Perennials*, page 202.

VALERIANA: see *Perennials*, page 203.

VALERIANELLA: *Corn-Salad.*

VALLOTA: see *Amaryllis.*

VEGETABLE-GARDEN. Even though vegetables are plentiful in the market, it is one of the choicest satisfactions in home-making to grow one's own supply of at least certain of the kinds. One may not only have the vegetables fresher but may grow varieties of better quality than those found in the market.

In the home garden one does not commonly have much choice of soil nor great opportunity for rotation of crops. But the usual vegetables

thrive on a wide variety of soils, and one may change the crops year by year from side to side or end to end of the area. The need of rotation is reduced if the grower does not allow the land to carry diseases that may persist from certain infected crops.

Land should be fertile and in good tilth. Stable manure is always advisable if well rotted and does not transport diseased refuse. Commercial fertilizer will be needed. Fertilizer is sometimes added to manure as it is made, to raise the phosphorus content. Probably most vegetables thrive best on a soil of slight acid reaction. Lime and wood-ashes are not needed unless the soil is distinctly acid. It is said that if beets grow quickly and well there is no need of liming.

Tillage should be maintained. Recently a specially made mulching paper has come into the market, which is durable and does not contain soluble coal-tar ingredients. This paper laid on the ground between the rows may be advisable in home gardens when persons are on vacations, to keep down weeds and conserve moisture.

Make the vegetable-garden ample, but economize labor. Plant the things in rows, not in beds; then they can be tilled easily, either by horse- or hand-tools. Wheel-hoes accomplish much of the labor of tillage in a small garden. Make the rows long, to avoid waste of time in turning and to economize land. One row may be devoted to one vegetable; or two or more vegetables of like requirements (as parsnips and salsify) may comprise a row. Place the permanent vegetables, as rhubarb and asparagus, at one side, where they will not interfere with the plowing or tilling. The annual vegetables should be grown on different parts of the area in succeeding years, thus practicing something like a rotation. If radish or cabbage maggots or club-root become thoroughly established in the plantation, omit for two years or more the vegetables on which they live.

Make the soil deep, mellow and rich before the seeds are sown. Time and labor will be saved thereby. Rake the surface frequently to keep down weeds and to prevent the soil from baking. Radish seeds sown with celery or other slow-germinating seeds come up quickly, breaking the crust and marking the rows. About the borders of the vegetable-garden is a good place for flowers to be grown for the decoration of the house and to give to friends. Along one side of the area rows of bush-fruits may be planted. Sweet herbs may find a place.

A home vegetable-garden for a family of six may require, exclusively of potatoes, a space not over 100 by 150 feet. Beginning at one side and running the rows the short way (each row 100 feet long) sowings may be made, as soon as the ground is in condition to work, of the following (to be varied to suit the particular case):

Fifty feet each of parsnips and salsify.

One hundred feet of onions, 25 feet of which may be potato or set onions, the remainder black-seed for summer and fall usé.

Fifty feet of early beets, 50 feet of lettuce, with which radish may be sown to break the soil and be harvested before the lettuce needs the room.

One hundred feet of early cabbage, the plants for which should be from a frame or purchased. Set the plants 18 inches to 2 feet apart.

One hundred feet of early cauliflower; culture same as for cabbage.

Four hundred and fifty feet of peas, sown as follows:

100 feet of extra early.
100 feet of intermediate.
100 feet of late.
100 feet of extra early, sown late.
50 feet of dwarf varieties.

If trellis or brush is to be avoided, frequent sowings of the dwarfs will maintain a supply.

After the soil has become warm and all danger of frost has passed, the tender vegetables may be planted, as follows:

Corn in five or six rows 3 feet apart, three rows to be early and intermediate, and two or three rows late.

One hundred feet of string beans, early to late varieties.

Vines as follows:

10 hills of cucumbers, 6 x 6 feet.
20 hills of muskmelon, 6 x 6 feet.
6 hills of early squash, 6 x 6 feet.
10 hills of Hubbard squash, 6 x 6 feet.

One hundred feet (or less) of okra.

Twenty eggplants. One hundred feet (25 plants) tomatoes.

Six large clumps rhubarb.

An asparagus bed 25 feet long and 3 feet wide (more, if the family is specially fond of this vegetable).

Late cabbage, cauliflower and celery are to occupy the space made vacant by removing early crops of early and intermediate peas and string beans.

VEGETABLE-MARROW: *Pumpkin.*

VEGETABLE-OYSTER: *Salsify.*

VENIDIUM. *Composite Family.* South African half-hardy annuals, or grown as such. They are hairy or tomentose, 1-1½ feet high but diffuse and spreading at the base.

They bloom freely in summer, seeds placed under glass in April giving flowering plants in July, or they may be started directly in the garden. Give an open exposure and place the plants 1 foot or so apart. Like the calendula, the heads are sometimes proliferous.

V. decurrens (*calendulaceum*). Heads golden-yellow with dark center, 2½ in. across.

V. fastuosum. Heads bright orange with purple-brown base, 4 in. across.

VENUS LOOKING-GLASS: see *Campanula.*

VERBASCUM. MULLEIN. *Figwort Family.* Tall biennial herbs useful for sunny borders, with terminal spikes of yellow, red or purple flowers.

Mulleins grow in any ordinary soil, even in dry situations. Propagated by cuttings, division or seeds.

V. olympicum. 5 ft., white-woolly: bright yellow. Greece.

V. phœniceum. 5 ft.: purple or red. Eu., Asia.

VERBENA. *Verbena Family.* The common garden verbena is a trailing perennial rooting at the joints and sending up heads or racemes of showy flowers that stand 8-12 inches high; it is cultivated as a half-hardy annual, blooming in three months from seed and continuing till frost. The plant is developed from southern South American sources. Certain other species of verbena are upright.

Plants grown from seed sown in a hotbed or house early in the spring, transplanted into pots or boxes when large enough, and planted out as soon as the ground has become warm, comprise the usual practice with verbenas, although good bloom is obtained from seeds sown in the open garden. Many of the strains have become so well fixed that the colors come true from seed. Cuttings are often employed, but the handling of stock plants is difficult except in the hands of a professional, and when plants are wanted in quantity it is cheaper to buy them from the plantsman than to attempt to keep over stock plants. Give a sunny position; thin 10 to 15 inches apart each way.

V. hortensis (*hybrida*). GARDEN VERBENA. Decumbent: pink, red. yellowish, white.

V. laciniata (*erinoides*). Decumbent: lilac, in heads. S. Amer. Plants grown as *erinoides* usually are *pulchella.*

V. pulchella. Decumbent: blue or lilac, in heads. S. Amer., much naturalized far South.

V. rigida (*venosa*). 1-2 ft.: purplish, in spikes. S. Amer.

VERONICA. SPEEDWELL. *Figwort Family.* Herbs grown in the flower-garden and border, and the smaller species in the rock-garden;

the small blue or white flowers are usually borne in racemes; some of them are low mat-forming kinds suitable for ground-cover.

Speedwells grow in any location but prosper in rather rich soil. Propagated by division and seeds.

The New Zealand species are shrubby and mostly evergreen but are not hardy in the North. They are much grown on the Pacific Coast. These plants are now separated from Veronica in the genus Hebe.

V. Allionii. Prostrate, per.: violet Eu.

V. alpina. 6 in., per.: blue or violet. Eurasia, N. Amer.

V. austriaca. 2 ft., per.: lvs. pinnatifid: blue. S. E. Eu., S. W. Asia.

V. Chamædrys. 1½ ft., per.: blue. Eu., Asia.

V. filiformis. Prostrate, ann. or per.: blue. Asia Minor.

V. fruticulosa (*saxatilis*). 6 in., per.: blue or pale pink. Eu.

V. gentianoides. 2 ft., per.: pale blue with darker veins. Eu.

V. incana. 2 ft., per., white-hairy: blue. Asia.

V. latifolia. 2 ft., per.: blue or reddish, in racemes. Eu.

V. maritima (*longifolia*). 2 ft., per.: lilac. Eu., Asia. Var. *subsessilis*, deep blue.

V. officinalis. Making mats: pale blue. Eurasia, N. Amer.

V. pectinata. Prostrate, per., white-hairy: deep blue with white center. Asia Minor.

V. repens. Creeping, per., making close moss-like mats: rose or bluish. Corsica.

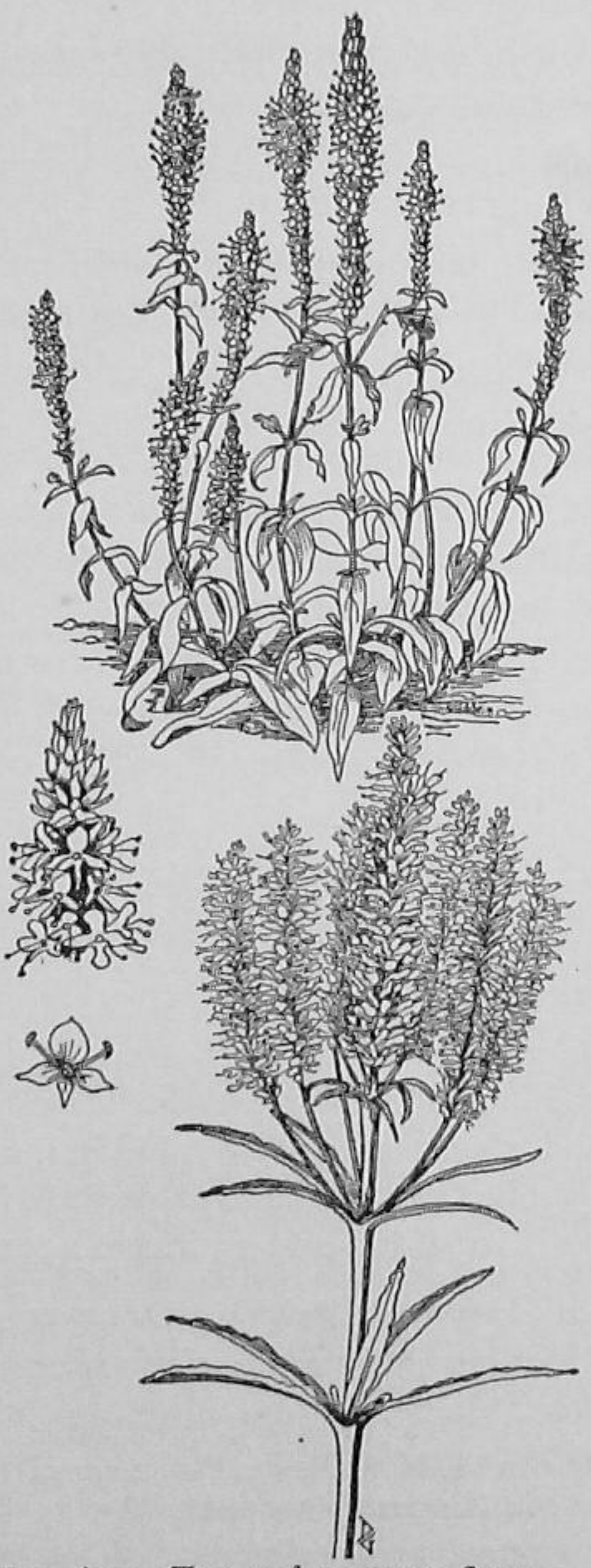
V. rupestris. Form of *Teucrium.*

V. spicata. 1½ ft., per.: blue or pink. Eu., Asia. Var. *alba*, white. Var. *rosea*, purplish-pink.

V. spuria (*amethystina*). 2 ft., per., hairy: blue. Eu., Asia.

V. Teucrium. 1½ ft., per.: blue to rose and white. Eu., Asia. Var. *prostrata*, nearly prostrate.

V. virginica (more properly *Veronicastrum virginicum*). 7 ft., per.: white or pale blue. E. N. Amer.



Veronicas. Top and separate flowers, *Veronica incana;* bottom, *Veronicastrum virginicum.*

VERONICASTRUM: *Veronica virginica.*

VICIA: *Bean.*

VIGNA: *Bean.*

VINCA. PERIWINKLE. *Dogbane family.* Three vincas are in general cultivation. (1) Small periwinkle, a hardy evergreen trailer, *V. minor* and its variety *alba;* useful for ground-cover particularly in shady places; native in Europe, run wild in cemeteries and along roadsides in North America; propagated by division. (2) Large periwinkle, *V. major*, evergreen grown in vases and hanging baskets, also in conservatories, not hardy North, a trailer with long strands, one form with variegated leaves; native in Europe; propagated by division and cuttings. (3) Madagascar periwinkle, *V. rosea*, an erect attractive perennial but grown from seeds in the flower-garden as an annual and retained for bloom in the window. The bright profuse flowers are rose-purple or white, often with a darker eye. Autumn flowers are produced from seeds sown in the open when weather is warm, but it is preferable at the North to start them indoors and transplant to 8-12 inches; plants usually grow 1-2 feet in the garden. The species is widespread in the tropics and subtropics.

VINES. The use of vines or climbers for screens and pillar decorations is widespread. The tendency is toward the hardy vines, of which Virginia creeper is one of the most common. It is a rapid grower, and lends itself to training more readily than many others. The Japan ivy is a strong clinging vine, growing rapidly when once established, and brilliantly colored after the first autumn frosts. Either of these may be grown from cuttings or division of the plants. Two woody twiners of special merit are actinidia and akebia, both from Japan. They are perfectly hardy, and rapid growers. The former has large thick glossy leaves, not affected by insects or disease, growing thickly along the stem and branches, making a perfect thatch of leaves. The flowers, which are white with a purple center, are borne in June in clusters, followed by round or longish fruits. The akebia has very neatly cut foliage, quaint purple flowers, and often bears ornamental fruit. Other common hardy vines are the wisteria, clematis, tecoma (or trumpet-flower), aristolochia (or Dutchmans-pipe), hedera (or ivy), loniceras (or honeysuckles), vitis or grape, roses.

Of the tender vines, the nasturtiums and ipomeas are the most common, while adlumia, balloon-vine, passion-vine, and the gourds are frequently planted. One of the best herbaceous climbers is the annual hop, especially the variegated variety. This is very rapid growing, seed-

ing itself each year, and needing little care. See *Hop*. All the tender vines should be planted after danger of frost is over.

In the following lists *t* means that the plant climbs by means of tendrils or similar parts, and *tw* that it is a twiner.

Herbaceous climbers.

1. Annuals (or grown as such), started each year from seeds at least in the North.

Adlumia fungosa, Allegheny-vine (biennial); t.

Bryonopsis laciniosa, little bryony; t.

Calonyction aculeatum, moonflower; tw.

Cardiospermum Halicacabum, balloon-vine; t.

Cobœa scandens, cobea; t.

Coccinia cordifolia, ivy gourd; t.

Cucurbito Pepo var. ovifera, yellow-flowered gourds; t.

Dolichos Lablab, hyacinth bean; tw.

Eccremocarpus scaber, glory-flower; t.

Echinocystis lobata, wild-cucumber; t.

Humulus japonicus, Japanese hop; tw.

Ipomœa purpurea, morning-glory, and others; tw.

Lathyrus odoratus, sweet pea, and other species; t.

Momordica Balsamina, balsam-apple, and M. Charantia, balsam-pear; t.

Phaseolus coccineus (multiflorus), scarlet-runner bean; tw.

Quamoclit pennata, cypress-vine, Q. coccinea, star-climber, and Q. Sloteri, cardinal-climber; tw.

Thunbergia alata, black-eyed susan; tw.

Tropæolum majus, garden nasturtium, and T. peregrinum, canary-bird-flower; tw.

2. Perennials, the root persisting over winter, sometimes a tuber.

Antigonon leptopus, coral-vine (far South); t.

Apios tuberosa, groundnut; tw.

Asparagus plumosus, fern asparagus, and other species (far South); tw.

Boussingaultia baselloides, Madeira-vine; tw.

Bryonia dioica, bryony; t.

Convolvulus mauritanicus, Morocco bindweed; tw.

Dioscorea Batatas, cinnamon-vine; tw.

Humulus Lupulus, common hop; tw.

Lathyrus latifolius, everlasting pea; t.

Maurandia Barclaiana, Barclay maurandia; t.

Polygonum Auberti, Chinese fleece-vine; tw.

Pueraria Thunbergiana, kudzu-vine (middle states and south); tw.

Woody climbers

Actinidia polygama and others, Akebia quinata, Ampelopsis brevipedunculata and others, Aristolochia durior, Berchemia racemosa (South), Bignonia capreolata (middle states and south) and other bignonias now referred to other genera and planted in the South, Calacinum (Muehlenbeckia) complexum (far South), Campsis radicans and others, Celastrus scandens, Clematis of many kinds, Decumaria barbara (South), Euonymus radicans, Gelsemium sempervirens (South), Hedera Helix, Hydrangea petiolaris, Jasminums (far South), Loniceras or honeysuckles of several kinds. Menispermum canadense, Parthenocissus tricuspidata and P. virginiana, Peri-

ploca græca, Petrea volubilis (far South), Porana paniculata (far South), Roses of several kinds, Schizophragma hydrangeoides, Solanums (far South), Smilax (native), Thunbergia grandiflora (far South), Vallaris Heynii (far South), Vitis (grape) of many kinds, Wisteria of several species.

Herbaceous Vines. Left, Allegheny-vine, *Adlumia fungosa*; upper right, balsam apple, *Momordica Balsamina*; right and lower leaf, balsam-pear, *M. Charantia*.

VIOLA, VIOLET: see *Pansy*.

VISCARIA: *Lychnis*.

VITIS: *Grape*.

VITTADINIA: *Erigeron Karvinskianus*.

WALLFLOWER (*Cheiranthus Cheiri*). *Mustard Family*. Perennials native of south Europe, allied to stocks. They are much grown in Europe for the rich early spring bloom, and are frequently seen in this country although at the North they should be wintered in a frame. The plant is erect, 12-30 inches, bearing spikes of very fragrant yellow or yellow-brown flowers. They bloom the year following seed-sowing, as in other similar perennials, but some of the strains flower freely the first season from seeds sown early in the spring. Plants may stand 6-12 inches apart, depending on the variety and whether grown for massing or for single specimens.

WANDERING JEW: *Zebrina pendula*.

WASHINGTONIA: see *Palms*.

WATER-CRESS: *Cress*.

WATER-LILIES AND POOLS. Species and hybrids of Nymphæa of the *Water-Lily Family*, aquatic perennial herbs native in many parts of

the world. They produce erect or horizontal rootstocks and are durable where hardy and when proper conditions are provided. Propagation may be by means of seeds that are imbedded in balls of clay and dropped into the pond or pool. The home gardener may purchase young plants. Pieces of rootstocks may also be employed in propagation. See *Aquatics*.

The limiting factor in the growing of water-lilies is the pool. Following directions on this point are taken from Cornell Extension Bulletin No. 265 by D. J. Bushey. A pool must have a supply of fresh water. This may come from a stream, a spring, clean drainage water, a city or private reservoir, or from a well. Sometimes a continuous drip of water from the main source keeps the pool clean and attractive at low cost or, with an electric pump and storage tank, the same water may be used over and over. Either method keeps the water fresh. A pool must not be too large for the supply. Unless there is a steady in-flow, a small pool need not have an out-flow. Because of natural evaporation water must be added at intervals. If the pool becomes stagnant, the water should be baled out or siphoned off and replaced with clean water. A few gold fish in the pool help to keep the water clean and free of mosquito larvae. The growth of algae, or green slime, can be prevented by adding one ounce of permanganate of potash for every twelve or thirteen gallons of water in the pool.

The overflow from a pool constantly supplied with water can be carried off through a pipe to near-by low ground, or to a ditch, or a sewer. If the supply is nothing more than a drip, the excess may overflow into a near-by planting bed where it will soak into the ground and be taken up by the roots of the plants.

Formal pools must accord with the size of the grounds or with the part in which they are placed. A suitable size for the pool may be determined either by drawing, to scale, a plan of the pool and grounds, or by laying a rope or garden hose on the ground to mark the outline of the pool, changing it until the desired size and shape are obtained. The smallest surface in which water-lilies can be grown successfully is about 15 square feet.

Before any excavation for the pool is started, a plan should be prepared to show the depth and outline of the pool. If water-lilies are to be grown, the depth will be determined by the height of the water-lily tubs. The minimum size for a tub is 15 by 15 inches square and not less than 8 inches deep. These are usually made of cypress or pine, but a butter or lard tub may be cut down to the required depth. The surface of the water should be from 14 to 18 inches above the tops of the tubs.

At the bottom, the sides of the pool may be rounded or angled. The sides should not be vertical, however, and the pool should be wider at the

surface than at the bottom. This prevents the concrete from cracking if the water freezes. In a clay soil, the pit can be dug to the size and shape of the pool, allowing an extra foot of depth; 6 inches for screened cinders as a foundation, and 6 inches more for concrete. The cinder foundation may be omitted in sand or gravel as such soil allows enough drainage to prevent heaving during the winter. The soil at the sides and the cinders or sand at the bottom serve as the outside of the concrete form. The inside of the form can be built with old boards if the outline is to be regular. For an irregular shape a satisfactory form may be constructed with linoleum, braced and curved to the outline planned. Reinforcing rods or heavy wire mesh can then be fastened in place. Provision should be made for a supply pipe or water inlet, and for an overflow pipe or outlet. The plumbing may be simple. Brass piping, although more expensive at the start, will not rust, and may be bent to do away with couplings and joints. As a protection to small children or to small animals that might fall into the pool, a coarse wire netting might be stretched over a pipe framework, some 2 or 3 inches under the proposed water level. Cracks in the concrete may be mended with a rich mixture of cement or heavy asphalt paint.

Informal or naturalistic pools should have no coping of stone, cement, or brick, and no concrete or cement will show in a cleverly constructed pool of this kind. Many pools are spoiled by stones of various sizes and shapes set at angles around the edge. Flat or round stones may be used for the edging, and placed informally before the concrete has hardened; or grass may be allowed to grow to the water's margin. If the sides have a slight slope, it may not be necessary to use any forms, and the concrete may be troweled in the excavation.

If lilies are to be planted in sunken tubs, holes may be dug to an extra depth of 8 inches in the desired position. The tubs are then set in place and concrete is poured around them. The tub must be tapped, both inside and outside, to fill all the voids and make it watertight. A 1-2-3 mixture of concrete is used, or one part of good cement, two parts of clean sharp sand, and three parts of crushed rock. All the concrete is poured at one time to prevent leakage through seams. Cups for shallow-water plants may be made at irregular intervals in the side of the pool. The top of these should be from 3 to 4 inches under the water level and they should be large enough to hold three-fourths of a cubic foot of soil. The inside of the pool is brushed with a rich mixture of cement, one part of cement and one part of sand, before the concrete has set or become dry. The cement is then covered with straw so it will dry slowly and become thoroughly cured before any water is put in the pool. At least two weeks are allowed for curing. The first filling of water should be allowed to stand for an-

other two weeks to absorb the alkali from the new concrete. The pool should then be drained and filled with clean water before stocking it with plants or fish.

Plantings for a pool may now be considered. Water gardens are likely to be over-planted. The surface should not be covered with much foliage, because half of the beauty lies in a reflecting surface. For water-lilies, a pool surface of about 40 square feet should not have more than two lily tubs with one plant in each tub; and a better effect is obtained if only one water-lily is used with other aquatic plants.

A catalogue from a reliable nursery is a good guide for selecting plants. The two types of water-lilies are the tender, or tropical, and the hardy lilies. Tropical lilies are divided into two classes according to habit, the day-blooming and the night-blooming, and come in a wide range of color except yellow. These tender tropicals are usually treated as annuals, and are replaced each year. Care must be taken not to set them out in the spring until the frosts are past and until the weather will keep the water in the pool warm. Cold water seriously retards their growth both in foliage and in bloom; but, with a warm start in the spring, they will bloom all summer and on into the fall until the frosts kill them.

Hardy lilies have a wide range of color, including yellow. They can be kept from year to year with a small amount of winter care. Some persons prefer to remove the tubs, put them in the basement, and keep them moist all winter. Others will drain the pool, put all of the tubs in one corner and cover them with a heavy mulch of straw and leaves. Still others prefer not to disturb the lilies but leave the water in the pool, cover the entire surface with boards, and put straw and leaves on top. Any one of these practices is satisfactory.

Since water-lilies are gross feeders, they are planted in two parts of good garden soil and one part of well-rotted cow manure. If cow manure is not available, at least one quart of blood meal is mixed in a bushel of soil. The tubs are filled to within an inch of the top and the root is planted so the crown is at the surface. A top layer of sand or fine-screened gravel keeps the soil from washing into the pool. The pool is then filled with water to top of the tubs and allowed to warm in the sun for a day or two. The pool is filled gradually so the shock of cold water will not retard the growth of the plants. The second year the soil should again be fertilized by working in a little well-rotted cow manure or blood meal. The third year new soil should be put in the tubs and the root divided by taking off the new side shoots and planting the old root.

WATERMELON (*Citrullus vulgaris*). *Gourd Family.* Rampart vine much grown for its large edible fruit; native in South Africa but naturalized elsewhere; tender annual.

The watermelon is readily grown in the home garden if one has room. In the North one should have a "quick" light soil and rely on the early varieties. One may grow varieties of high quality, very different from the ordinary market product. Watermelons should have a sunny exposure. The culture is essentially that for muskmelon (which see). For the dwarfer varieties, hills (of 3 or 4 plants) may be 6 x 8 feet apart, but the standard distance is 10 x 10 feet. One ounce of seed plants about 30 hills.

The "citron" of households, used in the making of sweet conserves, is a form of otherwise inedible watermelon with hard white flesh; cultivation the same as for the other kinds.

WAX-PLANT (*Hoya carnosa* of China and Australia). *Milkweed Family.* The wax-plant is one of the old-fashioned window-garden subjects, and yet it is one that persons usually have difficulty in flowering. However, it is one of the easiest plants to manage if a person understands its nature. It is naturally summer-blooming, and should rest in winter. In the winter, keep it just alive in a cool and rather dry place. If the temperature does not go above 50° F., so much the better; neither should it go much lower. In late winter or spring, the plant is brought out to warm temperature, given water and started into growth. The old flower-stems should not be cut off, since new flowers come from them as well as from the new wood. When it is brought out to be started into growth, it may be repotted, sometimes into a size larger pot, but always with more or less fresh earth. The plant should increase in value each year. In conservatories, it is sometimes planted out in the ground and allowed to run over a wall, in which case it will reach a height of many feet.

WEEDS. A weed is a plant not wanted. While certain plants are always spoken of as weeds, it is because they are more or less in the way and are likely to invade tilled areas; yet if pigweeds were grown for greens they would not then be a weed, but if radishes were to come up amongst them the radishes would be weeds. It has been said that the worst weed in a cornfield is corn, meaning that corn may be planted too thickly.

The sovereign remedy for weeds is good tillage and care of the plants that are wanted. Many very strong weeds are a compliment to one's soil: only good soil produces them. But they are not a compliment to one's

tillage. If the soil is well prepared and well tilled to conserve moisture and to unlock plant-food (see *Tillage*, page 150), weeds find little chance of growing. Stir the ground often: it benefits the ground and keeps out the weeds. Plant vegetables in long straight rows rather than in beds, for thereby tillage is made easier. For beds and for small plants, the hand-weeders are efficient. They save laborious finger-work. Weed seeds are often distributed in manure, especially if weeds have been allowed to grow and ripen on the piles. See that pernicious weeds do not seed about the premises. For the treatment of weedy lawns, see the article *Lawns*.

WHITLAVIA: *Phacelia.*

WIND: page 253.

WINDBREAKS are of two classes,—those for temporary use in the growing season, and those to stand permanently to check the force of winds against buildings and orchards at all times of the year. Reference is here made to growing windbreaks, comprised of trees and other plants, not to the shelter provided by walls, pales and fences.

Persons may desire the windbreak as a screen to hide undesirable objects. If these objects are of a permanent character, as a barn or an unkempt property, evergreen trees should be provided. For temporary screens, any of the very large-growing herbaceous plants may be employed. Excellent subjects are sunflowers, the large nicotianas, castor-beans, large varieties of Indian corn, sorghum, kafir, and plants of like growth. Efficient summer screens may be made with ailanthus, paulownia, basswood, sumac, and other plants which tend to throw up succulent shoots from the base. Many vines may be employed for the purpose, running over permanent fences or framework. After these plants have been set a year or two, they are cut back nearly to the ground every winter or spring, and strong shoots are thrown up with great luxuriance, giving a dense screen and presenting a semi-tropical effect. For such purposes, the roots should be planted only two or three feet apart. If, after a time, the roots become so crowded that the shoots are weak, some of the plants may be removed. Top-dressing the area every fall with manure will tend to make the ground rich enough to afford a heavy summer growth.

There is the greatest difference of opinion as to the value of windbreaks for fruit plantations. A windbreak may be of benefit in one place, but disadvantage in another. It is always advisable to break the force of very strong winds, for such winds tend to injure the trees when laden with fruit or ice, and they blow off the fruit; and in dry countries they cause the soil to become parched. If the wind is usually warmer than the

area, however, particularly in winter, it is better not to stop it but to allow it to circulate through the plantation. This is the case in areas that lie close to large bodies of water. The wind coming off the water is warmer than that from the land, and tends thereby to protect the plantation from severe cold. A good circulation of air is desirable in late spring and early fall to avoid the still frosts. If the area is very closely surrounded by dense plantations, it may have what the fruit-growers call "stagnant air"; but thinning out the windbreak on one or two sides, or cutting spaces through it, may allow the air to move quickly, thereby affording atmospheric drainage and insuring greater immunity from light local frosts.

It is ordinarily better to break the force of the winds rather than to stop or deflect them. The breaks may be thin enough to allow the wind to take its normal direction, but its force is modified. A stone wall or a very dense hedge of evergreens may cause the wind to rise over the plantation or to be deflected to one side, and this, in many cases, as already said, may be a decided disadvantage.

Ordinarily, one or two rows of deciduous trees are sufficient protection. When the plantation is much exposed to very cold or land winds, a thick evergreen screen may be an advantage. It is usually better to have the heavy windbreak on the upper side of the area, so that it may not interfere with the natural drainage of the cold air down the slope. In making a break, it is important that those trees be chosen which will not become harboring places for orchard enemies. The wild cherry, for example, is inveterately attacked by the tent caterpillar, and the wild crabs and wild plums are likely to breed orchard insects. If the windbreak is planted some time in advance of the orchard, the row of fruit trees next the windbreak will be likely to suffer from lack of moisture and food.

A different type of windbreak is that desired for a shelter-belt about the home grounds. Atmospheric drainage does not enter into this problem to any extent. Such shelter-belt is usually placed at the extreme edge of the home yard, toward the heaviest or prevailing wind. It may be a dense plantation of evergreens. If so, the Norway spruce is one of the best for general purposes. For a lower belt, the arbor-vitæ is excellent. Some of the pines, as the Scots or Austrian, are also to be advised, particularly if the belt is at some distance from the residence. As a rule, the coarser the tree the farther it should be placed from the house.

WINDFLOWER: *Anemone.*

WINDOW-GARDEN. One should distinguish between the window-garden for summer effect and that for winter effect.

Summer window-garden.—This kind of home gardening is particularly suited to those who live in the crowded city, where the want of other space makes the window-garden the only one possible.

Handsomely finished boxes, ornamental tiling, and bracket work of wood and iron suitable for fitting out windows for the growing of plants, are on the market; but such, while desirable, are by no means necessary. A stout pine box of a length corresponding to the width of the window, about 10 inches wide and 6 deep, answers quite as well as a costlier box, since it will likely be some distance above the street, and its sides, moreover, are soon covered by vines. A zinc tray of a size to fit into the wooden box may be ordered of the tinsmith. It tends to keep the soil from drying out so rapidly, but it is not a necessity. A few small holes in the bottom of the box provide for drainage; but with care in watering these are not necessary, since the box by its exposed position will dry out readily during summer, unless the position is shaded, and cracks will open in it. In the shade, provision for good drainage is always advisable.

Since there is more or less cramping of roots, it is necessary to make the soil richer than would be required were the plants to grow in the garden. The most desirable soil is one that does not pack hard like clay, nor contract much when dry, but remains porous and springy. Such material is found in the potting soil used by florists, and it may be obtained from them. Often it is desirable to have at hand a barrel of sharp sand for mixing with the soil, to make it more porous and to prevent baking. Some persons pot the plants and then set them in the window-box, filling the spaces between the pots with moist moss. Others plant directly in the soil. The former method, as a general rule, is to be preferred in the winter window-garden; the latter during the summer.

Plants useful for the summer winter-garden are those of drooping habit, such as lobelias, tropæolums, *Othonna crassifolia*, Kenilworth ivy, and sweet alyssum. Such plants may occupy the front row, while back of them may be the erect-growing plants, as geraniums, heliotropes, begonias. The suitability of the plants depends much on conditions. In the following lists certain kinds are of climbing or trailing habit and may be trained about the sides of the window. Others will be found among the climbing plants mentioned under *Vines*, *Annuals* and *Basket Plants*. For shady situations the main dependence is on plants of graceful form or handsome foliage; while for the sunny window the selection may be of blooming plants. For the shady side of the street, the more delicate kinds of plants may be used. (1) For full exposure to the sun, it is well to choose the more vigorous-growing kinds. In such position, suitable plants for drooping are: tropæolums, passifloras, the single petunias, sweet alyssum, lobelias, verbenas, mesembryanthemums. For

erect-growing plants: geraniums, heliotropes. (2) If the position is shaded, the drooping plants might be of the following: tradescantia, Kenilworth ivy, senecio or parlor ivy, sedums, moneywort, vinca, smilax, lygodium or climbing fern. Erect-growing plants are dracænas, palms, ferns, coleus, centaurea, spotted calla, and others.

After the plants have filled the earth with roots, it is desirable to give the surface of the soil among the plants a very light sprinkling of bone-dust or a thicker coating of rotted manure from time to time in the summer; or instead of this, a watering with weak liquid manure about once a week. This is not necessary, however, until the growth shows that the roots have about exhausted the soil.

In autumn the box may be placed on the inside of the window. In this case it is desirable to thin out the foliage somewhat, shorten in some of the vines, and perhaps remove some of the plants. It is also well to give a fresh coating of rich soil. Increased care will be necessary in watering, since the plants have less light than previously, and moreover, there may be no provision for drainage.

Quite different from this kind of summer window-gardening is the florists window-box. Leading city plantsmen prepare such boxes with plants grown or chosen for the purpose, many of them of stiff habit and durable character to withstand difficult conditions. These boxes are usually very attractive.

Winter window-garden.—In winter special attention must be given to sunlighting conditions and also to the artificial temperature and the moisture. The window for winter plants should have a southern, southeastern or eastern exposure. Plants need all the light they can get in the northern winter, especially those that are expected to bloom. The window should be tight-fitting. Shutters and a curtain will be an advantage in cold weather.

Plants need a certain regularity in conditions. It is very trying on them, and often fatal to success, to be snug and warm one night and in a temperature only a few degrees above freezing the next. Some plants live in spite of it, but they cannot be expected to prosper. Those whose rooms are heated with steam, hot water or hot air will have to guard against keeping rooms too warm fully as much as keeping them too cool. Rooms in brick dwellings that have been warm all day, if shut up and made snug in the evening, often keep warm over night without heat except in the coldest weather. Rooms in frame dwellings, and exposed on all sides, soon cool down. It is difficult to grow plants in rooms lighted by gas, as it vitiates the atmosphere. Most living-rooms are too dry for plants. In such cases the bay window may be set off from the room by glass doors; one then has a miniature conservatory. A pan of water on

the stove or on the register and damp moss among the pots, will provide the necessary humidity.

The foliage will need cleansing from time to time to free it from dust. A bath-tub provided with a ready outlet for the water is an excellent place for this purpose. The plants may be turned on their sides and supported on a small box above the bottom of the tub. Then they may be freely syringed without danger of making the soil too wet. It is usually advisable not to wet the flowers, however, especially the white waxen kinds, like hyacinths. The foliage of Rex begonias should be cleansed with a piece of dry or only slightly moist cotton or soft cloth; but if the leaves can be quickly dried off by placing them in the open air on mild days, or moderately near the stove, the foliage may be syringed.

The winter window-garden may consist simply of a jardinière, or a few choice pot-plants on a stand at the window, or of a considerable collection, with more or less elaborate arrangements for their accommodation in the way of box, brackets, shelves and stands. Expensive arrangements are by no means necessary, nor is a large collection. The plants and flowers themselves are the main consideration, and a small collection well cared for is better than a large one unless it can be easily accommodated and kept in good condition. The window-box in the room will be seen near at hand, so may be more or less ornamental in character. The sides may be covered with ornamental tile held in place by moulding, or a light lattice-work of wood. But a neatly made and strong box of about the dimensions mentioned on page 284, with a strip of moulding at the top and bottom, answers just as well; and if painted green, or some neutral shade, only the plants will be seen or thought of. Brackets, jardinières and stands may be purchased of florists.

The receptacle may consist of merely the wooden box; but a preferable arrangement is to make it about eight inches deep instead of six, then have the tinsmith make a zinc tray to fit. This is provided with a false wooden bottom, with cracks for drainage, two inches above the real bottom of the tray. The plants will then have a vacant space below them into which drainage water may pass. Such a box may be thoroughly watered as the plants require, without danger of the water running on the floor. Of course, a faucet should be provided at some suitable point on a level with the bottom of the tray, to permit of its being drained every day or so if the water tends to accumulate. It would not do to allow the water to remain long; especially should it never rise to the false bottom, as then the soil would be too wet. Some persons attach the box to the window, or support it on brackets below the window-sill; but a preferable arrangement is to support it on a low and light stand of suitable height provided with rollers. It may then be

drawn back from the window, turned around from time to time to give the plants light on all sides, or turned with the handsome side inward as may be desired.

In addition to the stand, or box, a bracket for one or more pots on either side of the window, about one-third or half way up, is desirable. The bracket should turn on a basal hinge or pivot, to admit of swinging it forward or backward. These bracket plants usually suffer from lack of moisture, and are rather difficult to manage.

Often the plants are set directly in the soil; but if they are kept in pots they may be rearranged to suit the pleasure. Larger plants to stand on shelves or brackets may be in porous earthenware pots; but the smaller ones which are to fill the window-box may be placed in heavy paper pots. The sides of these are flexible, and the plants in them therefore may be crowded close together with great economy in space. When pots are spaced, damp sphagnum or other moss among them will hold them in place, keep the soil from drying out too rapidly, and at the same time give off moisture.

Most of the plants suitable for the winter window-garden belong to the groups which florists grow in their medium and cool houses. The former are given a night temperature of about 60°, the latter about 50°. In each case the temperature is 10 to 15° higher for the daytime. Five degrees of variation below these temperatures is allowable without any injurious effects; even more may be borne, but not without more or less check to the plants. In bright sunny weather the day temperature may be higher than in cloudy and dark weather. The plant material suitable for winter window-gardens is really extensive.

Florists usually grow plants suitable for window-gardens and winter flowering, and any florist, if asked, will take pleasure in making out a suitable collection. The plants should be ordered early in autumn.

Watering house plants.—It is impossible to give rules for the watering of plants. Conditions that hold with one grower are different from those of another. Advice must be general. Give one good watering at the time of potting, after which no water should be applied until the plants really need it. If, on tapping the pot, it gives out a clear ring, it is indication that water is needed. In the case of a soft-wooded plant, just before the leaves begin to show signs of wilt is the time for watering. When the plants are taken up from the ground, or when they have their roots cut back in repotting, gardeners often rely, after the first watering, on syringing the tops two or three times each day, until a new rooting growth has started, watering at the roots only when really necessary. Plants that have been transferred into larger pots grow without the extra attention of syringing, but those from the borders, that have had

the roots mutilated or shortened, should be placed in a cool shady spot and be syringed often. One soon becomes familiar with the wants of individual plants, and can judge closely as to need of water. All soft-wooded plants with large leaf-surface need more water than hard-wooded plants, and one in luxuriant growth more than one that has been cut back or become defoliated. When plants are grown in living-rooms, moisture must be supplied from some source, and if no arrangement has been made for having a moist air the plants may be syringed often; but it is to be remembered that certain rusts may be encouraged by much syringing unless the plants can be dried quickly.

Syringing plants with water has three general offices: to clean the plants of pests or of dirt; to check evaporation or transpiration from the plant itself; to keep the air of living-rooms moist.

Gardeners look on water as a good insecticide. That is, if it can be thrown on the plants somewhat forcibly by means of a syringe or pump, or by the hose, it washes off the insects and drowns many of them. The water should be applied in a fine and somewhat forcible spray. Care should be taken that the plant is not torn or bruised. The red-spider is one of the most serious pests on house plants, and, in a dry season, on those about the lawn. It thrives in a dry atmosphere. It usually lives on the under sides of the leaves. Syringing the plants frequently keeps the pest in check. The thrips and slugs on rose bushes are usually kept in check is one can spray the plants freqnently. See *Spraying*, page 138.

In syringing plants, it is well to take care that the ground does not become too wet; otherwise the plant may suffer at the root. In the house, plants should rarely be syringed except when the weather is bright, so that they may soon dry off. The plants should not go into the night with soaking foliage. Out-of-doors in hot weather, it is best to syringe toward nightfall. The foliage ordinarily does not suffer in such cases. With plants in the house, it is necessary to keep the leaves dry most of the time that fungi may not breed. This is true of carnations when liable to attacks of the rust.

Winter window-garden plants for an average night temperature of 60°

Upright flowering plants.—Abutilon, browallia, calceolaria, begonia, bouvardia, euphorbia, scarlet sage, calla, heliotrope, fuchsia, Chinese hibiscus, jasmine, single petunia, swainsona, billbergia, freesia, geranium, cuphea.

Upright foliage plants.—Meuhlenbeckia, *Cycas revoluta*, *Dracæna fragrans* and others, palms, canna, *Farfugium grande*, achyranthes, ferns, araucaria, epiphyllum (zygocactus), pandanus or "screw-pine," pilea, *Ficus elastica*, grevillea.

Climbing plants.—*Asparagus plumosus*, *Cobæa scandens*, smilax, Japanese hop, Madeira-vine (Boussingaultia), *Senecio mikanioides* (parlor ivy). See also list below.

Low-growing, trailing, or drooping plants.—These may be used for baskets and edgings. Flowering kinds are: Sweet alyssum, lobelia, *Fuchsia procumbens*, mesembryanthemum, russelia, oxalis, *Mahernia odorata* or honey-bell.

Foliage plants of drooping habit.—Vinca, *Saxifraga sarmentosa*, Kenilworth ivy, tradescantia or Wandering Jew, *Festuca glauca*, othonna, *Isolepis gracilis*, English ivy, selaginella, and others. Some of these plants flower freely, but the flowers are small and of secondary consideration.

Plants for an average night temperature of 50°

Upright flowering plants.—Azalea, cyclamen, carnation, chrysanthemum, geranium, Chinese primrose, stevia, marguerite or Paris daisy, single petunia, camellia, ardisia (berries), cineraria, violet, hyacinth, narcissus, tulip, the Easter lily when in bloom, and others.

Upright foliage plants.—Pittosporum, palms, aucuba, euonymus (golden and silvery variegated), araucaria, pandanus, dusty miller.

Climbing plants.—English ivy, maurandia, senecio or parlor ivy, lygodium (climbing fern).

Drooping or trailing plants.—Flowering kinds are sweet alyssum, *Mahernia odorata*, russelia and ivy geranium.

Bulbs in the window-garden (see *Bulbs*, page 46).

The single Roman hyacinth is an excellent house plant. Its flowers are small, but graceful and specially well suited for cutting. The bulbs are easily forced, and are managed like other hyacinths. The secret of forcing the Dutch bulbs and most others is to pot them and then, after watering the pots, set them away in a cool dark place until the pot is filled with roots. They may be placed in the cellar "to root up," or be buried 3 or 4 inches deep in the earth. It is well to delay potting them until such time as they can be kept cool while forming their roots. A temperature of about 40° to 45° suits them during this period. In most cases it is well to use pots 5 or 6 inches in diameter and place three to six bulbs in a pot, according to the size of the bulbs. The pot having been filled with soil, it is only necessary to press them down till the tip, or about one-fourth, shows above it. After this a slight jarring or sharp rap will settle the earth. They are then watered and set away, as before mentioned. If kept dark and cool they will need no more watering until they are brought out and begin to grow, when they may be watered freely.

Hyacinths, tulips and narcissus require about the same treatment. When well rooted, which will be in six or eight weeks, they are brought out and given a temperature of say 55° to 60° till the flowers appear, when they should be kept in a cooler temperature, say 50°.

The Easter lily is managed the same way, only, to hasten its flowers, it should be kept at not lower than 60° at night; warmer is better. Lilies may be covered an inch or more deep.

Freesias may be potted six or more in a pot of mellow soil, and then started into growth at once. At first they might be given a night temperature of 50°, and 55° to 60° when they have begun to grow.

Bulbs like the snowdrop and crocus are planted several or a dozen in a pot and buried, or treated like hyacinths; but they are very sensitive to heat, and require to be given the light only when they have started to grow, without any forcing. Forty to 45° will be as warm as they ever need be kept.

WITLOOF: see *Chicory*.
WINTER SAVORY: *Sweet Herbs*.
WOLFSBANE: *Aconitum*.
WOODRUFF: *Asperula*.
WORMWOOD: *Artemisia*.

XERANTHEMUM annuum of southern Europe. *Composite Family*. Half-hardy annual, 2-3 feet high, erect, branching, grown for the papery white, lilac, rose and purple heads used as everlastings. It is also attractive in the garden. Sow where plants are to stand as soon as frosts are over, and thin to 12 inches; it blooms from midsummer till frost if kept vigorous and fading flowers removed. Consult *Everlastings*.

YARROW: *Achillea*.
YELLOW-TUFT: *Alyssum argenteum*.

YUCCA. *Lily Family*. Perennial stiff plants suitable for specimen or bold effects in the border; they have a basal clump of stiff sword-shaped leaves and the drooping flowers are borne in panicles at the ends of tall thick stalks.

Yuccas prosper in sunny exposures in sandy loam soil. *Y. aloifolia* is not hardy North. Propagated by offsets, stem- and root-cuttings, and also by seeds.

Y. aloifolia. SPANISH BAYONET. 25 ft.: fls. white or tinged purple. S. U. S., W. Indies, Mex.

Y. filamentosa. ADAMS-NEEDLE. 12 ft.: margins of lvs. with curly threads: fls. white. S. U. S. Var. *variegata* foliage variegated.

Y. glauca. 6 ft.: margins of lvs. white and with fine threads: fls. greenish-white. W. N. Amer.

ZANTEDESCHIA: *Calla.*

ZAUSCHNERIA: see *Perennials*, page 203.

ZEA: *Corn, Sweet.*

ZEBRINA pendula (*Tradescantia zebrina*). WANDERING JEW. *Spiderwort Family.* A Mexican decumbent perennial commonly grown in hanging baskets and under greenhouse benches; leaves purple beneath, striped above with white; flowers red-purple. This plant roots at the joints and thus propagates itself; cuttings of the stems are easily rooted.

ZEPHYRANTHES: see *Amaryllis.*

ZINNIA. *Composite Family.* Three kinds of half-hardy annual zinnias are known in flower-gardens for the abundant summer and autumn bloom: (1) The common large tall zinnia, *Z. elegans*, native in

Zinnias. Center and left, forms of *Zinnia elegans*; right, two forms of *Z. angustifolia.*

Mexico, 1½-3 feet (but with dwarf races), with clasping leaves and heads 2-6 inches across in purple, lilac, scarlet, light yellow, white, often very double and large. (2) The orange smaller zinnia, *Z. Haageana* which is a broad-leaved form of *Z. angustifolia*, native in Mexico, lower in stature, leaves narrow and not clasping, and heads 2 inches or less across. (3) The slender-rayed zinnias, *Z. multiflora* (*tenuiflora*), native Florida and Texas to South America, small in stature, leaves not clasping, heads small with linear red or purple rays.

The zinnias thrive in any garden soil. Give them an open sunny exposure, and soil not too fertile. Early bloom may be had from seed started indoors, but if it is sown in the open as soon as the ground is warm the plants should provide bloom from misdummer to frost if they do not suffer from drought and the flowers are removed as fast as they begin to fade. The tall varieties may stand 12-18 inches apart. Zinnias are useful for massing in the distance, and the smaller-flowered kinds for front positions. They provide excellent cut-flowers. Many of the selected sorts run to bronzy shades.