

FAVOURITE FLOWERS

OF

GARDEN AND GREENHOUSE



LEAF-STEMMED CACTUS
(*PHYLLOCACTUS PHYLLANTHOIDES*)

Nat. size
VOL. III.—Front.

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FAVOURITE FLOWERS
OF
GARDEN AND GREENHOUSE

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THE CULTURAL DIRECTIONS

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Three Hundred and Sixteen Coloured Plates

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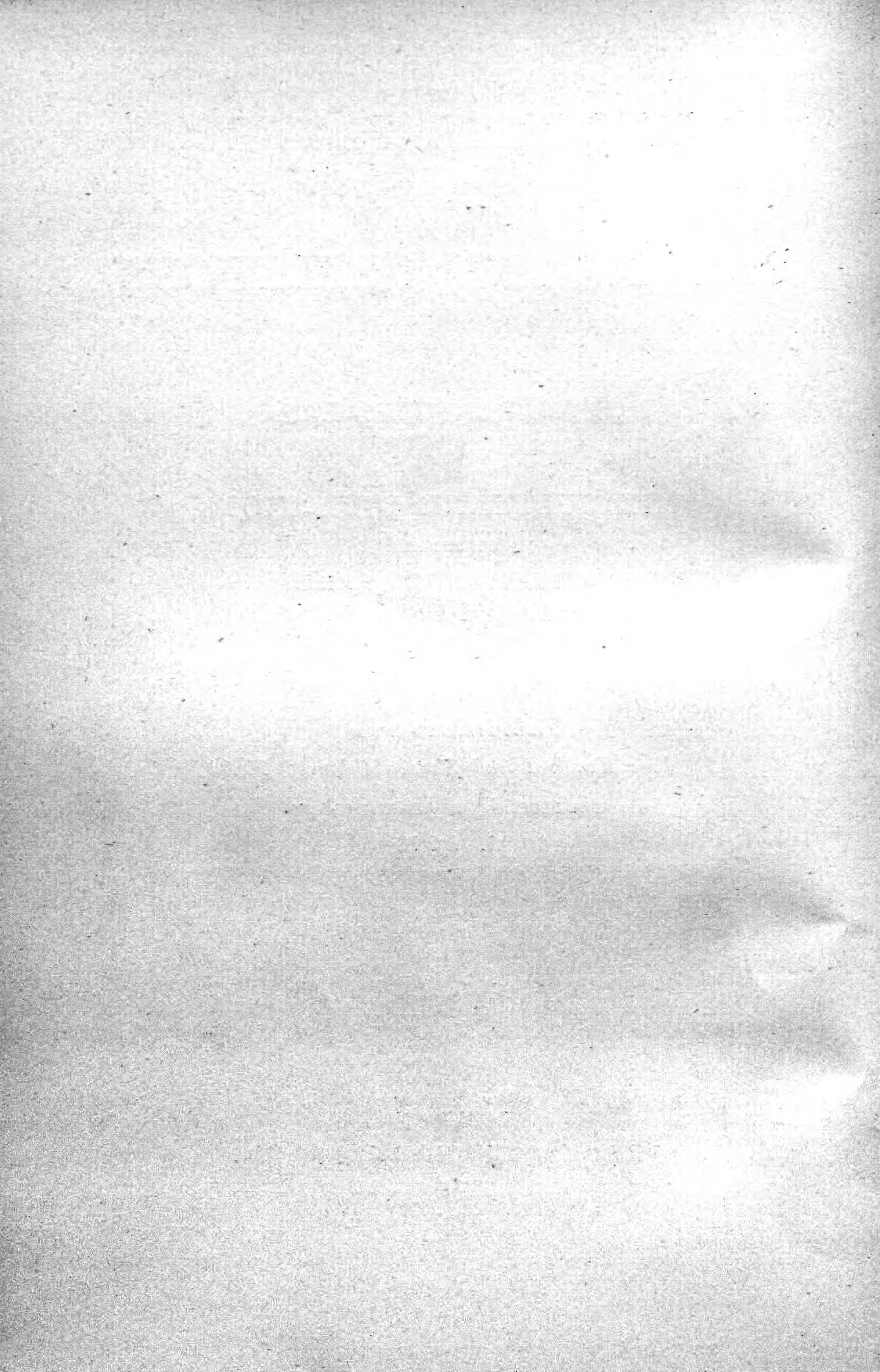
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FAVOURITE FLOWERS

OF

GARDEN AND GREENHOUSE

CORNFLOWERS AND KNAPWEEDS

Natural Order COMPOSITÆ. Genus *Centaurea*

CENTAUREA (name classical; the ancients believed that the *Centaur* Chiron used these plants medicinally). A large genus (three hundred and twenty species) of herbs, annuals and perennials, with globose or egg-shaped involucre, the bracts of which overlap and are variously ornamented with spines, teeth, fringes, or translucent margins. The florets are all tubular, divided at the mouth into five slender lobes; the outer florets usually larger and sterile, the inner bisexual. Fruit compressed, broad at top; pappus-hairs short, slender, and rough, usually in many series, occasionally absent. Natives of Europe, Western Asia, North Africa, and America.

History. Of the large number of species comprising this genus very few are of any importance regarded from the horticulturist's standpoint. Six are natives of Britain, but only one of these, *the* Cornflower or Bluet (*C. Cyanus*), is cultivated. This came into fashion for decorative purposes a few years ago as the favourite flower of the late Emperor of Germany. Several of the exotic species have been well known in our gardens for many years, notably *C. montana*, brought from Austria three centuries ago. *C. alpina* has been grown here for upwards of two hundred and fifty years, and *C. suaveolens* for

more than two centuries. At this end of the historical record we have the beautiful yellow-flowered *C. Fenzlii*, brought from unhappy Armenia in 1868.

Principal Species. CENTAUREA ALPINA (alpine). Stems 3 feet high. Leaves spiny, downy beneath, the margins continued down the stem (*decurrent*). Flower-heads yellow; July. Perennial. Introduced from Italy, 1640.

C. ATROPURPUREA (dark purple). Stem 3 feet high. Leaves cut into lance-shaped segments, which are also cut pinnately. Flower-heads dark purple; involueral scales toothed and fringed; June to August. Perennial. Introduced from Eastern Europe in 1802.

C. AUREA (golden). Stem 2 feet high. Leaves hairy; lower ones cut pinnately. Flower-heads golden yellow; florets equal; involucre spiny; July to September. Perennial. Introduced from South Europe, 1758.

C. BABYLONICA (Babylonian). Stems 6 to 10 feet high. Radical leaves oval-lance-shaped, with a few teeth; stem-leaves narrow-lance-shaped, extending down the stem; all covered with cottony down, and the lower ones very large. Flower-heads yellow, small, but numerous, borne very close to the stem; July. A noble perennial for shrubbery borders in large gardens. Introduced from the Levant, 1710.

C. CINERARIA (Cineraria-like). Stems 3 feet high. Upper leaves jagged and torn pinnately; lower ones cut twice-pinnately; downy, very white. Flowers purple with fringed involucre; July and August. Half-hardy perennial. Introduced from Italy, 1710. Also known as *C. candidissima*.

C. CYANUS (dark blue). Blue Bottle or Cornflower. Stems slender, grooved, slightly branched, 1 to 2 feet high. Leaves slender, entire or slightly lobed. Flower-heads 1 inch across; ray-florets few, large, dark blue; disk florets smaller, purple. Involueral bracts deeply toothed, margins translucent; cobwebby, stalks cottony. Native, annual. In cultivation there are several varieties, with flower-heads ranging from white to rose and purple.

C. DEALBATA (whitened). Stem 12 to 18 inches high. Radical leaves cut pinnately into lobed oval segments; stem-leaves pinnately cut into lance-shaped lobes; silvery beneath with white hairs. Flower-heads rose-coloured; July to September. Perennial. Introduced from the Caucasus, 1804.

C. FENZLI (Fenzl's). Stem 4 feet high. Leaves radical, large, heart-shaped, glaucous. Flower-heads, large, terminal, clear yellow; July. Biennial. Introduced from Armenia, 1868.



MOUNTAIN CORNFLOWER
(CENTAUREA MONTANA)

— Nat. size

PL. 157

C. MACROCEPHALA (big-headed). Stem hollow, 3 feet high. Radical leaves large, oblong-lance-shaped, margins undulating; stem-leaves narrower, margins continuing down stem. Flower-heads very large, yellow; involucral bracts with jagged edges; July. Perennial. Introduced from Caucasus, 1805.

C. MONTANA (mountain). Mountain Cornflower. Stem 2 feet high; sometimes branched slightly. Leaves cottony, lance-shaped, margins continued down stem. Flower-heads large; ray-florets deeply cut into four or five long slender teeth, blue; disk-florets purple; June to August. Perennial. Introduced from Austria, 1596. Plate 157. There are several varieties in cultivation: *alba* has white flowers, *rubra* has them red, and in one called *Lady Florence Hastings* they are creamy white.

C. MOSCHATA (musky). Sweet Sultan. Stems 2 feet high. Leaves lyre-shaped. Flower-heads roundish, purple; bracts egg-shaped; July. Hardy annual. Introduced from Persia, 1629.

C. RAGUSINA (Ragusan). Stem 2 feet high. Leaves covered with silvery down, pinnately cut into egg-shaped segments. Flower-heads yellow; involucral bracts fringed; June and July. Perennial. Introduced from Candia, 1710. This species is only half-hardy; all the others described are quite hardy.

C. SUAVEOLENS (sweet-smelling). Yellow Sultan. Stem 20 inches high. Leaves broad, spoon-shaped, toothed; upper ones varying. Flower-heads yellow, fragrant; July. Annual. Introduced from the Levant, 1683.

Cultivation. *Centaureas* are raised from seed, and will succeed with ordinary attention in most soils. The annuals are best sown where they are to flower, in little patches, of which only five or six of the most robust plants should be left after thinning out. The perennials bear transplanting, and the seed of these may be sown in a pan or in the border, the young plants afterwards removed where required. *C. ragusina* should be sown in slight heat, and the seedlings hardened off before planting out. March or April is the best time for sowing with either class. *C. Cyanus* is a good plant for sunny positions in the wild-garden or on sandy slopes. It is one of the best of native plants for the garden.

Description of *Centaurea montana*, the Mountain Cornflower, is shown
Plate 157. of the natural size. The *decurrent* leaf is here well shown. Fig. 1 is a section through the flower-head; 2, a ray-floret; 3, a disk-floret. Note the difference in size of the incipient fruits in 2 and 3, the former sterile, the latter fertile.

ANNUAL IMMORTELLS

Natural Order COMPOSITÆ. Genus *Xeranthemum*

XERANTHEMUM (Greek, *xeros*, dry, and *antheon*, a flower). A small genus containing only four or five species of annual herbs, whose flower-heads share the "everlasting" character of *Acroclinium* and other genera already described. This resemblance does not extend to the florets, which are more nearly allied to those of the Thistles. The only species cultivated is *Xeranthemum annuum*, whose description will serve for the genus.

Species. XERANTHEMUM ANNUUM (annual). Stem branching. 1 to 2 feet high. Leaves alternate, cottony, slender-lance-shaped, the edges turned back. Flower-heads, solitary, purple, pink, or white; involucral bracts, chaffy, in many series, the innermost series large and petal-like; florets about one hundred, tubular, the outer two-lipped and sterile, the inner regular, five-toothed, and bisexual; July. Native of the Mediterranean region, whence it was introduced in 1570. It is quite hardy, and seed sown in any light soil in a sunny border, about April, will do well.

Description of *Xeranthemum annuum*, natural size. Fig. 1 is a section through the flower-head; 2, one of the inner series of bracts; 3, a floret from the inner part of the disk; 4, one from the circumference of the disk.
Plate 158.

BELLFLOWERS

Natural Order CAMPANULACEÆ. Genus *Campanula*

CAMPANULA (Latin, *a little bell*). A large genus (about two hundred and thirty species) of chiefly perennial herbs. Radical leaves usually on foot-stalks; stem-leaves alternate. Flowers blue, white, or lilac, in spikes or racemes; producing honey. The calyx is egg-shaped or nearly globular, with five flat lobes. The corolla bell-shaped or wheel-shaped, divided at the mouth into five lobes. Ovary below the corolla. Stamens five, attached to top of ovary. Style club-shaped, divided at extremity into three or five arms—the stigmas. Fruit egg-shaped or top-shaped, divided into three or five cells, opening by pores or valves to liberate the flattened seeds. The species are distributed throughout all Temperate and most of the



ANNUAL IMMORTELLE
(XERANTHEMUM ANNUUM)

Nat. size

PL. 158

Tropical Regions. Six species occur in Britain, several of which are also cultivated.

History.

The earliest gardeners in this country, who had our native *Campanulas* to fall back upon, had no lack of worthy representatives of a beautiful Order, but for three hundred years they have also had *C. persicifolia* and *C. medium*, the Peach-leaved Bellflower and the Canterbury Bell. Most of the species of CAMPANULACEÆ have an abundant milky juice of an acrid character, but in spite of this fact *C. Rapunculus* has been long and largely grown for the sake of its roots, which are boiled and eaten. *C. persicifolia* and *C. rapunculoides* have also been cultivated for the same purpose. Both these species have become naturalised in parts of Britain, and some authorities regard *C. Rapunculus* also as a mere escape from the garden that has thriven without the gardener's help and taken up a permanent position among native wildings. These, with *C. medium*, were grown as garden plants as far back as the days of Gerarde, for he enumerates them among the flowers growing in his garden. We might here remark that many plants to which the date 1596 or 1597 is attached as the year of introduction are so marked because they are referred to in his *Herball* (published 1597) as growing in his garden, so that we may be certain they had been introduced at some date anterior to 1597. Some to which that date is attached had probably been introduced long before. This by way of parenthesis. About sixty years ago it was quite the fashion to grow *C. pyramidalis* in pots as a summer ornament for the empty fire-grate, and so it got its popular name of Chimney Bellflower.

Principal Species. CAMPANULA ALLIONII (Allioni's). An alpine, with creeping root, and hairy stem, 3 or 4 inches high. Leaves slender-lance-shaped, with fringed edges. Flowers large and solitary, blue (occasionally white), inclined to nod; July to September. Introduced from Piedmont, 1820.

C. BARBATA (bearded). Stems 6 to 18 inches high. Radical leaves lance-shaped, crowded, hairy; stem-leaves strap-shaped, scattered. Flowers pale blue, smooth outside, woolly within the mouth; nodding, in a loose raceme; June. Introduced from Italy, 1752. There is a handsome white-flowered var. *alba*.

C. CARPATICA (Carpathian). Stems tufted, branched, 9 inches high, leafy. Leaves heart-shaped, toothed; upper ones more oval. Flowers broad, blue, erect, in loose panicles; June to August. Introduced from Carpathian Alps, 1774. There are several good varieties in cultivation: *alba* differs from the type only in having pure white flowers; *pallida* has pale purple flowers; *turbinata* broad purple flowers, nearly 2 inches

across; *pelviformis* is a garden variety (a seedling of *turbinata*) with shallower, broader, fragrant lilac flowers.

C. CENISIA (native of Mont Cenis). A beautiful little alpine with numerous stems, not more than 3 inches high. Radical leaves oval, forming a rosette; stem-leaves more oblong. Flowers solitary, erect, deep blue; June. Introduced from Italy, 1775.

C. COLLINA (hill-loving). Stems unbranched, hairy, 1 foot high. Lower leaves oval-oblong, round-toothed; upper varying from lance-shaped to very slender. Flowers funnel-shaped, deep blue, in long raceme; July. Introduced from the Caucasus, 1803.

C. FRAGILIS (fragile). Stems branched, 4 to 6 inches high. Radical leaves kidney-shaped, lobed; stem-leaves broad-oval, somewhat heart-shaped. Flowers erect, solitary or in pairs; lilac-purple with white centre; July and August. Introduced from Italy, 1826.

C. GLOMERATA (clustered). Stem slender, 6 to 18 inches high. Radical leaves heart-shaped, stalked; stem-leaves oval, half-clasping the stem. Flowers numerous, bright blue, most of them gathered into a dense terminal bunch, of which the central bud is the first to open; September and October. Native. There are several varieties that differ but slightly from the type; the var. *flore pleno*, however, has double flowers.

C. GRANDIS (large). Stem furrowed, unbranched, 1 to 2 feet high. Leaves lance-shaped, saw-toothed, stalkless. Flowers broad-bell-shaped, shallow, pale violet-blue; June. Introduced from Siberia, 1842. There is a var. *alba* with white flowers.

C. HENDERSONI (Henderson's). Stem 1 foot high. Lower leaves heart-shaped, slightly round-toothed, stalked; upper ones oblong, stalkless. Flowers, mauve, in pyramidal racemes; July to September. A garden hybrid, the result of a cross between *C. alliaricifolia* and *C. carpatica*.

C. ISOPHYLLA (equal-leaved). Stem 6 inches high. Leaves heart-shaped, toothed. Flowers erect, in a corymb; salver-shaped, lilac-blue with grey centre; August. Introduced from Italy, 1868. There is a var. *alba* with pure white blossoms.

C. LACTIFLORA (milk-flowered). Stems branching, 2 to 6 feet high. Leaves oval-lance-shaped, sharply toothed. Flowers erect, in loose panicles, bluish white; July to September. Introduced from Siberia, 1814. There is a var. *carulea* with flowers quite blue.

C. MEDIUM (middle-sized). Canterbury Bells. Stem stout, erect, branched, 1 to 4 feet high. Leaves stalkless, oval-lance-shaped, round-toothed. Flowers large and numerous, in racemes, normally blue, but



CANTERBURY BELLS
(CAMPANULA MEDIUM)

$\frac{2}{3}$ Nat. size

PL. 159

under cultivation it has also produced purple, white, and rose-coloured flowers; July and August. A biennial. Introduced from Southern Europe, 1597. There are numerous garden varieties, and doubles of most colours. Plate 159.

C. NOBILIS (noble). Stem branched, 2 feet high. Leaves oval, toothed and stalked; upper ones lance-shaped, stalkless, or nearly so. Flowers drooping, reddish violet, cream coloured, or white; clustered at ends of branches; July. Introduced from China, 1844. There is a var. *alba*.

C. PERSICIFOLIA (Peach-leaved). Stems slightly branched, 1 to 3 feet high. Radical leaves broad-lance-shaped; stem-leaves narrow-lance-shaped; all leathery and smooth. Flowers, 1 inch across, purple-blue, in racemes; July and August. Native of the South of Europe (naturalised in several British localities). Introduced 1596. This is a deservedly popular garden plant, and many varieties are in cultivation, including a var. *alba* with single, double, and semi-double forms of this and various other tints between white and blue. Plate 161.

C. PORTENSCHLAGIANA (Portenschlag's). Stems 3 inches. Radical leaves kidney-shaped, irregularly toothed, on long stalks; stem-leaves more or less oval. Flowers erect, shallow, $1\frac{1}{4}$ inch across, several at the ends of the drooping shoots; June to September. Native of Dalmatia.

C. PULLA (dark). Stems 3 to 6 inches high. Lower leaves oval, on short stalks; upper stalkless, narrower. Flowers large, violet-blue, at end of shoots; June. Introduced from Eastern Europe, 1779.

C. PYRAMIDALIS (pyramidal). Chimney Bellflower. Stems 4 to 6 feet. Lower leaves stalked, oval, somewhat heart-shaped; stem-leaves oval-lance-shaped, stalkless. Flowers dark blue, pale blue, or white, in immense erect racemes; July. Introduced from Europe, 1596. Plate 160.

C. RAPUNCULOIDES (Rapunculus-like). Stem sometimes branched, 2 to 4 feet. Radical leaves heart-shaped, round-toothed, stalked, rough; stem-leaves oval, saw-toothed. Flowers large, bright blue, drooping, in long racemes; June to August. Native of Europe, naturalised in parts of Britain.

C. RAPUNCULUS (little turnip). Rampion. Root fleshy; stem 2 to 3 feet high, angled and bristly. Radical leaves broadly oval, on long stalks; stem-leaves lance-shaped, variable, slightly toothed. Flowers, red, purple, or blue, $\frac{3}{4}$ -inch across; July and August. Native, but rare.

C. ROTUNDIFOLIA (round-leaved). Bluebell; Harebell; Hairbell. Stems many, slender, branched, 6 to 12 inches high. Radical leaves round-heart-shaped; stem-leaves lance-shaped or very slender. Flowers

nodding, solitary at end of branchlets, deep blue; June to September. Native. There are several varieties, among them *alba*, with white flowers; *Hostii* with larger flowers of richer blue; *flore pleno*, with double flowers, etc.

C. SPECIOSA (showy). Stem unbranched, 12 to 18 inches high. Radical leaves narrow-lance-shaped, forming a rosette; stem-leaves slender; all stalkless with rounded teeth. Flowers blue, purple, or white, in a pyramidal raceme; June and July. Introduced from the Pyrenees, 1820.

C. THYRSOIDES (bearing dense panicles). Stems unbranched, 12 to 18 inches high. Leaves lance-shaped, hairy. Flowers sulphur-yellow, in dense spike; July. A biennial. Introduced from European Alps, 1785.

C. TRACHELIUM (Throatwort-like). Nettle-leaved Bellflower. Stems angular, 2 to 4 feet high. Leaves all stalked, oval-lance-shaped, doubly toothed. Flowers blue-purple, in paniced racemes; September and October. Whole plant bristly. Native. There is a var. *flore pleno* with double flowers of various shades between blue and white.

C. VAN HOUTTEI (Van Houtte's). Stem 2 feet high. Radical leaves round-heart-shaped, stalked, round-toothed; stem-leaves oblong-lance-shaped, saw-toothed, stalkless. Flowers dark blue, 2 inches long, drooping; July and August. A garden hybrid.

C. VIDALII (Vidal's). A shrubby perennial, with branching stem 1 foot high, and oblong, shining, green fleshy leaves. The flowers are borne on erect scapes about a foot high, and are nodding, wax-like white bells about an inch long. Greenhouse. Azores.

Cultivation. Most of the members of this genus are very easily grown, but from the great variety of sizes some discrimination must be shown in placing them. A reference to the figures of height given above is sufficient clue. The tall-growing should be placed in the middle row of the border; those of medium height in front of this line, and the dwarfs in the very front, or in the rock-garden. The latter is the most appropriate place for these diminutive kinds; they also look well in pots. For all the situation must be a well-drained one, and the soil most generally suitable for them is rich sandy loam. The alpines like some amount of grit and leaf-mould added, and during the growing period require plenty of water. *C. pyramidalis* is somewhat tender, and should have frame protection in the winter: repotting early in summer. Seed of the biennials, such as *C. medium* and *C. thyrsoides*, should be sown about June in cold frames, or on an open seed-bed. Seeds of the perennials may be sown as soon as ripe or in the spring. Propagation of the perennial species, however, is chiefly effected by dividing the



CHIMNEY BELL-FLOWER
(*CAMPANULA PYRAMIDALIS*)

$\frac{1}{2}$ Nat. size

roots in spring, or by making cuttings of the new shoots at the same period.

Description of Plate 159. *Campanula medium*, two-thirds of the
Plates 159-161. natural size. The purple, the white, and the rose forms are shown. Fig. 1 is a section through the flower; 2, a seedling; and 3, the seed, natural size and enlarged.

Plate 160. *C. pyramidalis*. Fig. 1 is a section through the unopened bud showing first position of stamens. When the flower opens they have discharged their pollen around the style and fallen back as shown in Fig. 2. After the pollen has been carried away by insects the upper part of style separates into four or five arms—the stigmas.

Plate 161. *C. persicifolia*. The white and blue forms, with (Fig. 1) a section of the flower.

LOBELIAS

Natural Order LOBELIACEÆ. Genus *Lobelia*

LOBELIA (named in honour of Mathias de L'Obel, a Flemish botanist and physician, 1538-1616). A genus consisting of about two hundred species of perennial herbs. The flowers are in terminal racemes, and consist of a somewhat oval calyx divided at the mouth into five lobes; an irregular corolla, the tube split at the back and the mouth two-lipped, of which the lower consists of three pendulous lobes, and the upper of two slender lobes that are either erect or curved back. There are five stamens united to form a tube round the thread-like style, which has two broad-spreading stigmas, below which is a ring of hairs. The ovary is two- or three-celled. The species are distributed throughout all but the very cold regions of the globe. Two are natives of Britain.

History Lobelias have been cultivated in this country ever since 1626, when the showy Cardinal Flower (*L. cardinalis*) was introduced from North America, whence also came *L. syphilitica* about thirty years later. Two species—*L. Dortmanna* and *L. urens*—are indigenous to this country but very rare, and of local occurrence only. Many of the species abound in an acrid milky juice, and in consequence *L. cardinalis*, *L. syphilitica*, and *L. inflata*—especially the latter—have been used in medicine as diaphoretics and anti-spasmodics; but the remedy is an exceedingly dangerous one, only to be administered by properly qualified practitioners. Although there are many species

which are here and there grown by the curious, those that are generally cultivated are not more than about five species and a large number of their varieties and hybrids. These may be divided into tall and dwarf Lobelias, the tall species being American with large flowers, and the dwarfs African with small flowers, the descendants chiefly of *L. Erinus*, which was introduced from the Cape of Good Hope about 1752. We shall content ourselves with describing these species, with the addition of some of the best garden varieties.

Principal Species. *LOBELIA CARDINALIS* (cardinal red). Cardinal Flower. Stems erect, 1 to 2 feet high. Leaves lance-shaped, slightly toothed, sometimes tinged with red, smooth. Flowers scarlet, in one-sided terminal racemes; July and August. Plate 163.

L. ERINUS (like the plant Erinus). Stems branched, somewhat trailing, about 6 inches high. Leaves oval, or narrow-lance-shaped, toothed, hairy at the base. Flowers bright blue, the throat of the corolla white or yellow; June to September. Plate 162.

L. FULGENS (shining). Stems downy, reddish, 1 to 2 feet high. Leaves lance-shaped, slightly toothed, downy, the edges turned back. Flowers also downy on the exterior, brilliant scarlet, 1 inch long, in terminal racemes; May to September. Introduced from Mexico, 1809.

L. SPLENDENS (glittering). Stems 1 to 2 feet high. Leaves lance-shaped, slightly toothed, margins *not* turned back. Flowers scarlet, shining, in terminal, somewhat one-sided, racemes; May to September. Introduced from Mexico, 1814.

L. SUB-NUDA (nearly naked). Leaves radical, heart-shaped in general outline, but cut pinnately, purplish beneath; forming a rosette. Flowers pale blue, $\frac{1}{3}$ -inch across, in loose racemes; July. Hardy annual. Introduced from Mexico, 1887. Dwarf, and specially suitable for rockwork.

L. SYPHILITICA (useful in syphilis). Stem 1 to 2 feet. Leaves elliptical, pointed at each end, unequally toothed, stalkless. Flowers light blue, corolla angular, the lobes nearly equal; in a long leafy raceme; August and September.

L. TUPA (Chilian native name). A herbaceous perennial with annual stems 3 feet high and lanceolate dark green leaves; flowers axillary, tubular, 1 inch long, dark red. Also known as *Tupa Fenillei*. Chili. Hardy in the South of England.

Garden Varieties. Of these, there are the two distinct classes already indicated: the tall-growing offspring of the American species, and the dwarf descendants of the African types. The following selection includes some of the best:—



PEACH-LEAVED BELL-FLOWER
(*CAMPANULA PERSICIFOLIA*)

$\frac{2}{3}$ Nat. size

PL. 161

I. TALL-GROWING LOBELIAS

- | | |
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| <p><i>Apollo</i>, tall-growing, medium-size flowers, rose-purple.</p> <p><i>Argus</i>, blue-purple with distinct white centre.</p> <p><i>Ceres</i>, crimson-scarlet.</p> <p><i>Challenger</i>, large, rosy purple.</p> <p><i>Don Juan</i>, mauve-purple.</p> <p><i>Firefly</i>, an improvement on the type form of <i>L. cardinalis</i>.</p> <p><i>Magenta superba</i>, magenta with white centre.</p> | <p><i>Mulberry</i>, a form of <i>L. cardinalis</i>, with claret-coloured flowers.</p> <p><i>Nizza</i>, rich dark crimson.</p> <p><i>Orion</i>, crimson-scarlet.</p> <p><i>Prince Arthur</i>, a light scarlet, robust form of <i>L. fulgens</i>.</p> <p><i>Syphilitica alba</i>, white.</p> <p><i>Vesta</i>, magenta, with clear white centre.</p> <p><i>Victoria</i>, rich scarlet, a large-flowered form of <i>L. fulgens</i>.</p> |
|--|---|

II. DWARF BEDDING LOBELIAS

- | | |
|--|---|
| <p><i>Barnard's Perpetual</i>, brilliant ultramarine flowers, with white blotches on lower lip.</p> <p><i>Beauty of Darmstadt</i>, dark blue, dark foliage.</p> <p><i>Brighton</i>, bright blue.</p> <p><i>Compacta Aurea Goldelse</i>, bright blue flowers, and yellow foliage.</p> | <p><i>Granite City</i>, pure white, free bloomer.</p> <p><i>King of the Blues</i>, exceedingly dark blue with white centre.</p> <p><i>Miss Hope</i>, white flowers, strong growing.</p> <p><i>Picotee</i>, pure white, edged with bright blue.</p> <p><i>Snowball</i>, white, dwarf and compact.</p> <p><i>Swanley Blue</i>, bright light blue.</p> |
|--|---|

Cultivation. Lobelias are among the most useful plants from a horticultural standpoint. The artist in bedding effects would be seriously handicapped without his neat little tufts of blue. The taller section is not nearly so well used, because there is no dearth of scarlets and crimsons among flowers; but a very fine effect can be obtained by introducing clumps of these in the border, or towards the centre of beds. The named varieties of Lobelias must of necessity be grown from cuttings or divisions of the tufts; but for ordinary bedding purposes it is the custom to treat *L. Erinus* as though it were an annual, sowing the minute seeds in light soil about March, and germinating them in gentle heat. As soon as the seedlings are large enough to handle safely, they are pricked out into pans or boxes, but still kept inside till they are wanted for the open ground. It should be remembered that bedding plants raised from cuttings are, as a rule, more compact than specimens of the same variety raised from seed. To propagate from cuttings, a few plants should be kept in pots throughout the summer and prevented from flowering. In winter these should be stored in frames or greenhouses where they can have light and air. In February they should be treated to gentle heat to induce growth; the new shoots are then used as cuttings and struck in light sandy soil, in which they soon root. By this method a considerable stock may be obtained that shall be absolutely uniform in colour, size, and habit. The tall-growing sorts may be treated in the various ways suggested for the dwarfs, but in

growing from seed, it is advised that the sowing should take place as soon as the seed is ripe and that the pans be placed in a cool structure. In the spring the seedlings will be nice young plants, well adapted for planting out and for flowering in their first summer. The old plants may be left in the ground during winter, but they should be cut down in late autumn, and the roots and stumps covered deeply with ashes. The new shoots in spring may be used for cuttings if desired. Well-grown, these taller plants present a very brilliant and dazzling effect, but to be well-grown they must be planted in deeply-dug, rich, but light soil, and neatly tied to sticks as they grow. This is especially necessary where they are exposed to wind, as much of their effect depends upon their stately erect bearing. Plenty of water during the period of growth, varied with draughts of manure-water as the flowers prepare for unfolding, are also factors towards success. *L. cardinalis* is a good plant for the waterside or bog-garden.

Description of Plate 162. A. *Lobelia Erinus*: portion of stem with leaves and flowers. Fig. 1, enlarged section of flower; 2, upper part of staminal tube enclosing style; 3, seedling; 4, seed, natural size and enlarged. B. *Isotoma longiflora* (see below).

Plate 163. *Lobelia cardinalis*. Fig. 1, detached flower; 2, section of same enlarged; 3, summit of style with frill of hairs.

ISOTOMAS

Natural Order LOBELIACEÆ. Genus *Isotoma*

ISOTOMA (Greek, *isos*, equal, and *tome*, a cutting). A small genus comprising about eight species formerly included in *Lobelia*, but differing from that genus in several important particulars. The mouth of the corolla is not divided into two lips as in *Lobelia*, but the five lobes are spreading and nearly equal, and the tube is only slightly cleft or not cleft at all. The stamens are attached to the upper part of corolla-tube. The species are natives of Australia and the West Indies, and require greenhouse or stove treatment.

Principal Species. ISOTOMA AXILLARIS (axil-flowered). Stems 1 foot high. Leaves stalkless, pinnately cut and toothed. Flowers purplish blue with long greenish white corolla-tube; August to October. Perennial. Introduced from New Holland, 1824. Plate 162 B. There is a var. *sub-pinnatifida* having the lobes of the leaves longer and sometimes again pinnately cut.



LOBELIAS

(A) LOBELIA ERINUS

(B) ISOTOMA LONGIFLORA

Nat. size

PL. 162

I. LONGIFLORA (long-flowered). Stems 1 foot high. Leaves downy, oval-lance-shaped, coarsely toothed. Flowers white, with long and slender tube; May to August. Perennial. Introduced from West Indies, 1752. It should be noted that this plant is of an exceedingly poisonous character, producing dangerous cathartic symptoms. It has been known to prove fatal to horses that have eaten it.

Culture. The directions given for the cultivation of *Lobelia* apply to the *Isotomas*, except that these require to be grown almost entirely under glass, though in warm sunny positions they may be placed outside in the middle of summer.

PHYTEUMAS

Natural Order CAMPANULACEÆ. Genus *Phyteuma*

PHYTEUMA (a classical name applied to a species of *Reseda*). A genus comprising about thirty species of perennial herbs, of which few have horticultural interest. The flowers are gathered into dense spikes or heads. The more or less oval calyx is five-lobed. The corolla is deeply cleft into five very slender segments that separate slowly. There are five stamens; the ovary is two- or three-celled; the style thread-like, divided above into three short slender stigmas. They are natives of Europe and Western Asia. Two species occur locally in Britain. They readily lend themselves to cultivation, succeeding in any good well-drained soil. The smaller species are very suitable subjects for rock-gardens. Propagation is effected by dividing the tufts.

Principal Species. PHYTEUMA COMOSUM (tufted). Holly-leaved Rampion. Stems 3 to 6 inches high. Leaves roundish-heart-shaped, or oval-lance-shaped, deeply and sharply toothed. Flowers purple or blue, inflated at base, in umbel-like heads; July. Introduced from Europe, 1752.

PH. HUMILE (lowly). Flower-stems 3 inches high. Leaves long, slender-lance-shaped, grass-like. Flowers blue, in globular heads; July. Introduced from Switzerland, 1825.

PH. ORBICULARE (spherical). Round-headed Rampion. Stems 6 to 18 inches high. Radical leaves lance-shaped, stalked; stem-leaves more slender, stalkless. Flowers deep blue in round heads; July and August. Native.

PH. SCHEUCHZERI (Scheuchzer's). A tufted plant, 6 to 12 inches high, with lance-shaped leaves of varied breadth, with sharp teeth. Flowers deep blue in dense round heads; July and August. A native

of the European Alps. Introduced 1813. The var. *Charmelii* does not greatly differ from this, though regarded by some authors as a distinct species.

PH. SPICATUM (spiked). Stems 1 to 3 feet, ribbed. Leaves heart-shaped. Flowers yellowish, in cylindrical heads; May and June. Varies white to blue in cultivation. Native.

HEATHS

Natural Order ERICACEÆ. Genus *Erica*

ERICA (name classical). A large genus comprising about four hundred species of rigid, much-branched evergreen shrubs. The leaves are small, usually whorled (occasionally alternate or scattered), slender and rigid. The flowers have mostly a nodding habit. Four is the dominating number in this genus, and to a considerable extent throughout the Order. Sepals four. Corolla, bell-shaped, globular, or tubular, four-lobed, of a persistent character, and secreting honey. Stamens eight, the anthers opening by slits or pores at the edges. Ovary four-celled; style thread-like, ending in an enlarged four-lobed stigma. The species are natives of Europe, Northern Asia, North Africa, and more especially South Africa.

History. Five species of *Erica* are natives of the British Isles, two of them abundant on heaths generally, two almost restricted to Cornish moors, and the fifth to boggy moors in Mayo and Galway. These are all deserving of a place in gardens of any size. The cultivation of the exotic species appears to have begun in 1658 with the introduction of *E. arborea* from Southern Europe, but most of the forms known to gardeners are natives of the Cape of Good Hope, whence they have been brought during the eighteenth and nineteenth centuries. Some of the most popular are hybrids that have been raised in cultivation as the result of experiments in cross-fertilisation between different species. The method by which this is effected naturally between individuals of the same species is exceedingly interesting. The anthers so press together that they form a ring round the style, and the openings for the exit of the pollen are thus kept closed. But if a bee in exploring for honey pushes his long tongue into the mouth of the flower, the ring is broken, the openings of the anthers are exposed, and the pollen falls upon the bee's face, just where on visiting a second flower it will be pressed against the more prominent stigmas. In our own *E. Tetralix* the anthers have each a couple of horns spreading towards the more globular corolla,



CARDINAL FLOWER

(LOBELIA CARDINALIS)

Nat. size

PL. 163

and acting as levers to dislocate the anther-ring on the slightest touch of an insect's tongue. Similar arrangements prevail in other species of *Erica*.

Principal Species. ERICA AITONIA (Aiton's). Stems slender, branched, 2 feet high. Leaves very slender (*linear*), faintly toothed, three in a whorl. Flowers, sticky, cylindrical, an inch long, with oval spreading lobes at top of tube; pale red or whitish, three or four in a cluster; June to September. Introduced from Cape, 1790. There are several good varieties grown: var. *superba* is of more compact habit and has larger corolla-tubes; var. *Turnbulli* has broader leaves, corolla-tubes as thick again as the type, with large white lobes.

E. AMPULLACEA (pitcher-shaped). Stems 2 feet high. Leaves lance-shaped, edges turned back, three or four in a whorl. Flowers sticky, in terminal clusters of four; corolla pitcher-shaped, ribbed at neck, red; July. Introduced from Cape, 1790.

E. ARBOREA (tree-like). Stems with woolly branches, 10 to 20 feet high. Leaves linear, smooth, three or four in a whorl. Flowers bell-shaped, small, white, in racemes; February to May. A hardy species from South Europe, 1658.

E. AUSTINIANA (Austin's). Stems 1 to 2 feet high. Leaves lance-shaped, spreading. Flowers tubular, an inch long, white streaked with crimson, in whorls; July and August.

E. BARNESII (Barnes'). Stems 1 to 2 feet. Leaves oblong, slightly one-sided, bristly, with a long point, four or five in a whorl. Flowers in terminal whorl; corolla-tube deep red, lobes white, spreading; March to August. Hybrid.

E. BOWIEANA (Bowie's). Stem with erect branches, 1 foot high. Leaves glaucous, linear, four in a whorl. Flowers dirty-white, drooping, in crowded whorls near the ends of the branches; cylindrical, with contracted mouth; October to December. Introduced from Cape, 1822.

E. CANDOLLEANA (Candolle's). Stems 1 foot high. Leaves erect, oblong, with fringed edges. Flowers over an inch long, white with rosy base; in umbels; June and July. A hybrid.

E. CARNEA (flesh-coloured). Stems 6 inches high. Leaves linear, three to four in a whorl. Flowers small, pitcher-shaped, pale red, drooping, in one-sided racemes; January to April. Introduced from Europe, 1763. There is a white-flowered form known in gardens as *E. herbacea*.

E. CAVENDISHIANA (Cavendish's). Stems 18 inches. Leaves awl-shaped. Flowers tubular, an inch long, bright yellow; May to July. A garden hybrid.

E. CILIARIS (fringed). Stem slender, branched, 12 to 18 inches high. Leaves small, oval, downy above, fringed, close-set, three to four in a whorl. Flowers egg-shaped, curved, with small oblique mouth; crimson; June to September. Native.

E. FAIRIEANA (Fairie's). Leaves lance-shaped, fringed with long white hairs, whorled. Flowers large, pitcher-shaped, in terminal whorls; rich rose with white mouth-lobes; June to August. Hybrid.

E. GRACILIS (slender). Stems branching, plant bushy, 1 foot high. Leaves linear, erect, four in a whorl. Flowers pinkish purple, pitcher-shaped, small, numerous, in terminal umbels; September to December. Introduced from Cape, 1774.

E. HYEMALIS (winter-flowering). The most popular of all garden Heaths, being grown by hundreds of thousands annually for the London market alone. It forms a compact bush with erect pyramidal branches a foot high, clothed in winter with tufts of pink and white tubular flowers $\frac{1}{2}$ inch long. Garden hybrid.

E. LINNÆANA (Linnæus'). Stems 1 $\frac{1}{2}$ foot high. Leaves needle-shaped, fringed, four in a whorl. Flowers numerous, club-shaped, downy, red at base, white above; January to May. Introduced from the Cape, 1790.

E. MAMMOSA (having nipples). Stem 18 inches high. Leaves awl-shaped. Flowers inflated cylinders three-quarters of an inch long, downy, reddish purple: July to October. Introduced from Cape, 1769.

E. MASSONII (Masson's). Stem branched above, 3 feet high. Leaves linear, faintly toothed, hairy, four or five in a whorl. Flowers an inch long, tubular, sticky, scarlet, with a swollen top and constricted greenish yellow mouth, whorled; July to October. Introduced from Cape, 1789. There are several varieties.

E. MELANTHERA (black-anthered). Stems branched, 2 feet high. Leaves linear, thick. Flowers small, bell-shaped, white or pale pink with purple-black anthers, usually produced in threes; autumn and winter. Introduced from Cape, 1803. Plate 165.

E. PERSOLUTA (finished). Stem branched, downy or hairy, 1 foot high. Leaves linear, short, four in a whorl. Flowers, bell-shaped, small, white (var. *alba*) or red (var. *rosea*); April and May. Introduced from Cape, 1774.

E. PYRAMIDALIS (pyramidal). Stem 18 inches high. Leaves needle-shaped, downy, about six in a whorl. Flowers funnel-shaped, with spreading mouth, purple-red; usually produced in threes; March. General shape of plant pyramidal, like miniature Fir-tree. Introduced from Cape, 1787.

E. SULPHUREA (sulphur-coloured). Stem branched, 2 feet high.



WILMORE'S HEATH
(*ERICA WILMOREANA*)

Nat. size

PL. 164

Leaves linear, blunt, woolly. Flowers trumpet-shaped, with spreading mouth, yellow, in spikes; June to October. Introduced from Cape, 1805.

E. TETRALIX (the classical name). Cross-leaved Heath. Stems branched, 18 inches high, wiry. Leaves linear, blunt, in whorls, the margins rolled back greatly. Flowers drooping, egg-shaped, $\frac{1}{3}$ -inch, rosy, darker on upper surface; in an umbel; July to September. Native.

E. VAGANS (wandering). Cornish Heath. Stem stout and woody, erectly branched, 1 to 3 feet high. Leaves small, linear, the margins turned back over midrib, three or four in whorl. Flowers erect, bell-shaped, pink; anthers protruding; July and August. Native (West Cornwall only).

E. VESTITA (clad). Stem 3 feet high. Leaves linear, with rough edges. Flowers somewhat club-shaped, $\frac{3}{4}$ -inch long, downy, white, in terminal spikes; June and July. Introduced from Cape, 1789. There are numerous varieties, whose colour is indicated by their names.

E. WILMOREANA (Wilmore's). Stems and branches hairy, 2 feet high. Leaves linear, whitish with hairs, four in a whorl. Flowers long, tubular with dilated top, crimson, with white lobes; January to March. Hybrid. Plate 164.

Culture.

All the Cape Heaths require cool greenhouse treatment; the native and Continental species will do well out of doors. The house most suitable for their cultivation is light and airy, of equal temperature, which need not be many degrees above freezing-point in the winter—38 to 40 degrees is high enough. When the outside temperature is equal to this, and the air dry, it will do good to open the lights. Care is required at all points in the culture of these plants, and it is a relief to be able to say so, after telling the reader so frequently that other genera could be grown without special care. Heaths are particular as to soil, as to water, as to atmospheric conditions.

The soil must be such as they are used to in nature—a fibrous peat, broken into small lumps, and a liberal quantity of silver sand added, say one-third of the whole. Anything in the nature of chalk is disliked by them; it is therefore important to use only rain or other soft water. The drainage of the pots should be perfect, for nothing is more likely to destroy Heaths than stagnant water about their roots. From mid-summer to mid-autumn they should be turned outside into a very sunny position, in order to make good growth and set flowers before winter. After flowering the shoots should be cut back severely in the case of the soft-wooded sorts, but only the tops pinched out in the case of the hard-wooded ones. This will induce more vigorous and bushy growth. Those of

rapid growth require more pot-room and a less sandy soil than the slower-growing kinds, which require to be potted very firmly in a very sandy soil.

Ericas are propagated by means of cuttings,—except, of course, when raising new hybrids—which should be about an inch long and made from the ripened tips of the basal shoots, in autumn. After the lower portion has been divested of leaves, the cuttings are inserted in well-drained pots containing sandy peat, broken fine, with an upper layer of silver sand. The cuttings may be put in pretty closely, the whole watered, covered with a bell-glass and kept close, in a temperature of about 60 degrees. They must be frequently overlooked to see that no sign of mildew appears; if so, it must be dealt with at once by removing the affected cutting. The glass should be frequently wiped inside to guard against mildew. No more water should be given until the slips have rooted and growth has commenced, when the glass must be gradually removed, and air and light freely given. It is not advisable to pot them separately till the following spring, but as soon as they begin to make growth, the main shoot should be stopped, to promote a bushy habit. After they have been separately potted they will require shifting twice a year, for, unlike such subjects as *Pelargoniums*, they must never get pot-bound. The potting compost should be the same as already mentioned, with the addition of small pieces of thin crocks, scattered throughout the mass. The repotting should be made at the beginning of spring. It will be found that the species with soft wood are much less difficult to grow than the hard-wooded kinds. On no account should animal manure be given; food should be given in the form of an annual top-dressing of fresh peat or leaf-mould.

Description of Plate 164. *Erica wilmoreaana*, natural size. Fig. 1 is **Plates 164 and 165.** an enlarged representation of a detached flower, which is shown in section at 2, whilst the anthers and stigma are shown in the natural position at 3.

Plate 165. *E. melanthera*, the Black-anthered Heath, natural size. Fig. 1 is an enlarged view of a leaf from above; 2, an enlarged flower with the protruding style and anthers; 3, the same in section.

RHODODENDRONS

Natural Order ERICACEÆ. Genus *Rhododendron*

RHODODENDRON (the old Greek name, from *rhodos*, rose, and *dendron*, tree). An extensive genus of hardy and greenhouse shrubs, including



BLACK-ANTHERED HEATH
(ERICA MELANTHERA)

Nat. size

PL. 165

the old Linnæan genus *Azalea*. They have alternate, leathery, annual or biennial leaves. The flowers are usually large and showy, their effectiveness being enhanced by their frequent association in corymbs at the ends of the shoots. The flower-parts are in fives; the calyx five-sepaled or five-toothed; corolla funnel-shaped, bell-shaped, tubular or salver-shaped, five-lobed. Stamens eight or ten. Seed-capsules woody, five- to twenty-celled. The *Azaleas* were separated chiefly on account of their stamens being but five (an important point under the Linnæan system) and the leaves being more herbaceous, some not lasting over their first winter; but recent researches have resulted in the discovery of species that bridge over these differences. The species are found in the mountain regions of Europe, Asia, the Malay Archipelago, and North America.

History. Naturally, the European species of *Rhododendron* were the first to become known in British gardens, and *Rh. hirsutum*, one of the pretty Alpine Roses, was introduced from Switzerland in 1656. It was nearly eighty years later that the first of the North American species were brought over. These were *Rh. (Azalea) nudiflora*, *Rh. (Azalea) hispida*, and *Rh. (Azalea) viscosa*, introduced in 1734, and two years later came *Rh. maximum* from the same quarter. *Rh. ponticum*, so largely used in plantations and as a cover for game, came from Asia Minor in 1763; the similarly named *Azalea pontica* (more correctly *Rh. flavum*) came from the Levant in 1793. When these North American species were introduced they were regarded as hothouse plants, and so treated, but naturally without success. The story is told how Mr. Waterer, the founder of the Knapp-hill nurseries, had his attention called to a *Rhododendron* that was growing and flowering splendidly after having been cast out among the rubbish from one of his houses. There on the sandy heathy soil out of doors it had found the conditions which made healthy growth possible, and it had struck in its roots and grown unregarded until it called attention to itself by such a head of flowers as none of the hothouse specimens had shown. It is said that Mr. Waterer at once ordered all the *Rhododendrons* to be turned out and planted in the heathy soil natural to that district of Surrey, and here was the beginning of the firm's fame as growers of these plants. The Sikkim *Rhododendrons* are of more recent introduction, and require greenhouse treatment, or at least winter protection. They are exceedingly beautiful, their flowers far surpassing the hardy sorts, and some being very fragrant. In the following descriptions the species formerly separated under the genus *Azalea* are distinguished by (*Az.*) after the generic initials.

Principal Species. Horticulturally considered, *Rhododendrons* group themselves in four classes, in which we will set down the characters of the principal species.

I. HARDY RHODODENDRONS.

RH. ARBOREUM (tree-like). Trunk branching, 20 to 35 feet. Leaves lance-shaped, large and leathery, the edges rolled back, smooth above, covered with silvery scales beneath. Flowers white, rosy, or blood-red, in large, dense clusters; March to May. A fine half-hardy tree, introduced from Himalaya, 1820. There are several natural varieties; and there are some good hybrids among its progeny, but they mostly share its characteristic of flowering early, which makes them unsuitable for outdoor planting, except in sheltered localities. It is, however, one of the principal parents of the popular garden *Rhododendrons*.

RH. BLANDFORDIÆFLORUM (Blandfordia - flowered). Stem with slender scaly branchlets, 8 feet high. Leaves lance-shaped, leathery, 2 or 3 inches long, with rusty scales on the under-surface. Flowers tubular, drooping, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, cinnabar or orange-red, five to ten in a cluster; April. A native of Himalaya, introduced 1851.

RH. CAMPANULATUM (bell-shaped). Stem 4 feet high. Leaves elliptic, smooth above, covered with a reddish powder below. Flowers 2 inches across, rosy, or pale lilac spotted with purple; in corymbs; April. Hardy. Introduced from Sikkim, 1825.

RH. CATAWBIENSE (first found near the Catawba River). Bushy, 4 to 6 feet high. Leaves broad oval. Flowers broad bell-shaped, lilac; July. Hardy. Introduced from Carolina, 1809. One of the parents of many of the best of the garden *Rhododendrons*.

RH. CAUCASICUM (Caucasian). Stems decumbent, 1 foot high. Leaves lance-shaped or oval, the edges rolled back, under-side covered with rusty wool. Flowers funnel-shaped, rosy without, white within, the throat spotted with green; in corymbs; August. Hardy. Introduced from the mountains of the Caucasus, 1803. One of the parents of garden *Rhododendrons*.

RH. CILIATUM (fringed as with eyelashes). Stem 2 feet high. Leaves elliptic, leathery; upper-side velvety, under-side covered with rusty scales. Flowers large, bell-shaped, rosy pink or white; in terminal clusters of three or more; May. Whole plant more or less hairy. Introduced by Sir J. D. Hooker from Sikkim. Half-hardy, except in the South.

RH. DAHURICUM (Dahurian). Stem erect, 3 feet high. Leaves deciduous, egg-shaped, scaly. Flowers rosy, occurring singly or in



AZALEA
(AZALEA INDICA)

$\frac{1}{2}$ Nat. size

PL. 106

clusters of two or three; March. Hardy. Introduced from Dahuria, 1780.

RH. EDGEWORTHII (Edgeworth's). A straggling shrub, with branches often pendulous. Leaves oval-lance-shaped, 2 to 4 inches long; with margins turned back, surface wrinkled. Flowers, white suffused with yellow or pink, 4 inches across, highly fragrant; corolla-lobes downy beneath with fringed edges; in clusters of two or three; May and June. Introduced from Sikkim, 1851, where it grows on rocks and trees.

RH. FALCONERI (Falconer's). Trunk early branching into two or three, each becoming 2 feet in diam., and 30 to 50 feet high. Leaves shining, very thick and leathery, as much as a foot and a half long, and half as wide, finer than those of the Magnolia. Flowers small, but numerous, white, in dense globose clusters; May. Half-hardy. Introduced from Sikkim, 1850.

RH. FERRUGINEUM (rusty). Alpine Rose. Stems branched, 1 to 2 feet high. Leaves elliptical, smooth above, covered with rusty scales beneath. Flowers small, funnel-shaped, carmine, in small terminal clusters; May to July. Introduced from Switzerland, 1752. Hardy. There is a white-flowered variety—*albiflorum*.

RH. FORTUNEI (Fortune's). A hardy shrub, with stout branches, 12 feet high. Leaves narrowly oblong, rounded or heart-shaped at the base, 5 to 7 inches long. Flowers pale rose, drooping, fragrant; corolla seven-lobed, 3 to 5 inches across; stamens fourteen; in loose clusters of eight or ten; May. Introduced from China, 1859.

RH. FULGENS (shining). Stems 4 feet high. Leaves egg-shaped, leathery, glossy above, woolly beneath, the margins curled back, 4 inches long. Flowers bright blood-red, corolla shining, with five lobes; in dense heads; June. Introduced from Eastern Himalaya, 1851.

RH. GRANDE (large). Trunks, one to three, branched above, 30 feet high. Leaves oblong-egg-shaped, as much as a foot long and 5 inches wide, silvery white beneath. Flowers, 2½ inches across, bell-shaped, white, with purple blotch at base; March. Introduced from Sikkim, 1850. Also known as *Rh. argenteum*.

RH. GRIFFITHIANUM (Griffiths'). A tall bush or tree, 4 to 8 feet high, with oblong-lance-shaped, shining green leaves, pale and smooth beneath. Flowers pure white, saucer-shaped, 6 inches across, in large loose, terminal umbels; May. Introduced from Sikkim, 1850. Also known as *R. Aucklandii*. Except in very warm situations, this should have greenhouse accommodation.

RH. HIRSUTUM (hairy). Alpine Rose. Similar to *Rh. ferrugineum*,

except that the leaves are delicately toothed and fringed, the lower side covered with resinous dots. Hardy. Introduced from Switzerland, 1656.

RH. MADDENI (Madden's). Stem 6 to 8 feet high, with erect slender branches covered with rusty wool. Leaves lance-shaped, 5 to 7 inches long, footstalks and under-sides clothed with rusty scales. Flowers funnel-shaped, 3 or 4 inches across, white; June to August. Half-hardy. Introduced from Sikkim, 1850. Syn. *R. Jenkinsii*.

RH. MAXIMUM (greatest). Great American Laurel. Stems 10 to 20 feet high. Leaves oblong-lance-shaped, nearly a foot long, very leathery, the edges rolled slightly back, dusted beneath with rusty powdery scales. Flowers bell-shaped, an inch across, white, or rosy and white with yellow and purple-brown spots on the upper lobe; in dense terminal clusters; July. Hardy. Introduced from North America, 1756. One of the parents of the garden *Rhododendrons*.

RH. NUTTALLII (Nuttall's). Trunk 15 to 30 feet high. Leaves large, oval, leathery; shining above, covered with brown scales beneath. Flowers bell-shaped, white, tinged with rose, bright yellow centre, 6 or 7 inches across, fragrant; in few-flowered corymbs; May. Introduced from Bhotan, 1859.

RH. PONTICUM (native of Pontus, Asia Minor). Stem with spreading branches, 6 to 20 feet high. Leaves oblong-lance-shaped, pale or rusty beneath. Flowers purple, the upper lobe often spotted; in terminal corymbs; May. Introduced from Asia Minor, 1763. One of the hardiest and most widely-grown species. Used extensively for game coverts, and as a stock for grafting tender species. Many varieties and hybrids.

RH. THOMSONI (Thomson's). A twiggy bush with erect branches, 6 to 12 feet high, clothed with smooth purple bark and shining egg-shaped leaves. Flowers, bell-shaped, nodding, rich crimson, in loose terminal corymbs; June. Hardy. Introduced from Sikkim, 1851.

RH. VEITCHIANUM (Veitch's). Stems 6 feet high. Leaves egg-shaped, glaucous, 3 or 4 inches long; rusty, scaly beneath. Flowers large, pure white, corolla-lobes waved and crisped; May. Half-hardy. Introduced from Moulmein, 1850.

II. MALAYAN RHODODENDRONS: Parents of the most valuable race of all for greenhouse culture.

RH. BROOKEANUM (Sir James Brooke's). Branches stout, dark purple. Leaves long, oblong-lance-shaped, with short, broad purple footstalks. Flowers deep orange, corolla-lobes crisped; April. Stove shrub. Introduced from Borneo, 1848.

RH. JASMINIFLORUM (Jasmine-flowered). Stems branching, 2 feet



AUSTRALIAN HEATH
(*EPACRIS IMPRESSA*)

Nat. size

high. Leaves somewhat leathery, egg-shaped. Flowers white, with a rosy tinge to the tube, anthers red; in terminal umbels; May. Introduced from Malacca, 1849.

RH. JAVANICUM (Javanese). Stems with spreading branches, 4 feet high. Leaves egg-shaped, dotted with minute brown scales beneath. Flowers orange, spotted with red, anthers purple; in clusters of eight to twelve; appearing at all seasons. Introduced from Java, 1847.

RH. MULTICOLOR (many-coloured). A small slender bush, with broad lance-shaped leaves, in whorls. Flowers few, horizontal, dark red or bright yellow, an inch long; winter. Introduced from Sumatra, 1883.

RH. MALAYANUM (Malayan). A large stove shrub with red-brown branches, and with red-brown scales covering the twigs, the under-side of the leaves, the calyx, corolla, etc. Leaves leathery, lance-shaped, 3 to 4 inches long. Flowers $\frac{3}{4}$ -inch long, dull scarlet, nodding, in few-flowered umbels; summer. Introduced from Malaya, 1854.

III. HARDY AZALEAS.

RHODODENDRON (AZ.) ARBORESCENS (tree-like). Stem branching, 10 to 20 feet high. Leaves deciduous (not evergreen), egg-shaped, fringed. Flowers large, reddish; calyx leafy; May. Introduced from North America, 1818. Swamp Honeysuckle.

RH. (AZ.) CALENDULACEA (Marigold-like). Stem 2 to 6 feet high. Leaves oblong, downy, at length hairy, deciduous. Flowers large, numerous, hairy, yellow, orange, or red; May. Introduced from North America, 1806. Swamp Honeysuckle.

RH. (AZ.) FLAVUM (yellow). Stem 4 to 6 feet high. Leaves oval, shining, hairy and fringed. Flowers funnel-shaped, sticky, yellow or orange; May. Introduced from Asia Minor, 1793. Better known as *Az. pontica*. Numerous varieties.

RH. (AZ.) LEDIFOLIA (leaves like those of *Ledum*). Stem 2 to 6 feet high, hairy. Leaves hairy, lance-shaped. Flowers bell-shaped, Lily-like, pure white; calyx sticky; March. Evergreen. Introduced from China, 1819.

RH. (AZ.) NUDIFLORUM (naked flower). Similar to *Rh. (Az.) calendulacea*, but differing in the corolla being some shade between pink and deep purple, and the tube glandular; appearing before the leaves in spring. Introduced from North America, 1734. Crossing freely with *Rh. (Az.) calendulacea*, *Rh. (Az.) flavum*, *Rh. (Az.) viscosa*, and others, from which crosses many beautiful hybrids have been produced. Swamp Honeysuckle.

RH. (AZ.) SINENSIS (Chinese). Stem 3 to 4 feet high. Leaves

elliptical, downy, the edges fringed; deciduous. Flowers bell-shaped, downy, flame-coloured; May. Half-hardy, except in the South. Introduced from China, 1823. It is better known in gardens under the name of *Azalea mollis*. Many of its seedling varieties and hybrids are in cultivation (Japanese Azaleas).

RH. (AZ.) SPECIOSA (showy). A hairy branched shrub, 3 to 4 feet high, with fringed lance-shaped leaves. Flowers scarlet and orange; May. Native of North America, of which many varieties and hybrids are in cultivation.

IV. GREENHOUSE AZALEAS.

RH. (AZ.) INDICA (Indian). Stem 3 to 6 feet high, branched above, branches hairy. Leaves lance-shaped, densely covered with stiff hairs. Flowers bell-shaped, scarlet, purple, orange, white, etc.; November to June. Introduced from China, 1808. Greenhouse shrub. Plate 166. There is a long list of garden varieties and hybrids of this useful plant, with flowers of all shades, single and double.

Cultivation. As a general principle the suggestions we have given respecting the most suitable soil for Heaths, apply to the genus *Rhododendron*. Peat, leaf-soil, and sand form the compost most acceptable to all, yet most of the garden *Rhododendrons* will do well in a loamy soil, providing that it be entirely free from lime or chalk, and well drained. *Rhododendrons* are naturally fond of shady places, rather moist than otherwise, but they will do well in a sunny spot provided other plants shield their roots. These are always very near the surface, and in danger of being destroyed by a little full sunshine; but if a bed is specially prepared for these plants by taking out the ordinary soil to a depth of about thirty inches and filling with a peaty compost, some of the larger species may be planted in the middle, or at the back, and others of smaller growth grown around them in such a way that the roots of all are shaded. Copious waterings should be given until the plants are well established, and they will need this attention always in dry weather—an annual top-dressing of peat or leaf-mould mixed with cow-dung being all that is required, beyond the removal of weeds, dead branches, and so forth.

For the soil and treatment necessary for the pot-culture of the less hardy kinds we might also refer back to our directions for the greenhouse Heaths. Turfy peat and silver sand make the best compost, mixing with it light loam or leaf-soil for the freer-growing kinds. In repotting, the ball of earth should not be destroyed, but the lower portion with the drainage crocks should be cleared away, and the new soil should be well rammed in between the pot and the ball, otherwise



SEA LAVENDER
(*STATICE LATIFOLIA*)

$\frac{2}{3}$ Nat. size

the water will run through the new soil and leave the roots dry. The Indian Azaleas require almost the same treatment as soft-wooded Heaths, except that they like more moisture and copious syringings over head during the summer.

Propagation.

For the purpose of raising hybrids and new varieties, seed must, of course, be used; and it should be sown on pans of sandy peat, covered with a very finely-sifted layer of a more sandy character. After pressing down and watering this, the seed may be sown in March, and lightly covered with a sprinkling of sand and a few sprays of damp moss. Place the pans in a slightly warm but shady place and keep close. When the seedlings appear remove the moss at once, and a little later prick out the young plants in other pans of similar soil and keep close for a few days. Then gradually admit air and harden off. For most purposes, cuttings, grafting, and layering are the more general methods of propagating *Rhododendrons* and *Azaleas*. The young shoots or tips of branches, with the wood half ripened, are selected and inserted in pans of sandy peat, or rather in a layer of silver sand with their bases just touching the sandy peat below. They must be kept close and shaded in gentle heat. The roots appear very slowly, but will do so more surely if the cuttings are kept cool until a callus forms and then subjected to slight heat. Where the branches are so near the soil as to lend themselves to layering, this plan of propagation may be adopted, but it is slow, for the rooted branch must not be separated for two years. Grafting is also adopted where it is desired to grow standards, or to give greater vigour to naturally tender kinds. *Rh. ponticum* and *Azalea flavum* are usually chosen as stocks. The Indian Azaleas are grafted upon the common white variety, known as *A. indica alba*. The plants so operated upon must be kept close in frames until there is evidence of the union being complete. With the hardy outdoor varieties grafting is best done in summer; but winter is the season for performing this operation with greenhouse varieties, as the wood is then firmer.

Many of the hardy *Rhododendrons* claim *Rh. ponticum* as one of their parents. The Ghent Azaleas of the nurseryman are hybrids and varieties of the hardy American species (Swamp Honeysuckles), whilst the Indian or Chinese Azaleas of the same catalogues are the varied progeny of *Rh. (Az.) indica* and its varieties.

Description of *Rhododendron (Azalea) indica*, the natural form.

Plate 166. Below is a double flower, and above (Fig. 1) a section through the flower.

AMERICAN LAURELS

Natural Order ERICACEÆ. Genus *Kalmia*

KALMIA (named in honour of Peter Kalm, a pupil of Linnæus, 1715-1799). A small genus—about six species—of hardy evergreen shrubs, with entire leathery leaves and showy white, purple, or rose-coloured flowers. Five is the number dominating the structure of these flowers. The five sepals are united at their base; the five petals are joined by their edges throughout their length, and have ten little pits in which the ten anthers are kept until wanted. The filaments or footstalks of these anthers are slender and elastic, and when the flower opens they are curved away from the slender style; but on the appearance of an insect within the bell attempting to get at the honey in the base of the flower, a touch will cause one or more of these filaments to spring back towards the style and shake the pollen out of the anthers upon the insect, to be thus carried to another flower. The species are restricted to North America, except one, which is a native of Cuba. All flower in May and June.

Principal Species. **KALMIA ANGUSTIFOLIA** (slender-leaved). Sheep Poison. Stem 2 to 3 feet high. Leaves opposite, or in whorls of three, oblong, stalked. Flowers in lateral corymbs, purple or crimson. Introduced from Canada, 1736.

K. GLAUCA (glaucous). Stem 1 to 2 feet high, with two-edged twigs. Leaves oblong, the edges rolled back; almost stalkless, opposite or in threes, pale, glaucous beneath. Flowers lilac-purple. Introduced from North America, 1767.

K. LATIFOLIA (broad-leaved). Calico Bush. Stems and branches crooked, 5 to 15 feet high. Leaves mostly alternate, smooth, stalked, elliptical. Flowers covered with a sticky down; variable in colour from white to rose-colour, in terminal compound corymbs. Introduced from North America, 1734.

Cultivation. The cultural directions given for hardy *Rhododendrons* apply also to *Kalmias*, and the peaty soil is a necessity for these as for those. They are among the most striking and useful of flowering shrubs, and their cultivation is not attended with any difficulty. *K. latifolia* is the best known and most widely grown, and has the recommendation of being amenable to forcing, for the early decoration of greenhouse or conservatory in spring, if plants are left outside until winter, then potted and taken into the greenhouse.



THRIFT OR SEA-PINK
(*ARMERIA MARITIMA*)

$\frac{2}{3}$ Nat. size

AUSTRALIAN HEATHS

Natural Order EPACRIDÆ. Genus *Epacris*

EPACRIS (Greek, *epi*, upon, and *akris*, the summit of a mountain). A genus of about twenty-six species of erect, greenhouse shrubs, similar to Heaths in their general appearance and the places where they grow, but differing from *Erica*, in the flowers being symmetrically five-parted, in the stamens being attached to the corolla-tube instead of to the disk, and in the anthers being only one-celled without appendages. The flowers are borne in the axils of the leaves, usually forming leafy spikes. The calyx is coloured, and surrounded by many overlapping bracts. Leaves scattered, usually lance-shaped, or heart-shaped, sharply pointed. They are natives of the Extra-tropical regions of Australia, New Zealand, and New Caledonia.

History. Australian Heaths were, of course, unknown in old-fashioned gardening establishments, for the sufficient reason that their native land had not been explored. The first species to be introduced were *E. purpurascens* and *E. longiflora*, from New South Wales in 1803, followed next year by *E. obtusifolia*. *E. acuminata* and *E. impressa* date from 1824, when they were brought from New Holland. Although they have been subject to cultivation for a period comparatively short, they have yielded good results in a long list of varieties and hybrids, superior in most cases to the natural forms from which they have been derived. About one hundred named varieties are grown by nurserymen who make a speciality of *Epacris*.

Principal Species. EPACRIS ACUMINATA (sharp-pointed). Stem branched, bushy, 2 to 3 feet high. Leaves oval, erect, concave, clasping the stem. Flowers few, red; calyx-lobes almost as long as corolla-tube; corolla-lobes blunt; April to June.

E. IMPRESSA (engraved). Stems loosely-branched, 2 to 3 feet high. Leaves lance-shaped, varying in width, stalkless. Flowers varying in form, colour, and size; some almost bell-shaped, others a slender-cylinder; all shades from white to deep red; from $\frac{1}{4}$ - to $\frac{1}{2}$ -inch long; April to June. The corolla is marked near its base, on the outside, with five *impressed* spots, which alternate with the positions of the anthers above and within. Plate 167.

E. LONGIFLORA (long-flowered). Stems 2 to 4 feet high, with straggling downy branches. Leaves broad-lance-shaped, rounded or heart-shaped at base. Flowers cylindrical, slightly curved, drooping,

the tube crimson or reddish-purple, the lobes and top of the tube pure white; May and June.

E. PURPURASCENS (purplish). Stems 2 to 3 feet high. Leaves oval, with a long slender point. Flowers white, tinged with red; January to March. There is a double form.

Cultivation. Again we have to refer back to *Erica*, for general instructions respecting soil, propagation, and after-treatment of *Epacris*. The same cautions respecting watering, drainage, and repotting apply. In order to obtain strong shoots the stems should be cut back with some severity soon after flowering, and the plants put into a close sunny frame or house until the new shoots have made a fair start; then they should be repotted. For about two months during the summer, they may be stood out of doors on a cinder-bed. They require ordinary greenhouse temperature in winter.

Description of Flowering shoots of *Epacris impressa*, showing
Plate 167. extremes of colour variation. Fig. 1 is an enlarged flower of A, 3 of B; 2 and 4, the same in section.

SEA LAVENDERS

Natural Order PLUMBAGINEÆ. Genus *Statice*

STATICE (Greek, *statizo*, to stop; originally applied to some unknown astringent herb). A genus comprising between fifty and sixty perennial herbs, with radical leaves, and regular five-parted flowers. The petals are free or united by their base only. Stamens, five, attached to lower part of petals. Ovary egg-shaped or oblong, surmounted by the five long thread-like styles. The species are found along the shores of Temperate seas, and in salt-marshes, more especially in Western Asia. Three species occur in Britain.

Principal Species. **STATICE ELATA** (tall). Scapes 2 feet high. Leaves oval, shortly stalked. Flowers blue, in small cymes gathered into branched panicles; branches three-angled; July. Introduced from Southern Russia, 1820.

S. LATIFOLIA (broad-leaved). Scapes 12 to 18 inches high, much-branched. Leaves large (7 or 8 inches long), oblong-elliptic, tapering into the leaf-stalk. Flowers: calyx white, corolla violet; the panicles extensive and of great lightness; June. Introduced from South Russia, 1791. Plate 168.

S. MACROPHYLLA (large-leafed). Scapes 2 feet high. Leaves



CERATOSTIGMA PLUMBAGINOIDES

Nat. size

PL. 170

oval-spoon-shaped, large, stalkless. Flowers white, May. Half-hardy sub-shrub. Introduced from Teneriffe, 1824.

S. ROSEA (rose-coloured), Scapes 3 feet high. Leaves oblong oval, stalked, with rough tubercles above and below. Flowers blue; May. Half-hardy sub-shrub. Introduced from the Cape, 1840.

S. SINUATA (sinuate-leaved). Scapes 1 foot high. Leaves cut pinnately into deep rounded lobes, narrower at base. Flowers purple or yellow, in small paniced corymbs; August. Half-hardy. Introduced from the Levant about 1629.

S. SUWOROWI (Suworow's). Leaves oblong-lance-shaped, entire or with very large teeth. Flowers lilac, in dense, branched spikes; July. A hardy native of Turkestan, introduced 1883; differing entirely in appearance from the others.

S. TARTARICA (Tartarian). Scape branched, 1 foot high. Leaves, oblong-spoon-shaped, rigid. Flowers ruby-red, in one- to three-flowered spikelets that form an extensive panicle; June and July. Hardy. Introduced from Russia, 1731.

Culture. Turfy loam, to which a good proportion of sharp sand and a little charcoal have been added, forms the best compost for growing *Statice*; and they should be given a sunny position. Large clumps may be divided in spring; or seeds sown in pots or pans in March, and placed in a frame. The seedlings should be hardened off and pricked out into nursery beds, when they may be finally planted out in the spring following. The greenhouse species, *i.e.* those from the Cape and the Canary Islands, require a light rich soil and a somewhat moist position in a light frame or house. They make handsome specimens for the conservatory.

Description of Plate 168. Leaves and panicle of *Statice latifolia*. Fig. 1, unopened bud showing white tubular calyx; 2, open flower; 3, section of flower. Figs. 1 to 3 all greatly enlarged.

THRIFTS OR SEA-PINKS

Natural Order PLUMBAGINEÆ. Genus *Armeria*

ARMERIA (*Flos Armeria* was the old Latin name for Sweetwilliam). A genus comprising about thirty species of tufted perennial herbs, with very narrow, thick, radical leaves. The flowers are separately stalked, but clustered in dense hemispherical heads, surrounded by an involucre of bracts, the bases of which are continued as a translucent tube some distance

down the scape. The flowers are five-parted, as in *Statice*; the calyx funnel-shaped, dry and translucent (*scarious*), the petals of a tough, persistent character, joined together by their bases. The stamens are attached to the petals by the dilated base of the filament; the ovary egg-shaped, the hair-like stigmas covered with little *papillæ*. The species are natives of Alpine, Arctic, and maritime North Temperate regions, also of Chili; two indigenous to the British Islands.

History. *Armeria maritima* (or *vulgaris*), the most widely-cultivated species, is a native of our own rocky coasts and lofty mountains. Any gardener to whom Thrift was unknown, and who happened to witness the glorious display it makes on some of our cliffs from April to June, would be struck with its obvious fitness for garden purposes, and filled with the desire to transplant it. So we may be sure it struck the early gardeners; but useful as it has long been in horticulture, it cannot reproduce in gardens the charming effects of its growth on rugged cliffs. Its proper place is in the rock-garden, where it shows to the greatest advantage; but it can be very profitably used as an edging. Not content with our native species, we introduced from Portugal, in 1740, *A. latifolia*, a taller-growing species with more deeply-coloured flowers; and at intervals since, other species have been brought under cultivation.

Principal Species. ARMERIA DIANTHOIDES (Pink-like). Scapes 6 inches high. Leaves spreading, flattened, slightly downy. Flowers light pink; May and June. Introduced from South Europe, 1810.

A. JUNCEA (Rush-like). Scapes 3 inches high. Leaves small, rounded, erect. Flowers rose-pink in small heads. An alpine species from Southern France.

A. JUNIPERIFOLIA (Juniper-leaved). Scapes 6 inches high. Leaves short, stiff, erect. Flowers deep rose; May and June. Introduced from Spain, 1818.

A. MARITIMA (belonging to the sea). Scape 3 to 12 inches high. Leaves in dense clusters, less than $\frac{1}{8}$ -inch broad, covered with impressed dots above and below. Flowers rose-pink or white; April to October. Native. Also known as *A. vulgaris*.

A. PLANTAGINEA (Plantain-like). Scape 12 inches high. Plant stouter, larger, and more rigid than *A. maritima*. Leaves smooth, narrow-lance-shaped, as much as $\frac{1}{4}$ -inch broad, with cartilaginous margins. Flowers deep rose; June to August. Native of Jersey.

Cultivation. *Armerias* are propagated by seeds and divisions. Seeds should be sown in spring on sandy loam, and



PRIMROSE
(*PRIMULA VULGARIS*, and *vars.*)

Nat. size

PL. 171

germinated in a cold frame. *A. maritima* and similar species are best multiplied by division of the tufts, which may be pursued almost indefinitely, a clump about 4 inches across dividing into hundreds of little tufts, each with a stout base, which easily roots under a hand-glass, or without, if the soil is not too dry. *A. latifolia* does not succeed so well when divided. The best compost for them is sandy loam and leaf-mould, but they will succeed in most garden soils. *A. juniperifolia* prefers a very sandy soil, well-drained and with bits of sandstone to root among. *A. maritima* makes a splendid edging, as it is always the same height, and requires no clipping; it has the fault, however, of getting too broad, and must be thinned out from time to time.

Description of A small tuft of *Armeria maritima*, two-thirds of the
Plate 169. natural size. The separate figures are—1, head of flowers cut through; 2, an unopened flower showing the silvery calyx and attached bract; 3, flower open; 4, section of flower. Fig. 1 is slightly, Figs. 2–4 considerably, enlarged.

PLUMBAGOS

Natural Order PLUMBAGINEÆ. Genus *Plumbago*

PLUMBAGO (Latin *plumbum*, lead, the plant being considered by Pliny to be an antidote for the lead disease). A genus including about ten species of mostly perennial herbs or sub-shrubs, with alternate leaves and showy flowers. Calyx tubular, five-toothed, glandular; corolla salver-shaped, five-lobed, stamens attached beneath the ovary. They are natives of the warmer regions of Europe, Asia, and Africa.

Principal Species. PLUMBAGO CAPENSIS (Cape of Good Hope). Stem ridged, 2 or 3 feet. Leaves oblong or spoon-shaped, entire. Flowers pale blue in one-sided terminal clusters; corolla-tube three times the length of calyx; continuously throughout summer and autumn. Stove or greenhouse. Introduced from the Cape, 1818. There is a white-flowered var. *alba*.

P. EUROPÆA (European). Stem erect, branched, 3 feet high. Leaves oval or lance-shaped. Flowers violet-rose, clustered at ends of branches; corolla about twice the length of calyx; September. Hardy. Introduced from Europe, 1596.

P. ROSEA (rosy). Stem slender, erect, branched above; finely ridged, 2 feet high. Leaves large, oblong, wedge-shaped at base, and stem-clasping. Flowers rosy scarlet, 1½ to 2 inches long; corolla-tube four

times the length of calyx; July. Stove. Introduced from East Indies, 1777.

Cultivation. *Plumbagos* succeed best in a compost of fibrous loam and sand to which a little peat has been added. Most of the species require warmth, though *P. capensis* may be used for bedding in summer after all danger of frost has passed. It does better, however, if kept in the greenhouse and trained up a pillar or wall. *P. rosea* may be induced to flower through winter in the stove; it requires a higher temperature than *P. capensis*, which really only needs protection from frost and keeping rather dry through the winter. After flowering they should be cut back rather severely, to induce an abundance of new shoots, for upon these the flowers are produced, and not upon the old wood.

LADY LARPENT'S PLUMBAGO

Natural Order PLUMBAGINÆ. Genus *Ceratostigma*

CERATOSTIGMA (Greek, *keratos*, horn, and *stigma*, the stigmas being covered with horn-like projections). A genus comprising only three or four species of perennial herbs or shrubs, very similar to, and having most of the characters of *Plumbago*. They differ, however, in minute points, such as the absence of glands from the calyx, and the stamens being attached to the corolla half-way up the tube, instead of beneath the ovary. One species is a native of China, another of Himalaya, and one or two others of Abyssinia.

Species. CERATOSTIGMA PLUMBAGINOIDES (Plumbago-like). Stems slender, flexuous, scaly, and hairy, 1 to 2 feet high. Leaves egg-shaped, pointed, fringed, minutely scaly. Flowers dark blue, changing to violet, in axillary clusters; lobes of corolla heart-shaped; September to November. Hardy. Introduced from Shanghai, 1846. Also known in gardens as *Plumbago Larpentæ*.

Cultivation. No special instructions are needed under this head, for it succeeds in ordinary garden soils, though it has a preference for those of a sandy nature and for a rather shady position. Its tendency to lean its stems upon the ground before rising may be utilised by pegging it down to form edgings, carpet-bedding, etc. It is happy when planted amongst stones in the rockery. It is propagated by dividing the root.

Description of *Ceratostigma plumbaginoides*, upper part of stem,
Plate 170. the natural size. Fig. 1 is a detached flower, enlarged; and Fig. 2 is a section through the same.



POLYANTHUS
(PRIMULA VARIABILIS)

Nat. size

PL. 172

PRIMROSES AND AURICULAS

Natural Order PRIMULACEÆ. Genus *Primula*

PRIMULA (Latin, *primus*, first, from the early date of flowering). This typical genus of an important Natural Order comprises about eighty species of perennial herbs, with radical leaves and scape-borne flowers. These are white, yellow, rosy, or purple, borne in umbels springing from an involucre of bracts. The calyx is persistent, five-toothed; corolla funnel- or salver-shaped, with five spreading or incurved lobes. Stamens five; ovary egg-shaped or globose, style thread-like, expanding at the tops into the stigma. In many species the flowers are of two forms (*dimorphic*), one having a long style, with the stamens attached low down the tube; the other with a short style and the stamens attached a little below the mouth of the tube. This arrangement has importance in promoting the natural cross-fertilising of the flowers. The species are distributed throughout the North Temperate, Arctic, and mountain regions, besides a few in Chili, Fuegia, and Java. No less than five species are indigenous to Britain.

History. This genus includes some of the most valuable plants the gardener and florist have. With five native species, every one worthy of cultivation, it is not too much to venture the opinion that so long as flower-gardens have existed in this country there have been cultivated Primroses. The Polyanthus is probably one of the results of this early cultivation, for no one can say with certainty now from which of our indigenous species it has been produced. Some say *P. vulgaris*, some *P. elatior*, others that it is a hybrid between *P. vulgaris* and *P. veris*. For more than three centuries we have grown *P. Auricula*, the progenitor of all the fine florists' Auriculas, brought from the European Alps some time prior to 1596. The favourite Chinese Primulas (*P. sinensis*) we have known little more than three-quarters of a century; whilst the Japanese and Himalayan species are introductions of yesterday, so to speak. It is to be regretted that in our enthusiasm for these new acquaintances we have to a certain extent neglected our old love, the Auricula. Possibly this may be due to the rigidity of the exhibition points insisted on by strict florists, which have rather tended to take away from the natural grace of the plant by making its blossoms too geometrically severe. A few years ago Auriculas were utterly neglected, but more recently there has been a revival of interest in them. Hybrids between distinct species of *Primula* are abundant.

Principal Species. PRIMULA ALLIONI (Allioni's). Scapes 3 inches high. Leaves oval or spoon-shaped, densely covered with a short glandular down, slightly toothed. Flowers, 1 inch across, solitary or in pairs; mauve with white centre; April. Native of the Alps of Dauphiné; introduced 1818.

P. ALTAICA (Altaic). Plant 3 to 5 inches high. Leaves egg-shaped, with somewhat waved margins, and slightly mealy. Flowers, $1\frac{1}{4}$ inch across, mauve or purple-crimson, with yellow centres; numerous; May to July. Introduced from the Altai, 1819.

P. AURICULA (ear-like). Leaves egg-shaped or oblong-lance-shaped, smooth, fleshy, glandular-toothed. Flowers, $\frac{3}{4}$ -inch across, bright yellow (assuming many different hues under cultivation), in umbellate clusters of many flowers at the summit of the scapes; 3 inches high; March to May. The parent of innumerable beautiful varieties and hybrids. The var. *flore pleno* is a natural form.

P. AURICULATA (eared). Leaves oblong or egg-shaped, smooth with slight round teeth at edges, pale beneath. Flowers purplish with white centre, drooping, five or six in an umbel, 4 inches high; May and June. Native of Asia Minor, introduced 1825. Somewhat resembling *P. farinosa*, but with longer flowers.

P. CALYCINA (large calyx). Leaves oblong or lance-shaped, with a horny, waved margin; glaucous beneath. Flowers purple, umbelled, on short scapes (3 inches); May and June. Native of Lombardy; introduced 1838.

P. CAPITATA (headed). Leaves oblong, wrinkled and toothed, mealy beneath. Flowers deep violet-blue, mealy, densely packed in round heads, $1\frac{1}{2}$ inch across; scapes 6 to 9 inches high; April to June. Introduced from Himalaya, 1850.

P. CORTUSOIDES (Cortusa-like). Leaves large, heart-shaped, wrinkled, deeply and doubly toothed, on long footstalks. Flowers deep rose, in umbels; scapes 6 to 10 inches high; May and June. Native of Japan and Siberia; introduced 1794. The var. *Sieboldii* is larger and handsomer than the type. Introduced from Japan, 1865, and known in gardens as *P. amoena*. There are numerous seedling varieties of this.

P. DENTICULATA (toothed). Leaves oblong-lance-shaped, hairy, wrinkled and toothed, mealy as well as hairy beneath. Flowers bright lilac, $\frac{1}{2}$ -inch across, in dense heads; scape 8 to 12 inches; April to June. Native of Himalaya. The var. *pulcherrima* has deeper lilac flowers; larger head and taller scape. Var. *alba* has white flowers. Var. *cashmeriana* has pale purple flowers with yellow eye, scape very stout and mealy, and the mealiness under leaves taking a golden hue.



AURICULA

(PRIMULA AURICULA)

Nat. size

PL. 173

P. ELATIOR (taller). Oxlip. Leaves wrinkled, on winged footstalks. Flowers similar to those of *P. vulgaris*, but scentless, with short footstalks springing from the top of a stout scape, 12 inches high, and either horizontal or drooping; the calyx also is less inflated; April and May. Indigenous to Eastern counties of England. The var. *amœna* is a purple-flowered form from the Caucasus.

P. FARINOSA (mealy). Bird's-eye Primrose. Leaves egg- or spoon-shaped, with rounded teeth, smooth above, covered with white or yellowish powder beneath. Flowers purple-lilac, erect or horizontal, in umbels on stout scape, 2 to 8 inches high; calyx mealy; corolla $\frac{1}{2}$ -inch across, with wedge-shaped, cleft lobes, and contracted yellow mouth with rounded folds; June and July. Indigenous to Northern English counties. The var. *acaulis* is a diminutive form.

P. FLORIBUNDA (abundant flowers). Leaves lance-shaped, stalked, toothed, covered with glandular down. Flowers yellow, in whorls; scapes 4 to 8 inches. Introduced from Western Himalaya, 1883.

P. JAPONICA (Japanese). Leaves large oblong-spoon-shaped, wrinkled and coarsely toothed. Flowers in several whorls on the same scape, 1 to 2 feet high; crimson, maroon, lilac, rosy, or white, the rim of corolla-tube differently coloured; March to May. Hardy in the South of England, naturalised in some parts. Introduced from Japan, 1871. Plate 174.

P. OBCONICA (reversed cone). Leaves somewhat heart-shaped, with lobe-toothed, margins. Flowers, drooping, in umbels, pale lilac or purplish; scapes 6 to 12 inches; April to June. One of the best of greenhouse plants. The hairs on the leaves when handled are known to cause an irritating skin eruption or eczema in some people. Introduced from Central China, 1882.

P. ROSEA (rosy). Leaves pale green, resembling those of *P. vulgaris*, but not wrinkled; edges crimped and slightly toothed. Flowers rosy carmine, with yellow centre, six to ten in a head; scapes stout, 4 to 6 inches high; March to May. A good plant for the bog-garden. Introduced from Kashmir, 1879.

P. SCOTICA (Scottish). Very similar to *P. farinosa* (of which it may be a sub-species), but much smaller and with purple-blue flowers; June to September. Scapes 2 to 4 inches high. Indigenous to extreme North of Scotland.

P. SIKKIMENSIS (native of Sikkim). Leaves egg-shaped, rough and wrinkled, doubly toothed; footstalk winged. Flowers pale yellow, $\frac{1}{2}$ -inch across, in large umbels, sometimes comprising fifty or sixty flowers; scapes $1\frac{1}{2}$ to 2 feet high; June to August. Introduced from Himalaya, 1850.

P. SINENSIS (Chinese). General outline of leaves heart-shaped, but edges lobed and toothed; fleshy, hairy, on long stalks. Flowers small in the wild form, white or pale lilac, lobes with only one notch; March to May. Scape 9 inches high. Introduced from China, 1820. A greenhouse plant, of which cultivation has produced numerous varieties both single and double. Plate 175.

P. VARIABILIS (variable). Polyanthus. Leaves intermediate in character between those of *P. vulgaris* and *P. veris*, of which two species it is generally considered a hybrid, although its origin is not known with certainty. Flowers like those of the Common Primrose, but mounted on tall scapes (5 or 6 inches high), and some mixture of purple, red, and yellow, in endless variety of combinations; March to May. Frequently occurs wild in Britain. Plate 172.

P. VERIS (true). Cowslip or Paigle. Leaves narrower than those of *P. vulgaris*, downy. Flowers small, deep yellow, fragrant; funnel-shaped, the lobes concave, forming a shallow cup; drooping, in umbels, scape 4 to 12 inches; April to June. Indigenous. Natural varieties sometimes occur with scarlet or orange-brown flowers. Several garden varieties.

P. VISCOSA (sticky). Leaves egg-shaped or more rounded, upper end closely set with large teeth, viscid with glandular hairs on each surface. Flowers rosy purple with white centres, in small umbels; scapes sticky, 2 to 4 inches high; May. Introduced from Pyrenees, 1768.

P. VULGARIS (common). *The Primrose*. Leaves, broad, wrinkled, becoming large after flowering. Flowers large, pale yellow, on separate footstalks as long as the leaves; April and May. The scape is suppressed in this species, and the footstalks to the flowers appear as scapes. Occasionally, however, specimens are found wild, with a tall scape bearing an umbel of long-stalked flowers, and is then confounded with *P. elatior*. The flowers also occur rarely of a white, lilac, or pale purplish tint. There are also numerous garden varieties and hybrids. Mr. G. F. Wilson, of Weybridge, has raised a series of varieties with blue or purple flowers. Indigenous. Plate 171.

In addition to the foregoing species there are a very great number of hybrids in cultivation, which are, as a rule, superior to the types for horticultural purposes. For these we must refer readers to the catalogues of the nurserymen.

Cultivation. Primulas like a rich but open soil; a position where they will neither dry up in summer, nor damp off in winter. The hardy alpine species should be planted in the rock-garden, and care should be taken to have their crowns above the soil; they will be



JAPANESE PRIMROSE

(PRIMULA JAPONICA)

$\frac{2}{3}$ Nat. size

PL. 174

benefited if planted against pieces of sandstone. This is a precaution that should be observed in all cases, whether *Primulas* be in pots or in the open ground. Propagation is effected by sowing seeds, or by dividing the roots. All the species come readily from seed, if sown immediately after ripening; but if kept for a few months it takes a long time to germinate. The best compost for seed-pans consists of two parts leaf-mould to one part loam, and a little sand. This should be filled in on a good layer of broken crocks for drainage, the surface made firm and even, watered, and a slight sprinkling of fine earth given after the seeds have been scattered. Now cover the pan with a sheet of glass, and place in a shady part of the greenhouse or warm frame. When the seedlings appear the sheet-glass should be removed and the pan brought more into the light. As soon as large enough, the young plants should be pricked out into other pans of similar soil, afterwards potting singly, or hardening off preparatory to planting out. *P. sinensis* and its varieties require to be grown in pots in a frame or greenhouse. The double varieties require an intermediate temperature. The garden varieties do not come true from seed, and must be increased in early spring by careful separation of the crowns and division of the rootstock.

Among the best species for pot-culture will be found *P. japonica*, *P. obconica*, *P. cortusoides* var. *Sieboldii*, *P. sinensis*, *P. sikkimensis*, *P. Auricula*, *P. capitata*, *P. floribunda*; all of which do well in a cold house, better in fact than in the high temperatures to which amateurs frequently subject them in heated greenhouses. They require protection from frost in winter, but even at the flowering period these species should not have a temperature higher than 55°.

The culture of *P. Auricula*, and its many garden varieties and hybrids, is a special department of horticulture into which the scope of this work will not allow us to enter; but we may briefly state that they are divided into two main classes, Show and Alpines. The Alpines are much hardier than the others, and are therefore chiefly grown outside. The Show Auriculas are again divided into four sub-classes: *Selfs*, *Green-edged*, *Grey-edged*, and *White-edged*. *Alpines* have flowers free from powder, yellow or white in centre, with another colour paling off towards the margin. *Selfs* have the corolla-tube yellow, the lobes of some other colour without different edging or shading. The *Edged* sections vary in apparent colouring of the edge of the flower in proportion to the quantity of powder with which they are dusted; the green-edged having little, the grey-edged more, and the white-edged much more, so that it appears to be white. There are other points insisted upon by Auricula specialists, in addition to the edges, but these

are the primary distinctions. In the propagation of distinct varieties of Auriculas, great reliance is placed upon offsets, and to obtain plenty of these the "crown" or top part of the plant is cut off the fleshy root-stock and potted separately. This treatment causes a number of side-shoots to break all round, and these become the offsets, which are taken off early in autumn and struck in pots. The most approved soil for Auriculas is a compost, all the ingredients of which have been carefully selected and stored for about twelve months prior to mixing. Here is the recipe: Take of good fibrous loam, four parts; cow-manure, thoroughly rotted, one part; leaf-mould, one part; silver sand, one part; season, so to speak, with a little charcoal or broken oyster-shells. Well mix before using.

Description of Plate 171. *Primula vulgaris*, the Common Primrose, **Plates 171-175.** and some of its varieties. Fig. 1 is an enlarged section through a flower.

Plate 172. *P. variabilis*, the Polyanthus, in two of its shades of colouring. Fig. 1 is a section of flower with the anthers near the top of tube; 2, with anthers more than half-way down.

Plate 173. *P. Auricula*, the Auricula. The yellow flowers are of the normal size and colour of the species, the others are of cultivated forms. Fig. 1 is a section of flower.

Plate 174. *P. japonica*, the Japanese Primrose, with upper portions of flowering stems, and the flowers in distinct whorls. Fig. 1, section.

Plate 175. *P. sinensis*, Chinese Primrose. Fig. 1, section through flower, showing disproportion between breadth of corolla-tube and calyx.

S O W B R E A D S

Natural Order PRIMULACEÆ. Genus *Cyclamen*

CYCLAMEN (Greek, *kyklikos*, circular; alluding to the spirally twisted flower-stalk when the fruit is ripening). A genus of eight or nine species of tuberous-rooted herbs, with broad, stalked, radical leaves and nodding pink, lilac, or white flowers. These are borne singly on an erect, naked scape, bent over at the summit. The calyx is five-lobed, the corolla with a short tube, a thickened throat, and five large lobes turned back over the calyx. The five stamens are attached to the bottom of the corolla-tube; the ovary is globose, with a short, simple style and stigma. The species are natives of South Europe, North Africa, and Western Asia; one a doubtful native in Kent and Sussex.



CHINESE PRIMROSE
(PRIMULA SINENSIS)

$\frac{2}{3}$ Nat. size

PL. 175

History. For at least three centuries we have grown *Cyclamens*, for the fragrant, bright-red-flowered *C. europæum*, and the inodorous *C. coum*, were in our gardens prior to 1596, and *C. hederæfolium*, whether truly indigenous to Britain or merely naturalised, had been here probably earlier than *C. europæum*. *C. persicum*, whose varieties are so popular as pot-plants for conservatory and window decoration, was introduced from the East in 1731; unfortunately, it is not so hardy as the foregoing species and some others. *C. neapolitanum* came from Italy in 1824, and *C. cilicicum* was introduced from Cilicia so recently as 1872. *C. Atkinsii* is of garden origin, having been raised by Mr. Atkins of Painswick from seeds of *C. ibericum*.

Principal Species. CYCLAMEN AFRICANUM (African). Tuber large, with root-fibres from all parts. Leaves round-heart-shaped, 6 to 8 inches across, strongly toothed; marbled with white. Flowers white or pale red, with purple blotches round the mouth of the tube; corolla-segments about an inch long; September and October, before the leaves; height 4 inches. Native of Algeria.

C. ATKINSII (Atkins'). Tuber globose, with root-fibres in tuft from base. Leaves appearing with the flowers, rounded, oval, zoned with white. Flowers of various shades of rose and red freely produced in winter and early spring. There is also a var. *album* with pure white flowers. These are very hardy.

C. CILICICUM (Cilician). Tuber depressed, with root-fibres in a bunch from base. Leaves almost round; untoothed, appearing with flowers in October. Flowers pure white, with a purple blotch at base of each segment.

C. COUM (native of Coum). Tuber depressed, root-fibres from base. Leaves round, untoothed, purple beneath, on short leaf-stalks; appearing with the flowers in February and March. Flowers smaller than in any other species, inodorous, deep red, with darker spot at base of corolla-segments. There is a white var. *album*, and a rosy red var. *carneum*. Hardy.

C. EUROPEUM (European). Tuber depressed, with root-fibres from the lower half generally; leaves and flowers often two or three inches away from tuber, connected by means of a rhizome. Leaves heart-shaped; entire or with minute teeth; prettily marbled and tessellated; produced at same time as flowers. Flowers bright reddish purple; August to October. Height 4 inches. Hardy.

C. HEDERÆFOLIUM (Ivy-leaved). Tuber 1 to 3 inches (sometimes much more) across, turnip-shaped, root-fibres from the whole of its surface. Leaves heart-shaped in general outline, but five- to nine-angled,

with smaller teeth, and whitish mottled border, often purple beneath; appearing soon after flowers. Flowers pink or white with purplish spot at base of the segments; August and September. Height 4 to 8 inches. Hardy.

C. IBERICUM (Iberian). Tuber globose, with root-fibres in tuft from base. Leaves roundish-oval, zoned with white, sometimes slightly undulated, appearing with flowers in February and March. Flowers bright red, with purple base to segments. Rather tender.

C. PERSICUM (Persian). Tuber depressed, large, with root-fibres from all parts of the under-side. Leaves heart-shaped, variegated with white, and with rounded teeth; appearing with flowers in November to April. Flowers larger than those of any other *Cyclamen*, white, with a carmine patch at base of the corolla-segments; inodorous. This is the best-known and finest species, of which there are many varieties in cultivation, with flowers of all tints between pure white and deep crimson; some fragrant. Tender. Plate 176.

Cultivation. The hardy species of *Cyclamen* do well out of doors in most parts of Britain, and good situations will be found for them on rockeries, and in somewhat shady places among grass, if the soil is thoroughly drained. For pot-culture use a compost of loam and leaf-mould in equal portions, and add a little silver sand and *thoroughly* rotted cow-manure. Good drainage is essential. The tuber must not be buried; the whole of the upper surface must be above ground, and it is best to have the upper half or third thus exposed. The pots must be stood near the glass in a light airy place (but shaded from bright sunshine), and freely watered; the leaves also being frequently syringed. Propagation is effected by means of seed, which should be sown as soon as fully ripe, and germinated in a frame, if of a hardy sort. The young plants should be grown on in the same structure until large enough to plant out. The seeds of *C. persicum* require a stove temperature to induce them to germinate satisfactorily. When the seedlings are large enough to handle, they should be pricked out into pans or boxes, and again separately into small pots (three inches) when they have developed three leaves. They should then be grown on a shelf in a warm house or close to the glass in a heated frame until the summer, when they should be shifted into five- or six-inch pots, for flowering. Green-fly, Thrips, and Red Spider should be constantly looked for, as they soon spoil the look of the plant by causing the leaves to curl.

Description of One of the numerous forms of *Cyclamen persicum*,
Plate 176. about one-third less than the natural stature. Fig. 1 is a section through a flower of the normal tints.



PERSIAN CYCLAMEN
(CYCLAMEN PERSICUM)

$\frac{2}{3}$ Nat. size

AMERICAN COWSLIP

Natural Order PRIMULACEÆ. Genus *Dodecatheon*

DODECATHEON (Greek, *dodeka*, twelve, and *theoi*, gods; best explained by stating that Linnæus, its author, regarded the flowers in an umbel—about twelve—as so many little divinities). A genus comprising two or three species of perennial herbs, with oblong radical leaves, and small flowers of similar structure to those of *Cyclamen*, but borne in graceful umbels on tall, erect scapes. The five corolla-segments are long and narrow, and turned back over the calyx. The anthers and style project far out of the mouth of the corolla, and look like a beak. They are natives of North America, and quite hardy.

Principal Species. DODECATHEON MEADIA (Dr. Mead, the discoverer). Shooting Star. Leaves nearly erect, in large tufts, with uneven teeth, 5 or 6 inches long and half as broad. Flowers white, lilac, or rosy purple, drooping, in an umbel at the summit of a scape 12 to 15 inches high; anthers yellow; April. Introduced from North America, 1744. Several distinct forms are occasionally grown. The flowers are long-styled and short-styled like those of Common Primrose.

Cultivation. *Dodecatheons* succeed best in a mixture of loam and leaf-mould, in a moist, shady position, preferably in the rock-garden or shady border, where they will be protected from bright summer sunshine. They may also be grown in pots in cool greenhouses, but will not bear anything in the nature of forcing. After flowering inside they should be turned out to pass the summer under a north wall, and kept cool. They are propagated by dividing the crowns, which is best done in autumn.

LOOSESTRIFES

Natural Order PRIMULACEÆ. Genus *Lysimachia*

LYSIMACHIA (named in honour of Lysimachus, King of Thrace, who, according to Pliny, first used it medically; or more probably from the Greek words *lysis*, loosing, and *mache*, strife). A genus of about sixty perennial herbs, with entire leaves, sometimes dotted with glands, and five- or six-parted flowers. The corolla is of the form botanically termed *rotate*, that is somewhat wheel-shaped. The stamens are united below

to form a glandular tube around the somewhat globose ovary and slender style. The species are distributed throughout the North Temperate zone, South Africa, and Australia; four are British.

Principal Species. *LYSIMACHIA ATROPURPUREA* (dark purple). Stems 2 feet high. Leaves egg-shaped, fleshy. Flowers dark purple in drooping racemes; July to September. Introduced from Southern Europe, 1820.

L. BARYSTACHYS (heavy spike). Stem erect. Leaves lance-shaped. Flowers small, white, in crowded terminal racemes. Native of Japan and China; introduced 1880.

L. CILIATA (fringed like the eye-lid). Stem erect, 2 to 3 feet high. Leaves lance-shaped, with heart-shaped base, on long fringed leaf-stalks. Flowers light yellow; July. Introduced from North America, 1732.

L. NUMMULARIA (Moneywort). Creeping Jenny, or Moneywort. Stem creeping, long, rooting at the joints. Leaves roundish, smooth, opposite. Flowers solitary, produced in the axils; bright yellow, 1 inch across; petals fringed; June to August. Native of England.

L. VULGARIS (common). Yellow Loosestrife. Stems erect, branching, 2 to 3 feet high. Leaves egg-shaped or lance-shaped, dotted with black glands. Flowers yellow, in short paniced cymes; dimorphic; July and August. Native of Britain.

Cultivation. Ordinary garden soils suffice for *Lysimachias* provided they are sufficiently moist. *L. Nummularia* is frequently cultivated in hanging pots and window-boxes; but as a rule sufficient attention is not paid to its need of much moisture, and as a result the leaves wither at the flowering time. So grown it should have abundant supplies of water to the roots, and the foliage should be syringed. The proper position for this plant is a moist and shady slope, where it can be allowed room to spread.

PIMPERNELS

Natural Order PRIMULACEÆ. Genus *Anagallis*

ANAGALLIS (the old Greek name). A genus comprising a dozen species of angular-stemmed annual or perennial herbs. The leaves are entire, opposite or in whorls. Flowers solitary from the axils on long stalks, which bend down after flowering. Corolla wheel-shaped or funnel-shaped, deeply cleft into five lobes. Stamens five, attached to base of corolla-



JASMINE
(JASMINUM OFFICINALE)

Nat. size

PL. 177

tube. The species are distributed over Europe, Temperate Asia, North Africa, and South America; two are British.

Principal Species. ANAGALLIS ARVENSIS (field). Poor Man's Weather-glass. Stems erect or trailing, 6 to 18 inches long. Leaves heart-shaped, usually opposite, but sometimes in whorls, dotted with glands beneath. Flowers $\frac{1}{2}$ -inch across, opening only in bright weather; usually scarlet; May to October. There is a variety with blue flowers, *cærulea*; and one with more pinky blossoms, var. *carnea*. Native annual.

A. INDICA (Indian). Stems trailing; plant very similar to *A. arvensis*, but flowers larger, deep blue; July. Annual. Introduced from Nepaul, 1824.

A. LINIFOLIA (flax-leaved). Stems erect, 9 to 12 inches high. Leaves slender, opposite. Flowers bright blue, $\frac{1}{2}$ -inch across; July. Introduced from Portugal, 1796. Perennial. There are numerous varieties with crimson, scarlet, lilac, and purple flowers. Mostly grown as annuals.

A. TENELLA (delicate). Bog Pimpernel. Stem creeping, 3 or 4 inches long. Leaves opposite, nearly round, $\frac{1}{4}$ -inch or less across. Flowers broad funnel-shaped on stout, erect footstalks, rosy with darker veinings; July and August. Native perennial. This species, which is more beautiful than the others, must be grown in wet Sphagnum-moss.

Cultivation. Pimpernels are easily grown in ordinary garden soils. Annuals and perennials may be alike raised from seed sown in spring in the sunny position they are intended to occupy when flowering. The perennials may also be increased by dividing the roots, or by means of cuttings from the new shoots. These readily root under a hand-glass in the shade, and when carefully hardened off may be planted out, giving them by preference a light rich soil. They are mostly grown as annuals.

JASMINES

Natural Order OLEACEÆ. Genus *Jasminum*

JASMINUM (a modification of *Ysmīn*, the Arabic name). An extensive genus of evergreen or deciduous shrubs, usually of trailing habit. The leaves are simple, or more frequently compound, cut into from three to seven lance-shaped leaflets; usually opposite. The flowers are salver-shaped, white or yellow, often highly fragrant. The calyx is tubular, furnished with five or eight long slender teeth; the corolla-segments four or five;

stamens two; ovary two-lobed. The flowers are borne in axillary or terminal few-flowered panicles. The species are distributed throughout the warmer regions of the Old World, South America, and Australia.

History. Few even of the really old-fashioned flowers of exotic origin can claim so long a record as the nowadays neglected Jasmine or Jessamine. Introduced from the East Indies in the year 1548, *J. officinale* had become so popular in this country that Gerarde, writing near the close of the sixteenth century, says it was then commonly used for covering arbours. At that date another species was also being grown in this country, for in 1570 *J. fruticans* had been introduced from Southern Europe. *J. grandiflorum*, largely used with *J. officinale* in the production of scent, was introduced from the East Indies in 1629, and *J. sambac* came from the same quarter in 1665. The popular hardy winter-flowering *J. nudiflorum* was introduced from China little more than fifty years ago. Jasmine is of great importance in the scent-producing industry; to take one local instance, we are informed that at Grasse alone the annual value of the Jasmine blossoms used for the extraction of essential oil is £5400. Several species also contribute *materia medica*.

Principal Species. **JASMINUM ANGULARE** (angled stems). A scrambling greenhouse shrub with angular stems and trefoil leaves. Flowers in terminal cymes; calyx-teeth short, oval; corolla-tube 1 or 1½ inch long, lobes lance-shaped, spreading, white. Introduced from South Africa, 1886.

J. GRACILLIMUM (very slender). An elegant, small stove shrub with long, slender branches, and heart-shaped, hairy leaves. Flowers large, white, fragrant, with nine corolla-lobes; in many-flowered panicles; winter. Introduced from North Borneo, 1881.

J. GRANDIFLORUM (large-flowered). Very similar to *J. officinale*, but more bush-like, the leaflets more equal in size, the flowers larger and reddish on the exterior. Greenhouse.

J. NUDIFLORUM (naked - flowered). Deciduous climber, with polished green, angular branches. Leaves small, in threes, produced at end of flowering period. Flowers clear yellow, produced in abundance though solitarily, opposite, all along the branches; winter.

J. OFFICINALE (of the shops). Common Jasmine or Jessamine. Branches angled. Leaves opposite; leaflets three to seven, egg-shaped, pointed. Flowers white, fragrant, in terminal clusters; June to September. Plate 177. There are several varieties, including those with silver and gold edges to the leaves, a double-flowered variety, and one (var. *affine*) with larger flowers in denser clusters.



LILAC

(*SYRINGA VULGARIS*, var *Charles X.*)

Nat. size

PL. 178

J. SAMBAC (Arabian). Stove evergreen climber. Leaves more or less heart-shaped, waved. Flowers white, fragrant, in small cymes; all the year.

Cultivation. The hardy species succeed in most garden soils, but require to be kept neatly nailed up, unless trained over trellis or arbour. For the more tender kinds in the greenhouse or stove a compost of loam and peat in equal portions is recommended. They are all propagated by cuttings, which should be taken from firm young wood, and inserted in sandy peat soil under a hand-glass. The tender species will, of course, require to be put in heat, in addition. *J. nudiflorum* is a very desirable climber on account of its rapid growth, its easy adaptability to almost any situation, and its wealth of golden blossoms all through winter.

Description of *Jasminum officinale*; a flowering branch, natural
Plate 177. size. An enlarged section of the flower is shown in
Fig. 1.

LILACS

Natural Order OLEACEÆ. Genus *Syringa*

SYRINGA (Latin, *syringis*, a pipe). A genus comprising less than a dozen hardy species of shrubs, bearing opposite, entire, heart-shaped leaves, and terminal, compound panicles of small, fragrant flowers. The calyx is bell-shaped, irregularly toothed; the corolla salver-shaped, with four lobes and two stamens. The species are natives of South-Eastern Europe, Persia, Northern India, and China.

History. So common is *the Lilac, Syringa vulgaris*, in British gardens that it seems as though it must always have been there. We know that it has been with us for at least three hundred years, and probably half a century more, for it had extended from Persia into Western Europe before the middle of the sixteenth century, bringing with it the Persian name *Lilag*. The true Persian Lilac, *S. persica*, a much smaller species, was not introduced till 1640. *S. chinensis*, which is commonly called Persian Lilac in gardens, has had several names, and its correct status can scarcely be fixed yet. It has been variously dubbed *S. dubia* and *S. rothomagensis*. In 1777, M. Varin, of the Botanic Gardens at Rouen, found it among seedlings of *S. persica*, and it was consequently known as the Varin or Rouen Lilac; but later it was found to agree with *S. chinensis*, which is itself suspected of being a hybrid between *S. persica* and *S. vulgaris*. There are those also

who believe that *S. vulgaris* is only a long-cultivated form of *S. persica*. There are numerous garden forms and nursery varieties of the species generally cultivated, most of them distinguished by slight differences in the size or colour of the flowers. The White Lilac, sold in abundance by florists during winter, is not really a white-flowered variety, but specimens, purple or lilac forms, of *S. vulgaris*, which, under a system of rapid forcing at a high temperature in the dark, do not develop this colour.

Principal Species. SYRINGA CHINENSIS (Chinese). Rouen Lilac. "Lilas Varin" of the French. Stems about 4 feet high. Leaves very smooth, oval-lance-shaped, small. Flowers usually intense violet, but somewhat variable. Introduced 1795. Plate 179B.

S. EMODI (Mount Emodus). A tall shrub (9 feet high) with warty excrescences on the stems, and egg-shaped, pointed leaves. Flowers purplish or white in dense-flowered panicles; May. Introduced from Himalaya, 1840. The var. *variegata* has the leaves blotched with yellow.

S. JOSIKÆA (Countess von Josika's). Stems 5 to 10 feet high. Leaves elliptic, wrinkled, slightly fringed, whitish beneath. Flowers bluish purple, scentless; May. Introduced from Hungary, 1835.

S. PERSICA (Persian). A distinct species with straight slender branches, 4 or 5 feet high, and small lance-shaped leaves which are sometimes broken up into pinnate lobes. The flowers are bluish purple or white; May and June. The species is much smaller than any other. Plate 179A.

S. VULGARIS (common). Common Lilac. Small tree, 8 to 25 feet high. Leaves heart-shaped, shiny. Flowers red, blue, white, or purple; April or May. Plate 178. Numerous varieties are in cultivation.

Garden Lilacs. From the numerous varieties and hybrids which have been named by the nurserymen the following will be found a good selection:—

Alba grandiflora, large, white.
Alphonse Lavallee, pale blue with violet tinge, double.
Charles X., purplish lilac, white when forced.
Dr. Lindley, reddish lilac.
Lemoinei, pale ashy lilac, double.
Madame Lemoine, double white.
Marie Legraye, white.

Mathieu de Dombasle, reddish mauve, double.
Michel Buchner, pale lilac, rosy margins, double.
Ranunculiflora, dark red, becoming lilac, double.
Rubella plena, red changing to rosy violet, double.
Souvenir de L. Spath, bright scarlet.

Cultivation. When one thinks of the frequency with which *Syringas* are planted in town gardens, and how they thrive in poor soil, with no attention, and under depressing conditions generally, hints on cultivation appear to be superfluous. Hardy and long-suffering, how-



PERSIAN LILAC

(SYRINGA PERSICA)

(A) *type form* (B) *var. dubia*

Nat. size

PL. 179

ever, as these trees are in such places, nothing approaching the full value is got out of them by this neglect. Their numerous suckers are allowed to grow unchecked, and consequently the elegant tree becomes a shapeless bush that flowers sparingly. The chief attention required is the removal of these suckers and the digging in of fresh soil from time to time. The waste of energy stopped, a main trunk is formed, and the bush becomes a tree upon which, in spring-time, blossoms are more conspicuous than leaves. Propagation is easily effected by means of cuttings inserted in a shady border, or more quickly by utilising the suckers for the purpose. Varieties are also reproduced by budding, crown-grafting, and cleft-grafting. Budding may be performed either in April or July; grafting should be done in March, and the stock used should have been raised from seed. For forcing, strong plants are grown in pots with loamy soil, outdoors, and those with plenty of flower-buds are taken in, in succession, during the winter, and submitted to a moist temperature of 55°, which may be gradually increased to 60°. Flower-buds are distinguished from wood-buds by their roundness and larger size. Plants cannot be forced two seasons in succession; after flowering they should be cut back and turned into the border.

Description of Plate 178. *Syringa vulgaris*, the Common Lilac; flowers **Plates 178 and 179.** and leaves. Fig. 1 is a detached flower, enlarged; 2, a section of the same.

Plate 179. A. *S. persica*, the Persian Lilac; Figs. 1 and 2, enlarged flower and section respectively. B. *S. chinensis*, or Rouen Lilac.

PERIWINKLES

Natural Order APOCYNACEÆ. Genus *Vinca*

VINCA (the Roman name, from *vincio*, to bind or connect; in allusion to use of its pliant stems). A genus of about ten species of perennial herbs or under-shrubs, with opposite evergreen leaves, and white, blue, purple, or rosy flowers. The calyx has five pointed lobes. The corolla is salver-shaped with five oblique lobes, the tube hairy within, the throat angled and thickened. The five stamens have very short filaments, and the anthers have a bearded membrane at the tip. The ovary consists of two carpels, and the long style supports a cup in which is the stigma. The fruit consists of a couple of slender rounded follicles containing many seeds. The species are natives of Europe, Asia, and Africa; two being found in Britain, but both probably introduced.

History. *Vinca minor* and *V. major* are included in the British Flora, but the latter is certainly only naturalised, and the former is strongly suspected of having been introduced by man at an early date. One of the reasons for this belief is the fact that the fruit is rarely produced here, but that fact has not the value that some persons appear to attribute to it as evidence. We do know that, however derived, *Vincas* have been grown in our gardens for a respectable number of centuries, and that about one hundred and forty years ago we introduced *V. rosea* from the East Indies. *V. herbacea*, which is also seen in gardens, was introduced from Hungary about eighty years since.

Principal Species. VINCA HERBACEA (herbaceous). Stems less shrubby than in the other species; bending downwards; unbranched. Leaves lance-shaped, blunt, about an inch long, the margins turned back and slightly fringed. Flowers purplish blue; June and July. Hardy native of Eastern Europe.

V. MAJOR (greater). Large Periwinkle; Band-plant. Stems at first erect, then lengthening and becoming prostrate, the tips rooting. Leaves egg-shaped, 2 to 3 inches long, fringed. Flowers purplish blue; calyx-lobes as long as corolla-tube, fringed; April and May. Native of Europe and North Africa. The var. *elegantissima* has the leaves margined or blotched with creamy white.

V. MINOR (lesser). Stems trailing, tough, rooting at the joints; branches erect. Leaves lance-shaped, not fringed. Flowers an inch across, violet-blue; calyx-lobes one-third of the length of corolla-tube, unfringed; April, May, and autumn. Plant half the size of *V. major* in all its parts. There are several varieties: one with variegated leaves, another with yellow leaves and white flowers, others with double flowers, white or blue.

V. ROSEA (rosy). Madagascar Periwinkle; Old Maid. Stems all erect, about 2 feet high. Leaves long, oval, slightly hairy. Flowers 1½ inch across, carmine with a violet tinge, or white; throughout spring and summer. Native of the Tropics generally. Greenhouse or stove perennial.

Cultivation. The grower of hardy species of *Vinca* requires no instructions: the plants only need to be placed in any ordinary garden soil, and thereafter they will take care of themselves. A sloping bank suits them admirably, and their rooting stems will take full possession of it rapidly. Cuttings root readily at any time. *V. rosea* requires different treatment. It is a tropical weed, and is usually grown in the stove or warm greenhouse, where it flowers almost continuously. To promote a bushy habit, the growing points should be nipped out occasionally. They may be raised from seeds sown in a



OLD MAID
(VINCA ROSEA)

* Nat. size

hot-bed or greenhouse in March or April; but the simplest plan is to make cuttings from the new shoots in spring. The soil most suitable for it is a compost of fibrous loam and decayed manure.

Description of *Vinca rosea*, or Old Maid. Fig. 1, section through
Plate 180. an enlarged flower.

OLEANDERS

Natural Order APOCYNACEÆ. Genus *Nerium*

NERIUM (the old Greek name, from *neros*, wet, in allusion to its habitat). A genus comprising only two or three species of erect greenhouse shrubs with narrow-lance-shaped, leathery leaves in whorls of three or four. The flowers are showy, of glowing pink, white, or yellowish hue; the corolla funnel-shaped, with five lobes, and the mouth of the tube surmounted by a crown of jagged appendages. The five stamens are attached to the corolla-tube half-way down. Leaves, flowers, and wood are highly poisonous. The species are found in the Mediterranean Region, and Sub-tropical Asia.

Principal Species **NERIUM ODORUM** (strong-scented). Stems 6 to 8 feet high, leaves slender, the edges rolled back, three in a whorl. Flowers pale red, exhaling a musky odour; June to August. Introduced from the East Indies, 1683. There is a partially double variety (*flore pleno*), and one with flesh-coloured flowers (var. *carneum*).

N. OLEANDER. Common Oleander. Stems 6 to 14 feet high. Leaves lance-shaped, three in a whorl. Flowers large, bright red; June to October. Introduced from Mediterranean Region about 1596. There are numerous garden varieties, from which the following are selected:—

GARDEN VARIETIES.

<i>Album</i> , pure white; <i>Album plenum</i> , double white.	<i>Mons. Balaguiet</i> , large, delicate salmon-pink; free bloomer.
<i>Atropurpureum plenum</i> , dark purple, double.	<i>Pauline Gregoire</i> , large, bright rose.
<i>Candidum</i> , white.	<i>Prof. Duchartre</i> , medium size, deep rosy purple, double.
<i>Cupreatum</i> , copper coloured.	<i>Prof. Durand</i> , pale yellow, hose-in-hose.
<i>Felix Bourgnat</i> , buds rosy, open flowers, pale saffron.	<i>Sœur Agnes</i> , pure white.
<i>Gloriosum</i> , double pink.	<i>Souvenir de Felix Dunal</i> , large, bright rose, double.
<i>Henri Mares</i> , double rosy pink.	<i>Souvenir de Claude Sahut</i> , double red.
<i>Jean Peyre</i> , double pink.	<i>Splendens</i> , double rose.
<i>Madame Peyre</i> , cream, semi-double.	<i>Tom Pouce</i> , carnation.
<i>Madonna grandiflorum</i> , large, creamy white, double.	<i>Variatum</i> , red, leaves edged white or yellow.

Cultivation. A compost of loam and well-rotted manure in equal portions is the most suitable for the culture of *Neriums*. It should be understood that in a state of nature they are plants of the waterside, and in summer require copious waterings, and a sunny position out of doors. In winter they need the protection of a conservatory or cool greenhouse, where they can have a temperature of about 40°, and certainly not less than 35°. In early spring the flowered stems should be cut back, but the new growths should not be interfered with, or next year's flowers will be cut away also. Water should now be given very sparingly. As soon as new growth commences, they should be re-potted—not necessarily into larger pots, unless they have not been given extended root-room for several years, but with new soil, using the compost as before. Now give them more warmth, air, and water, and as they start into vigorous growth a little manure water will help them. Cuttings are made from the tops of last season's wood, and these should be placed singly in pots, and kept in a warm close frame till rooted. Some persons prefer to strike such cuttings by placing them in bottles of water, and when they have produced roots, potting them carefully and well soaking the soil.

Description of *Nerium Oleander*, the Common Oleander; upper part
Plate 181. of a flowering stem. Fig. 1 is a section through the flower; 2, a stamen; and 3, the pistil, enlarged.

DOG'S BANE

Natural Order APOCYNACEÆ. Genus *Apocynum*

APOCYNUM (Greek, *apo*, afar off, and *kyon*, a dog; the plant supposed to be poisonous to dogs, and the knowledge of this keeping them away). A small genus (about four species) of perennial herbs with tough fibrous bark, and of erect habit. Leaves opposite and sharply pointed. Flowers small, pale, terminal or axillary; the calyx five-parted, the corolla bell-shaped, five-cleft, and with five triangular glutinous scales in the throat opposite the lobes, the five stamens attached to the base of the bell with long arrow-shaped anthers. The stigma is egg-shaped, somewhat two-lobed. One of the species is a native of Southern Europe, and three belong to America. Only one species is in cultivation, and that chiefly as an object of curiosity, for the flowers possess no great beauty.

Principal Species. APOCYNUM ANDROSÆMIFOLIUM (Tutsan - leaved)
 Common Dog's Bane, or Fly-trap. Stem branching, 1



OLEANDER
(NERIUM OLEANDER)

$\frac{2}{3}$ Nat. size

PL. 181

to 2 feet high, with smooth, egg-shaped leaves. Flowers pale red, with darker stripes, in loose cymes; July. The scales in the throat secrete honey, and this attracting insects, these irritate the scales, which bend towards the centre of the flower and imprison the insects till they die. Similar effects may be witnessed in other genera of APOCYNACEÆ. Introduced from Virginia, 1683.

Cultivation. *Apocynums* will succeed in ordinary garden soils, and require no care beyond that generally accorded to hardy perennials. Propagation may be effected either by sowing seeds in autumn, or separating the suckers from the roots in spring.

CAPE JASMINE

Natural Order APOCYNACEÆ. Genus *Trachelospermum*

TRACHELOSPERMUM (Greek, *trachelos*, neck, and *spermum*, seed; the seeds being drawn out into a kind of neck). A genus of four stove, or greenhouse, climbing shrubs, with distant opposite leaves and white flowers in loose cymes. The calyx is five-parted, with a series of scaly glands within. The corolla is salver-shaped, with a constricted throat and five twisted oblong lobes. Stamens arrow-head-like, as in *Apocynum*, but attached half-way down tube. The cylindrical seed-pods are from 4 to 9 inches long, and contain numerous beaked seeds. They are natives of India, China, Japan, and Malaya. Also known as *Rhynchospermum* and *Parechites*.

Principal Species. TRACHELOSPERMUM JASMINOIDES (Jasmine-like) is well-known as a greenhouse climber. Leaves oval-lance-shaped, shortly stalked, rigid. Flowers Jasmine-like, but with shorter tube; white, sweet scented, produced profusely at the ends of the branches; July. Introduced from Shanghai, 1846.

Cultivation. A compost of loam and peat will be found the most suitable soil for the Cape Jasmine. In the greenhouse it grows and flowers freely without special attention, and in the South it may even be grown out of doors against a south wall, where it can have extra protection in severe weather, but the warmth of the greenhouse is necessary to ensure free flowering. It is propagated by means of cuttings. There is a form of *T. jasminoides*—the var. *angustifolium*—distinguished by its smaller and narrower leaves, which is quite hardy out of doors in the South of England, if trained against a wall.

ALLAMANDAS

Natural Order APOCYNACEÆ. Genus *Allamanda*

ALLAMANDA (genus named in honour of Dr. Allamand of Leyden, who sent the seeds to Linnæus). Handsome evergreen stove shrubs with leaves in whorls. Calyx five-parted; corolla funnel-shaped, the limb bell-shaped, and spreading out into five blunt lobes. There are five fringed scales in the throat, and five stamens. The species are all South American.

Principal Species. ALLAMANDA AUBLETHI (Aublet's) has broad oblong leaves, and large yellow flowers; June. Introduced from Guiana, 1848.

A. CATHARTICA (purging). Leaves egg-shaped, with slightly waved margins. Flowers large, yellow; June. Guiana, 1785.

A. CHELSONI (Chelsea). A garden hybrid with fine, large yellow flowers; June. Excellent for cut flowers and for training under the roof.

A. GRANDIFLORA (large-flowered) has large, pale yellow flowers, produced very freely in June. Introduced from Brazil, 1844.

A. NERIIFOLIA (Oleander-leaved). Of more shrubby habit, about 3 feet high, with broader leaves, and deep yellow flowers streaked with orange, and the tube shorter and wider; in many-flowered panicles; June. Introduced from South America, 1847.

A. NOBILIS (noble), with hairy oblong leaves, and bright yellow flowers with deeper tint in the throat; July. From Brazil, 1867.

A. SCHOTTII (Schott's). A strong-growing roof-climber with smooth oblong leaves, and large yellow flowers, the throat striped with brown; September. Introduced from Brazil, 1847.

A. VIOLACEA (purple). Similar to *A. cathartica*, but with hairy leaves and dull purple flowers.

A. WILLIAMSHI (Williams'). A garden seedling of bush-like habit covered with large, light yellow flowers, making a fine pot-plant for the stove.

Cultivation. Given the requisite temperature—which should never be less than 55°—the culture of *Allamandas* is not attended with special difficulty. Their beauty is best seen when they are grown on wires running up at some distance from the glass roof. Fibrous loam and river sand, in the proportions of three to one, with the addition of decomposed cow-manure, forms the best compost. They require abundant water during the period of growth, and they should be cut back



REDHEAD
(ASCLEPIAS CURASSAVICA)

Nat. size

PL. 162

close to the old wood at the beginning of the year, the cut-off portions being used for propagation. These should be inserted in small pots of sandy peat or leaf-mould, and subjected to bottom heat. When these are well-rooted and have started growth, they must be pinched back if wanted to train up a trellis; but if desired for pillar or rafter training, they should be grown on with a single stem, until they reach the height at which it is better they should branch, and then pinch them back. They will require re-potting each spring, when growth has recommenced after the annual cutting back.

T A B E R N Æ M O N T A N A S

Natural Order APOCYNACEÆ. Genus *Tabernæmontana*

TABERNÆMONTANA (named in honour of Dr. James T. Tabernæmontanus, a celebrated sixteenth-century botanist of Heidelberg). An extensive genus of stove evergreens (trees or shrubs) comprising about one hundred and ten species. They have opposite, entire leaves, and white or yellowish flowers of similar structure to those of the preceding four genera, except that the salver-shaped corolla has no scales in the throat. The species are natives of the Tropics, and include *T. utilis*, the celebrated Cow-tree of British Guiana, which exudes a considerable supply of sweet white milk when tapped.

Principal Species. TABERNÆMONTANA BARTERI (Barter's). A shrub about 6 feet high with pale branches, and oblong pointed leaves, in unequal whorls. Flowers white; summer. Introduced from Western Tropical Africa, 1870.

T. CORONARIA (garland). Adam's Apple. A shrub about 4 feet high, with forking branches, and elliptic-oblong, opposite leaves. Flowers white, smaller than the preceding species, fragrant at night; July. Introduced from India, 1770. There is a var. *flore pleno* in cultivation with double flowers.

T. RECURVA (turned back). Shrub, 6 feet high. Leaves broad-lance-shaped, 4 inches long. Flowers fragrant, yellow, in many-flowered, spreading and recurved cymes, produced in the forks of the branches: June. Introduced from Chittagong and Tenasserim, 1824.

Cultivation. *Tabernæmontanas* will be found to do well in a compost of sandy loam and peat, with similar treatment to that recommended for *Allamandas*, making allowance for the difference of habit. The propagation is also the same.

DIPLADENIAS

Natural Order APOCYNACEÆ. Genus *Dipladenia*

DIPLADENIA (Greek, *diploos*, double, and *aden*, a gland). A genus of ornamental stove evergreen climbing shrubs or under-shrubs, with opposite entire leaves, and funnel-shaped or salver-shaped flowers, of similar structure to the foregoing genera of APOCYNACEÆ, but having two blunt glands at the base of the ovary. This is the chief character, upon which the name of the genus is based. They are natives of Central and South America. We give the names of the principal species, but these have largely been superseded in cultivation by their hybrid offspring.

Principal Species. DIPLADENIA ATROPURPUREA (dark purple). Rootstock tuberous, stems thin, wiry; leaves small, ovate, smooth; flowers funnel-shaped, 2 inches across, purple crimson, with a yellow throat. Brazil, 1842.

D. BOLIVIENSIS (Bolivian). A small plant with slender stems, oblong leaves, and white flowers, 2 inches across, with a golden throat; in small racemes. Introduced from Bolivia, 1866.

D. CRASSINODA (thick-jointed). Stems climbing, about 10 feet high, with oblong-lance-shaped leaves, and rose-coloured flowers. Introduced from Rio Janeiro.

D. SPLENDENS (shining). Leaves broad-lance-shaped. Flowers white, tinged with pink; in long racemes, opening successively for months. Native of the Organ Mountains.

GARDEN VARIETIES AND HYBRIDS.

D. amabilis, rosy crimson, 4 or 5 inches across. Hybrid between *D. crassinoda* and *D. splendens*.

D. amœna, rosy pink.

D. brearleyana, pink changing to rich crimson. Hybrid.

D. carissima, blush pink streaked with rose; 5 inches across.

D. diadema, soft pink tinged with rose.

D. houtteana, an improved var. of *D. crassinoda*, with orange-coloured throat.

D. hybrida, flaming crimson-red.

D. insignis, rosy purple.

D. nobilis, rosy purple changing to orange-red.

D. regina, blush with rosy throat.

Cultivation. *Dipladenias* should be grown in a warm moist stove in a compost of fibrous peat and silver sand. They require careful watering at all times, and during the winter they should be kept almost dry. The stems twine readily, and they are therefore best grown on strings stretched near the roof, so that they can be cut down and trained on a balloon or other trellis, or round a pillar, when the flowers are about to develop.



GENTIANELLA
(GENTIANA ACAULIS)

$\frac{2}{3}$ Nat. size

PL. 183

SWALLOW WORTS

Natural Order ASCLEPIADEÆ. Genus *Asclepias*

ASCLEPIAS (*Asklepios*, the Greek name of Æsculapius, to whom the genus is dedicated). A genus consisting of about twenty-five species of erect, perennial herbs, with milky juice and often fleshy roots. The flowers in this genus as well as throughout the Order ASCLEPIADEÆ are of very singular structure. There is a five-parted calyx, five petals united at their base, which fall back when the flower opens and hide the calyx; but the remarkable feature is the union of anthers and stigmas in one body above the ovary. The combined filaments of the stamens support a coronet of five hoods, each with a protruding horn. The five anthers each contains two clubbed-shaped masses of pollen (*pollinia*), suspended from a sticky gland beneath the broad disk of the stigma. These adhere to insects visiting the flower for honey, and thus help in the cross-fertilisation. The ovaries develop into two follicles which split along the inner face and disclose a multitude of seeds, each crowned with a plume of silky hairs, which serves to buoy it through the air. They are natives of America and the Temperate Regions of the North. All are more or less poisonous, and several are used medicinally.

Principal Species. ASCLEPIAS CURASSAVICA (Native of Curaçoa). Red-head. Stem downy, unbranched or but slightly branched, 2 or 3 feet high. Leaves opposite, oblong-lance-shaped. Flowers orange-scarlet, in small, axillary, long-stalked umbels; July to September. Stove. Introduced from Tropical America, 1692. Plate 182. There is a white variety.

A. DOUGLASII (Douglas'). Stems thick, woolly, unbranched, 2 to 3 feet high. Leaves opposite, heart-shaped, downy beneath, half a foot long and nearly as wide. Flowers purplish lilac, large, and waxy-looking, in large umbels; July to September. Introduced from Western America, 1846. Hardy.

A. INCARNATA (flesh). Stem branched and woolly at the top, 2 feet high. Leaves opposite, lance-shaped, somewhat woolly above and below. Flowers red or purplish, in numerous umbels; July. Introduced in 1710 from Canada, where it grows beside the rivers. Hardy.

A. SYRIACA (Syrian). Milkweed; Silkweed. Stems unbranched, 3 to 5 feet high. Leaves opposite, broad-lance-shaped or egg-shaped, woolly beneath. Flowers pale purple, fragrant, in large drooping umbels; July. Introduced from North America, 1629. Hardy.

A. TUBEROSA (tuberous). Butterfly-weed; Pleurisy-root. Stems almost erect, branching widely at the top, hairy, 1 to 2 feet high. Leaves broad-lance-shaped, hairy. Flowers showy, bright orange, umbels numerous along the terminal branches; July to September. Introduced from North America, 1690. Hardy.

Cultivation. The hardy species of *Asclepias* may be grown without difficulty as border plants in a light rich soil, or one that has been improved by the addition of peat. The greenhouse species should be potted in a mixture of fibrous loam and leaf-mould. All are grown chiefly from cuttings or divisions, but sometimes from seeds. Each of these methods is put in operation in spring. Cuttings are struck in gentle heat, covered with a bell-glass, and afterwards potted on in successively larger pots as the smaller ones get filled with roots. Seeds are sown in pots or pans, the seedlings being pricked into small pots, singly, and gradually brought on to larger sizes. When the flower-buds show, repotting must cease and the plants be treated to clear manure water instead. The greenhouse species must be kept rather dry in winter to allow the plants a rest, and a month or so later should be cut back before growth recommences.

Description of *Asclepias curassavica*, or Redhead; upper part of stem
Plate 182. only. Fig. 1 is an enlarged view of a fully open flower; 2, a section through the unopened bud; 3, a fruit; and 4, a transverse section of 3 showing position of seeds.

CARRION FLOWERS

Natural Order ASCLEPIADEÆ. Genus *Stapelia*

STAPELIA (named by Linnæus in honour of Dr. J. B. à Stapel, of Amsterdam; *d.* 1631). A genus of about sixty species of low, succulent, branching, leafless plants. The stems and branches are thick, fleshy, usually four-sided, with toothed angles and dark tubercles. The flowers give out a foetid odour, and consist of a five-parted calyx, a fleshy, wheel-shaped, five-cleft corolla with a very short tube, and a coronet somewhat similar to that of *Asclepias*, but double, the outer being five-lobed, spreading, the inner consisting of five scales. The species are restricted in range to South Africa, and require greenhouse treatment. Flies are so much deceived by the odour of the flowers that they deposit their eggs upon what they assume to be real carrion.



PHLOX SUBULATA *and var.*

Nat. size

PL. 184

Principal Species. STAPELIA ASTERIAS (Starfish). Starfish Flower. Branches erect, numerous, 6 inches high. The flowers are large, the lobes of the corolla lance-shaped, oblique, the edges turned back, violet coloured deepening into purple towards centre of flower and barred with yellowish stripes; May to November. Introduced 1795.

The following are also in cultivation:—*S. anguinea*, yellow and red; *S. bufonia*, mottled like a toad; *S. gigantea*, flowers pale yellow and brown, nearly a foot in diameter; *S. hirsuta*, *S. sororia*, *S. tsomoensis*, and *S. patula*, stems erect, flowers dark purple covered with long silk-like hairs.

Cultivation. The chief point in the cultivation of *Stapelias* is the greenhouse temperature and a thoroughly drained soil. This should be composed of sandy loam with an equal quantity of old brick, broken not too finely. They should be placed on the upper shelf of the greenhouse where they may obtain plenty of air and sunshine. In watering care must be taken to give no more than necessary, and in winter it should be almost withheld. *S. gigantea* is a stove plant, and thrives best when planted in a pan and suspended near the roof. Propagation is effected by cuttings, which should be left on the potting-board until the cut portion has callused before inserting in pots.

WAX FLOWERS

Natural Order ASCLEPIADEÆ. Genus *Hoya*

HOYA (named in honour of T. Hoy, F.L.S., a gardener, who died 1821). A genus of about fifty species of stove or greenhouse shrubs with opposite, often fleshy, leaves, and flowers in lateral drooping umbels. The corolla is wheel-shaped, the five lobes being somewhat egg-shaped. The species are found in Western Asia, Tropical and Sub-tropical Australia, but chiefly in Malaya. Most of them are worthy of cultivation, but we can give descriptions of only a few.

Principal Species HOYA BELLA (beautiful). Stems slender, about 18 inches high, with small dark leaves. Flowers waxy white with a crimson corona, in many-flowered umbels. Introduced from India, 1847.

H. CARNOSA (fleshy). Wax Flower. Stems rooting and climbing like Ivy. Leaves fleshy, oval-oblong. Flowers pinkish, very wax-like, on downy footstalks, in drooping umbels; July to September. Introduced from Queensland, 1802. There is a form with variegated leaves.

H. GLOBULOSA (globular). Leaves leathery, hairy, oblong. Flowers creamy with pink centre, in globose umbels; April. Introduced from India, 1880.

H. IMPERIALIS (imperial). Leaves slightly woolly, 6 to 9 inches long. Flowers waxy, 3 inches across, reddish brown, in large umbels; June. Introduced from Borneo, 1847.

Cultivation. A warm greenhouse or stove is the best situation for growing *Hoyas*. They like a fairly humid, though not too close an atmosphere, and a little shade in bright weather—but only a little. A perfectly-drained peaty soil is best suited to their wants, and they will do well if trained against a wall, where they will obtain more moisture than against woodwork of any kind. In such a position they will send out rootlets from the branches which render them independent of the true roots below. In large houses they may be trained round elm posts, to the bark of which their aerial roots cling and find nourishment. The plants dislike much water at the roots. *H. bella* requires more warmth than *H. carnosa*, and is often grafted upon a stouter species; owing to its habit this species does best where it can grow down—as over the trunk of a tree-fern. *Hoyas* are propagated by cuttings or layers. Cuttings are made from the previous year's growth, and are struck in sandy peat-soil under a bell-glass, on bottom heat.

GENTIANAS

Natural Order GENTIANEÆ. Genus *Gentiana*

GENTIANA (from *Gentius*, the name of a king of Illyricum, who is said to have discovered the medicinal virtues of these plants). A genus comprising about one hundred and eighty hardy species of annual or perennial herbs with opposite leaves, and mostly solitary flowers. The calyx is four- or five-lobed; the corolla funnel-shaped or salver-shaped, four- or five-lobed. Stamens, four or five, attached to the corolla-tube; ovary one-celled, with two stigmas. The species are distributed chiefly throughout the Temperate and Alpine Regions of the world, and are rare in the Arctic Regions. Five species occur in Britain.

History. Gentians are mostly plants of mountainous or hilly districts, and every visitor to the European Alps is struck by the beauty of form and intensity of colour of the species commonly found there in profusion, surrounded by ice and snow. Though blue is the prevailing hue of their flowers, purple, lilac, yellow, and white are



PERENNIAL PHLOX
(PHLOX PANICULATA, *var.*)

Nat. size

PL. 185

also met with. *G. lutea* and *G. cruciata* were the first of the exotic species to find their way into English gardens, and this was at some date anterior to 1596. There can be little doubt that when these were first introduced it was not for the purpose of embellishing borders, but in the case of *G. lutea* because of the tonic properties of its roots, for which reason it is still imported in quantity with others to be used in medicinal preparations. *G. cruciata* was in request because the astrologer-herbalists attached great importance to the fact that its opposite leaves grow crosswise (*decussate*). *G. asclepiadea* appears to have been the first species introduced (1629) for the sake of its flowers. During the last fifteen years a number of new species have been introduced from Himalaya and Turkestan.

Principal Species. GENTIANA ACAULIS (stemless). Gentianella; Dwarf-Gentian. Stems angled, 2 to 4 inches high. Leaves egg-shaped, opposite, stem-clasping. Flowers large, 2 inches long, solitary, terminal, of an intense blue, streaked with yellow outside, the throat spotted; March to May. Native of the Alps and Pyrenees. Plate 183.

G. ANDREWSII (Andrews'). Stem 1 to 2 feet high, round. Leaves oblong-lance-shaped. Flowers blue in close clusters, terminal and axillary; August. Introduced from North America, 1776.

G. ASCLEPIADEA (Swallow-wort-like). Stems faintly four-angled, 6 to 18 inches high. Leaves oval-lance-shaped, stem-clasping, with turned-back edges. Flowers deep blue, in terminal clusters, or singly from the axils; July. Introduced from Austria, 1629. There is a white-flowered variety.

G. CRUCIATA (crossed). Stems rounded, 6 inches high. Leaves broad-lance-shaped, the bases joined. Flowers in terminal and axillary clusters, pale blue, the throat dotted with green; June and July. Introduced from Austria, 1596.

G. GELIDA (icy). Stems four-angled, 6 inches high. Leaves lance-shaped. Flowers purplish blue; June and July. Introduced from the Caucasus, 1807.

G. PNEUMONANTHE (Wind-flower). Heath Gentian. Stems 1 to 2 feet high, slender. Leaves narrow oblong. Flowers bright blue; August and September. Native.

G. VERNA (spring). Spring Gentian. Stem 2 to 3 inches high. Leaves oblong. Flowers bright blue; May and June. Native.

Cultivation. The foregoing species are all hardy perennials, and form a mere sample from a long list of species suitable for garden purposes. But their place is not in the flower-bed; they are rather plants for the mixed border, the rock-garden, and the cold green-

house. Their bold, beautifully-coloured flowers make them highly-desirable plants, but their uncertainty of germination and settlement is a bar to their popularity. Most of them refuse to grow when divided, and bought seeds are slow to germinate. Seed of one's own harvesting sown as soon as ripe is more promising, but even this takes six months or more to show any result, and purchased seed may require several years. The best plan is to buy plants from a nursery and seek to establish them, afterwards raising seedlings from your own seed. A well-drained compost of three-parts loam to one of peat, with the addition of small stones, is best for them, and porous stones should also be pressed into the soil close round the plants. The drainage must be perfect, for Gentians require much water when growing, but cannot endure stagnant moisture.

Description of *Gentiana acaulis*, the Gentianella, two-thirds of the
Plate 183. natural size. Fig. 1, section of flower, natural size.

Among other genera of GENTIANEÆ may be mentioned the following:—

SABBATIA (named after L. Sabbati, an Italian botanist of the eighteenth century). American Centauries. A genus of about thirteen species of hardy annuals or biennials, with shortly tubular wheel-shaped flowers and opposite leaves, affecting moist and boggy situations, but of rather capricious growth in gardens. Natives of North America and Cuba. *S. campestris*, introduced from Texas (1855), is about a foot high, with yellow-centred, rose-coloured flowers in clusters. *S. calycosa* has leafy calyx-lobes and deep red corolla (introduced 1812); and *S. stellaris* has awl-shaped calyx-lobes and bright rosy-purple corolla (introduced 1817). Seed should be sown thinly in pots, or on a shady border, as soon as ripe. Flowers throughout following summer.

SWERTIA (named in honour of I. Swert, a Dutch cultivator of bulbs, seventeenth century). A genus of about forty species of erect herbs, natives of Europe, Asia, and Africa. Several species are cultivated in greenhouses. *S. corymbosa* (introduced from India, 1836) is an annual with pale blue or white flowers; May. *S. paniculata* (India, 1868), an annual with white flowers spotted with purple or green: June to August. *S. perennis* is a hardy perennial from Europe, with dark spotted blue flowers; July. Seeds of the two first should be sown on a hot-bed in spring, and the seedlings pricked out where they are to flower; those of *S. perennis* should be sown on pans of peaty soil, and afterwards the plants should have a moist bog-like situation for growth.

MENYANTHES (Greek, *men*, a month, and *anthos*, flower). Buckbean. A genus of two species of hardy perennials, one American, one British,



GILIA (LEPTOSIPHON) ANDROSACEA

Nat. size

PL. 186

etc. Flowers of great beauty, five-lobed, funnel-shaped, white, appearing in spring. *M. crista-galli*, introduced from North America, 1818, has kidney-shaped leaves, 2 to 4 inches wide. *M. trifoliata* has trefoils of oval leaflets, and flowers with pink outsides. Both species are easily cultivated in shallow water, or in a bit of boggy ground. Propagation by dividing the thick, creeping rootstock.

VILLARSIA (named in honour of Professor D. Villars, of Grenoble). A genus of ten species of greenhouse perennials of semi-aquatic habit. Flowers white or yellow, bell-shaped or somewhat wheel-shaped. The species principally cultivated are *V. parnassifolia* (from Australia, 1825), with broad heart-shaped leaves and yellow flowers in long panicles, August; and *V. reniformis* (Australia, 1820), with kidney-shaped leaves and fringed yellow corolla-lobes, flowering in July. *V. nymphæoides*, a native of Britain, is more correctly *Limnanthemum peltatum*. It is a miniature Water-lily, with rounded floating leaves, and bright yellow flowers an inch or more across; July and August. Its habitat is still water, and it will succeed in almost any pond or lake where it is planted—sometimes too well. The true *Villarsias* should be planted in pots containing a mixture of peat and sand, and these stood in water. They may be raised from seeds, or the old plants may be divided.

PHLOXES

Natural Order POLEMONIACEÆ. Genus *Phlox*

PHLOX (Greek, flame or blaze, from the brilliance of the flowers). A genus of about twenty-seven hardy perennial or half-hardy annual herbs, with entire leaves, and showy red, violet, or white flowers, solitary or in cymes, the cymes arranged in corymbs or panicles. The calyx is tubular-bell-shaped with five sharp lobes, the corolla salver-shaped, with a long slender tube and five wedge-shaped lobes. Stamens five, inserted on the corolla-tube; ovary three-celled; style slender, ending in three narrow stigmas. The species are natives of North America and Asia.

History. Few plants are more deservedly popular than Phloxes, and their cultivation is so simple that it may be truly said no garden is complete without them. And yet they are comparatively recent introductions to our gardens, as horticultural records go, for it is little more than one hundred and seventy years ago that *Phlox glaberimma* first came (1725) to Britain. *P. paniculata* followed in 1732. *P. maculata*, which with *P. paniculata* has been the fruitful parent of many of our best

garden varieties, was introduced in 1740, and others came at intervals of a few years, until in 1835 *P. Drummondii*, the popular annual, was introduced from Texas. This has produced many variations from the original purple-pink of its flowers, but, being an annual, these differences are not dignified with garden names, as in the perennial species. In the latter case such names are necessary, for the species have been so much crossed and intercrossed that their parentage is exceedingly doubtful. Although we give the characters of the principal species, we ought also to state that the types are rarely cultivated; their garden varieties and hybrids being in greater request.

Principal Species. *PHLOX AMÆNA* (pleasing). Plant covered with soft hairs; stem semi-erect, unbranched, 6 to 15 inches high. Leaves lance-shaped, broad or narrow. Flowers pink, purple, or rarely white, in corymbs; June. Introduced from North America, 1809.

P. DIVARICATA (spreading). Stems 10 to 15 inches high. Leaves oval-lance-shaped. Flowers pale lilac or bluish, in forked corymbs; April to June. Introduced from North America, 1746.

P. DRUMMONDII (Drummond's). Stems erect, hairy, branching slightly at top, 1 foot high. Leaves oval-lance-shaped, slightly stem-clasping, downy. Flowers white, rosy, red, or purple, with darker "eye" or centre; August.

P. GLABERIMMA (very bald). Stem slender, erect, 1 to 2 feet high. Leaves lance-shaped, glossy. Flowers red, a few in a panicle; July. Introduced from United States, 1725.

P. MACULATA (spotted). Stem erect, scarcely branched, 2 feet high. Leaves lance-shaped, rather thick. Flowers purple (varying much in cultivation), fragrant, in somewhat pyramidal panicles; July. United States.

P. OVATA (egg-shaped). Stems erect, 12 to 18 inches high. Leaves egg-shaped, somewhat fleshy. Flowers reddish purple, in small terminal cymes; May to July. Introduced from North America, 1759.

P. PANICULATA (panicled). Stems erect, 3 or 4 feet high. Leaves oblong-lance-shaped. Flowers pink-purple varying to white, in large, terminal panicles; August. Introduced from United States, 1732. Plate 185.

P. PILOSA (hairy). Stems erect, slender, 1 to 2 feet high. Leaves lance-shaped, short, usually downy or hairy. Flowers purple, pink, rosy, or white; May. Introduced from Carolina, 1759.

P. REPTANS (creeping). Plant downy, creeping, sending forth runners. Leaves spoon-shaped and lance-shaped. Flowers purple or violet, an inch across, in few-flowered corymbs; May and June. Introduced from North America (Alleghany), 1800.



(A) *GILIA CORONOPIFOLIA* (B) *GILIA TRICOLOR*

Nat. size

P. SUBULATA (awl-shaped). Moss Pink. Stems densely tufted. Leaves awl-shaped, fringed. Flowers pink with darker centre; corolla-lobes wedge-shaped, notched; April. Introduced from United States 1786. Plate 184.

Garden Varieties and Hybrids. Garden Phloxes are grouped in three classes, of which the first are the annuals, *P. Drummondii* and its varieties. The others are perennials, mostly hybrids, and these are distinguished as Early-flowering Phloxes and Late-flowering Phloxes. The Early-flowering (or *Suffruticosa*) are the progeny of *P. glaberimma*, and the Late-flowering (or *Decussata*) are hybrids chiefly between various forms of *P. maculata* and *P. paniculata*. New varieties of these are put on the market in considerable numbers every year, and the old ones are elbowed aside or reintroduced under new names. It therefore appears unnecessary to give lists when the most recent florists' catalogues will supply the current names of all the good sorts.

Cultivation. For mixed borders and the front of shrubberies the hardy perennial Phloxes are most desirable. Their colours are very bright and pleasing, and a bed filled entirely with them has a very fine effect. They succeed in most well-drained soils that are not too dry. They like sunshine. *P. Drummondii* and its varieties should be grown in a rich soil, which should be mulched with manure in summer, and they should have plenty of water. They are raised from seeds sown in March, in pans or boxes, and started in gentle heat. The seedlings should be pricked out into boxes and placed in frames. Some time in May, according to outside temperature, they should be gradually hardened by raising the lights, and afterwards planted out. To get nice bushy and compact plants the growing points are nipped out as soon as they are three inches high. Seeds of the perennials should be sown as soon as ripe, in pans of sandy loam, and kept in the greenhouse during the winter. The plants will not appear until early spring, and after growing on and gradually hardening, these will be ready to plant out in May. They do not as a rule flower well, if at all, the first season. From plants so grown the stock may be increased by dividing the roots in following springs. Although in ordinary seasons these plants do well in most soils, yet in a dry summer there is danger, where the soil is light, of their perishing; they should therefore be given a rich deep soil if possible, be mulched in summer, and given water abundantly at intervals.

P. subulata and other dwarf species do not produce seed freely, and are chiefly propagated by means of cuttings and divisions. The cuttings are taken about midsummer, and struck under glass in the shade. For division of the old plants a good plan is to sift some light soil over the

clump during the summer so that the creeping shoots become nearly covered, and the spaces between them filled up. This will induce them to root; and if the clump is taken up in the following spring and broken apart, it will be found that each portion has roots ready formed. This section is well adapted for growing in rock-gardens.

Description of Plate 184. *Phlox subulata*. A, the type, and B, a **Plates 184 and 185.** variety, with broader leaves. Figs. 1 and 2 are the flowers of A and B respectively cut through.

Plate 185. *P. paniculata*, showing several of its colour variations. Fig. 1 is a section of the flower.

GILIAS

Natural Order POLEMONIACEÆ. Genus *Gilia*

GILIA (named in honour of S. P. Gilio, a Spanish botanist, eighteenth century). A genus of about sixty-five species of herbs, mostly hardy annuals, with flowers more or less funnel-shaped or wheel-shaped, with the parts agreeing in number with *Phlox*, but the stamens are inserted at the mouth of the corolla-tube. They are natives of America.

History. The plants constituting this genus were formerly split up into the genera *Fenzlia*, *Ipomopsis*, *Leptodactylon*, and *Leptosiphon*, and to some gardeners they are still known under these names. They are of comparatively recent introduction, *Gilia coronopifolia*, the earliest known, dating only from 1726, whilst those at present grown have all been introduced during the present century. Of these, *G. achillæfolia*, *G. liniflora*, *G. multicaulis*, and *G. tricolor* were all introduced from California in 1833, whilst *G. micrantha* dates only from 1870, and *G. Brandegei*, a Colorado species, from 1878.

Principal Species. GILIA ACHILLÆFOLIA (Milfoil-leaved). Stems 1 foot high. Leaves twice or thrice pinnate, the leaflets awl-shaped. Flowers purplish-lilac, in many-flowered corymbs; August. There are varieties with flowers white and red. Annual.

G. ANDROSACEA (Androsace-like). Stems branching, 9 to 12 inches high. Leaves in pairs, deeply cut into slender segments, arranged palmately (see Plate 186) and fringed. Flowers lilac, pink, or whitish, with yellow or darker tinted throat, the corolla-tube twice the length of lobes; August. The var. *rosacea* has flowers some tint of red. Annual. Also known as *Leptosiphon androsaceus*.

G. BRANDEGEI (Brandegee's). Stem unbranched, 9 to 12 inches



COLLOCHIA COCCINEA

Nat. size

PL. 188

high. Leaves slender, but pinnate with many small leaflets. Flowers trumpet-shaped, golden yellow, in a short leafy spray; July. Perennial.

G. CAPITATA (headed). Stems 1 to 2 feet high. Leaves deeply cut pinnately, the slender segments again pinnate. Flowers blue, in dense heads on long stalks; June to August. Annual.

G. CORONOPIFOLIA (buckhorn-leaved). Stems 2 to 3 feet high. Leaves pinnate, the leaflets very long, very slender, and far apart. Flowers scarlet, varying in cultivation to bright red, and yellow spotted with red; August and September. Half-hardy biennial. Plate 187A.

G. DENSIFLORA (dense-flowered). Leaves rather rigid, with thread-like divisions. Flowers lilac, or nearly white; June. Native of California.

G. DIANTHOIDES (Pink-like). Stems 2 to 5 inches high; leaves slender. Flowers variable, generally lilac or pale purple, with darker purple or yellowish throat; July. Introduced from California, 1855.

G. LINIFLORA (Flax-flowered). Stems 1 foot high. Leaves palmately divided. Flowers solitary, white, on long stalks; July to September. Annual.

G. MICRANTHA (small-flowered). Stems softly hairy, 9 inches high. Leaves divided into five or seven slender segments. Flowers small, rosy, numerous; the corolla-tube long and slender; August. The var. *aurea* has golden-yellow flowers. Annual. Also known as *Leptosiphon roseus*.

G. TRICOLOR (three-coloured). Stems 1 foot high. Leaves twice pinnate, the segments very slender, almost awl-shaped. Flowers purple and lilac with a deeper shade in the centre; another form has the short tube orange coloured, the margin light purple or white, with an intermediate band of deep purple; June. There are also varieties with white or violet flowers. Annual. Plate 187B.

Cultivation. *Gilias* do best in a light soil and sunny position. The smaller species are very suitable for edgings. Most of them may be treated according to the usual routine for annuals, sowing the seeds thinly in March or April where they are intended to flower. *G. coronopifolia* should be sown about August in pots, and the young plants wintered in a cool house or frame, planting out about April. This species must have a well-drained position.

Description of Plate 186. *Gilia androsacea*. Fig. 1, flower enlarged; 2, section of same; 3, a seed, natural size and enlarged; 4, a seedling.

Plate 187. A, *G. coronopifolia*, the red and yellow forms: Fig. 1, section of flower. B, *G. tricolor*: Fig. 2, a seed, natural size and enlarged; 3, a seedling.

COLLOMIAS

Natural Order POLEMONIACEÆ. Genus *Collomia*

COLLOMIA (Greek, *kolla*, glue; the coating of the seeds). A small genus—about a dozen species—of dwarf hardy annuals allied to *Gilia* but differing in the form of corolla, which is salver-shaped, and in the general habit of the plants. The leaves are alternate, and the flowers are clustered in dense terminal heads. They are confined to the Western side of the American continent. The name of the genus was suggested by the remarkable character of the seeds, or rather their outer covering. If the seeds are placed in water this envelope swells up and forms a glutinous cloud around them.

Principal Species. COLLOMIA COCCINEA (scarlet). Stems erect, branched, downy, 12 to 18 inches high. Leaves narrowly lance-shaped, upper ones broader with a few bold teeth. Flowers deep red, tube buff; June to September. Introduced from Chili, 1831. Plate 188.

C. GRANDIFLORA (large-flowered). Stems erect, branched, downy near top, 1½ to 2 feet high. Leaves oblong-lance-shaped, entire, shining, fringed with glandular hairs. Flowers buff or pink, in half-round sticky heads; June to October.

Cultivation. Collomias are of easy cultivation in almost any garden soil. Seed should be sown where the plants are to flower, in March or April, and the young plants thinned out until they are about two inches apart.

Description of *Collomia coccinea*. Fig. 1, separate flower enlarged; **Plate 188.** 2, section of same.

JACOB'S LADDERS

Natural Order POLEMONIACEÆ. Genus *Polemonium*

POLEMONIUM (Greek, *polemos*, war; of doubtful application). A genus of nine perennial herbs, with alternate pinnate leaves, and blue, violet, or white flowers. The calyx is bell-shaped, five-lobed; the corolla wheel-shaped with five egg-shaped lobes. Stamens five, inserted on throat of corolla-tube; ovary egg-shaped with thread-like style and three-branched stigma. The species are natives of Europe, Temperate Asia, North



JACOB'S LADDER
(POLEMONIUM CÆRULEUM)

Nat. size

PL. 189

America, Mexico, and Chili; one—*P. cœruleum*—is indigenous in the northern half of England.

Principal Species. POLEMONIUM CÆRULEUM (blue). Greek Valerian; Charity; Jacob's Ladder. Rootstock short, creeping. Stems angular, hollow, 1 to 3 feet high. Leaves 6 to 18 inches long; leaflets six to twelve pairs, oval-lance-shaped, entire. Flowers blue, nearly an inch across, drooping, numerous, in corymbs; June and July. There are a number of cultivated varieties differing in the colours of the flowers; one has variegated leaves and white flowers.

P. CONFERTUM (close together). Stems 6 inches high. Leaves narrow, pinnate, the leaflets numerous and overlapping. Flowers rich blue, half an inch across, in small terminal heads; June to August. Introduced from the Rocky Mountains, 1885.

P. HUMILE (lowly). Stems many, downy, 6 inches high. Leaves chiefly radical, with egg-shaped leaflets. Flowers blue or purplish, drooping; July. The plant gives out a faint musky odour. Introduced from the Rocky Mountains, 1827. The var. *pulchellum* is smaller in all its parts, with violet, lavender-blue, or nearly white flowers.

P. REPTANS (creeping). Rootstock creeping, stems smooth, 6 inches high. Leaves with from seven to eleven egg-shaped leaflets. Flowers blue, drooping, with wedge-shaped corolla-lobes; April. Introduced from North America, 1758. Sometimes the flowers occur white.

Cultivation. *Polemoniums* succeed in any garden soil, but thrive most in rich, deep loam, where the drainage is perfect. *P. cœruleum* is an "old-fashioned flower," to be found doing well in many a cottager's garden. Its thorough hardiness makes it suitable for almost any aspect or situation. Seed may be sown in the border from April to June; or the tufts may be divided in spring. *P. humile* and *P. reptans* are useful for rock-gardens, and for edgings to borders or beds; the latter is especially desirable on account of its early flowering.

Description of *Polemonium cœruleum*, or Jacob's Ladder, including
Plate 189. the white variety. Fig. 1 is an enlarged section of the flower.

COBÆAS

Natural Order POLEMONIACEÆ. Genus *Cobæa*

COBÆA (named in honour of B. Cobo, a Spanish botanist). A genus of four ornamental greenhouse perennial climbers, with pinnate leaves

divided into two or three pairs of leaflets, and a terminal tendril. The flowers are borne solitarily on long stalks, in the axils of the leaves, and consist of a large, persistent, leafy calyx, and a handsome bell-shaped corolla with five lobes. The stamens and style all incline to one side, and are therefore termed *declinate*. The species are natives of Mexico, Guayaquil, and Caraccas.

Principal Species. COBÆA PENDULIFLORA (hanging flowered). Leaflets oblong, two pairs. Flowers large, on drooping stalks, green, the corolla-tube an inch long, the lobes 3 or 4 inches long, wavy and pendulous; December. A slender climber for the cool stove. Introduced from Caraccas, 1868.

C. SCANDENS (climbing). Stem woody at the base, rapidly attaining a height of 20 or 30 feet. Leaflets elliptic, slightly fringed, three pairs; tendrils branched. Flowers large, 2 to 3 inches across, at first green, then purplish; corolla-lobes short, broad, and spreading; May to October. Plate 190. Introduced from Mexico, 1792. There is a variety with the leaves variegated.

Cultivation. *Cobæas* are very suitable for conservatory decoration, rapidly covering a pillar or trellis, the leaves then being persistent. But *C. scandens* is very commonly grown out of doors, treated as an annual, and used for covering balconies, arbours, and trellis arches. Its rapid growth and its graceful habit make it valuable for such treatment quite apart from the richness and boldness of its flowers. If grown in large pots or tubs outside, it may be taken into the greenhouse before the frosts come, and the long shoots cut back to ensure a vigorous start early in spring. A rich but open soil is the most suitable for their growth. They are raised from seeds sown in spring in gentle heat; also from cuttings made of the young shoots in spring, struck in sandy soil on gentle bottom heat. The young branches layered in summer readily root, and may be separated in autumn.

Description of *Cobæa scandens*, slightly reduced. Fig. 1 shows the
Plate 190. early colouring of the corolla, and Fig. 2 is the stigma.

NEMOPHILAS

Natural Order HYDROPHYLLACEÆ. Genus *Nemophila*

NEMOPHILA (Greek, *nemos*, a grove, and *phileo*, to love; in allusion to the natural habitat). A genus of about eight species of hardy annual herbs, with blue, white, or spotted flowers, and pinnately-lobed or dissected



COBÆA SCANDENS

$\frac{2}{3}$ Nat. size

PL. 190

leaves. The flower-parts are in fives; calyx five-lobed, with reflexed teeth alternating with them; corolla bell-shaped, five-lobed. The species are natives of North America, and are all of comparatively recent introduction.

Principal Species. NEMOPHILA INSIGNIS (remarkable). Stems decumbent, branching, 6 to 18 inches high. Leaves pinnately lobed. Flowers bright blue with white centre, more than an inch across; May to August. Introduced 1822. Plate 191. There are several varieties: *alba*, with white flowers; *grandiflora*, with blossoms larger than the type; *marginata*, blue with a white edge; *purpurea-rosea*, purple-rose.

N. MACULATA (spotted). Stems 6 inches high. Leaves hairy, pinnately lobed. Flowers large, white, the lobes each bearing a violet-purple blotch; June to August. Introduced 1848.

N. MENZIESII (Menzies'). Stems 4 inches high. Leaves pinnately lobed. Flowers white to light blue, usually spotted with a darker tint; corolla rotate; June to August. Introduced 1836. There are several varieties: *alba*, white with dark centre; *oculata*, pale blue with black centre; *cælestis*, blue with centre spotted white and blue; *discoidalis* (a garden variety), purple-brown edged with white.

Cultivation. Nemophilas succeed in most good garden soils, preferring those that are rather light. Their compact habit renders them suitable for rock-gardens, or a front place in bed or borders; they may be used for edgings. The seed should be sown in autumn for a spring display, and another sowing about April will give a succession lasting in flower throughout the summer. Sow thinly, and thin out to four inches apart.

Description of *Nemophila insignis*, one-fourth less than natural size.
Plate 191. Fig. 1 is a section through enlarged flower; 2, is the rugged seed, natural size and enlarged; 3, a seedling.

PHACELIAS

Natural Order HYDROPHYLLACEÆ. Genus *Phacelia*

PHACELIA (Greek, *phakelos*, a faggot or bundle; in allusion to the inflorescence). A genus of about fifty species of rough annual or perennial herbs, mostly hardy, with blue, violet, or white flowers in terminal cymes. Calyx five-lobed without alternating teeth; corolla five-lobed, varying from bell-shaped to funnel-shaped. The species are almost confined to Western North America, Mexico, and the Chilean Andes.

Principal Species. PHACELIA CAMPANULARIA (bell-flowered). Stem much branched, 6 to 8 inches high. Leaves oblong, with rounded teeth. Flowers, $\frac{1}{2}$ -inch across, deep blue spotted with white; June to September. Annual. Introduced from California, 1882.

P. VISCIDA (sticky). Stem erect, branched, 12 inches high, with broad-ovate, saw-toothed leaves, and blue or purplish flowers in many-flowered, erect racemes; July. Annual. Introduced from California, 1834.

P. WHITLAVIA (Whitla's). Stem downy, 2 feet high, with oval-wedge-shaped, doubly-toothed leaves, and rich blue bell-shaped flowers in terminal racemes; June. Annual. Introduced from California, 1854.

Cultivation. *Phacelias* succeed in almost any garden soil with the treatment usually accorded to annuals. Seeds should be sown thinly in the open border from the end of February to the end of April.

WIGANDIAS

Natural Order HYDROPHYLLACEÆ. Genus *Wigandia*

WIGANDIA (named in honour of John Wigand, 1523–1587, a Bishop of Pomerania). A small genus containing only three or four species of bristly perennial herbs, with alternate, broad, wrinkled leaves, and five-lobed, bell-shaped, tubular flowers. They are natives of the mountain regions of Tropical America.

Principal Species. WIGANDIA MACROPHYLLA (large-leaved). Stem erect, 6 to 20 feet high. Leaves heart-shaped, hairy, rusty above; the lower ones 2 to 3 feet long. Flowers lilac, in one-sided spikes; April. Introduced from Caraccas, 1836. Commonly known as *W. caracasana*. In Tropical countries this grows to a large size, 20 feet or more in height and 40 feet through, and bears a profusion of lilac-blue flowers in spring. It is a popular summer-bedding plant in the London parks.

W. URENS (stinging). Stem branched, 6 feet high. Similar to the last, but leaves with longer reddish stalks and of more spreading habit. Flowers violet-blue; September and October. Introduced from Mexico, 1836. The hairs in this species are of a virulent stinging nature.

W. VIGIERI (Vigier's). Stem 6 feet high. Leaves with footstalks 9 inches long. Flowers lilac-blue turning to fawn-colour, in large panicles; September and October. Introduced from Mexico, 1868.

Cultivation. *Wigandias* require stove or greenhouse treatment, but may be used for Sub-tropical gardening in the middle of summer. They are propagated by means of seeds and cuttings.



NEMOPHILA INSIGNIS

$\frac{3}{4}$ Nat. size

Seeds should be sown in heat, about March, in pots of light loam. In June the young plants should be gradually hardened, and planted out about the end of that month. Cuttings should be inserted in sandy soil on bottom heat, and kept shaded until well-rooted, when the hardening process may be begun, preparatory to planting outside.

HELIOTROPES

Natural Order BORAGINÆ. Genus *Heliotropium*

HELIOTROPIUM (Greek, *helios*, the sun, and *trope*, a turning, from the ancient belief that it turned with the sun). A genus consisting of over a hundred species of herbs and under-shrubs, with alternate leaves and small blue or white flowers, in cymes which are rolled inwards. The calyx is four- or five-lobed; the corolla funnel- or salver-shaped, with five regular lobes. The stamens agree in number with the corolla-lobes and alternate with them. The species are found chiefly in the Tropical and Sub-tropical regions of the Old and New Worlds, and several species are natives of Europe.

History. The European species of *Heliotrope* were naturally the first to be introduced to this country, but they do not appear to have been much sought after, and this was probably due to their small size. *H. indicum*, *H. curassavicum*, and *H. parviflorum* were introduced from the West Indies in 1713, 1731, and 1732 respectively; but the species that has always been the favourite—*H. peruvianum*—on account of its sweet scent, was not introduced from Peru until 1757. The yellow-flowered *H. luteum* came from North Africa in 1779, and *H. corymbosum* from Peru in 1808. *H. convolvulaceum*, from New Mexico, dates only from 1867. The Heliotrope, or “Cherry Pie,” used for summer bedding, and of which there are numerous forms, are all varieties of *H. peruvianum*.

Principal Species. HELIOTROPIUM ANCHUSÆFOLIUM (Anchusa-leaved). Summer Heliotrope. Stem branched, hairy, 2 feet high. Leaves elliptic, downy, with wavy margins. Flowers violet-blue, similar to those of *H. peruvianum*, but inodorous; May. Introduced from Argentina, 1829. A sub-shrub requiring stove treatment.

H. CONVULVACEUM (Convolvulus-like). Stems 2 feet high. Leaves lance-shaped, varying in width. Flowers fragrant, white, opening at night; June to August. Hardy annual.

H. CORYMBOSUM (corymb-flowered). Stem 4 feet high. Leaves

oblong-lance-shaped. Flowers lilac, the cymes clustered in corymbs; May to September. Greenhouse shrub.

H. INDICUM (Indian). Stem a foot high. Leaves oval, somewhat heart-shaped, margins faintly toothed or wavy. Flowers bluish, in long, dense spikes; June to August. Annual requiring stove treatment.

H. PERUVIANUM (Peruvian). Cherry Pie; Common Heliotrope, or Turnsol. Stem branched, shrubby, as usually grown, from 1 to 2 feet high, but if trained up a greenhouse wall, 10 or 12 feet high. Leaves oblong-lance-shaped, wrinkled and hairy. Flowers lilac or dark blue, varying greatly under cultivation; strongly but pleasingly scented; throughout the year. Greenhouse perennial. Plate 192,

Garden Varieties. These have been bred from *H. peruvianum*. Their flowers vary from white through all shades to rich dark blue or violet. The following is a selection from the best sorts:—

Albert Delaux, foliage marbled yellow.
Adèle, dark lilac flowers.
Bouquet Parfumé, dark lilac.
Buffon, pale lilac.
Comtesse de Mortemart, deep violet, white centre.
Madame Jubbinger, very dark.
Madame P. Athles, dark, large trusses.
Miss Nightingale, dark lilac, dwarf.
M. Vilgrain, pale lilac, immense trusses.
Paul Pfitzer, light flowers, large truss.
President Garfield, mauve-purple.

Princess de Sagan, clear blue, white centre.
Queen Marguerite, deep dark blue, dwarf.
Roi des Noirs, deep blackish purple, white centre.
Rose Clair, dark, trusses numerous.
Swanley Giant, clear blue, enormous trusses.
The Queen, nearly white, very fragrant.
Volterrianum, violet, dwarf.
White Lady, nearly white, large trusses, free flowering.

Cultivation. Heliotropes are not exacting in the matter of soil, but will do best in fresh sandy loam. The greenhouse species do not require much heat, but must be protected from cold, which quickly proves fatal. In summer it is advisable to turn pot-plants out of the conservatory or greenhouse to enable them to harden their wood; and many plants are raised from cuttings for summer-bedding purposes only. These cuttings may be inserted at any time, but spring and autumn are the best periods for the process. They should be made from the young shoots, and rooted in a close frame; afterwards potted singly and grown on in a temperature of about 60°, giving the characters of standards, pyramids, or dwarfs by differently stopping the shoots. To obtain a quantity for bedding, cuttings are taken in autumn, and inserted thickly in pots in a close frame. In spring other cuttings are taken from these autumn-struck plants, which are now thrown away. The spring-struck plants should not be bedded out until all danger of frost is past. They are also grown from seed sown in heat in March.



CHERRY PIE
(HELIOTROPIUM PERUVIANUM)

Nat. size

PL. 192

Description of *Heliotropium peruvianum*, or Cherry Pie. Fig. 1 is a
Plate 192. single flower, enlarged, showing corolla and calyx; 2, the
 same in section, showing form and position of the organs.

VENUS' NAVELWORT

Natural Order BORAGINÆ. Genus *Omphalodes*

OMPHALODES (Greek, *omphalos*, the navel, and *eidōs*, resemblance). A small genus—about ten species of hardy annual or perennial herbs with lance-shaped, oval, or heart-shaped alternate leaves, and small white or blue salver-shaped flowers. The name is suggested by the four nutlike fruits, which have a border of membranous character which renders them cup-like. The species are natives of Europe, North Africa, Western and Central Asia, and Japan.

History. *Omphalodes verna* has been in our gardens ever since the year 1633, having been introduced from Southern Europe. Being perennial, and spreading by means of runners, it is quite naturalised in some old gardens, where its bright blue flowers with white star-like centres produce a very pretty effect. *O. linifolia* was introduced from the same regions about fifteen years later. *O. Luciliæ*, from the mountains of Greece and Asia Minor, is a modern addition to garden flowers, its introduction having taken place in 1873.

Principal Species. OMPHALODES LINIFOLIA (Flax-leaved). Stems erect, 6 to 15 inches high. Radical leaves wedge-shaped, stem-leaves slender-lance-shaped, smooth, the edges fringed. Flowers white, sometimes tinged with blue, $\frac{1}{4}$ -inch across, in racemes; May to August. Annual.

O. LUCILIÆ (Lucilia's). Stems 4 to 6 inches high. Leaves bluntly oblong; radical ones stalked, upper ones stalkless. Flowers lilac-blue, nearly $\frac{1}{2}$ -inch across; June to August. Perennial.

O. VERNA (spring). Stems 6 inches high. Radical leaves heart-shaped; stem-leaves oval-lance-shaped. Flowers bright blue with white centre; smaller than those of *O. Luciliæ*; March to May. Plate 193. There is a var. *alba*, with white flowers.

Cultivation. *Omphalodes* succeed in ordinary garden soil, liking a rather shady aspect. *O. Luciliæ* is recommended as a rock-plant; *O. linifolia*, being an annual, may be used as a bright bordering; and *O. verna* is very suitable for shrubbery borders, plantations, etc.

O. Luciliae and *O. verna* may be readily propagated by dividing the old plants in autumn or spring; and the whole of them may be raised from seed sown in March or April.

Description of Entire plant of *Omphalodes verna*, or Venus' Navel-
Plate 193. wort. Fig. 1 is an enlargement of the flower, and 2 is a section thereof.

FORGET-ME-NOTS

Natural Order BORAGINÆ. Genus *Myosotis*

MYOSOTIS (Greek, *mus*, a mouse, and *otis*, an ear; from the shape of the leaves). A genus including about thirty species of hardy annual and perennial herbs, with narrow-oblong leaves covered with bristles. The radical leaves are stalked, but those of the stem are not. The flowers are in scorpioid cymes, that is, cymes curled up after the manner of a scorpion's tail. The calyx is five-cleft or five-toothed; the corolla salver-shaped or funnel-shaped, five-lobed, the throat of the tube partly closed by five notched scales. Stamens five, attached to the throat of the corolla-tube by short filaments. Style short. Nutlets four, highly polished. The species are distributed throughout the North and South Temperate Regions, especially in Europe and Australia; six species are indigenous in Britain.

History. *Myosotis palustris*, the true Forget-me-not, is a common British plant. This and *M. sylvatica*, another native, whose flowers are almost as large, have doubtless been known in our gardens from the earliest times. *M. alpestris*, introduced as a garden-plant from Switzerland in 1818, also occurs locally, among moist rocks, at great elevations, in this country, and is generally regarded as a sub-species of *M. sylvatica* with larger flowers. Of the other species in cultivation, *M. azorica*, with still larger flowers, was introduced from the Azores in 1848, and *M. dissitiflora* from Switzerland in 1868. Another popular name for the plants included in the genus is Scorpion Grass.

Principal Species. MYOSOTIS ALPESTRIS (alpine). Stems tufted, semi-erect, hairy, branched at top only, 6 to 12 inches high. Leaves lance-shaped, bristly, with slight indication of stalks. Flowers bright blue with yellow centre, $\frac{1}{3}$ - to $\frac{1}{2}$ -inch across, fragrant in the evening; May to September. A sub-species of *M. sylvatica*, with stouter stems and shorter cymes; naturally growing upon moist rocks. Biennial. Plate 194.



VENUS' NAVELWORT
(*OMPHALODES VERNA*)

Nat. size
PL. 193

M. AZORICA (Azorean). Stems 6 to 12 inches high. Leaves bluntly oblong, hairy. Flowers purple, turning blue, without yellow centre, $\frac{1}{2}$ -inch across, in dense cymes; June to September. The var. *alba* has white flowers. A well-known garden variety is *Imperatrice Elizabeth*. Perennial; rather tender.

M. DISSITIFLORA (scattered-flowered). Stems 6 to 12 inches high, downy. Leaves oblong-lance-shaped, downy, bright green. Flowers deep bright blue, large, numerous; spring. Very similar to *M. sylvatica*, from which it differs in the shorter, less-spreading down, and the nutlets being stalked and keeled. It is a capital bedding plant. The var. *elegantissima* has the leaves edged with white. Perennial.

M. PALUSTRIS (marsh). Rootstock creeping, and sending out runners. Stem somewhat succulent, more or less erect, 1 to 2 feet high, stout, zigzag. Leaves oblong or spoon-shaped, glossy. Flowers sky blue, with yellow centre, $\frac{1}{3}$ - to $\frac{1}{2}$ -inch across, the lobes notched; May to July. Nutlets small, black, with border and keel. Native perennial, or biennial.

M. SYLVATICA (wood). Stems branched from the base, 6 to 24 inches high, clothed with spreading hairs. Leaves oblong-lance-shaped softly hairy. Flowers bright blue, $\frac{1}{3}$ -inch across, tube short, fragrant in evening; May to September. Perennial. *M. alpestris* is a sub-species of this. There are varieties in cultivation with white, pink, and striped flowers.

Cultivation. Most of the species succeed best in moist, shady places, although *M. sylvestris* proper is a native of dry woods. Soil is not of primary importance with them. They may all be grown easily from seed sown in spring in the open border. They readily sow themselves, and where a plant has grown this year an enormous number of seedlings will appear next spring. These must be transplanted, or they will destroy each other, or become poor and weedy. The perennial species may also be increased by dividing the rootstocks in spring, or by striking cuttings in summer, under a bell-glass or hand-light in a shady border. In pricking out seedlings a space of a foot should be left between the plants. *M. alpestris* and *M. azorica* make beautiful pot-plants for the decoration of windows and conservatories. The latter species also does well on the rockery. *M. palustris* should be planted wherever there is water.

Description of *Myosotis alpestris*, the Alpine Forget-me-not, of the
Plate 194. natural size. Fig. 1 is an unopened bud, enlarged; 2, an enlarged flower; 3, the same in section; 4, the nutlet, commonly called "seed," natural size and enlarged; 5, a seedling.

COMFREYS

Natural Order BORAGINÆÆ. Genus *Symphytum*

SYMPHYTUM (the classical Greek name, said to be derived from *symphuo*, to cause to grow together, in allusion to its reputation as a woundwort). A genus of sixteen or seventeen coarse, bristly perennials, with white, blue, purple, or yellow tubular flowers in drooping terminal cymes. Natives of Europe, North Africa, and Western Asia. Two species are British.

History. Comfrey has long held a place in old-fashioned gardens, though a trifle too coarse and robust to be very popular in those of a more modern type. In old days it shared with Borage the reputation of being a valuable ingredient in the concoction of "cool tankards," and was greatly esteemed as a blood cooler, a healer of all wounds, and a stayer of all fluxes. But though its medicinal character has been lost it still stays on in our gardens; or in places where it has been turned out to make room for more compact and brilliant subjects, you will find it clinging to the spot and growing in profusion on the boundary wastes. The native species are *Symphytum officinale* and *S. tuberosum*. Several foreign species have been introduced at various times, among them the Prickly Comfrey, *S. asperrimum*, from the Caucasus in 1799, and *S. peregrinum*, from Iberia (1816), which is frequently grown as a fodder-plant under the name of *S. asperrimum*. The plant introduced from Bohemia in 1810 under the name of *S. bohemicum* now ranks as *S. officinale* var. *bohemicum*. The blue-flowered *S. caucasicum* was introduced from the Caucasus in 1820.

Principal Species. **SYMPHYTUM CAUCASICUM** (Caucasian). Stem 3 feet high. Leaves oval-lance-shaped, hairy; upper ones continued down sides of stem; lower ones long-stalked. Flowers blue, tubular, the mouth bell-shaped; May to July.

S. OFFICINALE (of the shops). Common Comfrey. Bristly and hairy. Rootstock branched; stems 1 to 3 feet high, stout, branched, angular, and broadly winged. Leaves oval-lance-shaped; lower with long winged stalks; upper with short stalks. Flowers yellow, red, or purple in scorpioid cymes; May to August. There are several varieties, including var. *luteo-marginatum*, with yellow-edged leaves.

S. TUBEROSUM (tuberous). Hairy, not bristly. Rootstock short, horizontal. Stem rather slender, scarcely winged. Leaves similar to those of *S. officinale*, but the radical ones with longer stalks, and the



ALPINE FORGET-ME-NOT
(*MYOSOTIS ALPESTRIS*)

Nat. size
PL. 194

upper ones scarcely continued down stem. Flowers smaller, ochreous in colour; June and July.

Cultivation. Comfreys succeed in almost any soil, but especially where there is a tendency to wetness. They do not object to shade, and may on that account often be grown to advantage where a bold subject is desired on the edge of a plantation. They come freely from seed sown in the open border, and may also be increased by dividing the rootstock in spring. But they should not be planted where the coarse seedlings will interfere with more delicate subjects.

ALKANETS

Natural Order BORAGINÆ. Genus *Anchusa*

ANCHUSA (of doubtful derivation). A genus of about thirty species of annual or perennial herbs, usually bristly, with flowers of similar construction to those of *Symphytum*, with a straight or curved corolla-tube, whose throat is closed by hairs or scales, and whose limb is obliquely cut, or spreading in five lobes. The four nutlets are rough. They are natives of Europe and Western Asia; three being indigenous to Britain.

Principal Species. **ANCHUSA CAPENSIS** (Cape of Good Hope). Plant tufted; stems hairy, $1\frac{1}{2}$ foot high. Leaves narrow-lance-shaped, wavy and bristly. Flowers blue with white centre; in terminal cymes; July. Introduced from South Africa, 1800. Biennial.

A. ITALICA (Italian). Stems 3 to 4 feet high, bristly. Leaves lance-shaped, glossy; radical ones as much as 2 feet long. Flowers bright blue or purple; June to August. Introduced from the Caucasus, 1810. Perennial.

A. OFFICINALIS (of the shops). Stems densely covered with soft bristles, angled; 1 to 2 feet high. Leaves narrow-lance-shaped, the radical ones with winged footstalks. Flowers violet-blue with white centre, $\frac{1}{3}$ -inch across; June and July. Native biennial.

A. SEMPERVIRENS (evergreen). Stem bristly, unbranched, 1 to 2 feet high. Leaves oval-oblong, stalked. Flowers bright blue, with white centre, $\frac{2}{3}$ -inch across; May and June. A rare native perennial.

Cultivation. Alkanets are quite hardy, except *A. capensis*, which requires greenhouse accommodation in winter. They are easily grown, with little regard for soil. A sunny position is the best for them. The perennial species may be increased by divisions in spring; and all of them by sowing seed in sandy soil.

LUNGWORTS

Natural Order BORAGINEÆ. Genus *Pulmonaria*

PULMONARIA (from Latin, *pulmo*, the lungs, in allusion to its former use as a remedy in pulmonary complaints). A genus of five species of hardy herbaceous perennials with creeping rootstocks, and unbranched flowering stems. Calyx large, five-angled at the base, five-cleft. Corolla funnel-shaped, five-lobed, with five bunches of hairs alternating with the five stamens. Stigma two-lipped. Nutlets smooth, top-shaped. The species are distributed over Europe and Western Asia. One, *Pulmonaria angustifolia*, is indigenous to Britain, though rare; another, *P. officinalis*, is locally naturalised.

Principal Species. PULMONARIA ANGUSTIFOLIA (slender - leaved). Blue Cowslip. Rootstock short and stout. Stem 12 to 18 inches high, brittle, hairy. Leaves downy, narrow-lance-shaped, sometimes with paler spots. Flowers $\frac{3}{4}$ -inch across, pink changing to bright blue; April to June.

P. ARVERNENSE (Auvergne). Stem 12 to 18 inches high. Leaves lance-shaped. Flowers deep blue; April and May. Origin of this species unknown.

P. OFFICINALIS (of the shops). Jerusalem Cowslip. Stems 1 foot high. Leaves oval or oval-lance-shaped, always spotted with pale green. Flowers at first red, then pale purple; April and May. Native of Europe. There is a variety with white flowers.

P. SACCHARATA (sugared). Stems 1 foot high. Leaves oval. Flowers pink; May and June. Introduced from Europe, 1817.

Cultivation. *Pulmonarias* are of easy cultivation in almost all garden soils. They are mostly found in old-fashioned garden borders, where some of the clumps have been almost undisturbed for generations. They require little attention beyond occasional replanting. They are propagated by division of the rootstock in early spring.

VIPER'S BUGLOSS

Natural Order BORAGINEÆ. Genus *Echium*

ECHIUM (Greek, *echion*, from *echis*, a viper). A genus of about twenty rough herbs and shrubs, with alternate entire leaves and red, white,



CONVOLVULUS, OR MORNING GLORY
(*IPOMÆA PURPUREA*)

Nat. size
PL. 195

purple, or blue flowers. Calyx five-parted. Corolla cylindrical or funnel-shaped, with dilated throat, and the limb unequally divided into five lobes. Stamens five. Stigma two-lobed. Nutlets rough and wrinkled, top-shaped or oval. The species are chiefly South European and Oriental; two are British. The word Bugloss means ox-tongue.

Principal Species. *ECHIUM CANDICANS* (whitish). Stem branched, 2 to 4 feet high. Leaves lance-shaped, covered with silvery, silky down. Flowers blue; May. Greenhouse biennial shrub. Introduced from Madeira, 1777.

E. CALLITHYRSUM (beautiful-spray). A tree-like shrub, attaining a height of 12 feet, copiously branched with long lanceolate hairy leaves and thyrsoid panicles a foot long, of rich purple-blue flowers. The handsomest of all the *Echiums*. It is grown in the winter-garden at Kew. Canary Islands.

E. FASTUOSUM (disdainful). Stem branched, hairy above, 2 to 4 feet high. Leaves oblong-lance-shaped, covered with white hairs, the edges fringed. Flowers bell-shaped, deep blue; April to August. Greenhouse evergreen shrub. Introduced from the Canary Islands, 1779.

E. PLANTAGINEUM (Plantain-like). Stem diffusely branched, 1 to 3 feet high. Leaves slender-lance-shaped with heart-shaped base. Flowers 1 inch across; dark blue-purple; June to August. Native (Cornwall and Jersey only) annual or biennial.

E. VULGARE (common). Stem stout, usually unbranched, 1 to 3 feet high. Leaves lance-shaped with rounded base. Flowers $\frac{3}{4}$ -inch, red-purple in bud, turning bright blue; June to August. Native annual or biennial.

Cultivation. Ordinary garden soils of good quality suit these plants, and they need no special care. The herbaceous species are raised from seeds sown in spring or autumn; the shrubby species from cuttings or seeds, the latter mode preferably. Cuttings should be inserted in sandy soil under a bell-glass in the greenhouse. These may be grown out of doors in summer, but they require the shelter of a greenhouse in winter.

BORAGE

Natural Order BORAGINÆ. Genus *Borago*

BORAGO (of doubtful meaning). A genus of three annual or perennial herbs, bristling with swollen-based hairs. Leaves oblong or lance-shaped. The flowers are five-parted; corolla wheel-shaped, the throat closed by

notched scales. The five stamens are attached to the throat of the corolla and protrude in a circle round the stigma. Nutlets wrinkled. The species are natives of South Europe and North Africa; one, *Borago officinalis*, is naturalised in England, growing on waste places near dwellings.

Species. BORAGO LAXIFLORA (loose-flowered). Stems, several from each root, first erect, then prostrate, bristly. Leaves rough, oblong; the radical ones forming a rosette; the upper ones partially clasping the stem. Flowers pale blue, on long footstalks, drooping; May to August. Perennial. Introduced from Corsica, 1813.

B. LONGIFOLIA (long-leaved). Stem 1 foot high. Leaves narrowly lance-shaped, rough and downy beneath. Flowers blue; July and August. Annual. Introduced from Numidia, 1825.

B. OFFICINALIS (of the shops). Stem stout, succulent, branched, 1 to 3 feet high, erect. Leaves lance-shaped, waved; lower stalked, upper stalkless, eared at base. Flowers bright blue; June and July. Annual or biennial, largely grown to be used as an ingredient in the concoction of claret-cup.

Cultivation. The cultivation of *Boragos* is a simple matter, as they succeed in almost any garden soil. The seeds should be sown where they are to grow, in spring—from March to May—and the seedlings thinned out. The perennials may also be increased by means of cuttings, struck in a cold frame, or by dividing the roots in spring.

BINDWEEDS

Natural Order CONVULVACEÆ. Genus *Ipomœa*

IPOMÆA (derived from *Ips* and the Greek word *homoios*, similar. Linnæus, the author of the name, erroneously supposed that *Ips* was the Greek for Bindweed). An extensive genus (about four hundred species) of twining and creeping herbs, with a few shrubs. They have alternate leaves, which are entire, lobed or divided. The flowers are salver-shaped, bell-shaped, or tubular, of showy tints. The ovary is three-celled, and the pistil ends in a stigmatic head, which may be lobed, but is not divided into slender arms as in the genus *Convolvulus*. The species are distributed throughout the warm regions of the globe, and a few are found in North America.

History. *Ipomœas* have been known to cultivation in this country for at least three centuries, for in the year 1597



(A) IPOMÆA COCCINEA

(B) IPOMÆA QUAMOCLIT

Nat. size

both *I. Batatas* and *I. hederacea* (formerly called *I. nil*) were growing in England. The genus is rich in drug-producing plants, and doubtless several species owe their early introduction to this fact. *I. Batatas* is the Sweet Potato, whose tuberous roots are largely used in the Tropics for food. It is believed to have been known in this country long before the introduction of the now common Potato by Sir Walter Raleigh. The word *Potato* is said to be a corruption of *Batatas*. Many species possess a milky juice whose properties are of a purgative character, and from which inferior kinds of Jalap and Scammony are prepared. The real Jalap is produced by *I. purga*, introduced from Xalapa, Mexico, in 1838. Among the early species to find their way into English gardens were the Quamoclit, *I. Quamoclit*, and the popular Morning Glory, *I. purpurea*, which were both introduced about 1629 from Tropical America. The beautiful white-flowered *I. Bona-nox* also came from Tropical America nearly a hundred and fifty years later (1773), and *I. pandurata* from the United States in 1732. *I. rubro-cœrulea* was brought from Southern Mexico in 1830, *I. Horsfalliæ* from the West Indies (1833), and *I. Learii* from Ceylon in 1839. All the species described below are twiners. Several arborescent species have recently been introduced from Mexico.

Principal Species. IPOMÆA BONA-NOX (Good-night). Plant smooth. Stem climbing to a height of 10 feet. Leaves heart-shaped. Flowers white, 6 inches across, with very long tube; July and August. Stove annual. This is the "Moon-flower" of the Tropics. Its flowers expand in the evening and wither in the early morning.

I. COCCINEA (scarlet). Stem slender, 10 feet high. Leaves heart-shaped, entire. Flowers bright scarlet, small with long slender tubes; July to October. Introduced from West Indies, 1713. The var. *hederifolia*, represented in Plate 196A, has the leaves deeply lobed.

I. DIGITATA (finger-leaved). A deciduous stove climber with a thick tuberous rootstock and stout climbing stems bearing digitate leaves and numerous panicles of rosy-mauve funnel-shaped flowers 3 inches across. Also known as *I. paniculata* and *Batatas paniculata*.

I. HEDERACEA (Ivy-like). Stem 10 feet high. Leaves heart-shaped, three-lobed. Flowers light blue, with hairy calyx; July to September. Half-hardy annual. The seeds yield the medicinal resin Phorbatisin.

I. HORSFALLIÆ (Horsfall's). Leaves divided digitately into five lance-shaped leaflets. Flowers in racemes, 2 inches across, rich crimson, produced in winter. Stove evergreen, from the West Indies. A variety of *I. ternata*, of which *I. thomsoniana*, known as the White Horsfalliæ, is another variety with pure white flowers.

I. PANDURATA (crooked). Stem 12 feet. Leaves heart-shaped,

downy beneath. Flowers large white, with purple throat; June. Hardy perennial, from North America.

I. PURGA (purge). True Jalap. Leaves heart-shaped, somewhat arrowhead-shaped, glossy. Flowers broad, purple-rose; August and September. Hardy in a sheltered situation.

I. PURPUREA (purple). Morning Glory; Major Convolvulus. Stem 10 feet high. Leaves heart-shaped. Flowers deep violet-purple, but in cultivation producing many shades of blue, carmine, rose, white, with rays of another tint; June to September. Hardy annual. Plate 195.

I. QUAMOCLIT (Quamoelit, the native name). Stem 6 feet high. Leaves pinnate, with very slender leaflets. Flowers 1 inch long, dark red, with long tubes; July to September. Greenhouse annual. Plate 196B.

I. RUBRO-CÆRULEA (reddish blue). Leaves heart-shaped on long stalks. Flowers at first rich lake, becoming purplish blue; November and December. Stove annual.

Cultivation. The hardy species of *Ipomœa* will grow in almost any soil, but that most suitable for the genus generally is a compost of fibrous loam and leaf-mould, to which some thoroughly rotted manure has been added. The seeds should be sown in pots in March, and started in a warm house or frame, but when the stems show a disposition to twine they should be planted out in sheltered places where they will find some support to climb up. This may be an arbour, a trellis, tree-branches specially inserted, or wire arches over the paths. The half-hardy and tender annuals may be raised in the same manner, but their after-treatment must be of a different character. Half-hardy kinds, like *I. hederacea*, may be grown outside in summer, but the others should be trained up pillars or wires in the stove or greenhouse as the case may be. If these can be planted in a border in the house, so much the better, as they require plenty of root-space. The evergreens are propagated by cuttings and layers. The material for these will be found in the side growths, which in the one case are cut off and struck in bottom heat, in the other are pegged down into pots. Layering will be found to answer better than cuttings in some species, as *I. Horsfalliæ*, for instance. The seeds of *I. rubro-cœrulea* should be sown in June and the plants grown under glass in a warm sunny position. *I. digitata* is a most useful plant for clothing pillars, etc., in large stoves.

Description of Plate 195. *Ipomœa purpurea*, the Morning Glory. **Plates 195 and 196.** Upper portion of plant, and flowers of several tints. Fig. 1 is a section of a flower; 2, a seedling; 3, the seeds slightly enlarged.

Plate 196. A, *Ipomœa coccinea*; B, *Ipomœa Quamoelit*. Fig. 1, a section of the flower.



MINOR CONVULVULUS
(CONVOLVULUS TRICOLOR)

Nat. size

PL. 197

CONVOLVULUSES

Natural Order CONVULVULACEÆ. Genus *Convolvulus*

CONVOLVULUS (Latin, *convolvere*, to twine). A genus of about a hundred and sixty slender herbs or sub-shrubs, mostly trailers or twiners, similar to *Ipomœa*, but differing from it chiefly in the character of the stigmas and seed-capsule. The stigmas are two, and are oblong or very slender; the capsule is two-celled. The species are distributed throughout the Tropical and Temperate Regions of the World; three are British.

History. Our native *Convolvuli* are very beautiful plants, but they are seldom cultivated. One good reason for this neglect will be found in the character of their perennial roots, which ramify so extensively in the ground that they rapidly become a nuisance and difficult of extirpation. This is especially the case with the Field Convolvulus, *C. arvensis*, and in a lesser degree with *C. Soldanella* which only occurs near the sea. Our Hedge Convolvulus, *C. sepium*, with its very large white corolla and hooded calyx, can be kept more under control, and is well worth introducing where there is a hedge for it to scramble over; and even *C. arvensis* is harmless and exquisite if grown in a pot or basket where its roots cannot run. Like *Ipomœas*, several foreign species of *Convolvulus* have been cultivated here for long periods. *C. althæoides* was known in our gardens at least three hundred years ago, though the better-known *C. tricolor* (the Minor Convolvulus of the seedsman) was not introduced until 1629. *C. cneorum*, a half-hardy South European shrub with pale pink flowers, was introduced in 1640; *C. cantabricus* in 1680; *C. Scammonia*, which yields the valuable drug Scammony, in 1726. All these species came from Southern Europe or the Levant. The species now in cultivation from farther afield have been introduced chiefly during the present century: such as *C. erubescens* from Australia (1803), *C. pannifolius*, probably from the Canaries (1805), *C. chinensis* from China (1817), *C. mauritanicus* from North Africa, and *C. ocellatus* from South Africa.

Principal Species. CONVULVULUS ALTHÆOIDES (Althæa-like). Stems twining, 2 feet high. Leaves shining, silvery; some heart-shaped with rounded teeth, others lobed or dissected. Flowers pale red or lilac; June. Hardy perennial.

C. ARVENSIS (field). Small Bindweed. Stems many, slender, smooth or downy, trailing or twining, 2 or 3 feet long. Leaves variable, spear-

or arrow-shaped. Flowers fragrant, 1 inch across, white or pink; June to September. Native perennial.

C. CHINENSIS (Chinese). Stems twining, 2 to 3 feet high. Leaves somewhat leathery, spear-shaped, greyish green. Flowers purplish crimson with yellow rays; July and August. Flowers expand very early in the morning and close before noon. Hardy perennial.

C. ERUBESCENS (blushing). Stem twining, 6 feet high. Leaves spear-shaped, rather hairy. Flowers small, reddish pink; July to September. Greenhouse biennial.

C. MAURITANICUS (Native of Mauritania). Plant covered with soft white hairs. Stems prostrate, twining. Leaves egg-shaped. Flowers, 1 inch across, blue with white throat and yellow anthers; July to September. Greenhouse perennial. Native of North Africa. Hardy against a wall in the South.

C. PANNIFOLIUS (cloth-leaved). Stems shrubby, twining, 15 feet high. Leaves oblong-heart-shaped. Flowers pale violet-purple, the tube white; June to September. Greenhouse shrub.

C. SCAMMONIA (Scammony). Stem angular, 2 feet high. Leaves arrow-shaped, smooth. Flowers bell-shaped, cream-colour or faintly red; July. Hardy perennial.

C. SEPIUM (hedge). Great Bindweed. Stems twining, 3 to 6 feet high. Leaves large, heart-shaped. Flowers, 2 inches across, pure white; June to August. Native perennial.

C. SOLDANELLA (Soldanella-like). Sea Convolvulus. Stems trailing, rarely twining, 6 to 12 inches long. Leaves circular or kidney-shaped, thick. Flowers pale purple or pink, 1 to 1½ inch across; June to August. Native perennial.

C. TRICOLOR (three-coloured). Minor or Dwarf Convolvulus. Stem first erect, then trailing, branched, 1 foot high. Leaves spoon-shaped, downy, fringed. Flowers large, with yellow centre, blue marginal band and an intermediate white region; July to September. In cultivation there is considerable variation in the proportions and arrangement of the three colours. Hardy annual. Plate 197.

Cultivation The species of *Convolvulus* are among the simplest plants to grow. The hardy species do well in almost any garden soil; the perennials requiring to be watched lest they increase too rapidly. The seed of the annuals should be sown in the borders in spring and thinned out; whilst the perennials are most quickly propagated by taking up and dividing the creeping roots. Similar treatment under glass should be accorded to the more tender species; the greenhouse perennials being propagated by cuttings. A good



STAR CAPSICUM
(SOLANUM CAPSICASTRUM)

Nat. size

PL. 198

potting compost for these will be found in a mixture of peat, leaf-mould, and loam. *C. arvensis* and *C. mauritanicus* will be found useful subjects for hanging baskets.

Description of *Convolvulus tricolor*, or Minor Convolvulus, natural
Plate 197. size. Fig. 1, a flower in section; 2, a seed, natural size and enlarged; 3, a seedling.

SOLANUMS

Natural Order SOLANACEÆ. Genus *Solanum*

SOLANUM (the classical Latin name used by Pliny; meaning unknown). An enormous genus (about seven hundred species) of herbs and shrubs with a few trees, with leaves scattered, or in nearly opposite pairs. The flowers are yellow, white, purplish, or blue. Calyx with from five to ten teeth; corolla wheel-shaped with five to ten lobes. The five stamens are attached to the throat of the corolla, the anthers project, all in contact, around the style. Fruit a two-celled (rarely four-celled) berry, containing many kidney-shaped seeds. The species are mostly Tropical, especially plentiful in America; two British.

History. This is a most interesting genus to consider. It contains a large number of plants that are virulently poisonous, and several that are exceedingly valuable food-plants, including the Potato, *Solanum tuberosum*, and the Aubergine or Egg-plant, *S. Melongena*. In other countries many other species are eaten, such as *S. aviculare*, the Tasmanian Kangaroo-apple, and corresponding forms in their native countries. One of them, *S. anthropophagorum*, has a gruesome interest attached to it, by reason of its berries having been a favourite accompaniment to a dinner of human flesh in the unregenerate days of the Fijians. *S. pseudo-capsicum*, the Jerusalem Cherry, was in cultivation in this country three centuries ago, having been introduced from Madeira. *S. Melongena*, the Egg-plant, was known here as far back as 1597, as also was *S. æthiopicum*. Several species not now in cultivation were introduced during the seventeenth century, but most of those now grown are of much more recent date. *S. marginatum* was brought from Abyssinia in 1775, *S. pyracanthum* from Madagascar in 1789, and *S. giganteum* from India in 1792; *S. seaforthianum* from the West Indies in 1804; *S. crispum* from Chili, 1824; *S. Jasminoides* from South America, 1838; *S. atropurpureum* from Brazil, 1870; and *S. robustum*, also from Brazil, in 1878.

Principal Species. SOLANUM ACANTHODES (Acanthus-like). Stems and branches prickly, 3 to 6 feet high. Leaves, a foot long, more or less oval, deeply lobed, veins and ribs orange-coloured; mid-rib and footstalk spiny. Flowers, six to ten in a cyme, pale purple, with bristly calyx. Stove shrub. Introduced from Brazil, 1863.

S. CAPSICASTRUM (Star Capsicum). Stem sub-shrubby, branched, 1 to 2 feet high. Leaves produced mostly in twos, of which one is much larger than the other, more or less lance-shaped. Flowers white; June to September. Fruit scarlet. A greenhouse perennial. Native of Brazil. Plate 198. There is a variety with variegated foliage.

S. CRISPUM (curled). Potato Tree. Stems sub-shrubby with herbaceous branches, when trained against a wall growing to a height of 15 to 18 feet. Leaves oval-lance-shaped, margins crisped, 3 or 4 inches long. Flowers bluish purple, fragrant; June and July. Hardy in the South.

S. GIGANTEUM (gigantic). Stem thick and soft, prickly, and covered with soft starry hairs, 10 to 25 feet high. Leaves oblong-wedge-shaped, 8 inches long. Flowers blue, $\frac{3}{4}$ -inch across; June to July. Greenhouse sub-tree.

S. JASMINOIDES (Jasmine-like). Stems numerous, twiggy, 3 or 4 feet high. Leaves somewhat heart-shaped, sometimes deeply lobed. Flowers bluish white. Greenhouse climber.

S. MARGINATUM (margined). Stem erect, prickly, and covered with white wool, 3 or 4 feet high. Leaves somewhat heart-shaped, lobed, with prickles on each side, and woolly beneath; margin of upper surface white. Flowers white with purple centre; June to September. Fruit yellow, 1 inch across, globular, drooping.

S. MARONIENSE (Maroni River). Stem prickly, branched above, 6 to 14 feet. Leaves variously wedge-shaped, lobed, with prickles on the veins. Flowers bluish violet, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches across. Stove shrub; native of Brazil.

S. MELONGENA. Egg-plant or Brinjal. Stem 2 to 8 feet high. Leaves oval with lobed or waved margins, prickly, woolly beneath. Flowers blue, over an inch across. Fruit egg-shaped, variable in size and colour, being either white, yellow, purple, or nearly black; June and July. Greenhouse annual; native country uncertain, but commonly cultivated in Tropical countries.

S. PSEUDO-CAPSICUM (false Capsicum). Jerusalem Cherry. Stem 4 feet high. Leaves lance-shaped or oblong. Flowers white. Fruit scarlet, occasionally yellow, globular, $\frac{1}{2}$ -inch diameter. Greenhouse shrub.

S. PYRACANTHUM (fire-thorn). Stem prickly, sub-shrubby, 3 to 6



DATURA SANGUINEA

$\frac{1}{2}$ Nat. size

feet high. Leaves deeply divided pinnately, the lobes oval-lance-shaped. Flowers bluish violet, 1 inch across; August and September. Greenhouse perennial.

S. ROBUSTUM (strong). Stem tree-like, with robust, prickly, and woolly branches, 2 to 4 feet high. Leaves prickly on both sides, oval-elliptic with wavy lobes, velvety above, woolly beneath. Flowers white, 1 inch across, clustered. Fruit globular, hairy, of a rusty-orange hue. Greenhouse, suitable for Sub-tropical gardening.

S. SEAFORTHIANUM (Seaforth's). Stem trailing. Leaves oval, entire. Flowers lilac or pale red; July to September. Fruit globose, yellowish red. Stove.

S. WENDLANDII (Wendland's). The largest-flowered and handsomest of the climbing species. Stem succulent. Leaves large, deeply lobed, deciduous. Flowers, 2 inches across, in very large drooping cymes, lilac-purple. A magnificent summer-flowering stove-climber. Introduced in 1887 from Costa Rica.

Cultivation. *Solanums* do best in a rich loamy soil. Given the greenhouse or stove accommodation required by most of the species, their cultivation is not attended by difficulty. Most of them may be raised from seed, whilst the shrubby kinds are usually propagated by means of cuttings from the young shoots, struck in a propagating frame. The large-leaved annual species are used for Sub-tropical bedding. They are raised from seeds sown in heat in early spring.

Description of *Solanum Capsicastrum*, or Star Capsicum, natural size.
Plate 198. A, flowering branch; B, fruiting branch. Fig. 1 is a flower, enlarged; 2, a section through same; 3, a section through the fruit.

WINTER CHERRY

Natural Order SOLANACEÆ. Genus *Physalis*

PHYSALIS (Greek, a bladder). A genus of about thirty species of annual and perennial hairy herbs, similar to *Solanum*, but differing in the characters of the anthers and calyx. In *Solanum* the anthers open by terminal pores; in *Physalis* by longitudinal slits. After flowering the calyx enlarges, completely surrounds the Cherry-like fruit, and resembles a bladder. The species, of which only one or two are of horticultural interest, are chiefly American, though a few are widely distributed in warm regions outside America.

Principal Species. *PHYSALIS ALKEKENGI*. Winter Cherry; Chinese-lanterns. Roots creeping, stem scarcely branched, 1 foot high. Leaves oval-wedge-shaped. Flowers white with yellow anthers; July. The calyx becomes bright orange-coloured after the fall of the corolla, and encloses the scarlet fruit. Hardy perennial. Introduced from Europe, 1548.

P. FRANCHETII (Franchet's). Like the preceding in habit, but much larger in all its parts, the bladder-like fruits being 2 inches in diameter and of a rich orange-scarlet colour. Introduced from Japan in 1894.

P. PERUVIANA (Peruvian). Cape Gooseberry. Stem erect, branched, 3 feet high. Leaves heart-shaped, cottony. Flowers whitish with violet anthers; July. The fruits are edible, and make a very palatable preserve, for which purpose this plant is largely grown in South Africa. Greenhouse evergreen. Introduced from South America, 1772.

Cultivation. The three species here described may be grown out of doors in this country, but *P. peruviana* is not hardy. They prefer a light soil in a sunny position. *P. Franchetii* is an effective bedding plant, its freely-produced fruits being very attractive in autumn. They are easily propagated from seeds or root-cuttings.

FABIANA

Natural Order SOLANACEÆ. Genus *Fabiana*

FABIANA (named in honour of F. Fabiano, a Spanish botanist). A genus of about eleven species of shrubs with small heath-like leaves and tubular, funnel-shaped flowers, otherwise similar to *Solanum*. The fruit is a two-celled capsule enveloped in the persistent calyx. The species are all natives of South America.

Principal Species. *FABIANA IMBRICATA* (tiled). Stem 3 feet high. Leaves very small, oval, evergreen, crowded and overlapping like tiles on a roof. Flowers pure white, solitary but abundant; May. Hardy, except in the North of England, where it needs the shelter of a greenhouse, and is often grown as a conservatory plant. Introduced from Chili, 1838.

Cultivation. *Fabiana* is not exacting in regard to soil, providing it is of fairly good quality. It thrives best if grown against a wall. It is propagated by means of the young shoots taken off in spring, and inserted as cuttings in sandy soil in heat.



HYBRID PETUNIAS

Nat. size

PL. 200

THORN APPLE

Natural Order SOLANACEÆ. Genus *Datura*

DATURA (supposed to be derived from the Arabic name for the plants—*Tâtôrah* or *Datora*). A genus of annual herbs, perennial shrubs and trees, with large, lobed leaves and showy flowers. The most distinguishing feature is the large tubular calyx, of which the upper part falls off as the fruit ripens, leaving a small portion as a circular rim at the base of the fruit. The funnel-shaped corolla has five folds or plaits. The fruit is four-celled, covered with spines, and splits into four valves. The species are distributed over the warm and Tropical regions of the globe, one, *D. Stramonium*, being found locally naturalised in this country.

History. *Daturas* are extremely poisonous plants, owing to their containing an alkaline principle called *daturin*. This principle has been largely used as an anodyne in neuralgia, epilepsy, mania, and the leaves of *D. Stramonium* have been widely smoked to give relief to sufferers from asthma. It is to the early use of this plant in domestic medicine that we probably owe its introduction to this country, so far back that we have no record of it. It occurs in a semi-wild state on rubbish-heaps and waste places on the outskirts of cultivated land. A common Indian species, *D. fastuosa*, is used by the criminal classes in India and China for stupefying and poisoning. *D. Metel* was introduced from the Tropics prior to 1596, and *D. fastuosa* and *D. Tatula* followed in 1629, the former from the East Indies and the latter from the Continent. *D. suaveolens* was brought from Mexico in 1733, whilst *D. arborea*, from Peru, dates as a greenhouse shrub from 1813, and *D. meteloides*, from California, has no longer record than from 1856. The shrubby species are known in gardens as *Brugmansias*.

Principal Species. DATURA ARBOREA (tree-like). Stem shrubby, branches downy, powdered, 8 to 10 feet high. Leaves elliptic-oblong, downy. Flowers white, 7 or 8 inches long; August. Greenhouse. Also known as *Brugmansia candida*; there is a yellow-flowered variety of it cultivated under the name of *D. aurea* and *D. chlorantha*.

D. FASTUOSA (proud). Stem downy, 2 to 3 feet high. Leaves oval, toothed, downy. Flowers white, with a violet tint outside; July. Annual. *D. cornucopia* is a good variety of this, with large flowers streaked and flaked with violet.

D. METEL. Stem downy, 2 feet high. Leaves heart-shaped, entire,

or slightly toothed, downy. Flowers large, white, fragrant; June. Annual.

D. SANGUINEA (bloody). Stem woody, branched above, 4 to 8 feet high. Leaves oval-oblong, with waved margin, clothed with white hairs. Flowers pendulous, fleshy, downy, 7 inches long, orange-yellow and red; August and September. Also known as *Brugmansia sanguinea*. Plate 199.

D. SUAVEOLENS (sweet-smelling). Stem woody, 10 to 15 feet high. Leaves elliptic-oblong, shiny above. Flowers large, white, fragrant; August. Greenhouse shrub. Also known as *Brugmansia suaveolens*; there is a variety with double flowers known as *D. Knightii*.

Cultivation. The annual species of *Datura* are readily grown from seeds sown on a hot-bed; the young plants being transferred singly, as soon as possible, to small pots, preparatory to transplanting to the open border. The shrubby species—*Brugmansias*—are propagated by means of cuttings, made from the young shoots taken in spring, with a heel of older wood. These are inserted in sandy soil and treated to bottom heat. Any light sandy soil will suit the whole genus. The shrubby section require greenhouse treatment, giving them a fair amount of heat in summer, but much less in winter, when their chief requirements are to be kept cool and dry. They should be severely pruned every spring. They may be planted out to form large specimens or grown in pots as standards. During the flowering period food should be supplied in the form of manure water.

**Description of
Plate 199.**

Datura sanguinea, one-half the natural size.

PETUNIAS

Natural Order SOLANACEÆ. Genus *Petunia*

PETUNIA (from *petun*, the Brazilian word for tobacco, a closely-allied genus). A genus of about six species of hardy or half-hardy herbs, with sticky, entire leaves and five-lobed flowers. The lobes of the calyx are spoon-shaped, so deeply cut as to make the calyx almost five-parted. The corolla is funnel-shaped; and the five unequal stamens are attached somewhere about the middle of the tube. The two-celled ovary supports a simple style with button-shaped stigma. The fruit is a two-celled capsule. The species are natives of Brazil and Argentina.

History. *Petunias* may be described as among the “new-fangled notions” of the garden, for it was no further back than



NIEREMBERGIA FRUTESCENS

$\frac{3}{4}$ Nat. size

PL. 201

1823 that we received *P. nyctaginiflora* from Argentina. *P. violacea* followed in 1831, and *P. intermedia* in 1832. Horticulturally considered these are the principal species; but we move so quickly now that although Petunias are only of yesterday's introduction, so to speak, we have almost discarded these original species, and grow only a finer, more showy hybrid race produced from them.

Principal Species. PETUNIA INTERMEDIA (intermediate). Stem erect, branched, 1 foot high, becoming sub-shrubby. Leaves slender, somewhat spoon-shaped. Flowers, $\frac{1}{3}$ -inch across, purple, with paler margin, tube striped with yellow; August. Half-hardy perennial.

P. NYCTAGINIFLORA (Nyctaginia-flowered). Stem branched and spreading, 2 feet high. Leaves oval-oblong or heart-shaped. Flowers white, solitary; August. Half-hardy perennial.

P. VIOLACEA (violet). Stems prostrate with erect branches, about 1 foot high. Leaves oval-lance-shaped. Flowers purplish violet; August.

Hybrid Petunias. Most of the Petunias now in cultivation are the offspring of crosses between the foregoing species; chiefly of *P. nyctaginiflora* and *P. violacea*, and form two classes, Singles and Doubles. The Singles are mostly raised from seeds each year and treated as annuals, without paying much attention to names. The following selection is entirely from the Double class. Some of these are exceedingly fine and full.

Adonis, white blotched with purple and fringed.

A. Keers, lilac, marked with white.

Charlotte Boch, dark purple, fringed.

E. Bierbach, deep carmine-amaranth with white markings.

Frau. J. Widerkehr, pink and white

Frau. L. Petersen, creamy white with rosy markings.

Frau. Stadt. Schroder, deep rose and white.

Hibernia, rosy purple edged with green.

Kate Tidy, pure white.

Leon Gautier, rosy carmine blotched with white.

Med-Rath Dr. Koch, bright carmine blotched with lilac and white.

Wm. Brown, white and rosy pink.

Cultivation. Petunias are among the simplest things to grow, but the greatest amount of success is likely to be attained if we can give them a light rich soil, with abundant moisture through the hot period. These conditions can, of course, be more fully ensured to pot-plants than to those outside; but they should be borne in mind when selecting a position for a Petunia bed in the garden. The best compost consists of two parts loam to one part of well-rotted manure. For the seed-pans this should be sifted to ensure fineness, and some sand added. The seed should be sown, thinly, in March, and the pans placed

in a warm house. As soon as they are large enough to handle, the seedlings should be pricked out into large pots or other pans, and grown on until May, with several intervening shifts, early nipping out the leading shoot and so inducing a bushy habit. Then harden off, and plant out on a cloudy day, furnishing each plant with little stakes and tying out the shoots as they grow. This plan will be found preferable to pegging them down like *Verbenas*; they should rather be grown like *Geraniums*. For indoor flowering similar treatment is required, but for this purpose the Double varieties will be found more effective than the Singles. Named varieties can only be propagated with certainty by means of cuttings which are taken from the young shoots in February and March for indoor striking, or in July and August for outdoor treatment. The old plants retained to supply cuttings should be wintered in a warm house, but a high temperature should be avoided throughout the growth of indoor specimens.

Description Hybrid forms of Petunia—*P. nyctaginiflora* × *violacea*
Plate 200. —giving an idea of the variation in form and colour among the Singles. Fig. 1 is a section through the flower.

NIEREMBERGIAS

Natural Order SOLANACEÆ. Genus *Nierembergia*

NIEREMBERGIA (named in honour of John E. Nieremberg, 1595–1658, a Spanish Jesuit and writer on Nature). A genus of about twenty species of half-hardy or tender perennial herbs, mostly with creeping or diffuse stems and entire leaves. The flowers are pale violet or whitish, funnel-shaped, with five spreading lobes and slender tube. Stamens five, not quite equal, projecting beyond the tube, and slightly united at the base. The stigma is kidney-shaped, and hides the anthers. Fruit, a two-celled capsule, which remains within the persistent calyx. The species are natives of the warmer parts of America.

History. They are all of recent introduction, *Nierembergia gracilis*, *N. filicaulis*, and *N. calycina*, the earliest species, having been introduced from Buenos Ayres in 1831, 1832, and 1834 respectively. A period of thirty years elapsed before the introduction of the other cultivated forms:—*N. rivularis* from Argentina (1866), *N. Veitchii* from South America (1866), and *N. frutescens* from Chili (1867).

Principal Species. **NIEREMBERGIA CALYCINA** (with large calyx). Stems procumbent, covered with glandular down. Leaves



SALPIGLOSSIS SINUATA

Nat. size

PL. 202

roundish-oval. Flowers white with yellowish tube; September. Half-hardy.

N. FILICAULIS (thread-like stems). Stem erect, smooth, very slender, 6 to 12 inches high. Leaves narrow-lance-shaped. Flowers lilac with yellow centre; May. Greenhouse perennial.

N. FRUTESCENS (shrubby). Stem shrubby, 1 to 1½ foot. Leaves very slender, long. Flowers delicate blue paling to white at the margin; June. Hardy perennial, with habit and appearance of Flax. Plate 201.

N. GRACILIS (slender). Stem somewhat erect, 6 to 12 inches high. Leaves slender somewhat spoon-shaped, downy. Flowers white, streaked with purple, and a yellow centre, tube very long; July to September. Half-hardy perennial.

N. RIVULARIS (brook-loving). Stems slender, branching, creeping and interlacing. Leaves oblong or spoon-shaped, variable. Flowers bell-shaped, white tinged with yellow or rose, 1 inch across; July. Hardy perennial.

N. VEITCHII (Veitch's). Stems slender, branching, prostrate. Leaves oval-oblong. Flowers pale lilac, with slender tube, about an inch long. Greenhouse perennial.

Cultivation. *Nierembergias* like a light but fairly rich soil. A compost similar to that recommended for Petunias will suit them very well, but it need not have so large a proportion of manure. The quantities may stand thus: sandy loam three parts, well-rotted manure one part, with a little sharp sand added. Propagation is effected by means of seeds sown in spring or autumn, and grown in a warm greenhouse; or by cuttings taken in August and well-rooted before wintering. During the cold weather they must be allowed complete rest in a light airy greenhouse, and only given sufficient water to prevent withering. Before growth recommences in spring they should be repotted, whether it is intended to flower them in pots, or to turn them out into the beds at a later period. The treatment of the hardy species is the same as above, except that they do not require wintering indoors unless the situation is very exposed or the season very severe. *N. rivularis* requires a damper and more shady situation than the others.

Description of *Nierembergia frutescens*, one-fourth less than natural
Plate 201. size, showing variation of tints. Fig. 1 is a section of the flower showing how the bell-shaped mouth is suddenly narrowed into the very slender tube.

TOBACCO-PLANTS

Natural Order SOLANACEÆ. Genus *Nicotiana*

NICOTIANA (named in honour of Jean Nicot, 1530–1600, who introduced Tobacco into France). A genus of about forty species of greenhouse or half-hardy herbs, and a few shrubs, with large, sticky leaves, the viscidinity being secreted by glandular hairs. The calyx is bell-shaped, five-lobed; corolla funnel- or salver-shaped, with a spreading five-lobed limb. Stamens, five, attached to corolla-tube; ovary two-celled; style simple; stigma button-shaped. Most of the species are natives of America, but a few are found in the islands of the Pacific and in Australasia.

History.

The history of Tobacco as smoking material, and its cultivation for this purpose, is evidently prehistoric, for Columbus found it in common use among the natives of Cuba when he landed there in 1492, and subsequent inquiries show that it has been cultivated throughout America from periods of antiquity. But with that aspect of the plant we have little concern. The first Tobacco-plants grown in England are believed to have been planted in 1570. These were *N. Tabacum*, a native of South America, and *N. rusticum* from Mexico. Many species have been introduced since, but few have been used for decorative purposes—the principal ones being described below. Several of these described and grown as annuals are no doubt biennials or perennials.

Principal Species.

NICOTIANA ACUTIFLORA (acute-flowered). Stem erect, 1 to 2 feet high. Radical leaves oblong; stem-leaves lance-shaped with stem-clasping, eared base. Flowers white, $2\frac{1}{2}$ inches across, with slender tube 4 inches long; June to October. Annual. Native of Brazil.

N. ALBA (white). Stem stout, 3 or 4 feet high; whole plant hairy. Leaves oval or lance-shaped. Flowers white, greenish outside, 3 inches across, tube a little longer; strongly and sweetly fragrant at night; June. Will flower continuously for many months in the conservatory, or until cut down by frost outside. Half-hardy biennial, better known as *N. affinis*.

N. GLAUCA (glaucous). Stem woody, erect, branched, 10 to 20 feet high. Leaves smooth, heart-shaped, glaucous. Flowers yellow, the limb small and cup-shaped, the tube curved; August to October. Grown more as a foliage plant. Introduced from Buenos Ayres, 1827.



BUTTERFLY FLOWERS

(A) SCHIZANTHUS PINNATUS

(B) SCHIZANTHUS RETUSUS

Nat. size

PL. 203

N. LONGIFLORA (long-flowered). Stem 2 to 3 feet high. Leaves lance-shaped. Flowers lateral, white, afterwards purple or green; August. Annual. Introduced from Buenos Ayres, 1832.

N. SUAVEOLENS (sweet-scented). Stem slightly branched, 1 to 2 feet high. Leaves oval-lance-shaped, wavy. Flowers fragrant, white, with cylindrical tube; in loose panicles; June to September. Greenhouse herbaceous perennial. Introduced from Australia, 1800.

N. TABACUM (the native Cuban name for a cigar). Stem, clammy, with glandular down, 4 feet high. Leaves oblong-lance-shaped, downy, viscid. Flowers rosy, in many-flowered, short racemes; June to September. Herbaceous biennial or perennial. There is a form called *fruticosa*, with shrubby base and narrower leaves.

N. TOMENTOSA (hairy). The giant of the genus. Stem stout, 12 to 20 feet high, branched near the top. Leaves ovate-lanceolate, 3 feet by 2 feet; bright green. Grown for the sake of its enormous leaves. Introduced from Brazil in 1888. Known in gardens as *N. colossea*. Probably perennial.

Cultivation. *Nicotianas* deserve to be more widely grown as flowering plants than is the present practice. Seeds should be sown in February or March, and the pans placed in a warm house. As soon as large enough the seedlings are pricked out into other pans, in rich light soil, kept moist and grown on quickly, shifting them as necessary into pots. In genial weather, early in June, they may be planted outside. They should be tied to neat stakes as they grow, and the soil around should be encircled with a ring of fresh soot, to keep off slugs, which are fond of the succulent stems. They make admirable pot-plants for the greenhouse and conservatory. *N. alba* is very desirable for planting in borders beside paths where one strolls at eventide. The fresh flowers open early in the evening and become deliciously fragrant to attract moths. *N. tomentosa (colossea)* is a stately plant for Sub-tropical bedding.

BOX THORNS OR TEA-TREES

Natural Order SOLANACEÆ. Genus *Lycium*

LYCIUM (Greek, *Lukion*, from Lycia, in Asia Minor). A genus of about seventy species of more or less hardy climbing or trailing shrubs or small trees, often spiny, with simple leaves and small funnel-shaped, five-lobed flowers. Fruit—a succulent berry enclosed in the cup-like calyx. They

are natives of the Mediterranean Region, South Africa, Eastern Asia, and Tropical America.

History. *Lycium barbarum*, which is frequently seen covering the porches of cottages, and garden arbours, and is commonly known as Tea-tree, was introduced from North Africa in 1696. It is so hardy here that any fragment inserted in the soil will readily root; it may in consequence be seen occasionally forming part of a hedge. It was at one time recommended as a substitute for Tea. *L. afrum* also came from North Africa in 1712, and *L. europæum* from Southern Europe in 1730.

Principal Species. LYCIUM AFRUM (African). Stems erect, spiny, 6 to 10 feet high. Leaves in clusters, slender, fleshy, covered with whitish hairs. Flowers violet, solitary and drooping; June and July.

L. BARBARUM (native of Barbary). Stems climbing, 10 or 12 feet high; branches dependent, angular. Leaves lance-shaped, smooth. Flowers in pairs, purple with a yellowish base; May to August.

L. EUROPÆUM (European). Stems erect, spiny, 10 to 20 feet, with erect branches. Leaves in clusters, oval-lance-shaped, or spoon-shaped, oblique. Flowers in pairs or solitary, pale violet netted with red veins. May to August.

Cultivation. *Lyciums* prefer a well-drained soil, in which they will grow freely, and merely require training and fastening to the wall or trellis. They are propagated easily, either by cuttings or layers, or by separating the suckers that form round the base. Either method may be followed either in autumn or spring. They are excellent plants for gardens close to the sea, where they are frequently planted for fences.

HABROTHAMNUS

Natural Order SOLANACEÆ. Genus *Cestrum*

CESTRUM (from Greek, *Kestron*, the classical name for Betony). An extensive genus of stove, greenhouse, and half-hardy shrubs, many of which were formerly separated under the name *Habrothamnus*, by which they are better known. They have alternate, entire leaves, and tubular flowers with five-parted limb. They are natives of Tropical America, the West Indies, and South Africa.

Principal Species. CESTRUM AURANTIACUM (orange). Stem 4 to 10 feet high. Leaves oval, wavy. Flowers orange, in paniced



HERBACEOUS CALCEOLARIA
(CALCEOLARIA HYBRIDA)

$\frac{3}{4}$ Nat. size

spikes; autumn and winter. Cool-house evergreen. Introduced from Guatemala, 1843.

C. ELEGANS (handsome). Stems scandent, with downy branches. Leaves oval-lance-shaped, under-side downy. Flowers purplish red, numerous, in terminal cymes; petals fringed; June to September. Half-hardy evergreen. Introduced from Mexico, 1844. Also known as *Habrothamnus elegans*. The var. *argentea* has creamy-white leaves tinged with rose, and blotched with green.

C. FASCICULATUM (a bundle). Whole plant downy. Stem 5 to 10 feet high. Leaves egg-shaped. Flowers pitcher-shaped, purplish red, fringed; in head-like cymes with an involucre; April. Greenhouse evergreen. Introduced from Mexico, 1843. Also known as *Habrothamnus fasciculatus*

C. ROSEUM (rosy). Stem 4 to 10 feet high. Leaves oblong, downy. Flowers rose-coloured, clustered, with an involucre; July. Greenhouse evergreen. Introduced from Mexico, 1850. Also known as *Habrothamnus roseum*.

Cultivation. *Cestrum*s may be grown either as greenhouse pot-shrubs or as climbers; if the latter, they succeed best if planted in the greenhouse border, and trained against a pillar or other support. They do not require a high temperature, but the soil should be rich and open. They are propagated by inserting cuttings in August, and growing them on with frequent shifts; that is, as soon as the pots become well-filled with roots.

SALPIGLOSSIS

Natural Order SCROPHULARINEÆ. Genus *Salpiglossis*

SALPIGLOSSIS (Greek, *salpinx*, a tube, and *glossis*, a tongue—the tongue-like style in the corolla-tube). A small genus comprising only two or three species of perennial herbs, which forms a connecting link between the Orders SOLANACEÆ and SCROPHULARINEÆ. The folding of the lobes of the corolla would cause these plants to be placed in the former Order, but the reduction of the perfect stamens to four shows their affinity with SCROPHULARINEÆ. The calyx is tubular, five-lobed, the corolla funnel-shaped, with a bell-shaped throat, and five half-erect, half-spreading lobes. The species are restricted to Chili in their natural range. Only one species is grown in our gardens, although it is known to gardeners under five or six different names.

Species. SALPIGLOSSIS SINUATA (wavy). Tube-tongue. Stem sub-erect, branched, 2 feet high. Leaves varying from elliptic with wavy teeth or pinnate lobes, to slender and entire. Flowers dark purple, red, violet, yellow, or various combinations of these tints, often strongly veined with a colour different from that of the ground; June to September. Introduced from Chili, 1827.

Cultivation. *Salpiglossis* is usually grown as an annual, seeds being sown in gentle heat in March, or in the open border in April; in the former case transferring to pots for greenhouse culture or planting out in the border after hardening. They succeed best in a fairly rich soil, and sunny position. They should be grown in masses, otherwise they look weedy owing to the bareness of the base.

Description of *Salpiglossis sinuata*; upper portion of plants showing
Plate 202. range of colour; natural size. Fig. 1 shows the seeds, natural size and enlarged; 2, a seedling.

BUTTERFLY FLOWERS

Natural Order SCROPHULARINEÆ. Genus *Schizanthus*

SCHIZANTHUS (Greek, *schizo*, to cut, and *anthos*, flower = slit corolla). A genus of six or seven annual herbs with leaves cut pinnately, and irregular, showy flowers. The calyx is deeply cleft into five lobes, and the corolla deeply cut into numerous segments. Only two of the stamens are perfect; the style ends in a blunt stigmatic tip, and the seed-capsule is membranous. Like *Salpiglossis*, the natural range of the genus is limited to Chili.

History. *Schizanthus* is among the genera of beautiful flowers with which the American continent has enriched our gardens during the nineteenth century. *S. pinnatus* was introduced in 1822, *S. Hookeri* in 1828, *S. Grahami* in 1831, and *S. candidus* in 1843.

Principal Species. SCHIZANTHUS CANDIDUS (white). Stem branched, 2 feet high. Leaves deeply and pinnately cut into few-toothed segments. Flowers white; segments of the front lip with side lobes; July.

S. GRAHAMI (Graham's). Stem 2 feet high. Leaves minutely cut, pinnately. Flowers lilac or rosy, the upper lip yellow tipped with lilac; June to September.

S. PINNATUS (pinnate). Stem 2 feet high. Leaves cut into pinnate



CALCEOLARIA RUGOSA

$\frac{2}{3}$ Nat. size

lobes, these again often cut pinnately. Flowers violet or lilac, spotted with purple; middle segment of the upper lip yellowish spotted with purple or violet; June to September. Plate 203A.

S. RETUSUS (indented). Stem 2 feet high. Leaves pinnate, the lobes narrow, coarsely toothed. Flowers chiefly rosy, middle segment of upper lip orange; June to September. Plate 203B.

Cultivation. The directions given for the culture of *Salpiglossis* apply also to *Schizanthus*, except that *S. pinnatus* is quite hardy and may be sown out of doors in March. The others are half-hardy, and must be raised in gentle heat or sown later. They make admirable pot-plants for spring-flowering in the greenhouse. For this purpose they are sown in August, and the young plants wintered in a cool-house. They should be early potted singly and grown on with several shifts, until finally they are placed in seven- or eight-inch pots of rich soil, in which they bloom freely in March.

Description of Butterfly Flowers. A. *Schizanthus pinnatus*: Fig. 1,
Plate 203. section of flower. B. *Schizanthus retusus*: Fig. 2, section
of flower.

CALCEOLARIAS

Natural Order SCROPHULARINEÆ. Genus *Calceolaria*

CALCEOLARIA (Latin, *calceolus*, a little shoe, in reference to form of flower, but it appears probable that Linnæus shot two birds with one stone when he erected this genus, and also intended the name to honour F. Calceolari, an Italian botanist of the sixteenth century). A genus of shrubs, subshrubs, and herbs, with usually opposite leaves, occasionally in whorls of threes, or alternate. The most striking character is afforded by the corolla, which has a short tube, but this is hidden by the two lips of the limb. The upper lip is small, but the lower is large, concave, and greatly swollen in slipper-shape. In one species, *C. jovellana*, however, the lips are nearly equal in size. The perfect stamens are two only, and the capsule is two-celled. The species are South American, but the range of two extends to New Zealand.

History. The first *Calceolaria* introduced to English gardens appears to have been *C. pinnata* from Peru (1773), followed five years later by *C. Fothergillii* from the Falkland Isles. Most of the species were introduced after 1820, the year 1822 being marked by the arrival of *C. corymbosa* and *C. rugosa* from Chili, and of *C. scabiosæfolia* from Peru. In 1826 *C. plantaginea* and *C. purpurea* came from Chili,

in the following year *C. arachnoidea* and *C. thyrsiflora* also from Chili, and *C. bicolor* from Peru in 1829. It then began to strike growers that something might be done by crossing the species already at hand. Experiments were made, and resulted in the production of a large number of fine hybrids, which have been constantly added to since, with the result that to-day few of the natural forms are grown at all, growers confining their attention to the hybrids and their numerous varieties. Many of the natural species, however, are well worth attention, and we give descriptions of some of the best from a horticultural point of view.

Principal Species. CALCEOLARIA ALBA (white). A low-growing perennial herbaceous shrub with toothed, linear leaves, and dense panicles of globular pure white flowers produced all through the summer. Hardy against a wall. Introduced from Chili, 1844.

C. AMPLEXICAULIS (stem-clasping). Stem herbaceous, 18 inches high. Leaves heart-shaped, hairy, with rounded teeth, stem-clasping. Flowers yellow, in umbellate clusters; May to July. Half-hardy. Introduced from Peru, 1845.

C. ARACHNOIDEA (cob-webby). Stem herbaceous, with spreading branches, 1 foot high. Leaves tongue-like, wrinkled, slightly toothed, narrowed into a long winged stalk, which unites with its fellow on opposite side of stem. Flowers purple; June to September. Entire plant, with exception of corolla, invested with cobweb-like wool. Introduced from Chili, 1827.

C. BICOLOR (two-coloured). Stems branched, woody-based, 2 to 3 feet high. Leaves broad-oval, wrinkled, with coarse round teeth. Flowers in large terminal cymes; the small upper lip yellow, the lower yellow and white, gaping; July to October. Introduced from Peru, 1829.

C. BURBIDGEI (Burbidge's). Stems 2 to 4 feet high. Leaves oval, downy, doubly toothed, with winged stalks. Flowers rich yellow; September to January. A hybrid, produced in 1882, by crossing *C. Pavonii* and *C. fuchsifolia*.

C. FOTHERGILLII (Fothergill's). Stem herbaceous, slightly branched at base, 3 to 6 inches high. Leaves spoon-shaped, hairy above. Flowers yellow, the lower lip spotted with red; May to August.

C. FUCHSIÆFOLIA (Fuchsia-leaved). Stem shrubby, 1 to 2 feet high. Leaves lance-shaped. Flowers yellow, upper lip almost as large as the lower; in terminal panicles; April and May. Introduced from Peru, 1878.

C. PAVONII (Pavon's). Stem herbaceous, 2 to 4 feet high. Leaves downy, broadly-oval, coarsely toothed, footstalks with wings which are



ALONSOA INCISIFOLIA

Nat. size

PL. 206

continued round the stem, thus joining opposite leaves. Flowers rich yellow and brown, the large lower lip gaping.

C. PLANTAGINEA (Plantain-like). Plant herbaceous, downy, stemless; flower-scapes 1 foot high. Leaves egg-shaped, toothed, forming a rosette. Flowers yellow; lower lip large and hemispherical, upper small and divided; August. Introduced from Chili, 1826.

C. RUGOSA (wrinkled). Stem shrubby, 1 to 1½ foot high. Leaves lance-shaped, wrinkled, rusty beneath; leaf-stalks winged and bases connected. Flowers yellow, in terminal corymbs; August. Also known as *C. integrifolia*. Introduced from Chili, 1822. Plate 205.

C. SCABIOSÆFOLIA (Scabious-leaved). Stem trailing, shrubby. Leaves variously divided; pinnate, pinnately lobed, or three-lobed, hairy. Flowers pale yellow, in corymbs; May to October. Evergreen. Introduced from Peru, 1822.

C. VIOLACEA (violet). Stem shrubby, 2 feet high. Leaves small, hairy, oval-lance-shaped, coarsely toothed. Flowers large, pale violet, spotted with violet-purple; lips open, spreading, almost bell-shaped; June. Introduced from Chili, 1853.

Shrubby Calceolarias. There are very many named varieties of these in cultivation, of which the following small collection may prove sufficient for the reader's purposes:—

<i>Aurea floribunda</i> , yellow.	<i>General Havelock</i> , scarlet.	<i>Sparkler</i> , crimson - gold,
<i>Bijou</i> , dark red.	<i>Golden Gem</i> , bright yellow.	dwarf.
<i>Gain's Yellow</i> , rich deep yellow.	<i>Prince of Orange</i> , deep yellow.	<i>Sultan</i> , dark red.
		<i>Victoria</i> , dark maroon.

Cultivation. The two sections, the Shrubby and the Herbaceous, require different treatment, the latter being used only for greenhouse and conservatory decoration, whilst the shrubby in addition to this purpose are largely used for bedding. All require good rich soil, and a satisfactory compost may be made up in these proportions: two parts fibrous loam, one part well-rotted sheep-manure, one part leaf-mould; well mix and add enough coarse sand to prevent closeness or stickiness. The Shrubby kinds are propagated by cuttings or layers in August, layering being the most certain method. For this purpose old plants should be selected and placed under a north wall. Peg down the shoots, cover slightly with soil, and protect with a hand-light. The cuttings are inserted in sandy soil in frames having a northern aspect, and there kept until well-rooted, when they are transferred singly to small pots, and to a frame with a southern aspect, where they are to remain throughout the winter. With the advent of less severe weather, some time in February, prepare for new growth by pinching back the

stem. This should produce five or six side-shoots, but if a smaller number is obtained, the leading ones must be stopped to induce further breaks. Now, shift into the size pot known as 48's, and when these have become fairly filled with roots shift again, this time finally, to seven- or eight-inch pots. It is a good plan to tie a piece of bast round the rim of the pot, and to this attach short lengths by means of which the shoots may be tied out well away from the centre, so as to produce a bushy plant. The potting mixture for this final shift should be the compost previously prescribed, and as the flower-buds begin to appear, weak manure water should be given in addition, about every third day. Care should be taken in watering not to spill it on the foliage, and that it drains freely from the pots, or damping off will ensue. The lowest leaves are in special danger from this cause, or the opposite one of drying up; and if these go the appearance of the plant is to some extent spoiled. If the plants are required for bedding outside, their potting will not proceed so far, but in April they will be hardened off, and early in May, if the weather is favourable, planted out. Some rich soil, with a liberal admixture of manure, should be placed in the holes before putting in the new plants, so that the roots may have something in reserve to keep up the vigour of the plant, which will also mean a lengthened flowering period.

Herbaceous *Calceolarias* are raised from seed, which should be sown during the summer in light sandy soil. The pans should be about two-thirds full, the soil fine, the surface even, and watered before sowing the seed. Place in frame or greenhouse, in the shade, and cover with flat glass until the seedlings appear; then gradually uncover the pan. As soon as possible prick out into other pans, and keep close and shaded. As they increase in size and vigour, shift them successively into three-inch, five-inch, and finally eight-inch pots. This last shift will not come until they emerge from their winter quarters in a dry greenhouse, and they should then be treated to the special compost recommended for the Shrubby section. Give them an airy position in the greenhouse; water judiciously, never letting them get dry, yet avoiding the other extreme, and about May they should give you a brilliant display of flowers, and keep it up for eight or ten weeks. These will look all the better if, as they grow, the flower-stems are tied out to little sticks.

Description of Plate 204 shows two of the Hybrid forms of Herb-
Plates 204 and 205.aceous *Calceolarias*, about three-fourths of the natural size. Fig. 1 is a section through the flower; 2, a seed, natural size and enlarged; 3, a seedling.

Plate 205 is a Shrubby form, *Calceolaria rugosa*, two-thirds of the natural size; the separate Figure being a section through the flower.



PURPLE TOADFLAX
(*LINARIA BIPARTITA*)

Nat. size

PL. 207

ALONSOAS

Natural Order SCROPHULARINEÆ. Genus *Alonsoa*

ALONSOA (named in honour of Zanoni Alonso, a Spanish statesman). A small genus comprising half-hardy shrubs and perennial or annual herbs, with leaves opposite or in whorls of three, and loose leafy racemes of small flowers. These consist of a five-parted calyx, and a tubular corolla with a somewhat wheel-shaped five-lobed limb. One of these lobes corresponds with the lower lip in *Calceolaria*, but in *Alonsoa*, owing to a twist of the footstalk, the flower is turned upside down (botanically *resupinate*). The stamens are four in number, two longer than the others (*didynamous*). The ovary is two-celled. The species are natives of Peru and Chili.

Principal Species. ALONSOA ALBIFLORA (white-flowered). Stem 18 inches to 2 feet high. Leaves oval, saw-toothed. Flowers white, with yellow centre; August to October. Blooms all through the winter in a greenhouse. Introduced from Mexico, 1877.

A. INCISIFOLIA (cut-leaved). Stem shrubby, 1 to 2 feet high. Leaves oval, saw-toothed, opposite. Flowers scarlet; May to October. Native of Peru, introduced 1795. Plate 206. *A. Warscewiczii* (see below) is probably a herbaceous variety of this.

A. LINIFOLIA (Flax-leaved). Stem 12 to 18 inches high. Leaves slender, like those of Flax. Flowers scarlet. Annual. Native of New Holland.

A. WARSCEWICZII (Warscewicz's). Stem erect, branched, 1½ foot high. Leaves oval-lance-shaped. Flowers rosy scarlet; May to October. Introduced from Chili, 1858.

Cultivation. *Alonsoas* like a rich, light soil, and make admirable conservatory or greenhouse plants on account of the abundance and brightness of their flowers. For this purpose they are propagated by means of cuttings, which are taken in March or August, inserted in sandy soil, and struck in gentle heat. They may also be raised from seed sown in spring in a warm frame or greenhouse. The herbaceous species are usually treated as annuals, sown in gentle heat in March, pricked into pans and hardened, and about the beginning of May they are planted in the beds outside, where they keep up a bright display until the autumn.

Description of *Alonsoa incisifolia*, natural size. Fig. 1 is a front
Plate 206. view of an enlarged flower, and 2 is a section of the same.

CELSIAS

Natural Order SCROPHULARINEÆ. Genus *Celsia*

CELSIA (named in honour of Professor Olaus Celsias, of Upsal, 1670–1756, botanical author). A small genus of hardy and half-hardy herbs, differing from *Alonsoa* in the fact that the lobes of the corolla are nearly equal, which gives it a so-called wheel-shape. In other respects the flower-parts are similar to those of *Calceolaria*. The species are found chiefly in Europe, North Africa, and Western Asia.

Principal Species. CELSIA ARCTURUS (bear's-tail). Stem somewhat shrubby, 4 feet high. Radical leaves lyre-shaped; stem-leaves oblong. Flowers large, yellow; stamen filaments covered with purple hairs; July to September. Half-hardy. Introduced from Crete, 1780.

C. BUGULIFOLIA (bugle-leaved). Stem 1 foot high. Leaves oval, round-toothed. Flowers yellowish, marked with brown. A hardy annual. Introduced from South-Eastern Europe, 1877.

C. CRETICA (Cretan). Stems 4 to 6 feet high. Leaves hairy, oblong, the lower ones with wavy outline. Flowers yellow with two rusty spots; June. Introduced from Crete, 1752.

Cultivation. A light and fairly rich soil is the best for *Celsias*.

C. arcturus should be grown as a pot-plant in a cool-house; and may be propagated by cuttings from the young wood, which root readily in a frame or cool-house. The herbaceous section may be increased by seeds sown in gentle heat in March, or in the open border in June; in the latter case they should be thinned out rather than transplanted. The plants grow and flower freely in an ordinary frame.

TOADFLAX

Natural Order SCROPHULARINEÆ. Genus *Linaria*

LINARIA (Latin, *linum*, Flax, from the resemblance between the leaves). A genus of about one hundred and thirty species of hardy herbs (a few sub-shrubby). Flowers in spikes or racemes, or solitary in the axils. The calyx is five-parted, the corolla is tubular, ending in a spur behind, inflated towards the front, with a five-lobed limb. These lobes are formed into two unequal lips, which are closed, and the corolla is in



MAURANDYA BARCLAYANA

$\frac{2}{3}$ Nat size

PL. 208

consequence said to be *personate* (masked). Perfect stamens four, two long and two short. The species are distributed throughout Europe, North Africa, and Western Asia; six are indigenous to Britain, whilst a seventh—*L. Cymbalaria*—has thoroughly established itself on walls and dykes, and an eighth—*L. purpurea*—is locally naturalised.

History. There is no record of the introduction of *L. Cymbalaria* into Britain. It is a plant of Europe extending from Holland southwards, and was probably cultivated here at an early period, for it is still used as a salad in South Europe, and probably was formerly so used here. It has at least been here long enough to be now widely dispersed, away from gardens and habitations. The earliest *Linaria* introduced from abroad of which we have record is *L. alpina* from the Austrian Alps in 1570. *L. purpurea*, occasionally found wild in this country, was introduced from South Europe in 1648. *L. triornithophora* came from Portugal in 1710, *L. dalmatica* from South-Eastern Europe in 1731, *L. spartea* from Spain in 1772, *L. reticulata* from Algiers in 1788, *L. bipartita* from North Africa in 1815, and *L. macroura* from the Crimea in 1822.

Principal Species. LINARIA ALPINA (alpine). Stems densely tufted, 6 inches high. Leaves narrow-lance-shaped, thick, four in a whorl. Flowers bluish violet with golden centre, in short racemes; June to October. Perennial.

L. BIPARTITA (twice-parted). Stem branched, 1 foot high. Leaves narrow-lance-shaped, alternate. Flowers violet-purple, deep purple, pale violet, or pinkish, in loose racemes; June to September. Annual. Plate 207.

L. CYMBALARIA (boat-shaped). Mother of Thousands; Ivy-leaved Toadflax. Stems trailing and creeping. Leaves three- to seven-lobed, heart-shaped at base, concave; purple beneath. Flowers blue-purple or lilac, marked with yellow; solitary on long stalks; nearly all the year. Perennial. There is a var. *alba*, with white flowers.

L. DALMATICA (Dalmatian). Stem branched, very leafy, 3 to 4 feet high. Leaves lance-shaped, broad or narrow. Flowers yellow, large, terminal; June to August. Perennial.

L. MACROURA (large-tailed). Stem erect, 12 to 18 inches. Leaves very slender, glaucous. Flowers yellow, marked with deeper tint; spur long and straight; June to October. Perennial.

L. PURPUREA (purple). Stem erect, branched, 1 to 3 feet. Leaves slender or narrow-lance-shaped, whorled. Flowers in long, loose racemes; bluish purple, edges of lip fringed with white hairs; July to September. Perennial.

L. RETICULATA (netted). Stem 2 to 4 feet high. Leaves very slender, channeled; lower ones whorled, upper ones singly. Flowers in short crowded racemes, deep purple, net veined; palate yellowish, marked with purple lines; May to July. Annual.

L. SPARTEA (Spartium-like). Stem erect, branched, 1 foot high. Leaves narrow-lance-shaped. Flowers deep yellow on long stalks, in a few-flowered raceme; June to October. Annual.

L. TRIORNITHOPHORA (bearing three-birds). Stem branched, erect, 1 foot high. Leaves lance-shaped, glossy. Flowers purple with yellow palate, 1 inch long; three or four in a whorl; June to September. Perennial.

L. VULGARIS (common). Common Toadflax. Stems erect, 1 to 2 feet high, clothed with slender Flax-like leaves of glaucous hue. Flowers pale yellow with deeper lips, and long curved spur; in dense spike-like racemes; May to October. Perennial. There is a singular monstrous form called *Peloria*, in which the flowers are all five-spurred and with a regular five-lobed limb.

Cultivation. The cultivation of *Linarias* presents no difficulties; neither is anything special in the matter of soil required. They are naturally plants of banks and rocks, so require a well-drained soil. *L. alpina* is very suitable, on account of its dwarf habit, for growing on rockwork. *L. Cymbalaria* only needs to be well-established on an old wall, where the pointing is not too good, and it will soon cover it with its graceful foliage; *L. purpurea* may fitly keep it company on the wall-top. All the perennials may be easily increased by dividing the roots in spring or autumn: or both perennials and annuals may be raised from seed sown early in spring out of doors.

Description of Purple Toadflax, *Linaria bipartita*, showing range of
Plate 207. tints, natural size. Fig. 1 is an enlarged flower; 2, a section through the same; 3, a seed, natural size and enlarged; 4, a seedling.

SNAPDRAGONS

Natural Order SCROPHULARINEÆ. Genus *Antirrhinum*

ANTIRRHINUM (Greek, *anti*, like, and *rhin*, a snout—from the shape of the corolla). A genus of twenty-five hardy annual or perennial herbs, with entire (or rarely lobed) leaves, the lower ones opposite, the upper alternate. The flowers are very similar to those of *Linaria*, except that the corolla-tube is more bag-shaped (*saccate*) at the base and not spurred.



BEARD-TONGUE
(PENTSTEMON HARTWEGI)

$\frac{2}{3}$ Nat. size

The distribution of the species is the same as that of *Linaria*. One species—*Antirrhinum Orontium*—is indigenous in Britain, and another—*A. majus*—has established itself on old walls.

Principal Species. ANTIRRHINUM ASARINA (name of a former genus)
Stem trailing. Leaves heart-shaped, with round teeth, somewhat five-lobed. Flowers solitary in the axils, 1½ inch long, white, tinged with red and spotted with purple; June. Native of Italy, introduced 1699. Perennial.

A. MAJUS (great). Common Snapdragon. Stem erect, much branched, 2 feet high. Leaves narrow-lance-shaped. Flowers, 1 to 2 inches long, of varied tints from pure white, through yellow, orange, red, and purple to violet; palate tipped with yellow, prominent; in spring to autumn. Native of Mediterranean Region, but long naturalised here. Perennial.

A. MOLLE (soft). Stems trailing, clothed with woolly hairs. Leaves opposite, slender. Flowers 1 inch long, white, streaked with purple on upper lip; palate yellow; July. Native of Spain; introduced 1752. Greenhouse perennial.

A. TORTUOSUM (twisted). Stem branched, erect, 12 to 18 inches high. Leaves very slender, opposite or in threes. Flowers very large, in spike-like racemes; purple; tube short, upper lip large; June. Introduced from West Mediterranean Region.

Cultivation. *Antirrhinums* succeed best in a light rich soil, though they continue to do well with the slightest quantity of mould on a crumbling wall. Chalk or sand is more to their taste as a predominating ingredient than clay. *A. majus* will do well anywhere, so long as the soil is not wet. Seeds should be sown as soon as ripe; if obtained from a seedsman, it is as well to sow in March, when autumn-flowering plants will be obtained the same year. Those sown in July flower the following spring. From one packet of mixed seeds numerous varieties will be obtained, and if it is desired to propagate any particular form thus obtained, recourse must be had to cuttings, which should be made in September and rooted in a cold frame. *A. Asarina* and *A. molle* are rather tender, and should only be grown outside on a warm sunny rockery.

MAURANDYAS

Natural Order SCROPHULARINEÆ. Genus *Maurandya*

MAURANDYA (named in honour of Dr. Maurandy, Professor of Botany at the University of Carthage). A genus of about half a dozen

perennial herbs of climbing habit, with mostly alternate leaves, and showy flowers of violet, purple, or rose-colour. The corolla is tubular-bell-shaped, unequally five-lobed, but the mouth not closed as in *Antirrhinum*. The capsule opens with several valves. The species are natives of Mexico.

Principal Species. MAURANDYA BARCLAYANA (Barclay's). Stem climbing by means of the long, twisting leaf-stalks, 10 feet high. Leaves five-lobed, with heart-shaped base, Ivy-like. Flowers violet-purple, tube greenish, curved, downy; throughout the summer. Introduced 1825. Plate 208.

M. SCANDENS (climbing). Stem climbing. Leaves heart-shaped, strongly-toothed, hairy. Flowers smooth, purplish violet; June to September. Introduced 1834. Commonly known as *Lophospermum scandens*.

Cultivation. Rich sandy loam is the most suitable soil for *Maurandyas*. In the greenhouse they flower during the greater part of the year; but out of doors they must be treated as annuals. Seeds should be sown in slight heat in March, and the seedlings grown on in the same temperature until well-established little plants, when they can be transferred to the greenhouse for permanent growth there, or hardened preparatory to planting outside, in a sunny position, against a trellis. They should not be turned outside until the middle of May or beginning of June. They are admirably adapted for training against pillars or on the stems of large specimens in conservatories. Cuttings may also be prepared from the young shoots about August, inserted under a bell-glass, and shaded from the sun; or in spring, and struck in a gentle hot-bed under glass.

Description of *Maurandya barclayana*, reduced. Fig. 1 is a section through an enlarged blossom; 2, a seed, natural size and enlarged; 3, a seedling.
Plate 208.

CAPE FIGWORT

Natural Order SCROPHULARINEÆ. Genus *Phygelius*

PHYGELIUS (Greek, *phyga*, flight, and *helios*, the sun = loving shade). A genus consisting of two species of erect shrubs, with opposite leaves and showy scarlet flowers. The corolla is long and tubular, curved, and with five round, spreading lobes. Natives of South Africa; only one is cultivated here.



COLLINSIA BICOLOR

$\frac{3}{4}$ Nat. size

Species. PHYGELIUS CAPENSIS (of the Cape). Stem erect, branched, 3 feet high. Leaves oval or oval-lanceshaped. Flowers brilliant vermilion, $1\frac{1}{2}$ inch long; June to September. Introduced 1855. Perennial.

Cultivation. A light loam, well manured, is the best soil for the growth of *Phygelius*. It will succeed quite well out of doors if grown in a warm sunny position. It may be propagated either by means of seeds or by cuttings. Seeds should be sown in a little heat in spring, and the seedlings transferred, after the hardening stage, to the garden. Cuttings of the young shoots may be struck in autumn or spring in gentle heat. The underground stems run and root freely. It is a good plant for a sunny corner against a wall.

PENTSTEMONS

Natural Order SCROPHULARINEÆ. Genus *Pentstemon*

PENTSTEMON (Greek, *pente*, five, and *stemon*, a stamen). A genus of between sixty and seventy species of perennial herbs or sub-shrubs, mostly hardy, with erect branches, opposite leaves, and showy flowers. The calyx is deeply five-lobed, the corolla tubular, more or less swollen and two-lipped. Stamens five—two long, two short, and one imperfect. The capsule opens by valves to discharge the numerous seeds. The species are natives of North America and Mexico.

History. Like many other beautiful American plants, *Pentstemons* are of such recent discovery that they have no history to speak of. The name *Pentstemon* might be applied fitly to other genera of plants, but its fitness lies in the fact that while these plants agree with most other species of SCROPHULARINEÆ in having but four perfect stamens, the fifth and sterile one in this genus is large and as prominent as either of the others. According to Loudon, the first species to be introduced was *P. pubescens* in 1758, and *P. lævigatus* in 1776, followed by *P. campanulatus* and *P. barbatus* a few years before the close of the century. But most of those at present grown have made their first appearance in British gardens during the nineteenth century. Of these, *P. glaber* dates from 1811, *P. gracilis* from 1824, *P. gentianoides* 1825, *P. diffusus* 1826, *P. Wrightii* 1850, and *P. Eatonii* 1883. There has been much experimenting in the way of hybridisation, and the result is a splendid lot of florists' varieties, many the progeny of *P. gentianoides* crossed with *P. diffusus* and *P. Cobæa*. To-day these

varieties are largely grown, and *Pentstemons* form a very important factor in up-to-date horticultural displays. They are often called Beard-tongues.

Principal Species. PENTSTEMON BARBATUS (bearded). Stems erect, 3 feet high. Leaves lance-shaped. Flowers from light pink to carmine in colour; the lower lip bearded; flowers numerous in loose panicles; July. In the var. *Torreyi* the stem is much taller and the lip is not bearded. Also known as *Chelone barbatus*.

P. DIFFUSUS (diffuse). Stem semi-erect, 1½ foot high. Leaves oval or oval-lance-shaped; upper ones somewhat stem-clasping. Flowers in dense little cymes, purple, the sterile stamen bearded; September. Whole plant minutely downy.

P. EATONII (Eaton's). Stem 1½ foot high. Leaves broadly oval, upper ones narrower. Flowers in terminal panicles, rich crimson-scarlet; July.

P. GENTIANOIDES (Gentian-like). Stems 2 to 3 feet high. Leaves lance-shaped. Flowers two or three on the main footstalk, varying from scarlet and carmine to purple and bluish violet; June. Plate 209. Also known as *Pentstemon Hartwegii*.

P. GLABER (smooth). Stems 6 to 12 inches high, smooth. Leaves lance-shaped, sometimes slightly glaucous. Flowers purple-violet or blue; August.

P. GRACILIS (slender). Stems slender, 1 foot high. Radical leaves spoon-shaped or oblong; upper ones narrow-lance-shaped. Flowers lilac-purple or whitish, funnel-shaped or almost cylindrical; August.

P. WRIGHTII (Wright's). Stems 2 feet high. Radical leaves oblong; stem-leaves lance-shaped, stem-clasping. Flowers rosy red; tube short, lobes ample, spreading; sterile stamen long and densely bearded; June.

Cultivation. So numerous are the garden varieties, and so many are being added to the list every year, that we have considered it would serve no useful purpose to give a selection here. They are almost without exception good, and the selection may well be left to the florist. *Pentstemons* are so good-hearted and vigorous that they will succeed in almost any soil, but they do best in one that is rich and open, and well-drained. This last item will be found of great value during a winter characterised by fluctuations between wet and frost, for though they appreciate and demand liberal waterings in the summer, they require as much protection as possible from wet in winter. It is really advisable to winter them in cold frames, and plant out again in spring, but where this is not possible the plants should be protected by covering with ashes. Sandy loam and well-rotted manure form the

right kind of soil for successful growing. *Pentstemons* may be raised from seed, sown in a light soil early in March and germinated in gentle heat; the seedlings being pricked into boxes or singly into pots, and grown on in warmth until their roots have taken good hold of the soil. Then they should be turned into cold frames and gradually inured to the outside temperature preparatory to being planted in the open border late in May. Or the seed may be sown outside in June; the young plants being wintered in frames. Cuttings may be taken from many species, and must be taken when special varieties are to be propagated. They may be struck at any time, but August and September will be found the best period. They should be kept close under a hand-light or in a cold frame. The roots also may be divided.

Description of *Pentstemon gentianoides*. Fig. 1 is a section of the
Plate 209. flower.

COLLINSIAS

Natural Order SCROPHULARINEÆ. Genus *Collinsia*

COLLINSIA (named in honour of Zaccheus Collins, a well-known botanist of Philadelphia, U.S.A.). A genus of about a dozen species of branching hardy annual herbs with opposite leaves and showy flowers. The calyx is deeply five-cleft, the corolla irregularly two-lipped, the upper lip two-cleft and the lower three-cleft, the middle of the three lobes forming a cavity in which the stamens and style are enclosed. The corolla-tube bulges at the base on the upper side. The seed-capsule is globular and two-celled. The species are all natives of North America, mostly of California.

History.

Collinsias are all of recent introduction, and there is consequently little of interest to chronicle concerning them. *C. grandiflora*, *C. parviflora*, and *C. verna* were introduced in 1826, and these were the first known in British gardens. In 1833 came *C. bicolor*, and three years later *C. sparsiflora*. *C. tinctoria* dates from 1848, *C. corymbosa* from 1868; *C. violacea* is a plant of 1871.

Principal Species.

COLLINSIA BICOLOR (two-coloured). Stem branching, erect, downy, 1 to 2 feet high. Leaves lance-shaped, smooth, strongly nerved. Flowers large, upper lip pale lilac or white, lower rosy purple; August. Plate 210.

C. GRANDIFLORA (large-flowered). Stem 1 foot high. Leaves narrow-oblong, lower ones spoon-shaped. Flowers pale purple, upper lip blue; May to July.

C. VERNA (spring). Stem erect, slightly branched. Leaves lance-shaped. Flowers white, lower lip blue; May.

C. VIOLACEA (violet). Stem 3 to 12 inches. Leaves oval-lance-shaped, sparingly toothed. Flowers bright scarlet, the upper lip paler; June.

Cultivation. *Collinsias* succeed in most garden soils, but prefer those of a light character. The seeds should be sown in patches in the open border at the beginning of April, and the seedlings thinned out to about 4 inches apart. If desired for spring blooming, they should be sown between August and October, and protected during the winter by covering with hand-glasses. They also make good pot-plants for conservatory or window decoration.

Description of *Collinsia bicolor*. Fig. 1 is a section in which the
Plate 210. middle lobe of the lower lip is more plainly shown; 2 shows the seeds, natural size and enlarged; 3 is a seedling.

ZALUZIANSKYAS

Natural Order SCROPHULARINEÆ. Genus *Zaluzianskya*

ZALUZIANSKYA (named in honour of Adam Zaluzianskya à Zaluzian, a physician and botanist of Prague). A genus including about sixteen species of greenhouse and half-hardy annual and perennial herbs and sub-shrubs with tubular five-lobed flowers in spikes. The calyx is two-lipped, with five short teeth. They are natives of South Africa. Only three species are in cultivation, of which descriptions are given below. Of these, *Zaluzianskya lychnidea* was introduced in 1776, and *Z. selaginoides* in 1854. The date of *Z. capensis* is not recorded.

Principal Species. **ZALUZIANSKYA CAPENSIS** (Cape of Good Hope). Stem erect, branched, hairy, 6 to 12 inches high. Leaves very slender, few-toothed margins fringed. Flowers in terminal spikes, white, fragrant, opening at night; corolla-tube slender, $1\frac{1}{4}$ inch long; May. Hardy annual. Known also as *Nycteria capensis*.

Z. LYCHNIDEA (Lychnis-like). Stem branched, hairy, 6 to 12 inches high. Leaves narrow-oblong or lance-shaped, few-toothed margins fringed. Flowers yellowish white; corolla-tube $1\frac{1}{2}$ inch long; May to July. Greenhouse sub-shrub. Also known as *Erinus lychnidea*.

Z. SELAGINOIDES (Selago-like). Stems at first trailing, then more erect, hairy, 3 to 6 inches high. Leaves more or less spoon-shaped. Flowers abundant, white or pale lilac at first, becoming violet later,

fragrant at night; mouth of tube surrounded by a star-shaped patch of orange; May. Half-hardy annual. Also known as *Nycterina selaginoides*. Plate 211.

Cultivation. *Zaluzianskya*s should be grown in well-drained light soil; sandy loam and peat make an admirable compost for them. They should be given a sunny position, and be protected from excess of moisture. *Z. lychnidea* is propagated by cuttings or divisions of the root. Cuttings should be taken at the end of summer and struck in a cold frame. The annual species are grown from seed sown in the border in June; in pots in September, and kept in the greenhouse through the winter; or on a gentle hot-bed in March, to be afterwards planted out in the open air. *Z. selaginoides* from its low stature and abundant flowers makes a good edging, and is also useful as a pot-plant.

Description of *Zaluzianskya selaginoides*. Fig. 1 is a flower detached
Plate 211. showing characters of calyx and corolla; 2, a section through flower, enlarged; 3, a seed, natural size and enlarged; 4, a seedling.

MONKEY FLOWERS -

Natural Order SCROPHULARINEÆ. Genus *Mimulus*

MIMULUS (Greek, *mimo*, an ape, from supposed resemblance of corolla). A genus of about forty species of erect or prostrate annual or perennial hardy or half-hardy herbs, with opposite leaves, and solitary flowers produced in the axils. The calyx is tubular, five-angled and five-toothed: the corolla two-lipped—the upper one two-lobed and more or less erect, whilst the lower is three-lobed and spreading. Stamens four, stigma two-lobed, capsule two-valved. Most of the species are American, and a few belong to Australia and New Zealand; one naturalised in Britain.

History. The Common Musk, *Mimulus moschatus*, is accounted such a thoroughly old-fashioned flower that it must come to many persons as something in the nature of a shock to be told that the year of its introduction to our gardens was no farther back than seventy-one years from the time of writing, when it came from North America. At the same time, and from the same region, came *M. luteus*, the Monkey Flower, which would probably be considered as quite a new-fashioned flower. This species took to fresh soil so readily that it became naturalised by the sides of our rivers, and probably got its seeds dispersed by using the water as a carrier, and so to-day it may be found widely distributed in Britain south of Skye, and in Ireland. But there

had been species of *Mimulus* introduced earlier than 1826, for Loudon tells us that *M. alatus* was brought from North America in 1783, and *M. glutinosus* from California in 1794. *M. Lewisii* was introduced in 1824, and the brilliant *M. cardinalis* in 1835. *M. cupreus* was introduced from Chili in 1861, and has been regarded by some as one of the varieties of *M. luteus*, of which there are several.

Principal Species. MIMULUS CARDINALIS (cardinal). Stem covered with sticky hairs, 2 to 3 feet high. Leaves oval, stem-clasping, toothed. Flowers scarlet or rosy, sometimes with dotted throat; June to August. Hardy perennial. Also known as *Diplacus cardinalis*.

M. CUPREUS (coppery). Stem 8 to 12 inches high. Leaves oval-lance-shaped, toothed, three-nerved, smooth. Flowers nearly regular, copper-coloured, crimson, or purple-brown; lobes velvety and spotted; June to September. One of the parents of many beautiful spotted hybrids. Hardy perennial.

M. GLUTINOSUS (glutinous). Stem erect, branching, shrubby, 5 feet high. Leaves slender-lance-shaped, toothed. Flowers buff or salmon-coloured, almost regular; blooming almost continuously. Greenhouse shrub. Also known as *Diplacus glutinosus*. The var. *puniceus* has flowers varying from orange-red to scarlet, with heart-shaped lobes.

M. LEWISII (Lewis'). Stem erect, 1 foot high. Leaves oblong or oval, many-nerved, toothed, stem-clasping. Flowers rosy, with spreading lobes. Hardy perennial herb.

M. LUTEUS (yellow). Monkey Flower. Stems hollow, more or less erect, 1 foot high. Leaves oval or oblong, coarsely toothed. Flowers yellow, with two crimson or purple spots on the lower lip; June to September. Hardy perennial, but usually grown as an annual. The form most frequently cultivated is the var. *variegatus*, with larger flowers, more richly coloured and blotched. Plate 212. The var. *Neuberti* has double flowers. The var. *nobilis* is of dwarfer habit, and the flower known as "hose in hose," that is, one corolla produced from the centre of another.

M. MOSCHATUS (musky). Common Musk. Stems viscid, woolly, weak and watery, naturally growing 6 or 8 inches high. Leaves thin, oval or oval-lanced-shaped, slightly-toothed, covered with soft clammy hairs. Flowers small, yellow; June to September. Whole plant fragrant. Hardy perennial. The var. *Harrisonii* is more robust, with much larger flowers, but equally fragrant; commonly known as Giant Musk.

Cultivation. The herbaceous species of *Mimulus* do well in any garden soil that is not too light or dry. They like plenty of moisture, but to get the best results from them, the soil should be made rich as well as moist. The shrubby species are more suited for



ZALUZIANSKYA SELAGINOIDES

$\frac{1}{2}$ Nat. size

PL. 211

pot-culture in the conservatory or cool greenhouse. A suitable compost for them may be compounded as follows: take of good loam two parts, of leaf-mould one part, and of cow-manure one part; well mix. The minute seeds should be sprinkled on the surface of pans of loam and leaf-mould to which a little sand has been added. The pans should be watered before sowing the seed, and covered with a sheet of glass afterwards to maintain the moisture. The seedlings should be pricked out when about an inch high, and afterwards potted singly or planted out in the open borders. The herbaceous perennials die down in autumn, but their white creeping underground stems fill the soil, and these may be separated, broken up, and the portions separately planted early in spring. They will be found useful for covering the soil in beds where such tall-growing subjects as *Gladioli* are grown, but they should be replanted in fresh soil about every third year.

Description of Harlequin Monkey Flower, *Mimulus luteus* var. **Plate 212.** *variegatus*. Several different mottlings are shown. Fig. 1 is a section through a flower; 2, the seed, natural size and enlarged; 3, a seedling.

TORENIAS

Natural Order SCROPHULARINEÆ. Genus *Torenia*

TORENIA (named in honour of Rev. Olaf Toren, a Swedish botanist). A genus consisting of about sixteen species of stove herbs, with opposite leaves and tubular flowers in few-flowered racemes. The calyx is tubular, three- to five-toothed or two-lipped, with wings or plaits. Corolla-tube cylindrical, enlarged above; upper lip broad, notched or divided; lower lip of three broad spreading, nearly equal lobes. There are four perfect stamens. The oblong capsule is hidden within the calyx. The species are scattered over the Tropical Regions of the Old World, and one of them is also found in South America, where, however, it is thought probable it has been introduced at some time.

History. Very few species of *Torenia* are in cultivation, and these have all been introduced during the present century. *T. asiatica* was discovered growing in China by Olaf Toren, whose name it bears, about a hundred years before its introduction to Britain from India in 1845. In the same year came *T. peduncularis* from India, and the year previous *T. concolor* had been introduced from China. But the first species we received was really *T. cordifolia* from India in 1811. Others known in our gardens are of much more recent introduction

—as *T. Fournieri* from Cochin China, 1876, and *T. flava* from India, 1878.

Principal Species. TORENIA ASIATICA (Asiatic). Stem branched, branches prostrate, forming a loose tuft. Leaves heart-shaped or oval-lance-shaped. Flowers blue, the lateral lobes very dark violet; calyx scarcely winged; June. Annual.

T. FLAVA (yellow). Stems erect or prostrate, 6 to 10 inches high. Leaves oval or oblong-oval. Flowers yellow with purple centre; June to September. Annual. Also known as *T. Baillonii*.

T. FOURNIERI (Fournier's). Stem erect, much branched from the base, 4 to 8 inches high. Leaves oval or heart-shaped, saw-toothed. Flowers bright violet, the tube pale, the lower lobes dark, upper lip pale lilac, lower lip with a golden blotch in the centre; calyx with five broad wings; June to September. Annual. Plate 213.

Cultivation. Where there is a hothouse there should be no difficulty in growing *Torenius*. The first two of the species described are suitable, from their habit, for growing in hanging baskets as well as for pots. *T. Fournieri* is one of our finest flowering plants, and is of more erect habit. Each of these three may be raised from seed, sown about March and placed in heat. As soon as the seedlings may be handled safely they must be transplanted in their permanent quarters, with no preliminary shifts. When the plants are well-developed they may be used, if thought desirable, for further propagation by making cuttings of the shoots and striking them under a hand-glass in the house, or in a close warm frame. A suitable compost for the growth of *Torenius* may be obtained by mixing equal portions of loam and leaf-mould, to which a little sand should be added. They will, however, thrive in any garden soil. They are useful as an edging to beds in large tropical houses.

Description of A branch of *Torenia Fournieri*, the flowers and leaves
Plate 213. about one-third less than the natural size. Fig. 1 is a section of the flower; 2, the seeds, natural size and enlarged; 3, a seedling.

FOXGLOVES

Natural Order SCROPHULARINEÆ. Genus *Digitalis*

DIGITALIS (Latin, *digitus*, a finger; flower like a finger-stall or thimble). A genus of tall biennial or perennial herbs, of which about eighteen species have been described. The radical leaves are crowded, the upper



HARLEQUIN MONKEY FLOWER
(*MIMULUS LUTEUS VARIEGATUS*)

$\frac{2}{3}$ Nat. size

PL: 212

ones alternate. The drooping tubular flowers are in terminal racemes with five-parted calyx, and somewhat bell-shaped corolla, spotted inside and with bearded throat, and slightly lobed mouth. There are four stamens, maturing before the two-lobed stigma, and honey is secreted at the base. The capsule is two-valved. The species are natives of Europe; North Africa, and Western Asia, chiefly of the Mediterranean Region; one indigenous to Britain. Few of the species are cultivated.

Principal Species. DIGITALIS AMBIGUA (doubtful). Stem hairy, 2 to 3 feet high. Leaves oval-lance-shaped, toothed, stalkless, downy beneath. Flowers 2 inches long, yellowish, with network of brown veins; July and August. Native of Europe; introduced 1596. Perennial. Also known as *D. grandiflora* and *D. ochroleuca*. The var. *fuscescens* has smaller, brown flowers.

D. FERRUGINEA (rusty). Stem smooth, 4 to 6 feet high. Leaves oval-lance-shaped, smooth, edges fringed. Flowers rusty, downy outside, in long pyramidal racemes; July. Biennial. Introduced from Italy, 1597. Also known as *D. aurea*.

L. PURPUREA (purple). Common Foxglove. Stem 2 to 4 feet high. Leaves oval-oblong, downy, wrinkled. Flowers purple, varying to pure white, in dense-flowered, one-sided racemes; May to September. Native biennial.

Cultivation. Foxgloves are cultivated with the greatest of ease. They prefer a light soil with a good proportion of leaf-mould. Their favourite habitat is a hedge-bank, the sloping ground beside a copse, or any position where they can secure good drainage. They are grown from seed, which is sown in April, and the seedlings planted out in clumps, keeping the individuals six or eight inches apart. They look especially well in groups in a shrubbery border. They may also be propagated by dividing the roots, but this plan is not recommended.

VERONICAS

Natural Order SCROPHULARINEÆ. Genus *Veronica*

VERONICA (several derivations given, but not considered satisfactory). A genus containing about one hundred and sixty species of herbs or shrubs with opposite or whorled leaves, and usually blue flowers in racemes, rarely solitary. The calyx is usually four-parted, rarely five-parted; the corolla wheel-shaped or nearly bell-shaped with four (rarely five)

spreading lobes, the side lobes usually narrower than the upper and lower ones. Stamens two, attached to the sides of the upper lobe. The species are distributed throughout the North Temperate Regions, Australia, New Zealand, and Chili; sixteen are natives of Britain, but only one or two of these are occasionally cultivated.

History. The Speedwell or Bird's-eye (*V. Chamædrys*) on roadside banks, and the thick-stemmed Brooklime (*V. Beccabunga*) of streams and rivulets, have always given delight to country rambles; but in our gardens there have been exotic forms of *Veronica* for considerably more than three hundred years. *V. maritima* was introduced from Sicily about 1570, and *V. Teucrium* from Germany in 1596. Then no further introductions appear to have taken place until 1680, when *V. peregrina* came from Northern Europe. *V. virginica*, the Great Virginian Speedwell, came from North America in 1714, the Russian *V. incana* in 1759, and the first of the New Zealand shrubby species, which are the chief ones now grown, was brought hither in 1776. Since then many shrubby *Veronicas* have come to us from the same quarter of the globe. We must not mention them all, but the following, now in cultivation, may be named:—*V. parviflora* (1822), *V. speciosa* (1835), *V. hulkeana* (1865), *V. pinguifolia* (1870), *V. Traversii* (1873), and *V. Lyallii* (1879). *V. Andersonii*, *V. lindleyana*, *V. kermesina*, and *V. versicolor* are hybrids that have been produced by cross-fertilisation between *V. speciosa*, *V. macrocarpa*, and *V. salicifolia*. These shrubby kinds from New Zealand may be grown permanently out of doors in the warmer parts of this country. They are growing in popularity, over fifty of them being cultivated in gardens where they are in favour. A selection of them can only be mentioned here.

Principal Species. VERONICA ANDERSONII (Anderson's). Stem 1½ foot high. Leaves thick, oblong, downy on the margins. Flowers bluish violet; July. Half-hardy hybrid shrub. The var. *variegata* only differs by reason of the variegated foliage.

V. ELLIPTICA (elliptic). Stem woody, 5 to 20 feet high. Leaves slender oblong, close set, and spreading. Flowers large, white, ½-inch across, in few-flowered racemes, which are gathered into a terminal bunch: July. Half-hardy shrub. New Zealand.

V. HULKEANA (Hulke's). Stem scarcely branched, herbaceous, 1 to 3 feet high. Leaves leathery, oblong-oval, coarsely toothed. Flowers lilac, ¼-inch across; the racemes forming long panicles; June to September. Half-hardy shrub. New Zealand.

V. INCANA (hoary). Stem herbaceous, downy, 2 feet high. Leaves oblong or lance-shaped, toothed, covered with hoary down on both sides.



TORENIA FOURNIERI

$\frac{2}{3}$ Nat. size

PL. 213

Flowers blue, calyx woolly; July. Herbaceous perennial, also known as *V. neglecta*. South Europe.

V. LONGIFOLIA (long-leaved). Stem 2 feet high. Leaves oval or oblong-lance-shaped, toothed. Flowers lilac or blue, racemes dense-flowered; August. Perennial herb. Introduced from Central Europe, 1731. Plate 215.

V. LYALLII (Lyall's). Stems prostrate and rooting, branched, shrubby. Leaves oval to oval-lance-shaped, glossy, with a few teeth. Flowers white, with pink veining near the throat; $\frac{1}{2}$ -inch across; June to September. Half-hardy shrub. New Zealand.

V. PINGUIFOLIA (fat-leaved). Stem robust, erect or decumbent, with downy branches, 4 inches to 4 feet high. Leaves thick, leathery, concave, oval-oblong. Flowers white, in short dense-flowered racemes, crowded to form heads at tips of branches; June. Half-hardy shrub. New Zealand.

V. SALICIFOLIA (Willow-leaved). Stem shrubby, branched, 10 to 15 feet high. Leaves long, narrow-lance-shaped, glossy. Flowers variable in size and colour; bluish purple to white, in long many-flowered racemes; June. Half-hardy shrub. New Zealand.

V. SPECIOSA (showy). Stems with angular branches, $1\frac{1}{2}$ foot high. Leaves leathery, oval-oblong, glossy, midrib downy. Flowers deep blue-purple, varying to violet, red, pink, or white; in dense-flowered racemes; May. Half-hardy shrub. New Zealand. Plate 214.

V. SPICATA (spiked). Stem decumbent at base, afterward rising erectly to a height of from 6 to 18 inches. Leaves oblong-lance-shaped, leathery, round-toothed. Flowers bright blue, throat bearded; July to August. Europe. Perennial native herb.

V. TRAVERSII (Travers') Stem branched, $2\frac{1}{2}$ feet high. Leaves leathery, flat, narrow-oblong. Flowers white, $\frac{1}{4}$ -inch across, in many-flowered racemes; June to September. Half-hardy shrub. New Zealand.

V. VIRGINICA (Virginian). Stem unbranched, 2 to 6 feet high. Leaves lance-shaped or oblong, closely toothed. Flowers white or bluish, salver-shaped; July. Hardy perennial herb. North America.

Cultivation. *Veronicas* lend themselves to the purposes of most gardeners, being easily satisfied in the matter of soil. A moderately rich, open soil is the best, where there is choice, and a position half in shade. Some of the large-growing, hardy species must have special provision made for them in the shrubbery, whilst the smaller shrubs do well at intervals along borders, or in beds. Small specimens make admirable pot-plants, but they require frequent shifts,

and copious watering during hot weather. The half-hardy species, like *V. speciosa*, must be given slight protection in winter, turning them out again about May. In the extreme South of England there are many places where such species will do outside with little protection during the winter; such, for instance, as is provided by planting them against a south wall. Shrubby *Veronicas* are increased by cuttings taken at any time from the young shoots. These should be inserted in pots of sandy soil, and stood in a shady close place. The herbaceous perennials may also be propagated in a similar fashion, but they are chiefly increased by division of the plant. The annuals come readily from seed sown early in spring.

Description of Plate 214. *Veronica speciosa*, a shrubby species; **Plates 214 and 215.** upper portion of stem. The smaller sprig with rosy flowers is from the var. *rubra*. Fig. 1, a separate flower, enlarged; 2, section of flower.

Plate 215. *V. longifolia*, herbaceous species. Fig. 1 is a side view of a separate flower, enlarged; 2, a full view, showing the typical form and arrangement of the corolla-lobes in the genus, with the peculiar attachment of the stamens, etc.; 3 is a section through the flower, showing the short corolla-tube, ovary, etc.

GLOXINIAS

Natural Order GESNERACEÆ. Genera *Gloxinia* and *Sinningia*

GLOXINIA (named in honour of Benj. P. Gloxin, of Colmar, an eighteenth century botanical author). A genus of about half a dozen species of greenhouse herbs, with thick-textured opposite leaves, stalked, and of rich colours; and drooping, bell-shaped, tubular flowers. The border of the corolla is oblique, the upper lip two-lobed, and shorter than the three-lobed lower lip. The ovary is below (*inferior to*) the corolla, and between the two there is a complete circle of glands. The stigma is rounded and hollowed out. The species are natives of Tropical America.

SINNINGIA (named in honour of William Sinning, one-time gardener to the University of Bonn). A genus of about sixteen species of greenhouse herbs, very similar to *Gloxinia*, but differing in the facts that the ovary is only semi-inferior, and that the circle of glands surrounding the ovary is broken into a series of five distinct glands. They are natives of Brazil.



SHRUBBY SPEEDWELL
(*VERONICA SPECIOSA*)

$\frac{3}{4}$ Nat. size

PL. 214

History.

Though we shall distinguish between the species of the two genera in the following descriptions, it is impossible when regarding them from the horticultural standpoint to separate them. *Gloxinia maculata* was the first species to be introduced (1739), and when *Sinningia speciosa* was introduced in 1815, it was not as a *Sinningia* but as a *Gloxinia*. It is therefore not difficult to understand how the one name, *Gloxinia*, serves in gardens for the very similar plants of the two genera. *S. velutina* was introduced in 1827, *G. pallidiflora* in 1844, *G. glabra* 1847, *S. concinna* 1860, and *S. conspicua* 1868. Most of the garden *Gloxinias* are really the offspring of *S. speciosa*. Some, however, are hybrids. *G. diversifolia* is believed to be one such, of garden origin. *S. youngiana* is a hybrid, resulting from the crossing of *S. speciosa* and *S. velutina*, whilst *G. gesneroides* is believed to have originated from hybridising *Gesnera donkelaariana* with a species of *Sinningia*. It should be noted that in the natural species the flowers have a drooping tendency; whilst the aim of cultivation has been to secure a more upright pose. Success has attended these efforts, and the garden *Gloxinias* of to-day are more beautiful than their predecessors, partly because their beauty meets the eye of the observer at a glance, instead of being hidden by the drooping habit.

Principal Species. GLOXINIA GLABRA (bald, smooth). Stem erect, unbranched, 9 inches high. Leaves oval, toothed, smooth. Flowers funnel-shaped, solitary, white, the yellow throat spotted with purple; August.

G. MACULATA (spotted). Stems unbranched, spotted, 2 to 3 feet high. Leaves heart-shaped, doubly-toothed, smooth, dark green above, reddish beneath. Flowers solitary, purplish blue, downy; June to October.

G. PALLIDIFLORA (pale-flowered). Stem erect, unbranched, 1 foot high. Leaves broadly, irregularly oval, somewhat hairy above, faintly toothed. Flowers pale blue, with concave lobes; August.

SINNINGIA CONCIINNA (neat). Stem about an inch long, red. Leaves small, roundish-oval, with round teeth, and red stalks. Flowers lurid purple and yellow, the throat spotted; June to October.

S. CONSPICUA (remarkable). Leaves oval-oblong, slightly heart-shaped at base, toothed. Flowers yellow, the tube marked inside with purple lines and dots; June to September. Whole plant hairy, about 1 foot high.

S. SPECIOSA (showy). Stem short. Leaves oblong, round-toothed, velvety. Flowers violet, bell-shaped; September. The parent of the popular garden *Gloxinias*. The var. *albiflora* has white flowers; var. *caulescens* has a longer, thicker stem, and larger leaves; var. *macrophylla*

has very large leaves with white nerves; and var. *rubra* has splendid red flowers.

S. VELUTINA (velvety). Stem erect, slender, 1 foot high. Leaves oval, green on both sides, but the nerves and stalk become purple; round-toothed. Flowers pale greenish; June.

The garden varieties are very numerous, and additions are being yearly made to the lists, for which we refer readers to the catalogues of the growers.

Cultivation.

The prevailing notion concerning these plants is that they require stove treatment. This is not quite accurate. A warm greenhouse where a temperature between 60° and 70° may be maintained is sufficient for them. The tubers require a temperature of about 65° to start them into growth, and in this, potted into small pots, they should be placed in February. Most good soils suit them, but the best compost will be found to consist of equal parts of leaf-mould and peat to which a little sand or powdered charcoal has been added. In preparing the pots, see that a good layer of broken crocks is so placed at the bottom that efficient drainage is assured; then nearly fill the pots firmly with the compost, press in the tuber gently, and fill up with more compost, slightly covering the top of the tuber. Give no water until growth has commenced. In order that the soil shall not become dry, the atmosphere in the house should be kept moist. *Gloxinias* dislike wetting over head. When growth has well started, the plants require plenty of water, morning and evening, but it must be tepid, not cold water. They should have plenty of light when growing, but must be effectually shaded from the sunshine. The leaves and stalks are very brittle at this stage, and must be handled with great care, or they will snap. As soon as the roots have well taken hold of all the soil in the pot, the plants should be shifted into larger pots; the size depending upon the usual stature of the species concerned, because this is to be the flowering-pot. When the flowers begin to develop, a lower temperature, accompanied by weekly doses of liquid manure, will be found beneficial. After flowering, and as the leaves show they are fully developed, the plants should be allowed to go to rest, by withholding water from them. Gradually the leaves will wither as their substance is withdrawn into the tuber, and when they are to all appearance dead, the tubers must be stored away in a dry place where they will be secure from frost.

Gloxinias are propagated in several ways. Seed should be sown in February in pans of fine compost, which should consist of equal parts leaf-mould, peat, and sand. Slightly cover with a sprinkling of fine soil, and water lightly, then place in a temperature of 70°. As soon as the



LONG-LEAVED SPEEDWELL
(*VERONICA LONGIFOLIA*)

Nat. size

PL. 215

seedlings are sufficiently large to handle, they should be pricked out into pans or pots of similar compost, kept in a warm moist and shaded house, and as they grow into nice little plants, must be potted singly and grown on under similar conditions. If this process is judiciously managed, so that there is no check, the seedlings will flower the same year. When the old tubers have been started in spring, some of the shoots may be taken off and struck in a close warm frame. A third method is carried out at the end of summer, when the leaves are fully developed. Taken from the plant with the leaf-stalk intact, they are laid face downward on the potting-table, and a number of clean cuts are made across the midrib, about an inch apart. The leaf is then reversed, pegged down upon cocoa-nut fibre refuse in a close warm frame, and left until it decays. It will then be found that a small tuber was formed at each of the cuts, and the substance of the leaf has been withdrawn into them. Stored away dry, these will serve for starting early in the new year.

GESNERAS

Natural Order GESNERACEÆ. Genus *Gesnera*

GESNERA (named in honour of Conrad Gesner, the famous Zurich naturalist, 1516-1565). A genus of about fifty species of stove perennials, mostly tuberous-rooted herbs, with opposite leaves and tubular flowers borne in opposite cymes. The corolla-limb is five-lobed, regular or two-lipped. They are natives of Brazil, Peru, Guiana, Columbia, and Mexico.

Principal Species. GESNERA CARDINALIS (scarlet). The best and most popular of the cultivated species. It has a large woody tuber, from which spring several unbranched short stems about 9 inches high, bearing oblong-cordate, rich green, hairy leaves, 6 to 9 inches long, and erect terminal racemes of rich red tubular flowers; May to September. Brazil. Also known as *G. macrantha* and *G. splendens*.

G. DONKELAARIANA (Donkelaar's). Stem 1 to 2 feet. Leaves large, somewhat heart-shaped, green tinged with purple and red. Flowers vermilion, 2 inches long, in large, terminal heads; June. Native of Columbia.

G. EXONIENSIS (Exeter). Leaves dark, covered with velvet of red hairs. Flowers deep orange-scarlet with yellow throat, in great masses; winter. Garden hybrid.

G. NÆGELIODES (Nægelia-like). Leaves heart-shaped, hairy on the

roughly-toothed edges. Flowers rosy pink blotched with red, throat yellow dotted with red; June to September. A garden hybrid of which there are many varieties, with flowers varying from white through pink and lilac to plum-colour.

G. PYRAMIDALIS (pyramidal). Leaves nearly circular, 7 inches across, dark velvety green. Flowers deep orange-red, throat and lip lighter, spotted. Winter-flowering garden hybrid.

Cultivation. *Gesneras* require stove temperature, but the details of their treatment, propagation, etc., are the same as for *Gloxinia* (which see). The stronger-growing species should have a loamy compost.

ACHIMENES

Natural Order GESNERACEÆ. Genus *Achimenes*

ACHIMENES (Greek, *chemaino*, to distress by cold). A large genus of stove or greenhouse perennial herbs, more or less hairy, with underground, catkin-like tubercles. They have opposite toothed leaves and solitary funnel-shaped flowers, the corolla-tube being somewhat oblique, and the spreading limb having five nearly equal lobes. The flowers are produced in the axils of the leaves, and at their base little bulbils are often developed similar to those underground. They are natives of Central America and Jamaica. Each separate scale of the tubers is capable of giving rise to a new plant.

Principal Species. ACHIMENES COCCINEA (scarlet). Stem 1½ foot high. Leaves oval, three in a whorl. Flowers scarlet; August. Introduced from Jamaica, 1778.

A. GRANDIFLORA (large-flowered). Stem 1½ foot high. Leaves oval, oblique at base, with few teeth. Flowers very large, violet-purple; June. Introduced from Mexico, 1842.

A. LONGIFLORA (long-flowered). Stem 1 foot high. Leaves oval or oblong, coarsely toothed, three or four in a whorl. Flowers long-tubed, violet; July and August. Introduced from Guatemala, 1841.

A. TUBIFLORA (tube-flowered). Differs from the other species in having a large, woody tuber from which the stems are developed annually. They are from 2 to 3 feet high, with oblong wrinkled leaves 2 to 3 inches long, and elegant, terminal panicles of long-stalked, pure white fragrant flowers. Brazil.

These are merely typical species. It appears inadvisable to increase the list, for the reason that very few of the natural species are now

grown, their place having been taken by the even more beautiful hybrids, of which there is now an enormous number. Any trade grower will supply a large or small selection of these, which will be sure to give satisfaction.

Cultivation. *Achimenes* require the temperature of a warm house, and a light compost consisting of loam, peat, leaf-mould, and sand. They may be started along with the *Gloxinias*. They are very prolific in the production of scaly tubercles, consequently they must be shaken out and repotted annually. About a dozen in a five-inch pot will be found quite thick enough. They should be placed on a shelf near the roof glass, and when the stems are long enough they should be staked. They are also excellent plants for hanging baskets. *A. tubiflora* requires the same soil as *Gesneras*. When the flowers begin to expand, the plants should be removed from the stove to the greenhouse. When the flowering is over, gradually withhold water, and allow the plants to rest. They may be kept through the winter by storing the pots under the stage, or on an out-of-the-way shelf in an ordinary greenhouse.

ÆSCHYNANTHUS

Natural Order GESNERACEÆ. Genus *Æschynanthus*

ÆSCHYNANTHUS (Greek, *aischune*, shame, and *anthos*, flower). A genus of stove plants, which grow upon the trunks of trees (*epiphytes*) in Tropical Regions, chiefly of Asia. They have climbing or pendent stems, opposite, fleshy leaves, and handsome, fragrant, tubular flowers of some brilliant shade of red. The calyx is tubular, with the margin equally five-cleft, corolla with curved tube dilated at the throat, and ending in two unequal lips, the upper two-lobed, the lower three-lobed. There are four stamens, two long and two short, and the ovary is encircled by a fleshy glandular ring.

Principal Species. ÆSCHYNANTHUS JAVANICUS (Javan). Stems climbing. Leaves small, oval, with sunk veins, and slightly toothed. Flowers bright red, stained with yellow in throat, corolla downy; June. Introduced from Java, 1848.

Æ. LOBBIANUS (Lobb's). Stems somewhat climbing. Leaves elliptic, glaucous, sometimes slightly toothed. Flowers rich scarlet, corolla downy, calyx bell-shaped, dark purple; June. Introduced from Java, 1845.

Æ. LONGIFLORUS (long-flowered). Stems pendulous. Leaves broad-

lance-shaped. Flowers scarlet, erect, in bunches; corolla curved, club-shaped; June to August. Introduced from Java, 1845.

Æ. SPECIOSUS (showy). Stem nearly erect, 2 feet high. Leaves oval-lance-shaped, slightly toothed. Flowers rich orange; corolla curved, club-shaped, limb four-lobed, downy; June to August. Introduced from Java, 1845.

Æ. TRICOLOR (three-coloured). Stem slender, drooping, 1 foot high. Leaves heart-shaped, pale beneath, hairy on edges, under-surface, and stalk. Flowers blood-red, throat bright orange, upper lobes striped with black, corolla-tube much shorter than in foregoing species; July. Introduced from Borneo, 1857.

Cultivation. The *Æschynanthus* may be grown as pot-plants or in baskets suspended from the roof of a stove. The latter is the more natural way, having regard to the habits of these plants. For this purpose a mixture of peat and Sphagnum moss must be used. The plants should be kept moist by frequent syringing, and occasionally the baskets should be entirely immersed in a pail of tepid water; grown as pot-plants they require a light soil with frequent renewals. Propagation is principally effected by striking cuttings in spring, made from half-ripened wood inserted in pots of well-drained light compost above which is a thick layer of silver sand. They root easily if kept close in a frame or under a bell-glass. The plants require to be repotted every spring. *Æ. speciosus* is best adapted for pot-culture, as it is a sturdy grower.

ECCREMOCARPUS

Natural Order BIGNONIACEÆ. Genus *Eccremocarpus*

ECCREMOCARPUS (Greek, *ekkremes*, hanging, and *karpos*, fruit). A small genus of half-hardy perennial climbers with a somewhat shrubby stem, long succulent branches, and much-divided, compound, opposite leaves ending in a branched tendril. The flowers are brilliantly coloured, and consist of a five-lobed, bell-shaped calyx, and a tubular corolla with constricted five-lobed mouth. Stamens four, two long and two short, with a rudimentary fifth stamen. The ovary is encircled by a glandular ring, and develops into a one-celled oval capsule opening by two valves. The seeds are surrounded by a membranous wing. The species are South American.

Principal Species. ECCREMOCARPUS LONGIFLORUS (long-flowered). Stem woody, 12 to 15 feet high. Leaves twice- or thrice-



ECCREMOCARPUS SCABER

$\frac{1}{2}$ Nat. size

pinnate, with entire oval leaflets. Flowers very long, yellow with green lobes, and red calyx, in many-flowered racemes; July. Introduced from Peru, 1825.

E. SCABER (rough). Stems angular and hairy, 12 to 15 feet high. Leaves twice-pinnate; leaflets alternate, unequally heart-shaped. Flowers deep orange or scarlet, with swollen throat, in many-flowered racemes; July and August. Introduced from Chili, 1824. Plate 216.

Cultivation. *Eccremocarpus* is raised from seeds sown about March in slight heat, and grown on in the greenhouse with fairly rich light soil until the middle of May, when they may be planted out against a wall or trellis, where they will flower a couple of months later. Any soil that is light and fairly good will suit them, and if the situation is sheltered, the plants will probably endure the winter outside; especially is this likely in the South of England, where they are usually quite ardy.

Description of Upper shoot of *Eccremocarpus scaber* with flowers.
Plate 216. The plant naturally grows with the racemes hanging down. Fig. 1 is an enlarged flower, and Fig. 2 is a section of the same.

TRUMPET FLOWERS

Natural Order BIGNONIACEÆ. Genus *Bignonia*

BIGNONIA (named in honour of the Abbé Bignon, librarian to Louis IV.). A large genus consisting of about one hundred and twenty species, chiefly shrubby climbers (a few trees or erect shrubs), with opposite leaves, and flexible stems, twisted like ropes, that often hang from tree to tree, supported by strong tendrils. The calyx is bell-shaped, toothed or entire. The corolla is shortly tubular, with a bell-shaped throat, and a slightly irregular five-lobed limb, divided into two lips. There are four fertile stamens and a rudimentary fifth. The capsule is two-celled, opening by two valves. The species are natives of America, chiefly of the Tropical portions.

Principal Species. **BIGNONIA CAPREOLATA** (having tendrils. Capreolate, pertaining to a goat). Stem 15 feet long. Leaves divided into a pair of heart-shaped leaflets, and ending in a small three-branched tendril. Flowers orange, crowded; April to August. Introduced from North America, 1710. Known as the Goat or Cross Vine. Hardy in the South of England. There is a var. *atrosanguinea*, with red-purple flowers.

B. CHERERE (native name). Stems slender, 10 to 20 feet long. Leaflets oval, in pairs or threes. Flowers orange-red, 4 inches long, in axillary cymes; June to November. Introduced from Guiana, 1824. A magnificent climber for a warm conservatory.

B. CLEMATIS (Clematis-like). Stems about 15 feet long, with square branches. Leaflets heart-shaped, pinnate, with an odd one. Corolla-tube white, yellowish within, with red rounded lobes, in axillary panicles. Introduced from Caraccas, 1820.

B. PURPUREA (purple). Habit of *B. speciosa*, but flowers of a rich red-purple colour. Stove; July. Brazil.

B. FLORIBUNDA (abounding in flowers). Stem 12 feet long; branches covered with white warts, and powdery. Leaflets oblong-elliptic, shining, with unbranched tendrils. Flowers funnel-shaped, purplish, in axillary panicles. Introduced from Mexico, 1824.

B. SPECIOSA (showy). Stem slender, 12 feet long. Leaflets lance-shaped. Flowers mauve-purple; June to August. Introduced from Santa Cruz, 1820.

B. VARIABILIS (variable). Branches four-sided; tendrils three-branched. Leaves three-lobed; upper ones in pairs. Flowers 3 inches long; corolla-tube greenish yellow, limb becoming white; in terminal, many-flowered short racemes; June to August. Introduced from Caraccas, 1819.

B. VENUSTA (charming). Stems 10 to 30 feet long, wiry. Leaves ternate. Flowers, in large branched panicles, bright scarlet. A grand climber for a warm house; June. Brazil.

Cultivation. With the exception of *B. capreolata*, these plants should be grown in the stove or warm greenhouse. They require plenty of room, and are therefore more suited for planting in the borders of these structures. There is, however, a danger of their becoming too large, and to prevent this the roots must be restricted, and the branches freely pruned. They must be so trained as to allow as much sunlight as possible to all parts of the plant, or the wood will not ripen sufficiently. The bed or pot must be well drained, and the compost should consist of rough fibrous loam and coarse sand. They are most useful plants for furnishing pillars, rafters, etc., in large houses. They may also be grown so as to form a curtain-like screen. In habit they resemble *Clematis*, but they are as a rule evergreen. Propagation is effected by means of cuttings of two or three joints, made in spring from strong shoots. These are inserted in sandy soil, covered with a bell-glass, and placed in bottom heat. They may also be increased by layering the lower shoots.

TECOMAS

Natural Order BIGNONIACEÆ. Genus *Tecoma*

TECOMA (contraction of the Mexican word *Tecomaxochitl*, which, however, belongs to a species of *Solandra*). A genus of about two dozen trees and climbers, with the characters of *Bignonia*, from which they are separated by the lack of tendrils, and by the partition of the capsule being opposed to the valves, whilst in *Bignonia* it is parallel with them. They are natives of the warmer and Sub-temperate Regions of the globe.

Principal Species. TECOMA AUSTRALIS (Southern). The Wonga-wonga Vine. Stem tall, woody, climbing. Leaflets five to nine, varying from oval-oblong to very slender, with rounded teeth or entire margins. Flowers yellowish white, tinged with red; in loose terminal panicles; June. Introduced from New South Wales, 1793. Also known as *Bignonia pandorea*. *T. jasminoides* resembles this, but has larger and more attractive flowers. It is a popular greenhouse climber.

T. CAPENSIS (Cape of Good Hope.) Stem climbing, smooth, 15 to 30 feet. Leaflets nine, oval, toothed. Flowers orange-scarlet, 2 inches long, curved in racemes; August. Introduced from South Africa, 1823. Also known as *Bignonia capensis*. Often planted to form a fence, for which purpose it is kept clipped like a Thorn.

T. GRANDIFLORA (large-flowered). Stem smooth, climbing, 30 feet high. Leaflets seven to eleven, oval, toothed. Flowers scarlet, in a terminal panicle; July. Half-hardy shrub (hardy at Kew). Introduced from China, 1800. Also known as *Bignonia grandiflora*.

T. RADICANS (rooting). Common Trumpet Flower. Stem climbing, 25 feet, supporting itself by rootlets from the joints. Leaflets nine or eleven, oval, toothed. Flowers orange and scarlet, similar to *T. grandiflora*, but with longer tube and narrower mouth; 2 to 3 inches long; June to September. Hardy shrub. Introduced from North America, 1640. Also known as *Bignonia radicans*. The var. *minor* has more slender scarlet flowers.

T. SMITHII (Smith's). Supposed to be a hybrid between *T. stans* and *T. capensis*. It has sturdy stems, pinnate leaves, and large, erect, terminal panicles of deep yellow flowers which are developed in winter. Introduced from Australia, 1889.

Cultivation. *T. radicans* and *T. grandiflora* are hardy in the South of England. They should be grown against a south wall. The others require greenhouse treatment, and should be given as

much light and air as possible during the hot weather, more especially in autumn, when they are ripening their wood. During winter they should be kept rather dry, but in summer they must have plenty of water. *T. capensis* and *T. Smithii* are grown as pot-plants to flower in winter. Cuttings of them are struck in early spring, and these are grown up as single stems in a light airy house till July, when they are placed outside. They require five-inch pots, and as a rule they each develop a good terminal head of flowers.

BEAR'S BREECH

Natural Order ACANTHACEÆ. Genus *Acanthus*

ACANTHUS (Greek, *akantha*, a thorn or spine). A genus of about fourteen perennial herbs, of stately vigorous habit and handsome foliage. The leaves are large, and deeply cut or lobed in a pinnate or bipinnate manner, the lobes ending in fine soft points or harder spines. The calyx consists of four unequal portions, the two side ones being smaller than the others. The corolla is tubular, with a single three-lobed lip. Stamens four, two longer than the others. Capsule two-celled, each cell containing two seeds only. The species are natives of the Mediterranean Region and Tropical and Sub-tropical countries.

History. The *Acanthus* is chiefly seen in old-fashioned gardens and in places where it has room to display its fine foliage.

Somewhere about three hundred and fifty years ago *A. mollis* was introduced from Italy; and this species and *A. spinosus*, introduced in 1629, are the two most commonly grown in this country. Considerable interest attaches to one of these species from the fact that Callimachus, the inventor of the Corinthian column, is said to have copied the leaves in the ornamentation of its capital. Several other species have been introduced, among them *A. montanus* from West Africa, 1865; *A. longifolius* from Dalmatia, 1869; and *A. Caroli - Alexandri* from Greece in 1887; but the two original introductions are the best known.

Principal Species. ACANTHUS LONGIFOLIUS (long-leaved). Flowering stem 3 or 4 feet high. Leaves radical, 2 to 3 feet long; those of the stem reduced to bracts, oval, spiny, reddish. Flowers purple or rose; June.

A. MOLLIS (soft). Flowering stem 3 to 4 feet high. Leaves, general outline heart-shaped, but much indented into toothed lobes; not spiny;



LIBONIA FLORIBUNDA

Nat. size

PL. 217

2 feet long. Flowers white or rosy; June to September. The var. *latifolius* is in all respects larger, and more desirable.

A. SPINOSUS (spiny). Flowering stem 3 to 4 feet high. Leaves deeply and regularly cut into tooth-like lobes, each ending in a short spine. Flowers purplish; calyx spiny; June to September. The var. *spinosissimus* has the leaves blistered, the spines white, and the flowers rosy, with recurved spines.

Cultivation. The *Acanthus* is easily grown where it can have a sunny position, a deep soil, and elbow-room; though we have seen fine self-sown specimens growing in the partial shade of a wood among Hart's-tongue Ferns. They should be planted in such positions as will enable their bold foliage to be seen to advantage, without fear of confusion with other plants. They may be propagated by means of seeds, which usually require a little heat for their germination, or by dividing the roots.

LIBONIA AND JACOBINIA

Natural Order ACANTHACEÆ. Genus *Jacobinia*

JACOBINIA (a commemorative name given by Moricand, but in whose honour it is not clear). A genus of about thirty species of stove or greenhouse herbs and shrubs with somewhat leathery, opposite leaves, and large yellow or red flowers, with deeply five-cleft calyx, a two-lipped corolla, two stamens, a two-lobed stigma, and a two-celled capsule. They are natives of Tropical America.

History. The plants, here associated by Bentham and Hooker, were formerly separated in several genera, and the species represented in Plate 217 is best known as *Libonia floribunda*, the name which appears beneath it. *Jacobinia coccinea* was introduced in 1770, but the other species known in gardens are of much more recent introduction—*J. ghiesbreghtiana* dating only from 1843, and *J. floribunda* from 1862. *L. penrhosiensis* is a hybrid produced by crossing *J. floribunda* with *J. ghiesbreghtiana*.

Principal Species. JACOBINIA COCCINEA (scarlet). Stem 2 to 5 feet high. Leaves stalked, elliptical, 6 to 9 inches long. Flowers scarlet, in large, erect, terminal spikes; November. Stove shrub. Native of South America.

J. (LIBONIA) FLORIBUNDA (abundant-flowered). Stems shrubby, branched from the base, 1 to 2 feet high. Leaves elliptic-oblong.

Flowers tubular, in axillary racemes, lower half scarlet, upper half yellow; October to February. Native of Brazil. Plate 217.

J. GHIESBREGHTIANA (Ghiesbreght's). Stem 1 to 1½ foot high. Leaves oval-lance-shaped, smooth. Flowers scarlet, in terminal panicles; winter. Native of Mexico.

J. PENRHOSIENSIS (Penrhose's). Similar to *J. floribunda*, but with more acute leaves and rich crimson flowers, brighter and more showy. Hybrid.

J. MAGNIFICA (magnificent). Whole plant pubescent. Stems erect, angular. Leaves stalked, elliptic, acuminate, 6 to 9 inches long, dull green. Flowers 2 inches long, rosy mauve, in dense terminal erect heads 3 to 6 inches long. Var. *Pohliana* has flowers of a darker colour and purple-tinted leaves. Both plants are known in gardens as *Cyrtantheras*. Brazil.

Cultivation. *Jacobinias* are either stove or warm greenhouse plants, which, however, may be grown in frames during the summer; in the autumn they must be given all the sunshine possible to ripen them before transferring to the warm greenhouse. When actually flowering they do not require a high temperature. They require plenty of water, and during the growing period they should frequently be syringed. Insufficient watering causes a loss of leaves. The most suitable compost is a mixture of equal parts loam and leaf-mould. To secure a compact bushy growth the main shoots should be nipped, especially for pot-culture. They are propagated by cuttings made from shoots of the old plants, inserted in a close frame in spring or summer. They are useful as winter- and spring-flowering plants.

Description of *Justicia* (or *Libonia*) *floribunda*, natural size. Fig. 1,
Plate 217. an enlargement of the flower; 2, a section of the same.

THUNBERGIAS

Natural Order ACANTHACEÆ. Genus *Thunbergia*

THUNBERGIA (named in honour of Professor Thunberg, of Upsala, 1743–1822). A genus of about thirty species of annual or perennial stove herbs, some of which are of twining habit. They have opposite leaves, and conspicuous tubular flowers with five rounded spreading lobes; four stamens of unequal length; capsules thick and leathery with a sharp flattened beak. They are natives of South and Tropical Africa, Madagascar, and the warmer parts of Asia.



MYOPORUM PARVIFOLIUM

Nat. size

Principal Species. THUNBERGIA ALATA (winged). Stem twining, covered with silky hairs, $4\frac{1}{2}$ feet long. Leaves spear-shaped, the stalks winged. Flowers yellow above, purple below; May to September. A perennial, but usually treated as an annual. Introduced from South Africa, 1823. There are varieties with white, buff, and orange flowers.

T. LAURIFOLIA (laurel-leaved). Stem climbing, very tall. Leaves elliptic or oblong, with waved or toothed margins. Flowers blue, 2 or 3 inches across, and as long; May to August. Perennial. Introduced from India, 1856. Also known as *T. Harrisii*.

T. (MEYENIA) ERECTA (erect). A privet-like shrub, 2 to 3 feet high, with ovate leaves and numerous axillary tubular flowers of a bright blue-purple colour, yellow in the throat. Stove. West Africa, 1857. There is a white-flowered variety.

T. GRANDIFLORA (large-flowered) resembles *T. laurifolia*. There is a variety of it with pure white flowers. India.

T. MYSORENSIS (Mysore). Stem climbing, with pendent branches, 10 to 25 feet long. Leaves oval or oblong, more or less heart-shaped at base, 6 or 8 inches long. Flowers scarlet and yellow, in long pendent racemes; April and May. Perennial. Introduced from India, 1854. Also known as *Hexacentris*.

Cultivation. A compost of fibrous loam, sand, and a little well-rotted manure is the best soil for *Thunbergias*; though they will do well in any ordinary soil made rich. They are raised from seeds or increased by means of cuttings. Seeds should be sown in pots during March, and placed in a warm greenhouse; afterwards potting the seedlings singly, and growing on in the stove with a moist atmosphere. Cuttings should be made from firm young shoots, placed in a close warm frame. Proper attention must be paid to cutting back all bare wood in spring, and training the stems. *T. erecta* is a useful stove flowering plant; whilst in *T. laurifolia*, *T. grandiflora*, and *T. mysorensis* we have two of the best of coarse-growing, free, large-flowering stove climbers.

MYOPORUMS

Natural Order MYOPORINEÆ. Genus *Myoporum*

MYOPORUM (Greek, *myo*, to close, and *poros*, a passage; in allusion to the transparent glands of the leaves). A genus of about thirty species of greenhouse shrubs with alternate (rarely opposite) leaves, and white (rarely purple) flowers produced from the axils of the leaves. The

branches and young leaves are sticky. The calyx consists of five sepals; the corolla is bell-shaped or funnel-shaped, with a short tube and five lobes. There are four almost equal stamens; and the fruit is a fleshy drupe containing three or four large seeds. The species are natives of Australasia, Malaya, China, Japan, and the islands of the Pacific. They are seldom cultivated, although the species described is easily managed.

Principal Species. MYOPORUM PARVIFOLIUM (small-leaved). Stem with many drooping branches, forming a bushy plant 3 feet high. Leaves slender or narrowly-spoon-shaped, fleshy, rough with glands. Flowers white, numerous, produced singly, or two or three together; June. Evergreen shrub. Introduced from New Holland, 1803.

Cultivation. *Myoporums* require greenhouse treatment, and a potting soil of a peaty nature. A mixture of fibrous loam and peat in equal portions with a little sand added will be found the most suitable. They otherwise require no special treatment. They are propagated by means of slips taken from the young shoots in spring or autumn, inserted in sandy soil and covered with a bell-glass, on gentle bottom heat.

Description of A flowering branch of *Myoporum parvifolium*, natural
Plate 218. size. Fig. 1 is a detached leaf; 2, a flower, enlarged; 3, a section of the same.

LANTANAS

Natural Order VERBENACEÆ. Genus *Lantana*

LANTANA (ancient name of Wayfaring-tree, which these plants were supposed to resemble). A genus of about fifty species of stove evergreen shrubs (rarely herbs) with toothed, opposite leaves, and red, golden, or white flowers. These have a slender corolla-tube with five spreading lobes, four stamens, and a two-celled ovary. The fruit is fleshy, containing two nuts. Most of the species are natives of Tropical and Sub-tropical America, a few African or Asian.

History. *Lantana Camara* was introduced from the West Indies about 1691, *L. mellissifolia*, *L. stricta*, and *L. trifolia* in 1733; *L. crocea* in 1818; and *L. selloviana* from Monte Video in 1822. All these were treated as stove-plants, until in recent years, but without much success. It has since been discovered that young plants do well and flower freely out of doors, and this has led to their use as bedding plants in place of the less brilliant *Verbenas*. Increased attention has been paid to the genus, with the result that a fine series of hybrids and florists' varieties have been raised, and these have to a very great extent



LANTANA CAMARA

Nat. size

PL. 219

supplanted the natural species. Of these, however, we give a brief selection.

Principal Species. LANTANA CAMARA (arched). Stem prickly, 6 to 10 feet high. Leaves oval or oblong, saw-toothed. Flowers red or orange, variable, in hemispherical heads; June.

L. CROCEA (saffron). Stem 3 feet high. Leaves oval, rough and wrinkled. Flowers bright red, those in centre of cluster yellow; June.

L. SELLOVIANA (Sellow's). Stem downy, trailing. Leaves oval, with rounded teeth, downy. Flowers bright purplish red in flat heads; December and January.

L. TRIFOLIA (three-leaved). Stem 3 feet high. Leaves elliptical, saw-toothed; often in whorls. Flowers reddish or purplish, in oval or oblong heads; August.

GARDEN VARIETIES.

<i>Diadème</i> , rose, centre flowers yellow.	<i>Favourita</i> , brown-scarlet, shaded purple.	<i>Perle Poitevine</i> , pure white, centre flowers sulphur.
<i>Distinction</i> , bright orange-scarlet.	<i>La Neige</i> , pure white.	<i>Pluie d'Or</i> , light canary yellow.
<i>Don Calmet</i> , pink.	<i>Magenta King</i> , purple-scarlet.	<i>Rayon de Soleil</i> , rosy violet.
<i>Eclat</i> , reddish crimson.	<i>Ne Plus Ultra</i> , rose-pink.	<i>Rutilant</i> , deep yellow.

Cultivation. *Lantanas* are as easy to cultivate as Geraniums.

They succeed best in a compost of two-thirds loam to one-third leaf-mould or well-rotted manure. Cuttings should be taken at the end of the summer and inserted in small pots of sandy soil, placed in the greenhouse or under a bell-glass, and kept in the greenhouse through the winter. They require very little water until after growth has well commenced in the spring, and then they must have plenty. In summer these young plants may be used for bedding purposes, the old ones being repotted and cut back for greenhouse decoration.

Description of Plate 219. Flowering branch of *Lantana Camara*, natural size. Fig 1 is an enlarged flower; 2, a section through same; and 3, the fruit.

VERBENAS

Natural Order VERBENACEÆ. Genus *Verbena*

VERBENA (Latin, the classical name, signifying altar herbs). A genus of about eighty species of herbs or under-shrubs, annual or perennial, greenhouse or hardy, with square stems, leaves opposite or in whorls of three, simple or much indented, and flowers in terminal spikes or racemes.

The calyx is tubular, five-ribbed, with five unequal teeth. Corolla salver-shaped, two-lipped, five-lobed. Stamens four, two sometimes imperfect. Ovary four-celled; fruit, four-ribbed nutlets. Most of the species are confined to America; one, *V. officinalis*, is indigenous in Britain and distributed over Europe, North Africa, etc.

History.

The Common Vervain, *Verbena officinalis*, has been for ages the object of superstitious regard, but its small flowers and general weediness of growth render it unsuitable as a garden flower. *V. supina* was introduced from Spain in 1640, *V. urticæfolia* from North America in 1683, and *V. bonariensis* from South America in 1732, but of those which may be properly regarded as garden flowers we commence with the introduction of *V. Aubletia* from North America in 1774. This species, with *V. chamædrifolia* (1827), *V. incisa* (1826), *V. phlogiflora* (1834), *V. teucrioides* (1837), all from Brazil, are believed to have had the largest influence in the production of the hybrid forms whose varieties are so largely used to-day for bedding purposes, almost to the exclusion of the original species. But as to the exact proportion in which this influence has been exercised by different species, or which particular species are concerned, there is no definite knowledge.

Principal Species.

VERBENA AUBLETIA (Aublet's). Rose Vervain. Stems 9 to 12 inches high. Leaves oval, deeply toothed and lobed, leaf-stalk winged. Flowers reddish purple, varying to lilac and white, $\frac{2}{3}$ -inch across; July and August. Hardy biennial. Plate 220A.

V. CHAMÆDRIFOLIA (Chamædryis-leaved). Stem very slender, creeping. Leaves oval or oblong, toothed, hairy beneath. Flowers brilliant scarlet, large; June to August. Half-hardy under-shrub.

V. INCISA (cut). Stem sub-erect, branches erect, 2 feet high. Leaves varying from wedge-shaped to lance-shaped, wrinkled, with deeply-cut teeth and lobes. Flowers rosy purple; July to September. Greenhouse sub-shrub.

V. PHLOGIFLORA (flame-flowered). Stems sub-erect, branches erect, 1½ foot high. Leaves spear-shaped, wrinkled, deeply-toothed, hairy beneath, margins slightly turned back. Flowers purple or lilac, $\frac{3}{4}$ -inch across. Greenhouse sub-shrub. Under cultivation the flowers vary to red and blue.

V. TENERA (delicate). Stem creeping, with many sub-erect branches. Leaves torn into slender pinnate divisions, margins curled back. Flowers violet. Greenhouse sub-shrub. Introduced from Brazil, 1827. Plate 220B. The var *Maonetti* has the flowers of a more reddish violet, the lobes margined with white.

V. TEUCRIOIDES (Teucrium-like). Stems tufted, sub-erect, rooting at



VERVAIN

(A) VERBENA AUBLETIA

(B) VERBENA TENERA

Nat. size

PL. 220

base, 2 feet high. Leaves oval, wrinkled, hairy, with wavy teeth, the margins turned back. Flowers white or pink, fragrant at night. Greenhouse sub-shrub.

V. TRIFIDA (cut into three). Stems 3 feet high, hairy. Leaves with three lance-shaped segments; margins turned back. Flowers purple. Greenhouse sub-shrub. Introduced from Mexico, 1818.

V. VENOSA (veined). Stems unbranched, sub-erect, 2 feet high. Leaves oblong, deeply-toothed, wrinkled, the margins turned back, half clasping stem. Flowers lilac or bluish. Half-hardy sub-shrub. Introduced from Brazil, 1830.

Bedding varieties are very numerous. The following **Garden Verbenas.** brief selection is merely suggestive, and the reader should also refer to nurserymen's current lists.

<i>Basilisk</i> , bright scarlet.	<i>Lady Cowley</i> , pink, with white centre.	<i>Sunny Thoughts</i> , rosy crimson.
<i>Beethoven</i> , deep rosy lake.	<i>Lady Londesborough</i> , mauve.	<i>Stadtgartner Schwarz</i> , deep rose-pink, with cream-coloured centre.
<i>Blue Beauty</i> , deep blue.	<i>Melindris Splendens</i> , bright scarlet.	<i>Zulu</i> , deep rich claret-colour.
<i>Boule de Neige</i> , white, fragrant.	<i>Purple King</i> , purple.	
<i>Crimson King</i> , bright crimson.		

Cultivation. *Verbenas* are best grown as bedding plants. In preparing the beds attention must be paid to proper drainage, the soil should be rich and light, and in a sunny position. They are propagated by seeds, cuttings, and divisions. Seeds should be sown in March or April on a hot-bed or in a warm frame, and the seedlings planted out in the second half of May. Cuttings are more satisfactory than seeds, because the latter cannot be relied upon to produce the variety. If the old roots have been preserved through the winter in the greenhouse, the young shoots that appear in spring may be taken off and inserted in sandy soil, in a frame, when they will root quickly. To preserve a neat appearance of the bed, the shoots will require pegging down, and if, when this is done, the points are nipped out, it will induce a dwarf bushy habit with more abundant flowers. Division of the roots should only be practised with the more hardy sorts. A careful watch must be kept for green-fly and mildew, either of which may be fatal to a bed of *Verbenas* if allowed a little headway.

Description of Plate 220. A, *Verbena Aubletia*. Fig. 1, a section of **Plates 220 and 221.** the flower, enlarged; 2, the seed, natural size and enlarged; 3, a seedling. B, *V. tenera*.

Plate 221. A group of Bedding *Verbenas* of garden origin. Fig. 1, an enlarged flower; 2, a section of same; 3, the style, enlarged.

LEMON VERBENA

Natural Order VERBENACEÆ. Genus *Lippia*

LIPPIA (named in honour of Dr. Augustus Lippi, a French traveller). A genus of about ninety shrubs or sub-shrubs, rarely herbs, with opposite or whorled leaves, and small flowers in heads or spikes. The calyx is two- or four-toothed, the corolla two-lipped. The fruit is a two-celled capsule. They are for the most part American. Only one species is generally cultivated, and that for its strongly fragrant leaves.

Principal Species. LIPPIA CITRIODORA (Lemon-scented). Lemon Plant. Stems 3 feet high. Leaves narrow-lance-shaped, in whorls of three. Flowers small, nearly white, in a panicle; June to October. Introduced from Chili, 1794. Greenhouse shrub, except in South of England, where it will grow outside.

Cultivation. A rich light soil is essential for success in growing it, either indoors or out. Propagation is effected by cuttings made from the branches, and inserted in sandy soil in a close warm frame.

CLERODENDRONS

Natural Order VERBENACEÆ. Genus *Clerodendron*

CLERODENDRON (Greek, *kleros*, lot or chance, and *dendron*, tree; supposed to be uncertain in its medicinal action). A genus of about seventy species of stove or greenhouse, erect and climbing shrubs with undivided leaves, opposite or in whorls of three. The flowers consist of a somewhat bell-shaped calyx with five lobes or teeth, a slender corolla-tube with five nearly equal spreading lobes, and four stamens. The fruit is fleshy, surrounded by the calyx, and its kernel separates into four nutlets. They are chiefly natives of Tropical Asia, though some are found in Africa and America. *Clerodendron foetidum* will thrive outside in South-West England, as also will *C. trichotomum*.

Principal Species. CLERODENDRON FALLAX (deceptive). Stem erect, 4 feet high. Leaves large, heart-shaped, slightly lobed. Flowers bright scarlet, in erect, terminal, many-flowered panicles; August and September. Native of Java. Stove.

C. FOETIDUM (foetid). Stem erect, annual, rough, 5 feet high. Leaves large, heart-shaped, downy, toothed. Flowers lilac-rose, in dense



BEDDING VERBENAS
(*VERBENA HYBRIDA*)

Nat. size

PL. 221

terminal corymbs; August. Half-hardy shrub. Introduced from China, 1820.

C. FRAGRANS (fragrant). Stem erect, 6 feet high. Leaves somewhat heart-shaped, downy, saw-toothed. Flowers white, fragrant, in compact terminal corymbs; October. Greenhouse shrub. Introduced from China, 1790. The var. *flore-pleno* has double flowers tinged with pink, and very fragrant.

C. SCANDENS (climbing). Stems square, downy, climbing. Leaves heart-shaped. Flowers white, forming numerous corymbs; August. Stove climber. Introduced from Guinea, 1822.

C. SPECIOSUM (showy). Stem climbing. Leaves oblong-oval, smooth. Flowers rich deep rose, with large reddish calyx. Hybrid stove climber.

C. SPLENDENS (splendid). Stem climbing. Leaves oblong-heart-shaped, wavy. Flowers scarlet, in terminal panicles. June and July. Stove climber. Introduced from Sierra Leone, 1839.

C. SQUAMATUM (scaly). Stems erect, 10 feet high. Leaves roundish-heart-shaped. Flowers bright scarlet, in large branching panicles; June to August. Stove shrub. Introduced from China, 1790.

C. THOMSONÆ (Thomson's). Stems climbing, 12 feet high. Leaves oval. Flowers bright crimson, with white calyx; in large panicles; free-flowering. Very popular stove climber. Introduced from Old Calabar, 1861. Also known as *C. balfourianum*.

C. TRICHOTOMUM (three-forked). Stem erect, 6 feet high. Leaves oval, saw-toothed. Flowers white, with inflated red calyx; in terminal three-branched loose cymes; September. Hardy shrub. Introduced from Japan, 1800.

Cultivation. In growing *Clerodendrons* some difference must be shown in the treatment of the climbers and the shrubby section. For instance, the shrubby sorts must have a much richer soil than will satisfy the climbers. For the climbing plants this should be a compost of peat and loam in equal proportions with a little well-decayed manure and sand. For the shrubby section the amount of manure must be much larger and of a stronger character. The pot-plants after they have shed their leaves should be kept almost entirely without water for the winter, and be removed to a cooler house, but the temperature should not be much lower than 60°. Where climbers are planted out in the stove border and cannot be removed, the temperature of the house must be reduced during the winter. At the beginning of the year they should be subjected to higher temperature to start them into growth again, repotted, and plunged in bottom heat. Propagation is effected by sowing the seeds as soon as ripe, or in the following spring, on a hot-bed. The

general plan, however, is to make cuttings when the plants are cut back after flowering. These should be 4 or 6 inches long, and should be inserted in pots of sandy soil plunged in bottom heat. The climbers do not root so readily as the shrubby kinds.

COLEUS

Natural Order LABIATÆ. Genus *Coleus*

COLEUS (Greek, *koleos*, a sheath, from the filaments of the stamens uniting at the base and forming a sheath for the style). A genus of tender herbs, some with perennial base, and a few shrubby. The stems—as is usual throughout the Order—are square, the leaves opposite or in whorls of three. The flowers also are in whorls—of about six—but are small, inconspicuous, and not regarded horticulturally, though important botanically. The calyx is bell-shaped, five-toothed, or two-lipped, bending back when in fruit. Corolla tubular with two lips, the upper cleft into three or four, and the lower entire, concave, often enclosing the four stamens. The species are natives of Tropical Asia and Africa.

History. There are few reliable records concerning the introductions of species. *Coleus barbatus* appears to have been the first, from Abyssinia in 1806; but as this is not one possessing variegated foliage, it scarcely counts in the present work. *C. Blumei* was the first of the blotched-leaved species, and this was introduced from Java somewhere about 1830. At a later date came *C. Veitchii* and *C. Gibsoni* from the Pacific Islands, and by crossing *C. Blumei* with these, the brilliant tribe of Hybrid Coleus has been produced. As it is only from these that the genus possesses any importance in the gardener's eyes, we content ourselves with a description of Blume's Coleus. The hybrids and their varieties are well-nigh endless, and every year sees important accessions to the list, there being apparently no limit to the shuffling of the spots and blotches on the leaves.

Principal Species. COLEUS BLUMEI (Blume's). Stems 1 to 1½ foot high. Leaves oval, deeply cut and coarsely-toothed; the central portion reddish purple surrounded by yellowish green, upon which are smaller purple spots. Flowers small, white and purple. The var. *Verschaffeltii* has rich crimson velvety leaves. Perennial. The first batch of beautiful forms of *Coleus* originated in gardens were raised in the gardens of the Royal Horticultural Society at Chiswick about



HYBRID COLEUS

$\frac{2}{3}$ Nat. size

twenty-five years ago. New varieties have since been added yearly.

Cultivation. The *Coleus* serves several purposes. It may be used for giving brilliance either to the greenhouse, the table, or the garden bed. Where there is heat, though it be but a Cucumber-frame, its cultivation is easy. The only troublesome part of the business consists in wintering them safely. They are so tender that they must be housed during the cold weather in a temperature between 55° and 60°. Their propagation is simple; portions of the shoots cut off to induce a dwarf and bushy habit will root very quickly. The compost most suitable for them is made up as follows: turfy loam, four parts; rotted cow-manure, two parts; leaf-mould, one part; sharp sand, one part. Pot firmly in this, and water freely whilst the plants are growing, as the leaves and stems are of delicate texture, and rapidly wilt if allowed to get slightly dry. With the water they require heat, and the roots should be pot-bound. Grow them near the glass and give liquid manure twice a week; by this means you will get strong healthy plants of splendid colour. As the flower-buds appear pinch them all out. Raising from seed is only adopted for the purpose of securing new varieties. The plants intended for summer-bedding are obtained from spring-struck cuttings grown in pots in a warm frame till June, when they are planted out.

Description of Plate 222. A group of Hybrid *Coleus*.

SAGES

Natural Order LABIATÆ. Genus *Salvia*

SALVIA (the classical Latin name, from *salveo*, to save or heal). A genus of about four hundred and fifty species of herbs and shrubs, with flowers in whorls, usually forming racemes or spikes. The calyx is a two-lipped tube or bell. The corolla-tube is also two-lipped, the upper erect and sometimes notched, the lower three-lobed. There are only two stamens, and these have the anther-cells distant, one being undeveloped. The species are natives of all Temperate and Tropical Regions; two occur in Britain — *Salvia verbenaca*, the Wild Clary, and *S. pratensis*, the Meadow Sage.

History. Exotic *Salvias* have been cultivated in Britain during a long period. Some authorities suspect from the rarity of *S. pratensis*, and the fact that it is widely cultivated as a garden-flower, that it is not really indigenous, but an escape from cultivation. *S. sclarea*,

the Clary, is recorded as in cultivation here so far back as 1562, and *S. officinalis*, the Sage, at least as early as 1597; but most of the early introductions that were cultivated as flowering plants have been supplanted by the finer importations of the nineteenth century. Most of these are greenhouse plants, but even these are suitable for planting out for summer-flowering.

Principal Species. *SALVIA ALBO-CÆRULEA* (white and blue). Stems sub-shrubby, erect, 3 feet high. Leaves oblong-lance-shaped, round-toothed, downy beneath. Flowers 1 inch long, white with deep blue lower lip, in a long raceme; June to September. Greenhouse perennial. Native of Mexico.

S. ANGUSTIFOLIA (slender-leaved). Stem 2 feet high. Leaves slender, faintly toothed, almost stalkless. Flowers blue, the lower lip very broad; May. Greenhouse perennial. Introduced from Mexico, 1806.

S. AZUREA (azure). Stem erect, 6 feet high. Leaves lance-shaped or oblong, upper ones narrow; toothed, with short stalks. Flowers blue, varying to white, in a spike-like raceme; August. Perennial. Introduced from Carolina, 1806. The var. *grandiflora* (often known as *S. Pitcheri*) has a larger, denser raceme, and the calyx is clothed with silky hairs.

S. BOLIVIANA (Bolivian). Stem shrubby, 4 feet high. Leaves heart-shaped, wrinkled, stalked. Flowers bright scarlet, with purplish calyx; in a branched panicle; August to October. Greenhouse under-shrub. Introduced from Bolivia, 1856.

S. CACALIÆFOLIA (Cacalia-leaved). Stem erect, downy, 3 feet high. Leaves broad-spear-shaped, thick, stalked, downy above, covered with soft red or white hairs beneath. Flowers deep blue, with broad tube, in branched racemes; June. Greenhouse perennial. Introduced from Mexico, 1858.

S. COCCINEA (scarlet). Stem erect, 2 feet high. Leaves stalked, heart-shaped or oval, round-toothed, woolly beneath. Flowers deep scarlet, nearly 1 inch long, racemed; July. Greenhouse perennial, often grown as half-hardy annual. Introduced from South America, 1774. The var. *major* is taller, with larger flowers.

S. CONFERTIFLORA (close-flowered). Stem sub-shrubby, branched, 3 feet high. Leaves oval-oblong, wrinkled and downy, round-toothed. Flowers reddish, clothed with golden wool, in long dense spikes; August. Greenhouse sub-shrub. Introduced from Rio Janeiro, 1838.

S. FULGENS (glittering). Stem shrubby, much branched, 3 feet high. Leaves heart-shaped, stalked, downy above, woolly beneath. Flowers



SCARLET SAGE
(*SALVIA SPLENDENS*)

Nat. size

PL. 223

scarlet, nearly 2 inches long, in long, distant-whorled racemes; July. Greenhouse shrub. Introduced from Mexico, 1829.

S. GESNERÆFLORA (Gesnera-flowered). Stem 2 feet high. Plant very similar to *S. fulgens*, but the flowers larger and more numerous. Greenhouse perennial herb. Introduced from Columbia, 1840.

S. GOUDOTII (Goudot's). Stem shrubby, 2 feet high. Leaves downy, oval-lance-shaped, round-toothed. Flowers bright crimson, 1 inch long, in unbranched racemes; June to August. Greenhouse shrubs. Introduced from Columbia, 1870.

S. HEERII (Heer's). Stem shrubby, branched, 2 to 3 feet high. Leaves heart-shaped or lance-shaped, stalked, wrinkled, round-toothed. Flowers scarlet, downy; racemes at end of branches; June to August. Greenhouse shrub. Introduced from Peru, 1855.

S. INVOLUCRATA (with an involucre). Stem sub-shrubby, slightly branched, 2 or 3 feet high. Leaves oval, stalked, round-toothed. Flowers rosy, in spike-like racemes; August. Greenhouse or half-hardy sub-shrub. Introduced from Mexico, 1824. The var. *Bethellii* of garden origin (1881) has heart-shaped leaves and rosy-crimson flowers in large spikes at the ends of the branches.

S. LEUCANTHA (white-flowered). Stem shrubby, with woolly branches, 1½ to 2 feet high. Leaves stalked, narrow-lance-shaped, wrinkled, downy beneath. Flowers white, clothed with lavender-coloured wool, in a long spike-like raceme; June. Greenhouse shrub. Introduced from Mexico, 1847.

S. PATENS (spreading). Stem erect, hairy, 2½ feet high. Leaves spear-shaped, heart-shaped, or rounded-wedge-shaped, stalked, round-toothed. Flowers blue, 2 inches long, broad-tubed; September. Half-hardy perennial. Introduced from Mexico, 1838.

S. PRATENSIS (meadow). Stem 2 feet high. Leaves heart-shaped, wrinkled, long-stalked. Flowers bright blue, 1 inch long, in long spikes; June to August. Native perennial.

S. RŒMERIANA (Rœmer's). Stem 1 to 2 feet high. Leaves roundish-heart-shaped, lower leaves with lateral leaflets of similar form. Flowers deep scarlet, 1 inch long, in long, loose racemes; July. Hardy perennial herb. Introduced from Texas, 1852.

S. RUTILANS (shining). Stem sub-shrubby, 2 to 3 feet high. Leaves heart-shaped, downy. Flowers bright scarlet, with slender tube; June to September. Greenhouse sub-shrub. Introduced about 1873, but country of origin doubtful.

S. SPLENDENS (glittering). Stem branched, 3 feet high. Leaves oval, somewhat heart-shaped, toothed, stalked. Flowers scarlet, 2 to 2½

inches long; calyx coloured as well as corolla; in spike-like racemes; December. Greenhouse shrub. Introduced from Brazil, 1822. Plate 223. The garden var. *Bruantii* (1881) is dwarfer, with flowers of brighter scarlet.

Cultivation. *Salvias* are propagated by means of seeds and cuttings.

Seeds should be sown thinly on pans of sandy soil about April, and placed in gentle heat. Cuttings may be taken at the same time or a little later, and should be made from growing shoots and struck in heat. They are strong feeders and must have a rich soil, especially for potting. This should be a compost of equal portions of good loam and cow-manure. If grown in beds in the open air the soil should be light and not rich. Plants intended to flower in the conservatory in winter are grown in pots along with Chrysanthemums, and kept bushy by frequent pinching.

Description of Plate 223. *Salvia splendens*, one-half the natural size. Fig. 1 is a detached flower; 2, a section of the same.

SPOTTED DEAD NETTLE

Natural Order LABIATÆ. Genus *Lamium*

LAMIUM (Greek, *laimos*, throat, from the form of the corolla). A genus of about forty annual and perennial herbs, with square, hairy stems, decumbent at the base, then becoming erect. Leaves oval or roundish, toothed and stalked. Upper lip of corolla long and vaulted, lower lip with large centre lobe and very slender side lobes. Stamens four, nutlets three-sided. Natives of Temperate Europe, Asia, and North Africa; five species British.

History. Though we have several undoubted natives among the species of *Lamium*, when they are by chance seen in our gardens it is not by the introduction of the gardener. *L. maculatum* is about the only species that is actually planted, and that more on account of its pretty foliage than its flowers, which are too much like those of the exceedingly common weed *L. purpureum*. *L. maculatum* is said to have been introduced from Italy about the year 1683. It may occasionally be found growing, apparently wild, in waste places.

Principal Species. LAMIUM MACULATUM (spotted). Stems about a foot high. Leaves somewhat heart-shaped, coarsely toothed, wrinkled, with a broad, white, central band. Flowers large, pale purple;



SPOTTED DEAD NETTLE

(*LAMIUM MACULATUM*)

Nat. size

PL. 224

April to September. Hardy perennial. There is a var. *aureum*, with golden leaves. Plate 224.

Cultivation. *Lamiums* are at home in most soils. Any ordinary border will suit it, where it can form a dwarf clump. It is very free-flowering, and may be readily propagated by dividing the roots in spring.

Description of *Lamium maculatum*, natural size. Fig. 1 is an
Plate 224. enlarged section through the flower. The two lowest whorls in the centre shoot represent the persistent calyces, after the corollas have been shed.

LAVENDER

Natural Order LABIATÆ. Genus *Lavandula*

LAVANDULA (Latin, *lavandus*, to be washed: the ancients using it to perfume their baths). A genus of about twenty perennial herbs, shrubs or sub-shrubs, with blue or violet flowers in whorled spikes; the corolla tubular, two-lipped. There are four stamens, bent downwards and hidden within the corolla. The species are chiefly natives of the Mediterranean Region.

History. The Lavender is of ancient renown for its sweet fragrance and medicinal virtues. The true Lavender, *Lavandula vera*, and an allied species, *L. Stœchas*, were introduced from the Mediterranean Region as far back as 1568. Lavender became almost an essential plant in all old-fashioned gardens, the housewife growing the flowers for the purpose of perfuming the clean linen in her press, and for making Lavender water. Mitcham in Surrey has been long famous for its acres of Lavender, and it is said that the essential oil produced there realises six times the price of that distilled by the French growers.

Principal Species. LAVANDULA STÆCHAS (upright). French Lavender. Stem branched, 2 to 3 feet high. Leaves narrow, the margins curled back, grey, with cottony hairs on each side. Flowers dark purple, the whorls forming a long dense spike, surmounted by a cluster of coloured bracts; June to September. Hardy aromatic shrub.

L. VERA (true). Common Lavender. Stem branched, forming a rounded head. Leaves lance-shaped, somewhat spoon-shaped, the edges curled back, both sides covered with greyish down. Flowers blue, occasionally white; June to September. Also known as *L. spica*.

Cultivation. *Lavandulas* succeed in any light soil, and are easily propagated by means of cuttings. These should be made from the young shoots in autumn, and inserted in sandy soil, covering with a hand-light or bell-glass, and leaving them until the spring.

OTHER LABIATE FLOWERS

Natural Order LABIATÆ

ROSMARINUS (Latin, *ros*, dew, and *marinus*, the sea). *R. officinalis* (of the shops). Common Rosemary. A hardy evergreen shrub found in old-fashioned gardens, and very similar to *Lavandula*, but the calyx as well as the corolla is coloured pale blue and two-lipped, whilst two stamens project beyond the mouth of the corolla. June to September. Introduced from South Europe (1548). There are varieties with silvery, golden, and broad leaves. Cultivation as for *Lavandula*.

MONARDA (named in honour of Dr. Nicholas Monarda, a Spanish botanist, 1493–1588). A genus of about half a dozen species of hardy perennial herbs, with long, slender, two-lipped corollas, arranged in close heads or whorls. Natives of North America. Two species are worth recommendation. *M. didyma* (twin); Oswego Tea; with one or two whorls of bright scarlet flowers; July to September; growing to 1½ foot high, with oval-lance-shaped leaves. Introduced 1656. *M. fistulosa* (hollow); Wild Bergamot; with less numerous purple flowers; June to September. Growing 2 feet high. Introduced 1656. There are several varieties. Both are easily grown in ordinary garden soil, where they get a fair amount of sunshine. Increased by divisions in autumn.

DRACOCEPHALUM (Greek, *drakon*, a dragon, and *kephale*, a head, from the shape of the corolla). A genus of about thirty annual and perennial herbs, natives of Europe and Asia, with tubular, two-lipped corollas, in terminal, leafy spikes. *D. grandiflorum* (large-flowered) has erect stems 6 to 10 inches high, oblong leaves, and spikes of large blue flowers appearing in July. Perennial. Introduced from Siberia, 1759. *D. ruyschiana* (Ruysch's) is a taller-growing perennial, with smaller, purplish flowers appearing in June. Introduced from Europe, 1699. The var. *japonicum*, with white and blue flowers, is an improvement. They are hardy, and succeed in cool borders. Propagation by cuttings and divisions in spring.

PHYSOSTEGIA (Greek, *physa*, a bladder, and *stega*, a covering: the inflated flowers). A genus of three species allied to *Dracocephalum*,

but with both calyx and corolla inflated. The principal species is *P. virginiana*, introduced from North America in 1683. It is a perennial with flesh-coloured or purple flowers, from July to September. There are several varieties, of which *speciosa*, with the panicles in dense spikes, is the best. The remarks on cultivation and propagation of *Dracocephalum* apply to this.

PERILLA (said to be the Indian name). Two or three half-hardy annuals, of which *P. ocymoides* (Ocimum-like) var. *crispa* is sometimes grown as a bedding plant on account of its purple-black foliage. The rosy flowers are small and insignificant. This variety is of garden origin, and usually called *P. nankinense* in seedsmen's lists. The parent is a native of India and China. Introduced 1770.

MARVEL OF PERU

Natural Order NYCTAGINEÆ. Genus *Mirabilis*

MIRABILIS (Latin, *mirabilis*, admirable, wonderful). A genus of about ten species of tuberous-rooted perennial herbs, with opposite leaves and showy flowers. These are *perianths*; what appears to be the calyx being really an involucre one- or many-flowered. The perianth is tubular or funnel-shaped; the stamens five, united at their base. The species are restricted in range to the warmer parts of America, and to the West Indies.

History. *Mirabilis Jalapa*, the Marvel of Peru, has been an ornament of British gardens for more than three hundred years. For a long period it was thought that the drug Jalap was obtained from this plant, hence its specific name. It was ascertained later to be prepared from *Ipomea purga*. The marvellous character of the species consists in the fact that on one plant flowers of several colours are produced. The French designate it *Belle de nuit*, in consequence of its flowers being usually at their best at night. In the West Indies the species are called Four-o'clock Flowers, that being the time of day when they usually open. In English gardens where the sun is not seen so regularly they frequently remain open all day. *M. dichotoma* was introduced from Mexico in 1850, *M. longiflora* from Mexico in 1759, and *M. multiflora* from California in 1876.

Principal Species. MIRABILIS DICHOTOMA (divided in two). Stem forking, 2 or 3 feet high. Leaves oval. Flowers yellow; July. Greenhouse perennial.

M. JALAPA (Jalap). Common Marvel of Peru. Stem much branched, 2 to 3 feet high. Leaves broad, oblong. Flowers fragrant; white, yellow, crimson, or purple, selfs or variously striped or spotted; June to September. Half-hardy perennial.

M. LONGIFLORA (long-flowered). Stem branching from the base, 2 feet high. Leaves heart-shaped. Flowers variably white, pink, violet; fragrant, with long, sticky tube; July. Hardy perennial.

M. MULTIFLORA (many-flowered). Stem downy, 2 feet high. Leaves oval, downy. Flowers purple, 2 inches long; July. Hardy perennial.

Cultivation. *Mirabilis* is a genus of easy culture, that ought to be more widely grown than is customary. Though they prefer an open, loamy soil, they will do well in most gardens. They are usually grown as annuals, sowing the seeds in a warm frame or greenhouse in March, and planting out when the weather has become genial. But they develop thick fleshy roots like those of the *Dahlia*, which may be lifted in autumn and stored in a dry place during winter, then started in a little warmth in spring. By this method much larger plants may be obtained, with much finer floral effects.

Description of *Mirabilis Jalapa*, the Common Marvel of Peru, showing various colours of flowers. **Plate 225.** Fig. 1 is a section of the flower; 2, the seed enclosed in a portion of the perianth; 3, a seedling.

ABRONIAS

Natural Order NYCTAGINEÆ. Genus *Abronia*

ABRONIA (Greek, *abros*, elegant). A genus of about seven dwarf perennial herbs, of trailing habit with opposite leaves, and heads of funnel-shaped flowers surrounded with a finely-divided involucre. The flower-clusters are not unlike those of *Verbena*. There are five stamens. The species are restricted to North-West America.

Principal Species. **ABRONIA ARENARIA** (sand-loving). Sand Verbena. Stems from 9 to 18 inches high. Leaves sticky, kidney-shaped with short thick stalks. Flowers fragrant, yellow, $\frac{1}{2}$ -inch long; in dense heads; July. Half-hardy. Introduced from California, 1865.

A. UMBELLATA (umbel-flowered). Stem prostrate, branches erect, 1 to 2 feet high. Leaves oval or oblong on long stalks. Flowers rosy pink, slightly fragrant; in small dense terminal heads; April. Intro-



MARVEL OF PERU
(MIRABILIS JALAPA)

Nat. size

PL. 225 *

duced from California, 1823. Greenhouse perennial, grown as half-hardy annual.

Cultivation. *Abronias* require to be grown in sandy soil in a sunny position. If grown as annuals they must be raised from seeds (divested of their tough outer coats) sown in autumn in pots of sandy soil. They must be wintered in a frame, and planted out in spring. For after-growth in the greenhouse as perennials they may be potted in autumn and taken inside. In the following spring these old plants may be used for the production of cuttings, which should be inserted in sandy soil and struck in the frame or greenhouse.

BOUGAINVILLÆAS

Natural Order NYCTAGINEÆ. Genus *Bougainvillœa*

BOUGAINVILLÆA (named in honour of the French navigator De Bougainville). A genus of seven or eight gorgeous stove or greenhouse shrubs, with alternate leaves, and small tubular flowers surrounded with large coloured bracts. These bracts are the chief glory of the plant. The species are restricted to the warmer regions of America.

Principal Species. BOUGAINVILLÆA GLABRA (smooth). Stem climbing. Leaves oval, smooth or hairy, bright green. Flowers small, in panicles, each panicle enclosed in three large heart-shaped rosy bracts; June to September. Introduced from Brazil, 1861. Stove or warm conservatory. Var. *sanderiana* is more floriferous, especially in a small state, than the type.

B. SPECTABILIS (handsome). Stems branched, with numerous recurved spines. Leaves oval, very dark green, hairy above. Floral-bracts, large, heart-shaped, lilac-rose, in numerous very large panicles; March to June. Introduced from Brazil, 1861. Also known as *B. speciosa*. Var. *lateritia* is remarkable for the brick-red colour of the bracts. Greenhouse.

Cultivation. *Bougainvillœas* are plants for the stove or greenhouse border, but *B. glabra* may also be grown in pots. Those planted out must have their roots restricted, or they will not flower so freely. The most suitable compost consists of turfy loam, three parts; leaf-mould, one part; sharp gritty sand, one part, or sufficient to keep the whole open. Attention must be paid to efficient drainage of the bed or pot, and manure must not be given except in a liquid form. Freedom of growth should be allowed without any stopping or pinching back; but they must be allowed to rest by withholding water in winter, and about

February all weak shoots must be cut right back. They require all the sunshine possible. In Tropical countries *Bougainvillæas* occupy as prominent a position on human dwellings, etc., as the Ivy and Ampelopsis do with us. They are propagated by cuttings of half-ripened wood, in sandy soil, on a hot-bed.

KNOTWEEDS

Natural Order POLYGONÆÆ. Genus *Polygonum*

POLYGONUM (Greek, *polys*, many, and *gonu*, knee; from the many nodes). A genus of about one hundred and fifty species of herbs with thickened joints and alternate leaves with tubular stipules at their base sheathing the stem. The flowers are small, bell-shaped or funnel-shaped, clustered in panicles, racemes, or spikes. They consist of five sepals, no petals, five to eight stamens, and a compressed or three-sided ovary ending in three styles. The fruit is three-sided or compressed. The species are widely distributed in all climates, twelve being British.

History. *Polygonums* are not among the most desirable of garden plants. Our native species, with the possible exception of *P. Bistorta*, are not worth growing, whilst some of them are perfect pests, especially where manure is used or stacked. *P. Bistorta*, the Bistort or Snakeweed, was at one time widely grown on account of its medicinal reputation, and many of the plants now found in old-fashioned gardens are probably the descendants of those planted there for domestic medicine. In Cumberland the green-tops are—or were till recently—eaten under the name of Easter Man Giants. Of those still cultivated, *P. orientale* has been with us the longest, the first specimens having been introduced from the East Indies in 1707. *P. affine* was brought from Nepaul in 1822, *P. cuspidatum* from Japan in 1825, *P. vacciniifolium* from Himalaya in 1845, and *P. sachalinense* from the island of Sachalin in 1869.

Principal Species. POLYGONUM AFFINE (related). Stems 1 foot high. Leaves stalked, lance-shaped, few. Flowers rosy, in dense spikes; August to October. Hardy perennial.

P. AMPLEXICAULE (stem-clasping). Stems 2 or 3 feet high, rising from a woody rootstock. Leaves heart-shaped, the lower ones stalked. Flowers rosy or white, in racemes, solitary or twin; September and October. Hardy perennial. Native of Himalaya.

P. COMPACTUM (compact). Stems 2 feet high. Leaves oval-oblong, dark, slightly crimped. Flowers white, in erect racemes; September.



EASTERN KNOTWEED
(POLYGONUM ORIENTALE)

Nat. size

PL. 226

P. CUSPIDATUM (pointed). Stems slender, 6 or 8 feet high. Leaves large, oval-oblong, pointed and stalked. Flowers creamy white, in drooping feathery panicles; June to August. Hardy perennial. Also known as *P. Sieboldii*.

P. ORIENTALE (Eastern). Stem branched, stout, 4 to 10 feet high. Leaves large, oval. Flowers rosy purple or white, in long drooping racemes; August. Hardy annual. Plate 226.

P. SACHALINENSE (Sachalin). Stems erect, strong, angular, grooved, 10 to 12 feet. Leaves oval-oblong or lance-shaped. Flowers greenish yellow, in racemes from the axils; July and August. Hardy perennial.

P. VACCINIFOLIUM (Bilberry-leaved). Stems creeping, much branched, sub-shrubby. Leaves small, elliptic, margins slightly rolled back. Flowers bright rose, in nearly round spikes; August to October. Hardy perennial.

Cultivation. *Polygonums* will grow readily in any cultivated ground, but they have a fondness for the richer, moister places. Some of the larger kinds, such as *P. cuspidatum*, *P. orientale*, and *P. sachalinense*, form fine clumps, but their growth should not be attempted where space is restricted. They are more suited for the wild-garden or by the side of streams or ponds. *P. affine* is, from its dwarf habit and profusion of rosy spikes, better for the border; and *P. vaccinifolium* should be planted on the rockery. If there is a specially wet place in the garden *P. sachalinense* should have it. *P. orientale* should be placed where it will get plenty of sunshine. The perennials are propagated by divisions of the roots. *P. orientale* is raised from seed sown in gentle heat in spring, and the seedlings planted out early in summer.

Description of *Polygonum orientale*, the Eastern Knotweed. Fig. 1
Plate 226. is a separated flower with its coloured bract; 2, a section through the same; 3, a seed; and 4, a seedling soon after germination.

R H U B A R B S

Natural Order POLYGONÆÆ. Genus *Rheum*

RHEUM (Greek, *rheon*, an adjectival form of *rha*, the old Greek name for Rhubarb). A genus of about fifteen species of hardy perennial herbs with thick, hard rootstocks, very large radical leaves on long juicy stalks, wavy-toothed or palmately lobed. The flowers are small, white, yellowish, or pink, combined in bundles which are in turn united in narrow racemes. The perianth consists of six spreading sub-equal segments. Stamens

nine. Fruit triangular, winged. Natives of Siberia, Himalaya, and Eastern Asia.

History.

Very little Rhubarb is grown in this country for ornamental purposes, yet where there is room one or two plants make a very striking group of foliage and flower-spikes. The history of the genus in the garden is really as medicinal and culinary plants. *Rheum Rhaponticum*, a native of Siberia, is said to have been introduced *viâ* Padua, 1573. *R. undulatum*, another culinary species, was introduced from Siberia in 1734. *R. palmatum*, which had been introduced as a cultivated plant in 1763, was not discovered in its wild state until Colonel Prejevalsky came across it in North-West China in 1873, and the *R. officinale* was similarly unknown to us as a wild plant until its introduction from Thibet in 1871. *R. nobile* is one of Sir Joseph Hooker's Himalayan discoveries.

Principal Species.

RHEUM EMODI (Emodus'). Flower-stem leafy, 6 to 10 feet high. Leaves heart-shaped, with red nerves, the margins slightly wavy, the footstalks half round. Flowers whitish, in a dense pyramidal panicle; June and July. Native of Himalaya. Introduced 1823.

R. NOBILE (noble). Stem 3 feet high. Leaves radical, bright green, with red nerves and stalks. Floral bracts semi-transparent, straw-coloured, the edges pink. Flowers insignificant, green, hidden by the bract.

R. OFFICINALE (of the shops). Stem 8 to 10 feet high, much branched. Leaves large, roundish-kidney-shaped, with the margins cut into five short unequally-toothed lobes. Flowers small, greenish, in dense spikes.

R. PALMATUM (palmate-leaved). Stem 5 feet high. Leaves rough, broad-heart-shaped, palmately-lobed. Flowers greenish, small, in a leafy panicle; May.

Cultivation.

Rhubarbs succeed well in any rich, deep soil, and are very suitable for planting at the back of shrubbery borders, in the wild-garden, etc. They are easily propagated by division, or by sowing seed in spring on a gentle hot-bed.

AMARANTHS

Natural Order AMARANTACEÆ. Genus *Amarantus*

AMARANTUS (Greek, *a*, not, and *maraino*, to wither; in allusion to the persistent character of the flowers and coloured bracts). A genus of about twelve coarse-growing hardy and half-hardy annual herbs with



LOVE-LIES-BLEEDING
(AMARANTUS CAUDATUS)

$\frac{2}{3}$ Nat. size

alternate leaves, and small green or red flowers in long clustered spikes. These flowers are perianths, three- or five-lobed, with three coloured bracts at their base. The stamens are five or three. The fruit is an *utricle*—a kind of nut—containing one loose seed, and splitting transversely. They are natives of warm and Temperate Regions.

History.

Amaranths are among the real old-fashioned garden flowers. As far back as the year 1548 *Amarantus tricolor* was growing in British gardens, having been brought from the East Indies. By 1596 *A. caudatus*, from the same quarter of the globe, had also made its way here; and in 1684 *A. hypochondriacus* came from North America. Many others have been introduced, but the most notable of those at present in cultivation are of recent introduction; thus *A. speciosus* came from Nepal in 1819, and *A. salicifolius* from the Philippine Isles in 1871. *A. caudatus* has received the sentimental English name of Love-lies-bleeding, whilst the French call it Fox Brush and Nun's Scourge.

Principal Species. AMARANTUS CAUDATUS (tailed). Love-lies-bleeding. Stem angular, 2 to 3 feet high. Leaves oval. Flowers very small, in long, drooping, cylindrical, branching racemes; July to September. Plate 227.

A. HYPOCHONDRIACUS (melancholy). Prince's Feather. Stem erect, 4 to 5 feet high. Leaves lance-shaped, purplish beneath. Flowers deep crimson in dense, erect spikes; July.

A. MELANCHOLICUS RUBER (melancholy-red). A more compact, dwarf plant about a foot high, the leaves shaded with crimson. A native of Japan.

A. SALICIFOLIUS (Willow-leaved). This plant, which is about 3 feet in height, is grown for its graceful foliage, like that of the Willow in shape, and varying from half a foot to a foot and a quarter in length, wavy and drooping; and when mature brilliantly variegated with orange, carmine, and bronze.

A. SPECIOSUS (showy). Large Prince's Feather. Stems 3 to 5 feet high. Leaves lance-shaped, at first tinged with red, but this passes when the plant flowers. These are dark crimson-purple in long erect spikes which form a plume-like panicle; July.

A. TRICOLOR (three-coloured). Variegated Amaranth. Stem 1½ foot high. Leaves crimson, yellow, and green; apex yellow or green, dark purple in centre, crimson or carmine from centre to base, stalk usually yellow, sometimes red. Flowers green and conspicuous. This is more tender than the others. Plate 228.

Cultivation.

Amaranths will grow almost anywhere with ease; but to have them at their best they should be grown in rich loam. As they are all annuals they require to be grown from seed,

which should be sown in a hot-bed in spring, and the seedlings thinned out. Harden them before planting out at the end of May or beginning of June. They are also admirable plants for conservatory decoration if given plenty of room both for roots and foliage. They must not be stinted for moisture or sunshine. In some of these species the leaves are the most important feature, and the plant must be encouraged to develop them by free root action. Intensity and brilliance of colour is only to be obtained by giving them strong light and growing near the glass when grown inside. Outside, *A. tricolor* should be given the warmest sunniest position.

Description of Plate 227. *Amarantus caudatus*, or Love-lies-bleeding. **Plates 227 and 228.** Fig. 1, a group of flowers of which the central one is male and the side ones female; 2, a section through the same group; 3, a female flower; 4, a seed, natural size and enlarged; 5, a seedling.

Plate 228. *Amarantus tricolor*, or Variegated Amaranth. Fig 1, a cluster of male and female flowers; 2, a male flower; 3, a female flower; 4, a section through the latter; 5, a seed, natural size and enlarged; 6, a seedling.

COCKSCOMBS

Natural Order AMARANTACEÆ. Genus *Celosia*

CELOSIA (Greek, *kelos*, burnt, in allusion to scorched appearance of the flowers in certain species). A genus of—for the chief part—Tropical annual herbs, closely allied to *Amarantus*. Like those plants, these have the perianth composed of five equal spreading segments, the three bracts beneath, and the seed-vessel splitting transversely; but in *Celosia* the five stamens are united at their base and form a cup, the style is elongated, and the seed-vessel contains several seeds instead of one only. The species are natives of India, China, and Malaya.

History. The Cockscomb, *Celosia cristata*, is another of the old-fashioned plants of cultivation that take us back over three centuries in order to arrive at the date of their introduction from abroad. "Asia, 1570," is the record; but it must not be supposed that the plant as usually seen in our conservatories, and as depicted in Plate 229, is anything like the natural form. That has erect, pyramidal, plummy panicles, to which the common name does not fit well; whilst the plant depicted is a monstrosity in which the stems and plumes have become laterally joined, with a partial suppression of their upward growth,—*fasciation* is the botanist's term for this eccentric growth.



VARIEGATED AMARANTH
(AMARANTUS TRICOLOR)

Nat. size

PL. 228

The pyramidal spike or panicle is the usual form in the genus. *C. argentea* was introduced from China in 1740, *C. pyramidalis* from India, 1820, and *C. Huttonii* from Java, 1871.

Principal Species. CELOSIA ARGENTEA (silvery). Stems branching from the base, 1 foot high. Leaves narrow, pointed, stalkless, or the stalks very short. Flowers white, in a dense, spike-like, erect raceme; June to September. The var. *linearis* differs only in the more attenuated leaves.

C. CRISTATA (crested). Common Cockscomb. Stems erect, 1 to 2 feet high; roundish, striated, branched from near the base. Leaves lance-shaped or oval-lance-shaped. Flowers dark red, in erect pyramidal panicles; June to September. The var. *fasciata* has the inflorescence fasciated in a broad, compressed mass, larger above, the upper margin convoluted; the Garden Cockscomb. Plate 229. The var. *coccinea* is like the type, but with scarlet panicles. The var. *variegata* is also like the type, except that the foliage is variegated; and the var. *comosa* has the scarlet or purplish flowers combined in a drooping pyramidal panicle. There are numerous colour varieties, ranging from whitish to dark crimson.

C. HUTTONII (Hutton's). Stem branched, 1 to 2 feet high. Leaves oval, crimson, or claret-coloured. Flowers red in oval spikes. Plant forming a pyramidal bush. Stove.

C. PYRAMIDALIS (pyramidal). Stems 1 to 3 feet high. General aspect of plant similar to the natural form of *C. cristata*, but with the flowers variously tinted, pink, crimson, red, yellow, or violet.

Cultivation. *Celosias* are not hardy plants. They must be germinated and grown on in heat, though they may be afterwards employed for summer decoration outside. Seed should be sown in pans of rich sandy soil early in spring, and these placed in the hot-bed. A day temperature of about 70°, falling not lower than 65° at night, is requisite, with a moist, fresh atmosphere. When the seedlings appear the pans must be brought close to the glass, and care taken that they do not dry. As soon as they can be handled with safety they must be transferred singly to small pots, inserting them deeply so that the seed-leaves are close to the soil. This is to induce as dwarf a habit as possible, and this effort is continued by growing in a warm frame, close to the glass, and in the case of *C. cristata* in an atmosphere as dry as possible to induce early flowering. Other species will not endure to be kept dry. When the flower-heads begin to appear, selection must be made of the finest, and these repotted in five-inch pots, after giving the roots a thorough soaking. The potting soil should be a compost of equal

portions of rich sandy loam and well-rotted manure (cow and stable mixed), to which sufficient silver-sand should be added to make it fairly open. Now prepare a hot-bed, with a top layer of cocoanut-fibre refuse of sufficient depth to take the pots up to their rims, and bring the plants close to the glass. In this the pots should be plunged, and now again water must be given sparingly, though air should be admitted more freely. If large plants are desired, they should be shifted to seven-inch pots, and potted firmly. When these are well filled with roots, give liquid manure twice a week. Some of the species will require more frequent shifting than above, according to size and habit. *Celosias* are very liable to the attacks of red-spider and thrips; frequent syringing is the best method of keeping these in check. *C. pyramidalis* is used for summer-bedding, the plants being grown in pots till June, when they are planted in a sunny bed or border outside.

Description of *Celosia cristata*, the Common Cockscomb; upper part
Plate 229. of fasciated stem (var. *fasciata*) with flower-heads, natural size. Fig. 1, unexpanded flower, surrounded by coloured bracts; 2, expanded flower; 3, section of Fig. 2; 4, seed, natural size and enlarged; 5, seedling.

IRESINES

Natural Order AMARANTACEÆ. Genus *Iresine*

IRESINE (Greek, *eiros*, wool, or *eiresione*, olive branches bound with wool; in allusion to the woolly appearance of the stems). A genus of about eighteen species of erect herbs and sub-shrubs, with stalked, opposite leaves, and inconspicuous white or greenish flowers, each with three bracts, as in the preceding genera. The perianth consists of five segments; there are five stamens, and the fruit is a one-seeded utricle like that of *Amarantus*, but not splitting open. The inflorescence is a loose panicle, a dense head, or a spike. The species are natives of the warmer parts of America and Australia.

Principal Species. IRESINE FORMOSA (beautiful). Believed to be a sport from *I. Lindenii*, and useful alike for bedding or for conservatory and table decoration. Leaves golden, veined with crimson and pencilled with green. Introduced 1883.

I. HERBSTII (Herbst's). Stem bright carmine, 12 to 18 inches high. Leaves somewhat heart-shaped, upper surface deep crimson or maroon, the midrib and larger veins margined with a lighter tint; under-side deep

crimson. Introduced from South Brazil, 1864. There are a number of garden varieties. The var. *acuminata* has the leaves drawn out to a long sharp point, as shown in Plate 230A. The var. *aureo-reticulata* has green leaves, veined and blotched with yellow; the stems, leaf-stalks, and parts of the midrib, and the under-surface sometimes, stained with crimson. Plate 230B.

I. LINDENII (Linden's). Stems branching, deep blood-red. Leaves narrow-oblong-lance-shaped, dark blood-red with a central band of amaranth, flat and glossy. Whole plant very handsome and robust, bearing cutting or pegging down to any height for bedding purposes. Introduced from Ecuador, 1868.

Cultivation. *Iresines* are tender plants, requiring a warm house for growth, and for protection through the winter; but of the greatest value for outdoor bedding during the summer, with *Coleus* and similar subjects. Their rich glowing leaf-colours afford fine contrasts, not only with other foliage plants, but also with many flowering plants. They are propagated by cuttings, which root readily, but, where a large number of plants are required for bedding, preparations must be made in advance, and a first batch must be rooted in August. These may be put into sandy loam in five-inch pots, and struck in a close frame. When rooted, these should be put near the glass in the greenhouse, and kept rather dry to keep them as short as possible. The winter temperature should be about 55°. In early spring they should be transferred to warmer and moister quarters, and water should be given at the roots. This will cause a number of shoots to break from each, which will soon become large enough to take off and use as cuttings. These should now be struck in gentle heat, and about the beginning of June, if the weather is genial, they may be planted out in the beds as required. If planted out earlier than this they are liable to destruction by a late frost. When the cuttings are inserted, they should be placed very near the glass, and kept shaded until they are rooted; afterwards they must have all the light they can get, as the brilliance of their leaf-colour will depend very largely upon this. Certainly, the richness of the reds cannot be developed where there is shading during the growing period. During the time these plants are in the house they must be examined frequently for green-fly and red-spider, and in the event of these appearing, immediate steps must be taken to destroy the pests before they can spread; fumigation and frequent syringing are the best means to employ against these enemies.

Description of *Iresine Herbstii*: A, var. *acuminata*; B, var. *aureo-*
Plate 230. *reticulata*.

ALTERNANTHERAS

Natural Order AMARANTACEÆ. Genus *Telanthera*

TELANTHERA (Greek, *teleios*, complete, and *anthera*, anthers). A genus of perennial herbs, with small opposite leaves of various colours, and inconspicuous flowers in axillary heads. The flowers are similar in general structure to those of the last genus. The perianth is five-parted, the five stamens are united at their base, and alternate with five barren filaments. The globose ovary is one-celled, and contains but one ovule. The fruit also is one-seeded, and does not split open when ripe. The species are natives of Tropical countries.

History. Alternantheras are recent introductions to our gardens.

Plants with this name were introduced in the early part of the eighteenth century, and at intervals since; but these have passed out of cultivation, and their place has been taken by other plants of the genus *Telanthera*. To these later arrivals gardeners persist in attaching the name of those they have succeeded; but though we have taken Alternanthera as the popular or garden name, we are compelled to retain them under the genus *Telanthera*. Most of those now grown are Brazilian plants, and of these *T. bettzichiana* was introduced in 1862, *T. amœna* and *T. versicolor* in 1865, and *T. amabilis* in 1868. They are grown solely on account of their coloured foliage.

Principal Species. TELANTHERA AMABILIS (lovely). Stems branched. Leaves elliptic, greenish, stained with red and yellow; under good treatment rose and orange tints prevailing over the green. The var. *tricolor* is more brightly coloured. The leaves are broadly oval with bright rosy centre, between which and the dark green margin there is a band of orange-yellow; the veins are purple.

T. AMÆNA (charming). A neat little plant about 6 or 8 inches high, with spreading branches forming dense tufts, and small, spoon-shaped leaves tinted with orange, red, purple, green, and bronze. Plate 231A.

T. BETTZICHIANA (Betzich's). Leaves spoon-shaped, olive-green streaked with pink and coppery red. The var. *spathulata* has longer leaves of reddish pink and light brown, shaded with bronze and green.

T. FICOIDEA (Fig-like). Leaves lobed, variegated with green, rose, and red.

T. PARONYCHIOIDES (Paronychia-like). Stems branched and tufted, about 4 inches high. Leaves narrow-spoon-shaped, deep orange-red



COCK'S-COMB
(CELOSIA CRISTATA)

Nat. size

PL. 229

ground shaded with olive-green. The var. *magnifica* similar to the type, but with the leaves more strongly and brightly coloured. The var. *major* has bronze leaves with rich orange tips. The var. *major aurea* has the foliage permanently coloured a fine golden yellow.

T. VERSICOLOR (various colours). This is a larger species, the stems as much as a foot high, with many branches. The leaves are oval, streaked with dark coppery red and bright pink, shaded with green and bronze. Plate 231B. The var. *grandis* is larger and of stronger habit.

Cultivation. Speaking generally, the treatment of *Telanthera* should be similar to that prescribed for *Iresine*. They may be grown in pots for greenhouse or conservatory decoration, but are chiefly used for bedding purposes, and consequently propagated on an extensive scale. For growth, then, as pot-plants we refer the reader back to *Coleus*, whilst we devote our space to the methods for raising *Telantheras* in quantity. Let it be understood that, as in the case of the richly-coloured foliage plants, an essential condition of obtaining fine colour is the supply of abundant light and sufficient heat to develop it, otherwise ordinary greens will take the place of the yellows and crimsons. As suggested in the case of *Iresines*, robust and sturdy plants should be prepared about August, and kept dry through the winter to provide the requisite number of shoots when started into active growth in spring. At the beginning of April a hot-bed should be made up of leaves and stable-manure that will give a temperature of a little over 80° for several weeks, and keep the cuttings just under the glass. The hot-bed should be covered—when the first extreme heat has subsided to about 85°—with a compost of sandy loam and rotted manure in equal portions, and upon this a thin layer of silver-sand. The whole is now pressed down with boards until it is moderately firm and level. Now put in the cuttings one inch apart, cover with the lights, and over these put mats or boards to keep off the sun until the first roots are thrown out. During this time—only a few days—the close, moist heat must be kept in, but afterwards the shading may be gradually withdrawn until full sunlight falls upon them, and ventilation is as gradually increased until, midway in June, when the outside temperature will be equal to that of the frame, the young plants should be sturdy, of good colour, and sufficiently hardened for planting out in sheltered sunny beds. The frame-bed should be broken carefully, and the plants, each with its roots and soil intact, placed in wooden trays, and taken off to the beds as required. With ordinary care this operation may be performed—if an overcast day is chosen—without the plants showing the least sign of flagging. If

small quantities only are required, these may be raised from cuttings inserted in pots of light soil and placed in a close warm frame till rooted.

Description of A, *Telanthera amoëna*; the small white flowers form **Plate 231.** a terminal cluster. Fig. 1 is one removed from this cluster before expansion; 2 is a section through the expanded flower. B is a shoot of *T. versicolor*.

GLOBE AMARANTHS

Natural Order AMARANTACEÆ. Genus *Gomphrena*

GOMPHRENA (altered from *Gromphœna*, the classical name for a species of Amaranth). A genus comprising seventy or more herbs, annuals, biennials, and perennials, with opposite, entire leaves, sometimes partially stem-clasping. The flowers, which are associated in loose spikes, panicles, or globular heads, consist of a five-parted perianth, five stamens, the filaments united to form a tube, within which is the one-celled ovary; fruit, a one-seeded utricle; the whole enclosed within the coloured bracts. The species are natives of Tropical America, where they chiefly abound, Australia, and one species is widely distributed through Asia and Tropical Africa.

History. The best known species of *Gomphrena* is the pretty annual, *G. globosa*, which was introduced from India in 1714, and has continued in favour ever since. It owes its popularity not to its flowers, but to the persistent coloured bracts, which give the flower-heads the character of an "everlasting" if they are gathered before quite fully mature, and dried in the shade. *G. perennis* was introduced from South America in 1732, and *G. pulchella* from Brazil in 1843. These are the principal species in cultivation.

Principal Species. GOMPHRENA GLOBOSA (globose). Stems jointed, coloured, 1½ foot high. Leaves oblong, downy. The flower-heads in the type are purple, with a two-leaved involucre, but there are many varieties, and in most cases their names are indicative of the colour of their flower-heads. Thus, *alba*, white; *aurea superba*, golden yellow; *carnea*, flesh-coloured; *Isabellina*, brownish yellow; *purpurea*, purple. The var. *nana* is dwarf, not half the height of the type, but forming a little bush with dark red flower-heads. All these are annual, and flower from July to October. Plate 232.

G. HAAGEANA (Haage's), differing from the foregoing in the thicker



IRESINE HERBSTII

(A) *var. acuminata* (B) *var. aureo-reticulata*

Nat. size

PL. 230

bracts and the orange-yellow heads. Introduced from Mexico. Also known as *G. aurantiaca*.

G. PERENNIS (perennial). Stems 2 feet high. Leaves lance-shaped. Flower-heads pale yellow, with a two-leaved involucre; July to October.

G. PULCHELLA (fair). Stems 1½ foot high. Leaves lance-shaped. Flower-heads with involucre of many leaves; rather smooth, rosy, on long flower-stalks; July.

Cultivation. *Gomphrenas* like a light but rich soil, and in most respects should be treated as though they were Cockscombs. Seed should be sown on a hot-bed in March, either in a layer of special compost above the heating material, or in pots or pans plunged in it. Germination takes place in a week or ten days, and when the seedlings are about an inch high they should be pricked out, three or four inches apart, in a new hot-bed, or in the same if the heat is sufficient, shading them until re-established, and keeping them moist. As soon as the roots have again got hold of the soil give more light and more air. After being here three or four weeks they may be potted without disturbing the soil around the roots, and grown on with frequent waterings and fresh air to gradually harden them. In June, during genial days, fully expose them, and thereafter they may be used for the outdoor decoration of windows, terraces, vases, for bedding purposes, or for the conservatory. For the ripening of seed it is as well to take up a few of the best plants in August, potting them, and removing them to a frame or greenhouse to protect them from cold nights and too much wet. *G. haageana* is more delicate than the other species, and must be given a more sheltered position if used outside.

Description of *Gomphrena globosa*, the Globe Amaranth, natural
Plate 232. size. Fig. 1 is a section through the entire flower-head; 2 is a single flower with its coloured bracts; 3, the same with the bracts removed; 4, a section through the staminal tube; 5, the seed, natural size and enlarged; 6, a seedling.

GARDEN BEETS

Natural Order CHENOPODIACEÆ. Genus *Beta*

BETA (origin uncertain, but said to be from the Celtic, *bett*, red). A genus of about nine species of herbs with fleshy roots, and almost entire leaves. The flowers are very small, greenish and inconspicuous, in spikes or

cymes from the axils. They consist of a pitcher-shaped perianth, five stamens, an ovary sunk in the disk, with a short style and two to four stigmas. The species are natives of Northern Temperate Europe and Asia; one British.

History.

The wild *Beta maritima* of our own seashores is believed by some to be the raw material from which the Garden Beet and the Marigold Wurzel have been evolved. Some species of the wild plant exhibit a strong purple, others a yellowish green coloration of their roots and leaves, which appears to indicate how the two races have originated. By others the South European *B. vulgaris* is considered not as an intermediate stage in this evolutionary process, but as a distinct species, cultivated from early times. The Romans grew it of old and esteemed it as food; probably they brought it with them when they annexed Britain, but if so, its cultivation became a lost art for the record of its introduction gives the date as 1548, though it is not known to have been really in cultivation here until about a hundred years later. But, of course, with *Beta* as a culinary or agricultural root we have nothing to do here; our connection with it is as a foliage plant, its flowers being horticulturally beneath notice. The Sicilian Beet, *B. cicla*, and its variety known as Chilian Beet, are largely used where fine-coloured and bold foliage is required, as in Sub-tropical gardening.

Principal Species.

BETA CICLA (Sicilian) has very small roots, but fine large leaves with broad, thick midribs, 6 feet high. The form commonly known as the Chilian Beet is the var. *variegata*, with beautifully variegated, erect leaves 3 or 4 feet long, a foot wide, and with orange or scarlet midribs.

BETA HORTENSIS METALLICA (metallic Garden Beet) is known as the Victoria Beet. This is more largely used than the former in general bedding. The leaves are of a fine deep blood-red with a metallic lustre, and the roots are large and edible.

Cultivation.

Beets succeed best in a light sandy soil in an open sunny spot. Seed should be sown in the seed-bed in April, and transplanted to the beds where desired for ornament. They attain their full foliage in August and September. Where such strains as the Victoria Beet and Dell's Crimson are employed the roots may be used for the table at the end of the season—an admirable combination of the ornamental and the useful. Where a straight row is desired, as in carpet-bedding, it will be found best to sow in the permanent position and thin out the seedlings to the required distance. Where there is plenty of room these look well if planted in masses; where space is more limited it is better to plant single specimens at some distance from each other.



(A) TELANTHERA AMÆNA

(B) TELANTHERA VERSICOLOR

Nat. size

BOUSSINGAULTIAS

Natural Order CHENOPODIACEÆ. Genus *Boussingaultia*

BOUSSINGAULTIA (named in honour of M. Boussingault, a French chemist). A small genus of half-hardy tuberous-rooted plants, of which one species is grown for hanging baskets in the greenhouse or for climbing over a trellis in a warm situation. This is the *Boussingaultia baselloides* (Basella-like), with a twining or trailing red-tinted stem, 20 to 25 feet long, alternate, shining, fleshy, heart-shaped leaves, and fragrant, small white flowers (afterwards turning black), produced in clusters at the end of autumn. This is a very desirable plant on account of its rapidity of growth, which enables it to cover considerable space in little time. If it is grown outside, the tubers must be taken up in October and stored in a dry place like those of *Dahlias*, starting them again in spring, but not planting out of doors until the end of May. A number of small tubercles are produced on the stem, and if these are carefully separated (they are very brittle) they may be used for propagating. It requires a rich sandy soil containing a considerable proportion of leaf-mould, and should be given a sunny position. It is a native of South America. Introduced 1835.

B. LACHAUMEI (Lachaume's) is a stove species, from Cuba (1872), which produces its rosy flowers at all seasons, and pretty constantly.

CASTOR-OIL PLANT

Natural Order EUPHORBIACEÆ. Genus *Ricinus*

RICINUS (Latin, a tick; the peculiarly mottled seed being thought to resemble a tick). A genus consisting of one or two species of small trees, though in this country climatic considerations necessitate their growth as annual herbs. They have succulent, jointed stems, and large, palmately-divided, alternate leaves, the divisions being lance-shaped. At the junction of these divisions with the leaf-stalk there is a saucer-shaped gland. The flowers are disposed in a terminal spike, and are of two kinds; the upper female, the lower male. Each has a green perianth; that of the males consists of five segments enclosing a large number of anthers, their filaments united in several bundles; the perianth of the female flowers is three-parted, the ovary is three-celled, spiny, ending in

a forked style and six stigmatic branches. The fruit is three-celled, each cell containing one seed, which is somewhat flattened, oval-oblong, mottled with black, brown, and grey. They are natives of Tropical Regions.

History.

Ricinus is of particular interest on account of its seeds being the raw material from which the delectable Castor-oil is expressed. For this purpose the plant is largely cultivated in India, whence most of our Castor-oil is obtained. The plant was introduced from the East Indies in 1548; and is now largely used in Sub-tropical gardening, or in situations where rapid summer growth and handsome foliage are desirable. Several varieties have been introduced at subsequent dates as distinct species, but there is little doubt—in most cases no doubt whatever—that these are all forms of *Ricinus communis*.

Species.

RICINUS COMMUNIS (common). Castor-oil Plant, or Palma Christi. Stem 4 to 6 feet high in this country, taller elsewhere. Leaves large, handsome, palmately-lobed; leaf-stalk in the middle (*peltate*), lobes toothed. Flowers green, the males appearing yellow on account of the profuse anthers; July to October. There are several varieties, among them the var. *major* with hollow, glaucous stems 6 to 8 feet high, and tinged with purple; the leaves acutely lobed. The var. *minor* is similar, but only half the height and with smaller leaves. Var. *sanguineus* has brownish red stems, leaf-stalks, and perianths. The var. *Gibsonii* has the leaves of a bronzy purple hue.

Cultivation.

Ricinus will grow well in any well-manured soil. They are propagated by means of seeds, which should be sown in heat in March. Only one seed should be sown in each pot, which should then be placed in the hot-bed. The young plants must be kept under glass and well-watered to encourage free growth, and at the end of May or beginning of June, according to the season, gradually hardened by the admission of more air until they can be safely planted out permanently. It will be found advisable to give at least one shift into larger pots whilst still inside. By the system of growing singly in pots it will be found that they suffer no check on being planted out, but will grow rapidly. They may also be sown outside in a warm sunny spot about May, but will not attain any great size before the frosts cut them down. Any rough place in the garden may be beautified by planting a clump of *Ricinus*, putting in the young plants about two feet apart. They also look well at the back of a sunny shrubbery border.

Description of

Ricinus communis, the Castor-oil Plant; upper portion of stem, and flowers. The words "Natural size" refer to the flower-spike to the right of the plate; the leaves are much



GLOBE AMARANTH
(GOMPHRENA GLOBOSA)

Nat. size

PL. 232

reduced. Fig. 1 is a cluster of anthers detached from a male flower; 2 is a separated female blossom; and 3 is a section through the same.

SPURGES

Natural Order EUPHORBIACEÆ. Genus *Euphorbia*

EUPHORBIA (the classical Greek name; according to Pliny, so named in honour of Euphorbus, physician to King Juba, of Mauritania). An enormous genus comprising about six hundred species of trees, shrubs, and herbs, including stove, greenhouse, and hardy subjects. The leaves are usually alternate. The flowers are very singular, unisexual, the perianth wanting, or, if present, very minute. The male flowers consist of a single stamen on a flower-stalk. The female flowers consist of an ovary on a footstalk which lengthens; the stigma is divided. One female flower and several males are grouped together within an involucre which is four- or five-lobed, and bordered by marginal glands, which appear like petals or calyx-lobes. The fruits are three-celled capsules. The species are distributed throughout all regions except the Arctic; twelve species are British, and a thirteenth is naturalised here.

History. Comparatively few members of this extensive genus are suitable subjects for the gardener, and some even of these not so much on account of their flowers as of their peculiar shapes and near resemblance to species of *Cactus*. The genus is noted for its milky juice, usually acrid, and in many cases highly poisonous. This varies greatly in the different species, that from some being used medicinally, from others for poisoning arrows and killing fish, whilst from others again it furnishes products useful in the arts and as food. The powerful drug Euphorbium, now little if ever used on account of its violent and dangerous character, is the solidified juice of certain of the succulent, leafless species. *Euphorbia cattimandoo* furnishes caoutchouc. In some of the species the involucreal bracts, instead of being of the prevailing green hue, are brightly coloured, and this is the case with those chiefly cultivated. Among these may be mentioned *E. cyparissias*, a Continental species which has long been naturalised in Britain; *E. Characias*, *E. aleppica*, and *E. pilosa*, all hardy species. Among those suited for greenhouse culture are the following:—*E. Myrsinites*, from South Europe, 1570; *E. meloformis*, a curious succulent, introduced from South Africa, 1774; *E. atropurpurea*, from Teneriffe, 1815; *E. splendens*, from the Isle of Bourbon, 1826; *E. pulcherrima*, from Mexico, 1834; *E. fulgens*, also

from Mexico, two years later; and *E. Monteiri*, from Bahia, 1864. *E. abyssinica*, *E. canariensis*, and *E. chandelabrum* are the most striking of the large Cactus-like species.

Principal Species. EUPHORBIA ALEPPICA (Aleppo). Stem 1 foot high. Leaves slender, crowded. Bracts yellow, in dense terminal heads; July and August. Herbaceous perennial. Introduced from Crete, 1739.

E. ATROPURPUREA (dark purple). Stem 3 to 6 feet high. Leaves blunt-lance-shaped, glaucous, spreading or drooping. Bracts deep reddish purple; March. Evergreen greenhouse shrub.

E. CYPARISSIAS (Cypress-like). Cypress Spurge. Stems 1 to 2 feet high. Leaves very narrow, somewhat glaucous and crowded. Bracts numerous, somewhat heart-shaped, yellow; June and July. A hardy perennial.

E. FULGENS (glittering). Stem 4 feet high. Leaves lance-shaped. Bracts bright orange-scarlet, in axillary clusters; winter. Stove perennial. Generally known under the name of *E. jacquiniflora*. Mexico.

E. MONTEIRI (Monteiro's). Stem branching, 3 to 6 feet high. Leaves narrow-spoon-shaped, fleshy. Bracts green. Stove perennial.

E. MYRSINITES (Myrsine-like). Stem prostrate. Leaves fleshy, concave, stalkless. Bracts oval, yellow; July. Evergreen hardy herb.

E. PILOSA (hairy). Stem 18 inches high. Leaves narrow-oblong. Bracts greenish yellow, in dense terminal tufts; May to August. An evergreen perennial herb. Introduced from Siberia, 1758.

E. PULCHERRIMA (most beautiful). Stems woody at base, 2 to 6 feet high. Leaves oval-elliptical, stalked. Bracts large, vermilion; winter. Stove shrub, better known as *Poinsettia pulcherrima*. There is a variety with white bracts.

E. SPLENDENS (splendid). Stems dark, branching, thickly armed with long, stout thorns, 4 feet high. Bracts waxy-looking, bright red; almost continuously flowering. Stove perennial. Isle of France.

Cultivation. Hardy species of *Euphorbia* grow readily in a dry border in any garden soil, and may be increased by cuttings, or divisions of the roots. The stove species, though perennial, give best results when cuttings are struck afresh every few months and the oldest of the flowered plants thrown away. By this method a succession of healthy young plants with a good terminal head of flowers and bracts may be secured. A suitable compost for pot-culture may be contrived thus: turfy loam, two parts; dried cow-manure, one part; leaf-mould, one part. The cuttings should be taken close to the old wood, in June, inserted singly in small pots, and placed in a close propagating frame, and after rooting, grown on without stopping the shoots, near



CASTOR-OIL PLANT
(*RICINUS COMMUNIS*)

Nat. size

PL. 233

the glass on a spent hot-bed or in a sunny frame. When the bracts and flowers appear manure-water should be given. These plants are very sensitive to sudden changes of temperature, whether to higher or lower, and should be protected from them. After flowering water should be withheld, the plants kept as dry as possible, and allowed a three months' rest, after which they may be subjected to increased heat, and watered. The young shoots will soon appear, and may be taken off for use as cuttings.

ACALYPHAS

Natural Order EUPHORBIACEÆ. Genus *Acalypha*

ACALYPHA (the classical name used by Hippocrates for the Nettle). A genus of about two hundred and twenty species of annual or perennial shrubby plants whose leaves give them a strong resemblance to Nettles. The green or reddish flowers are small and inconspicuous, arranged in erect or drooping spikes from the axils of the leaves and the tips of the shoots. As in *Euphorbia*, the male and female elements are in separate flowers. The species are distributed all over the Tropical and Sub-tropical Regions. Those named below are all from Polynesia, and are grown on account of their richly variegated leaves. They are largely grown in gardens in Tropical countries.

Principal Species. ACALYPHA MACAFEEANA (Macafee's). Leaves oval, red blotched with bronzy crimson. Introduced 1877.

A. MACROPHYLLA (large-leaved). Leaves heart-shaped, russet-brown with paler spots.

A. MUSAICA (mosaic). Leaves bronzy green variegated with orange and dull red. Introduced 1877.

A. OBOVATA (reversed oval). Leaves at first green with creamy margin, then olive with pink margin, finally bronze with broad margins of rosy crimson. Introduced 1884.

A. SANDERIANA (Sander's). A shrub with large green cordate leaves and long tail-like axillary racemes of rich red flowers. A recent introduction from the East Indies.

A. WILKESIANA (Wilke's). Leaves oval, coppery green, blotched, mottled and splashed with red and crimson. Introduced 1866. The var. *marginata*, introduced 1875, has larger olive-brown leaves with rosy-carmine margin.

Cultivation. *Acalyphas* succeed well if potted in a compost of loam and peat, and given ordinary stove treatment. They are

propagated by cuttings taken in April, inserted in sandy soil, covered with a bell-glass and stove temperature maintained. They colour well only when grown in a sunny position.

CROTONS

Natural Order EUPHORBIACEÆ. Genus *Codiaeum*

CODIÆUM (from *Codebo*, the Malayan name for one species). A genus of four species of stove evergreen shrubs with the leaves magnificently coloured and often of singular form. The flowers are green and inconspicuous, the sexes distinct, in separate racemes on the same plant. The males have a calyx of five divisions, five small petals and numerous stamens. In the female flowers the calyx, though similar, is smaller, the petals are absent, but there is a three-lobed ovary with a three-branched style. They are natives of Malaya, the South Pacific Islands, and Australia.

Principal Species. **CODIÆUM PICTUM** (painted). Stem 4 feet high. Leaves oblong, 6 to 9 inches long, rich crimson, irregularly spotted and blotched with bright green and black. Introduced from the Moluccas, 1810. The cultivated forms of *Codiaeum* (usually set down in trade catalogues as *Croton*) are exceedingly numerous. They are all varieties of *C. pictum*. As this work is chiefly concerned with plants cultivated for the sake of their flowers, we cannot afford space even for a selection of these. There is great variety of form with endless diversity of marbling and mottling.

Cultivation. The wonderful variety referred to as the product of one species is largely due to the popularity of the plants in all countries where Tropical plants can be cultivated. In the gardens of the Tropics they fill an even larger place than Aucubas and Laurels do here. Many of the varieties have originated in European gardens.

They require to be grown in a hot moist house, and to be exposed to full sunshine except during the hottest part of the day. In winter they require a temperature ranging between 60° and 70°. The most suitable soil is fibrous loam to which sufficient sand has been worked in to make it open. When grown specimens are intended for conservatory or room decoration they must be hardened very gradually, or the leaves will drop off—the usual effect of a sudden change of temperature on these plants. Small plants for table decoration should be grown with unbranched stems, and are produced by striking the tops of leading shoots.



INDIA-RUBBER PLANT
(*FICUS ELASTICA*)

$\frac{1}{2}$ Nat. size

PL. 234

FICUSES

Natural Order URTICACEÆ. Genus *Ficus*

FICUS (the classical Latin name for the Fig, *Ficus Carica*). A genus of about six hundred species of trees and shrubs, usually subjects for the stove or greenhouse. In most cases the leaves are alternate, but very variable in shape. The sexes are in separate flowers, though a considerable number of each are clustered round the inner surface of a hollow, globular or pear-shaped body, the opening of which is closed with small scales. The upper flowers are males, the lower females. The species occur in all Tropical Regions, but are specially plentiful in Asia.

History. *Ficus Carica*, which produces the Fig of commerce, has been in cultivation from the most remote period of antiquity. It is believed to have been introduced to Britain at an early date, of which, however, we have no record. It is said to have been reintroduced by Cardinal Pole from Italy in 1525, when several trees were planted at Lambeth Palace, of which the present specimens there are probably the direct descendants. But for our present purpose we have no concern with fruit-trees as such, and must confine our attention to those species of *Ficus* that are suitable for pot or greenhouse culture. These are not of ancient date in this country. The earliest of these to be cultivated here appears to have been *F. stipulata* (*repens*), which was introduced from China in 1721. The Peepul, *F. religiosa*, came from India in 1731; the India-rubber, *F. elastica*, from India in 1815; *F. dealbata* from Peru in 1867; *F. macrophylla*, the Australian Banian, from Queensland in 1869; *F. Parcelli* from Polynesia in 1874; *F. exsculpta* from the South Seas in 1879. The Banian of India is *F. indica*, which is to be seen in botanical collections. Some of the species are remarkable for their manner of growth, the stems and roots encircling large tree-trunks with a thick interlacing growth which finally strangles the tree. They are called *Bois Matador* (tree-killer) in South America.

Principal Species. FICUS BARBATA (bearded). Stems creeping and rooting after the manner of Ivy. Leaves heart-shaped, 3 inches long, the edges bearded with long brown hairs. Stove.

F. COOPERI (Cooper's). Leaves dark, oval, a foot or more long. Stove or greenhouse.

F. DEALBATA (whitened). Leaves elliptic, a foot long, leathery, covered beneath with dense white silky hairs. Greenhouse.

F. ELASTICA (elastic). India-rubber Plant. Leaves 6 to 18 inches long, long-oval, leathery, of a beautiful dark lustrous green, paler beneath. Plate 234. There are several variegated varieties, of which the best is *foliis aureo-marginatis*, which has a golden-yellow margin to the leaves, an inch broad. Warm greenhouse.

F. MACROPHYLLA (large-leaved). Australian Banian, or Moreton Bay Fig. Leaves like those of *F. elastica*, but thinner and less glossy, veins slightly raised. Greenhouse.

F. PARCELLI (Parcell's). Leaves oblong, saw-toothed; bright green blotched with darker green, and white. Stove.

F. RELIGIOSA (religious). Peepul. Leaves somewhat heart-shaped, with a long-drawn-out terminal point. Stove.

F. STIPULATA (having stipules). Leaves small, roundish, dark green. Stem climbs walls, attaching itself after the manner of Ivy. Greenhouse. Also known as *F. repens*. *F. minima*, usually described as a distinct species, is merely a form of this.

Cultivation. These plants are very easy to grow under the proper conditions of temperature. A suitable compost can be made by taking three parts of sandy loam and one of leaf-mould and well incorporating them. The pots should have a good layer of drainage material. The greenhouse species may all be used during the summer for outdoor gardening. For this purpose *F. elastica* is certainly the best, and the pots should be sunk in the earth. It is also frequently grown in town apartments amid dust and gas, but provided it is well-supplied with water and the leaves frequently syringed or sponged, it flourishes there and makes an admirable ornament for the window or table. It must, however, have good light, and be kept in a warm room in winter or the leaves will fall. Whilst these are small it is well to keep the one straight, unbranched stem; but as they get larger a more bushy habit may be secured by nipping out the terminal shoot, and this process may be repeated with the branches when they have attained sufficient length. In the Tropics it forms a large Oak-like tree. It is the source of Bengal India-rubber. All the species will thrive in comparatively small pots provided they have abundant watering; there is little danger of giving them an injurious quantity. Propagation is effected by means of cuttings. These should be taken off of good length, as these root more readily than short pieces. In the case of *F. elastica* and other woody species the cuttings should be formed of lateral shoots when about 6 inches long. The climbing species should be used for covering inside walls, where they present an ever-fresh appearance.

Description of
Plate 234. Upper portion of a plant of *Ficus elastica*, the India-rubber Plant, about one half the natural size. The lower eaves would, of course, be much larger in proportion.

Beyond the Natural Order URTICACEÆ lie the Orders CUPULIFERÆ, SALICINEÆ, and CONIFERÆ, together comprising about nine hundred species of trees. The flowers of these trees are almost without exception inconspicuous, and therefore outside the scope of the present work. But inasmuch that they are extensively used in all but the smallest of gardens, we cannot quite pass so important a group without any reference to it. The Order CUPULIFERÆ includes the genera *Betula*, the Birch; *Alnus*, the Alder; *Quercus*, the Oak; *Fagus*, the Beech; *Corylus*, the Hazel; and *Carpinus*, the Hornbeam. The Order SALICINEÆ consists of two genera only: *Populus*, the Poplars, and *Salix*, the Willows and Sallows. The CONIFERÆ contains no less than thirty-three genera and over three hundred species, including the various classes of Pines, Firs, Larches, Cypresses, Yews, Thujas, Sequoias, etc. These trees are of the greatest importance where there are pleasure-grounds or parks attached to the garden, and for use in landscape gardening. A solitary illustration of this Order will be found at the beginning of Volume IV. —a species used for conservatory decoration—but beyond this we cannot go in the present work.

END OF VOLUME III.

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